

**THREATENED, ENDANGERED, AND NONGAME  
BIRD AND MAMMAL INVESTIGATIONS**

**Wyoming Game and Fish Department  
Nongame Program  
Biological Services Section  
Wildlife Division**

**Annual Completion Report**

**Period Covered:  
15 April 2008 to 14 April 2009**

**Edited by: Andrea Orabona**

**September 2009**

The Wyoming Game and Fish Department receives Federal financial assistance from the U.S. Fish and Wildlife Service. Under Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972, the U.S. Department of the Interior and its bureaus prohibit discrimination on the basis of race, color, national origin, age, disability, or sex (in educational programs). If you believe that you have been discriminated against in any program, activity, or facility, or if you desire further information, please write to:

The U.S. Fish and Wildlife Service  
Office for Diversity and Civil Rights Programs – External Programs  
4040 North Fairfax Drive, Suite 130  
Arlington, VA 22203

## PREFACE

Most Wyoming residents and visitors know and cherish the thought of the State being rich in wildlife diversity. There is strong public interest in wildlife conservation and, along with that interest, are high expectations. A national survey by the U.S. Fish and Wildlife Service found that, in addition to \$138.5 million associated with hunting and \$373.6 million for fishing in 2006, \$392.5 million was added to Wyoming's economy by wildlife watchers. The State is also rich in other natural resources such as livestock forage, timber, and a variety of minerals, all of which contribute greatly to Wyoming's economy. Sometimes the best management of one resource can conflict with the needs of another. Or, worse yet, unknown effects and concerns can sway public opinion and prevent implementation of desired management.

Fortunately, the operating budget of the Wyoming Game and Fish Department (Department) was increased significantly in 2008 by the State Legislature and Governor Dave Freudenthal to boost data collection and strengthen management for Wyoming's nongame species, particularly those considered sensitive. In the past three biennium budget sessions, the Legislature and the Governor have been instrumental in funding wildlife conservation programs such as the Department's Veterinarian Services, the Sage-Grouse Program, and the Wyoming Natural Resources and Wildlife Trust. Their recent funding of nongame efforts is a significant and progressive expansion of their support for natural resources in Wyoming. The expectation that accompanies such welcomed funding is to develop the information base and expertise to allow for effective decision making associated with resource management and to avoid unnecessary conflicts and restrictions.

These new expectations are similar to the expectations associated with the Department's past portfolio of funding sources for nongame, but they are more targeted. In the past, the Department's nongame efforts were funded primarily by user fees collected from hunting and fishing. Most of the hunting and fishing public recognizes that sound management of nongame fish and wildlife helps provide additional support for maintaining functioning ecosystems for game species. Yet, for most of us, there is a limit to how much should be spent on a concept. So, there have been a number of efforts over the past two decades at both the national and the state level to find alternate funding for nongame species conservation. Many of the same individuals contributing to Wyoming's economy through expenditures associated with wildlife watching were, no doubt, involved in intense national lobbying efforts to develop this nongame funding.

In response to these efforts, Congress established the federally funded State Wildlife Grants (SWG) program in 2000. Since then, the Department has received nearly \$6 million of SWG funds to address species that have received little attention to-date, and to collect information that may provide an early warning of species heading for a potential listing under the Endangered Species Act. Most states tended to focus SWG projects on species that would grab the attention of supporters and Congress establishing (or slashing) federal budgets on an annual basis. But, the expectations associated with SWG also extend to species like the pika or Harlequin Duck that are high on the interest scale for wildlife watchers but have little potential for conflict with other resource users because of the habitats they occupy in the State.

During the early years of SWG funding, we tended to focus on planning efforts that produced documents such as the Trumpeter Swan Habitat Enhancement Project, Wyoming Bird Conservation Plan, A Plan for Bird and Mammal Species of Greatest Conservation Need in Eastern Wyoming Grasslands, and A Comprehensive Wildlife Conservation Strategy in Wyoming. The latter planning document, approved in 2005, provides guidance for development of more recent SWG proposals and is currently being updated as the 2010 State Wildlife Action Plan. We have used SWG funding to develop and implement inventory methods for sensitive species, such as Harlequin Duck, black-tailed prairie dog, and white-tailed prairie dog. We have also used SWG to collect additional information on several species of bats, Canada lynx, pygmy rabbit, swift fox, and wolverine. Recent SWG projects also include initial inventories of raptors in the Wyoming Range and small mammals in southwest Wyoming.

The new funding provided by the Wyoming State Legislature and Governor Freudenthal has greatly enhanced our ability to collect information on Species of Greatest Conservation Need. In addition, the new funding has allowed money generated from hunting and fishing to revert back into Department resources for more traditional wildlife uses, delaying the need for increased license fees. Permanent personnel continue to develop and implement federally funded projects. However they are in a balancing act to produce products past supporters continue to expect, but also expand the focus to meet expectations associated with new State funding. Our current funding base certainly influences our priorities. Not only is State funding allowing us to greatly increase our knowledge of Species of Greatest Conservation Need distribution and abundance, but it is also allowing us to expand our understanding of what is needed for effective and proactive management of those species. Examples of some of this expanded effort include hiring contract biologists to conduct inventories of American Bitterns, colonial nesting waterbirds, Yellow-billed Cuckoos, black-footed ferrets, and bats. This funding has also allowed us to work closely with other entities, such as the University of Wyoming, Audubon Wyoming, the Rocky Mountain Bird Observatory, and private contractors, as well as interested volunteers, to implement projects that will provide population status and trend information on additional Species of Greatest Conservation Need, such as the Ferruginous Hawk, Preble's meadow jumping mouse, and Wyoming pocket gopher. Finally, we have also had the opportunity to implement funds provided by the U.S. Fish and Wildlife Service for several additional projects, including a collaborative survey effort for Northern Goshawks in the Wyoming Range and a study to determine the potential effects of energy development on raptor populations in Wyoming.

## TABLE OF CONTENTS

|  | PAGE |
|--|------|
| INTRODUCTION .....   | 1    |
| THREATENED AND ENDANGERED SPECIES.....   | 2    |
| Spotlighting for Free-ranging Black-footed Ferrets in the Shirley Basin/Medicine Bow<br>Management Area, Wyoming .....                     | 3    |
| SPECIES OF GREATEST CONSERVATION NEED.....   | 20   |
| Rocky Mountain Population of Trumpeter Swans – Wyoming Flock.....  | 21   |
| Trumpeter Swan Summer Habitat Enhancement Project, Green River Basin, Wyoming.....   | 41   |
| Harlequin Duck Inventories and Technique Development.....  | 49   |
| Common Loon Surveys .....  | 58   |
| Bald Eagle .....   | 65   |
| Distribution and Abundance of Breeding Ferruginous Hawk Pairs in Southcentral Wyoming .....  | 72   |
| Raptor Nest Survey Cost-share Agreement.....   | 86   |
| Peregrine Falcon Nest Surveys.....   | 91   |
| Upland Sandpiper Population Monitoring in Wyoming.....   | 94   |
| Long-Billed Curlew Surveys in Western Wyoming.....   | 103  |
| Surveys for Avian Species of Greatest Conservation Need.....   | 110  |
| Forest Owl Surveys .....   | 117  |
| Forest Bat Inventories.....  | 123  |
| White-tailed Prairie Dog Mapping and Black-footed Ferret Habitat Evaluation in Western<br>Wyoming.....                                     | 136  |
| White-tailed Prairie Dog Evaluation of Survey Techniques.....  | 143  |
| Estimate of Abundance for the White-tailed Prairie Dog in Wyoming.....   | 149  |
| Landowner Incentive Program Summary .....  | 173  |
| RAPTORS TAKEN FOR FALCONRY.....  | 175  |
| Falconry.....  | 176  |
| OTHER NONGAME.....   | 179  |
| Breeding Bird Survey .....   | 180  |
| Wyoming Partners In Flight .....   | 243  |
| Bird Conservation Planning .....   | 243  |
| Monitoring Wyoming’s Birds .....   | 244  |
| Public Contacts.....   | 245  |
| North American Migration Count .....   | 245  |
| Nongame Bird Distribution and Abundance Surveys.....   | 268  |
| Wyoming Avian Atlas.....   | 268  |
| Riparian Transects.....  | 269  |
| Species Checklists .....   | 269  |
| Wyoming Bird Records Committee .....   | 270  |
| APPENDICES .....   | 278  |
| Appendix I – The Official State List of the Common and Scientific Names of the Birds,<br>Mammals, Amphibians, and Reptiles in Wyoming..... | 279  |
| Birds.....   | 279  |
| Mammals.....   | 291  |
| Amphibians .....   | 295  |
| Reptiles.....  | 296  |
| Appendix II – Latilongs (Degree Blocks) in Wyoming.....  | 298  |
| Appendix III – Native Species Status Matrix and Species of Special Concern.....  | 299  |
| Native Species Status Matrix .....   | 299  |
| Avian Species of Greatest Conservation Need in Wyoming.....  | 300  |
| Mammalian Species of Greatest Conservation Need in Wyoming.....  | 304  |

## INTRODUCTION

The Nongame Program of the Wyoming Game and Fish Department (Department) was initiated in July 1977. This report summarizes data collected from 15 April 2008 to 14 April 2009 on various nongame bird and mammal surveys and projects conducted by Department personnel, other government agencies, non-governmental organizations, and individuals in cooperation with the Department. Cooperating agencies and individuals are listed in the individual completion reports, but we recognize that the listing does not completely credit the valuable contributions of the many cooperators, including Wyoming Game and Fish Department District Wildlife Biologists and members of the public.

In October of 1987, a Nongame Strategic Plan was distributed; this plan was updated and renamed in May of 1996. The 1996 Nongame Bird and Mammal Plan (Plan) presents objectives and strategies for the management and study of nongame birds and mammals in Wyoming. As part of the State Wildlife Grants funding program to provide long-term conservation planning for those species most in need, information was gleaned from the Plan and other pertinent sources and compiled into A Comprehensive Wildlife Conservation Strategy for Wyoming, which was approved by the Wyoming Game and Fish Commission on 12 July 2005. This Nongame Annual Completion Report presents information in four major sections similar to these planning efforts: threatened and endangered species, species of greatest conservation need, raptors taken for falconry, and other nongame surveys.

This report serves several purposes. First, it provides summaries of nongame surveys for the benefit of the Department and other agencies and individuals that need this information for management purposes. Second, it provides a permanent record of summarized data for future use. Although some of this information is in lengthy tables, it was felt that these data should be published rather than kept in the files of the Nongame Program staff. Some information, such as Bald Eagle and Ferruginous Hawk nest sites and bat roost locations, is sensitive and is not provided in this document. Those needing this information for purposes that will lead to better management of these species can request the data from the Nongame Program staff.

Common bird names used in this report follow the most recent American Ornithologists' Union guidelines and supplements cited in Appendix I. Mammal names follow the "Revised checklist of North American mammals north of Mexico, 2003" cited in Appendix I. Scientific names for birds and mammals are presented in Appendix I.

## **THREATENED AND ENDANGERED SPECIES**

**SPOTLIGHTING FOR FREE RANGING BLACK-FOOTED FERRETS IN THE  
SHIRLEY BASIN/MEDICINE BOW MANAGEMENT AREA, WYOMING  
COMPLETION REPORT**

STATE OF WYOMING

NONGAME MAMMALS: Endangered Species / Section 6 Funding, Governor's ESA Funding –  
Black-footed Ferret

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Laurie Van Fleet, Nongame Biologist  
Martin Grenier, Nongame Mammal Biologist

**INTRODUCTION**

Eighteen years ago, the black-footed ferret was reintroduced onto white-tailed prairie dog colonies in Shirley Basin, Wyoming. A total of 228 ferrets were released between 1991 and 1994. Epizootics of sylvatic plague and canine distemper impacted this population through the mid-1990s. During this period, the reintroduced ferret population was characterized by slow population growth. Notably, surveys in the early 2000s documented an increasing population, and by 2006 it had grown exponentially to a high of 229 (95% CI: 169-289) (Grenier et al. 2007).

Survey objectives in 2007 focused on quantifying the distribution of the ferret in Shirley Basin (Grenier et al. 2008). Efforts were made to characterize the distribution north and west of the study area. Grenier et al. (2008) reported that the ferret was well distributed throughout Shirley Basin and, as such, abundance monitoring has become intermittent.

Diseases remain the biggest threat to the persistence of the ferret in Wyoming. Although epizootics were absent in recent years, few data were collected in recent years. Consequently, impacts to the population of ferrets in Shirley Basin resulting from diseases are poorly known. To improve our understanding, we conducted blood serology tests of ferrets captured in 2008. We analyzed blood samples for the presence of antibodies to common wildlife diseases (e.g. sylvatic plague, tularemia, etc.).

Recently, concern over the impacts of shooting prairie dogs to ferrets has increased. Pauli and Buskirk (2005) reported that lead fragments from ammunition used to shoot prairie dogs could be a portal for lead toxicity in the environment. The ferret is potentially at risk in areas where shooting occurs because the ferret is a dietary obligate of prairie dogs. Scavenging of shot prairie dogs by the ferret, however, has not been quantified and has only been anecdotally

reported. To improve our understanding and determine the impacts to the ferret, we analyzed blood samples for lead concentration levels in 2008.

This report quantifies results of summer spotlight surveys conducted on a small portion [i.e., <20,000 acres (8,094 ha)] of the Shirley Basin complex. We compare estimates of abundance and serology results to previous survey results and discuss the implications of our findings for recovery of the ferret in Shirley Basin, Wyoming.

## **METHODS**

We conducted spotlight surveys from approximately 2000 – 0100 hours and 0200 – 0600 hours in blocks of three consecutive nights (Grenier 2008). Vehicles equipped with roof-mounted spotlights (Model RM 240 Blitz, Lightforce™ Professional Lighting Systems, Porofino, ID) were driven along existing roads, and portions of the plots not surveyable from a vehicle were traversed on foot by personnel wearing a backpack. Personnel conducting foot surveys were equipped with Lightforce™ Walkabout portable spotlight kits. Observations of ferrets, non-target carnivores, and Species of Greatest Conservation Need were recorded using a global positioning system (Garmin GPS 12XL or 60, GPS).

After locating ferrets with spotlights, we attempted to capture them once using an unbaited live trap (Sheets 1972). Traps were checked hourly throughout the night, and all traps were removed at sunrise. We transported captured ferrets to a mobile processing trailer, where they were anesthetized using isoflurane gas (Kreeger et al. 1998). Ferrets were assigned to juvenile or adult age classes by palpation of the sagittal crest, examination of dentition and tooth wear, and reproductive status (Thorne et al. 1985). We marked ferrets with passive integrated transponders (PIT tags; AVID Microchip I.D. Systems, Folsom, LA) and hair dye (Grenier 2008). We collected blood samples when possible. Following a brief recovery period, we returned the ferret to the burrow from which they were captured. Blood samples were sent to the Wyoming Game and Fish Department Wildlife Veterinary Laboratory where they were analyzed for the presence of tularemia (*Francisella tularemia*), canine distemper virus (CDV), and sylvatic plague (*Yersinia pestis*) antibodies, as well as lead concentration levels.

Our study design for abundance estimation using correlated density estimates (CDE) (Bowden et al. 2003) followed recommendations developed by Grenier (2008). Prairie dog colonies were subdivided into sampling plots based on accessibility. Sampling plots accessible only by foot were approximately 300 acres (121 ha) in size, while those accessible by vehicle were approximately twice as large. Actual size of the survey plots varied due to size and shape of the prairie dog colony, as well as other geographical boundaries (Grenier 2008). Colonies <150 acres (61 ha) were not surveyed (Figure 1). We allocated survey effort to each strata proportionally, and sampled 24 plots within the two strata (Figure 2) (Grenier 2008).

We analyzed capture histories for ferrets using the Huggins conditional likelihood approach (Huggins 1989, 1991), available in program MARK (White and Burnham 1999), to estimate capture,  $p$ , and recapture,  $c$ , probabilities. Sampling plot data was pooled to obtain model-based estimates for each sampling plot (Bowden et al. 2003, Grenier 2008). Models with full

heterogeneity were not included due to small sample sizes. We used an information theoretic approach and based model selection on Akaike's Information Criterion adjusted for small sample sizes (Burnham and Anderson 2002). We investigated the effects of moonlight, effort, wind speed, relative humidity, barometric pressure and temperature by standardizing the covariates (Franklin 2001). We calculated variance,  $\text{var}(\hat{N}_R)$ , for the estimated total population size using equations and recommendations provided by Grenier 2008, and Bowden et al. 2003.

## RESULTS

We spent a total of 582 hours spotlighting during nine survey nights (Table 1). Approximately 269 hours were spent spotlighting from vehicles and 313 hours by foot. We observed 104 ferrets 199 times (Table 2), and a discrete ferret about every 2.9 person-hours. Additionally, we observed a minimum of 29 litters. Observations of species other than ferrets are not presented in this completion report; however, they were entered into the Wyoming Game and Fish Department's Wildlife Observation System database, and are also available from the Nongame Mammal Biologist, Wyoming Game and Fish Department, 260 Buena Vista, Lander, WY 82520.

Our mark-recapture estimates were derived from a candidate model set which included 12 closed-capture models. The best model did not include a behavioral response or timing effect (i.e. we estimated  $p$  and  $c$  simultaneously), a positive effect of *relative humidity* on  $p$ . We estimated  $p = 0.39$  (SE = 0.04). The beta estimates for our covariates were statistically different from zero, were negative for *relative humidity* ( $\beta_{rh} = -0.53$ , SE = 0.18). Using our mark-recapture estimates, we estimated the density of ferrets on individual sampling plots in 2008 to be between 0 and 0.10 ferrets per hectare. Mean density for the high-density stratum was 0.03 (SE = 0.009) and for the low-density stratum was 0.03 (SE = 0.006) ferrets per hectare. We estimated 239 (95% CI: 177-303) ferrets within the 20,000 ac (8,094 ha) study area (Figure 3, Table 3).

We captured 54 ferrets: 23 adults and 31 juveniles. Five of the 54 ferrets were recaptures from 2005-2006 (Table 4). We collected blood samples from 36 of the 54 captured ferrets. Three recaptures tested positive for the CDV (Table 5). We believe these are false positives and resulted from incomplete protection from previous vaccination attempts. Blood samples were negative for all other pathogens. Lead concentration levels for these ferrets were all <0.05 ppm. We detected no abnormalities and very few (e.g.,  $\leq 10$ ) ectoparasites (i.e., fleas and ticks) on ferrets we handled in 2008.

## DISCUSSION

Results of the surveys indicated that ferrets continue to be in good physical and reproductive condition. All adult females that we captured and observed showed signs of lactation or were in the presence of juveniles. We failed to detect any physical abnormalities or genetic defects in 2008 ( $n = 54$ ). Serology results also supported our conclusions that this population is healthy. Notably, single dose prophylactic vaccination of ferrets for canine

distemper has proven ineffective. Tularemia and sylvatic plague also do not appear to be affecting this population.

We failed to detect any differences in lead concentration levels (Table 5). Lead concentration levels normally stay elevated from several weeks to several months (Dr. Cynthia Tate, Wyoming Game and Fish Department, personal communication); therefore, we should have been able to detect a difference among ferrets. There are two possible explanations for our inability to detect a difference among ferrets. First, ferrets may not be scavenging shot prairie dogs and, therefore, are not being exposed to elevated lead levels. If ferrets are not susceptible, then our results contradict predictions of Pauli and Buskirk (2008). A second explanation is that ferrets may be ingesting lethal doses of lead and dying very quickly before we can detect them. This seems unlikely because, in spite of shooting that occurs on some colonies, Grenier et al. (2007) documented rapid increase in abundance of the ferret in Shirley Basin and toxic lead levels build up slowly with time. Given our results, there seems to be little support that shooting negatively impacts ferrets. Impacts to diurnal raptors and other meso-carnivores, however, could be different, and efforts should be made to quantify the impacts.

Our results suggest that ferrets may be approaching an ecological carrying capacity within the study site because the density of ferrets in low strata increased in 2008. Density of ferrets in the low strata was similar to that of the high strata (Table 3). Further, the growth rate for this population has decreased compared to previous years and appears to be transitioning to logistic growth (Figure 3). After the conclusion of our surveys, three dispersing ferrets were killed and recovered between September and November on Highway 487 adjacent to the study area.

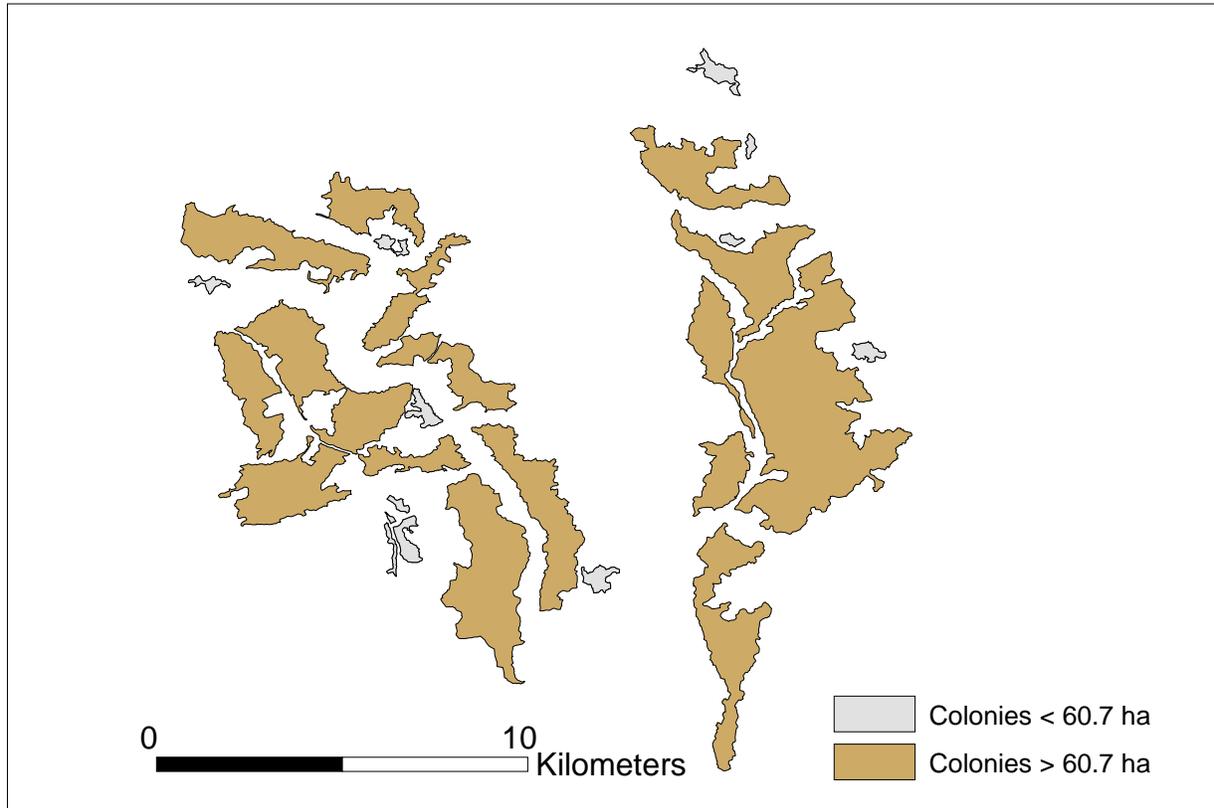
## **ACKNOWLEDGEMENTS**

Special thanks are extended to the Heward Ranch and Q Creek Land and Cattle Company, who generously allowed access to their property for black-footed ferret spotlight surveys during the summer of 2008. We would also like to thank the following Wyoming Game and Fish Department personnel: S. Chrisman, H. Cooper, T. Filipi, M. Haas, J. Heyward, B. Krueger, J. Martinez, H. Obrien, R. Schilowsky, G. Sheridan, C. Smith and N. Steere, and the following volunteers: S. Cornell, B. Gordan, S. Naylor, M. Osborn, J. Selby, and R. Zook for their assistance during the surveys. Funding for this project was provided by the U.S. Fish and Wildlife Service through Section 6 of the Endangered Species Act and the State of Wyoming through the Governor's ESA funding, for which we are extremely grateful.

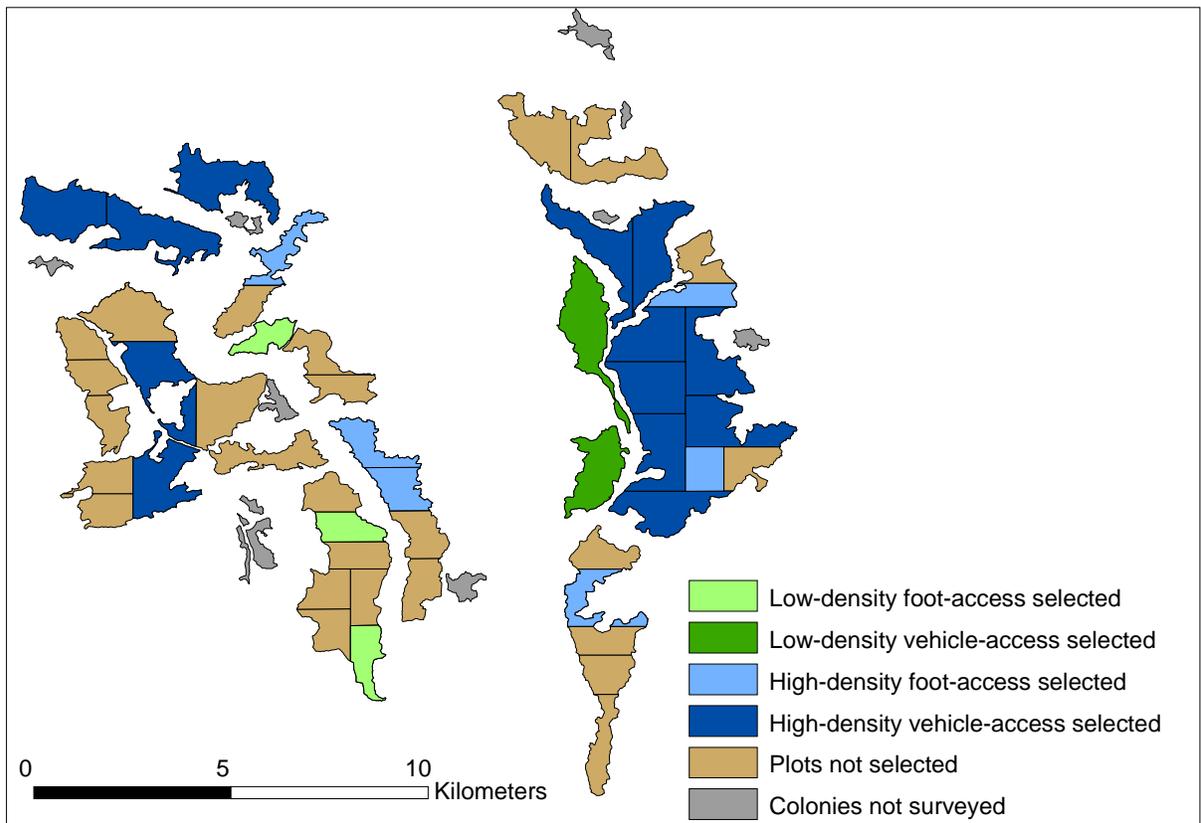
## **LITERATURE CITED**

- Bowden, D. C., G. C. White, A. B. Franklin, and J. L. Ganey. 2003. Estimating population size with correlated sampling unit estimates. *Journal of Wildlife Management* 67:1-10.
- Burnham, K. P., and D. R. Anderson. 2002. Model selection and multimodel inference: a practical information-theoretic approach. Springer Science+Business Media, New York, NY.

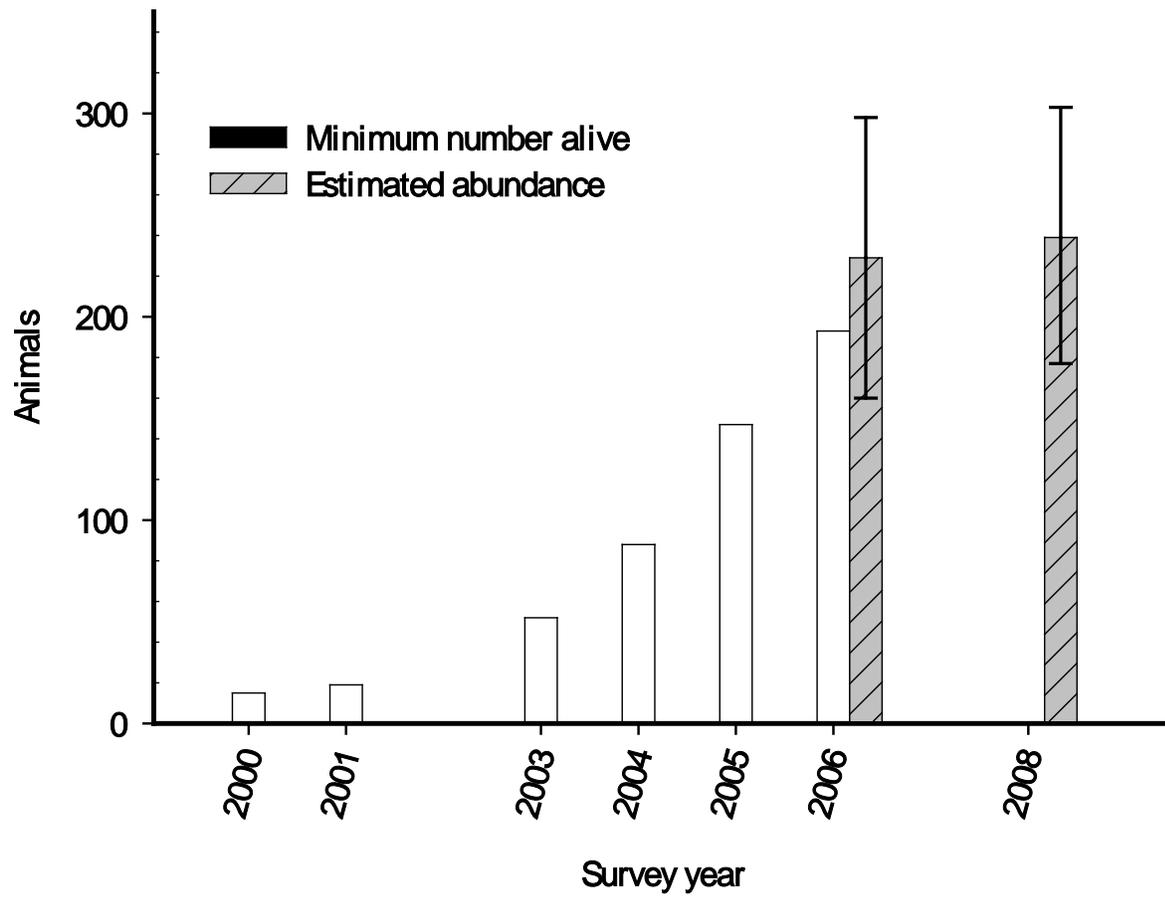
- Franklin, A. B. 2001. Exploring ecological relationships in survival and estimating rates of population change using program MARK. Pages 290-296 in R. Field, R. J. Warren, H. Okarma, and P. R. Sievert, editors. *Wildlife, Land, and People, Priorities for the 21<sup>st</sup> Century*, Proceedings of the Second International Wildlife Management Congress, Bethesda, MD.
- Grenier, M. B. 2008. Population biology of the black-footed ferret reintroduced into Shirley Basin, Wyoming. M.S. Thesis, University of Wyoming, Laramie. 90pp.
- Grenier, M. B., B. D. McDonald, and S. W. Buskirk. 2007. Rapid population growth of a critically endangered carnivore. *Science* 317:779.
- Grenier, M., L. Van Fleet, T. Filipi, and B. Oakleaf. 2008. Spotlighting for free ranging black-footed ferrets in the Shirley Basin/Medicine Bow Management area, Wyoming completion report. Pages 20-35 in A. O. Cerovski, editor. *Threatened, Endangered, and Nongame Bird and Mammal Investigations*. Wyoming Game and Fish Department Nongame Program, Lander. 270pp.
- Huggins, R. M. 1989. On the statistical analysis of capture-recapture experiments. *Biometrika* 76:133-140.
- Huggins, R. M. 1991. Some practical aspects of a conditional likelihood approach to capture experiments. *Biometrics* 47:725-732.
- Kreeger, T. J., A. Vargas, G. E. Plumb, and E. T. Thorne. 1998. Ketamine-medetomidine or isoflurane immobilization of black-footed ferrets. *Journal of Wildlife Management* 62:654-662.
- Pauli, J. N., and S. W. Buskirk. 2005. Recreational shooting of prairie dogs: a portal for lead entering wildlife food chains. *Journal of Wildlife Management* 71:103-108.
- Sheets, R. G. 1972. A trap for capturing black-footed ferrets. *American Midland Naturalist* 88:461-462.
- Thorne, E. T., M. H. Schroeder, S. C. Forrest, T. M. Campbell III, L. Richardson, D. E. Biggins, L. R. Hanebury, D. Belitsky, and E. S. Williams. 1985. Capture, immobilization and care of black-footed ferrets for research. Pages 9.1-9.8 in S. Anderson and D. Inkley, editors. *Proceedings of the Black-footed Ferret Workshop*. Wyoming Game and Fish Department, Cheyenne.
- White, G. C., and K. P. Burnham. 1990. Program MARK: survival estimation from populations of marked animals. *Bird Study* 46 Supplement:120-138.



**Figure 1. Spatial arrangement of white-tailed prairie dog colonies that were spotlighted for black-footed ferrets in Shirley Basin, Wyoming, 2007. Colonies  $\leq 150$  acres (61 ha) in size were not surveyed. Not all colonies surveyed were sampled to estimate abundance.**



**Figure 2. Distribution of sample units that were spotlighted for the presence of black-footed ferrets in Shirley Basin, Wyoming 2007. Colonies  $\leq 150$  acres (61 ha) in size were not surveyed, and no inference to these colonies are made.**



**Figure 3. Abundance of black-footed ferrets in Shirley Basin, Wyoming, 2000-2008. In 2008, abundance was estimated at 239 (95% CI: 177-303). Abundance surveys were not conducted in 2002 and 2007.**

**Table 1. Survey effort expended while spotlighting for black-footed ferrets in Shirley Basin, Wyoming, during the summer of 2008. We surveyed 24 sample units that varied in size due to survey accessibility. Each sample unit was spotlighted for 3 consecutive nights. Survey effort was similar between weeks and varied with available personnel and the juxtaposition of sample units.**

| <b>Survey Type</b> | <b>Survey Hours Expended</b> |                    |                      | <b>Total</b> |
|--------------------|------------------------------|--------------------|----------------------|--------------|
|                    | <b>Aug. 19 - 21</b>          | <b>Sept. 2 - 4</b> | <b>Sept. 16 - 19</b> |              |
| Vehicle            | 88.25                        | 97.75              | 82.50                | 268.50       |
| Foot               | 129.00                       | 66.50              | 117.50               | 313.00       |
| Total              | 217.25                       | 164.25             | 200.00               | 581.50       |

**Table 2. Discrete black-footed ferrets observed in Shirley Basin, Wyoming, during the summer of 2008. Discrete observations were determined using guidelines developed by Grenier (2008). We observed 104 discrete ferrets 189 times during the surveys.**

| Obs. # | Date      | Obs. Time | Colony | Observer    | Age | Sex | Comments                       |
|--------|-----------|-----------|--------|-------------|-----|-----|--------------------------------|
| 1      | 8/19/2008 | 2246      | 554-2  | S. Cornell  |     |     |                                |
| 2      | 8/19/2008 | 2246      | 554-2  | S. Cornell  |     |     |                                |
| 3      | 8/19/2008 | 0308      | 554-2  | S. Cornell  |     |     |                                |
| 4      | 8/19/2008 | 0308      | 554-2  | S. Cornell  |     |     |                                |
| 5      | 8/19/2008 | 0325      | 554-2  | S. Cornell  | A   | M   | AM, red+                       |
| 6      | 8/19/2008 | 0350      | 554-2  | S. Cornell  |     |     | recapture,                     |
| 7      | 8/19/2008 | 0413      | 554-2  | S. Cornell  |     |     | resight,                       |
| 8      | 8/20/2008 | 2150      | 554-2  | B. Zook     |     |     |                                |
| 9      | 8/21/2008 | 0420      | 554-2  | B. Zook     |     |     |                                |
| 10     | 8/20/2008 | 0420      | 554-2  | B. Zook     |     |     |                                |
| 11     | 8/20/2008 | 0420      | 554-2  | B. Zook     |     |     |                                |
| 12     | 8/20/2008 | 0420      | 554-2  | B. Zook     |     |     |                                |
| 13     | 8/20/2008 | 0110      | 554-1  | B. Zook     | J   | M   | JM, black U                    |
| 14     | 8/20/2008 | 0230      | 554-1  | M. Haas     |     |     |                                |
| 15     | 8/19/2008 | 0450      | 554-1  | M. Haas     | J   | M   | caught JM, orange T            |
| 16     | 8/19/2008 | 2049      | 554-1  | M. Haas     | J   | M   | org side T                     |
| 17     | 8/19/2008 | 2230      | 554-1  | M. Haas     |     |     |                                |
| 18     | 8/20/2008 | 0015      | 554-1  | M. Haas     |     |     | org other side T               |
| 19     | 8/20/2008 | 0448      | 554-1  | M. Haas     |     |     |                                |
| 20     | 8/20/2008 | 0448      | 554-1  | M. Haas     |     |     |                                |
| 21     | 8/20/2008 | 0448      | 554-1  | M. Haas     |     |     |                                |
| 22     | 8/20/2008 | 0205      | 554-1  | M. Haas     | A   | F   | org solid triangle             |
| 23     | 8/20/2008 | 2051      | 558-1  | H. Cooper   |     |     | orange box                     |
| 24     | 8/21/2008 | 0015      | 558-1  | H. Cooper   | A   | M   | black X                        |
| 25     | 8/19/2008 | 0220      | 558-1  | H. Cooper   |     |     |                                |
| 26     | 8/19/2008 | 0220      | 558-1  | H. Cooper   |     |     |                                |
| 27     | 8/19/2008 | 0220      | 558-1  | H. Cooper   |     |     |                                |
| 28     | 8/19/2008 | 0220      | 558-1  | H. Cooper   |     |     |                                |
| 29     | 8/19/2008 | 0310      | 558-1  | H. Cooper   | J   | M   | orange Z                       |
| 30     | 8/19/2008 | 0315      | 558-1  | J. Heyward  |     |     |                                |
| 31     | 8/19/2008 | 0345      | 559-2  | Naylor      | J   | M   | JM, red V                      |
| 32     | 8/21/2008 | 2116      | 559-2  | Cooper      | J   | M   | caught at 0300, blk Y          |
| 33     | 8/19/2008 | 0005      | 559-2  | Cooper      | J   | M   | caught at 0317, Red ^          |
| 34     | 8/21/2008 | 0030      | 509-2  | N. Steere   |     |     | set trap, no capture           |
| 35     | 8/21/2008 | 0435      | 509-1  | C. Smith    |     |     |                                |
| 36     | 8/19/2008 | 0435      | 509-1  | C. Smith    |     |     |                                |
| 37     | 8/19/2008 | 0455      | 509-1  | C. Smith    |     |     |                                |
| 38     | 8/19/2008 | 0300      | 509-1  | C. Smith    | J   | M   | blk W                          |
| 39     | 8/19/2008 | 0337      | 509-1  | C. Smith    |     |     | close together, w/in 20' 1bff1 |
| 40     | 8/19/2008 | 2150      | 519-1  | J. Martinez |     |     | did not trap                   |
| 41     | 8/19/2008 | 0247      | 519-1  | J. Martinez |     |     | JM, orange V                   |

| Obs. # | Date      | Obs. Time | Colony | Observer      | Age | Sex | Comments  |
|--------|-----------|-----------|--------|---------------|-----|-----|---|
| 42     | 8/19/2008 | 0318      | 519-1  | J. Martinez   |     |     | AF, blk upside triangle                               |
| 43     | 8/21/2008 | 0245      | 555-1  | L. Van Fleet  |     |     | lost eyeshine   |
| 44     | 8/21/2008 | 0445      | 555-1  | L. Van Fleet  |     |     | unmarked, escaped, same 3bff1                         |
| 45     | 8/21/2008 | 0405      | 555-1  | L. Van Fleet  |     |     | MG set trap   |
| 46     | 9/2/2008  | 2112      | 556-4  | L. Van Fleet  |     |     | not caught  |
| 47     | 9/2/2008  | 2245      | 556-4  | L. Van Fleet  |     |     | ~20' from 1bff1 same ?                                |
| 48     | 9/2/2008  | 0505      | 556-4  | L. Van Fleet  | J   | F   | JF, black O w/ horizontal line(at edge of Bryce's rt) |
| 49     | 9/2/2008  | 0108      | 556-6  | L. Van Fleet  | A   | F   | caught, AF brn triangle w/dot                         |
| 50     | 9/2/2008  | 0200      | 556-6  | L. Van Fleet  | J   | M   | JM, brown Y   |
| 51     | 9/2/2008  | 0345      | 556-6  | J. Heyward    | J   | M   | brown roman numeral I                                 |
| 52     | 9/2/2008  | 0345      | 556-6  | J. Heyward    |     |     |   |
| 53     | 9/3/2008  | 0215      | 556-6  | L. Van Fleet  | J   | M   | JM, orange sideways Y                                 |
| 54     | 9/3/2008  | 0150      | 556-6  | L. Van Fleet  |     |     |   |
| 55     | 9/4/2008  | 2030      | 556-6  | J. Heyward    |     |     |   |
| 56     | 9/2/2008  | 0315      | 556-7  | J. Heyward    | J   | F   | orange box w/diag slash                               |
| 57     | 9/3/2008  | 2130      | 556-7  | J. Heyward    | A   | F   | AF orange 8   |
| 58     | 9/3/2008  | 2245      | 556-7  | H. Obrien     |     |     | 2 ferrets? Or 1 fast one?                             |
| 59     | 9/3/2008  | 0215      | 556-7  | H. Obrien     |     |     | escaped, silver trap door open                        |
| 60     | 9/3/2008  | 0422      | 556-7  | H. Obrien     | A   | F   | AF, blk circle w/dot,                                 |
| 61     | 9/2/2008  | 0044      | 556-10 | R. Schilowsky | J   | F   | JF, black Z   |
| 62     | 9/3/2008  | 0345      | 556-10 | R. Schilowsky | J   | M   | JM, blk N, trapped w/belowJF                          |
| 63     | 9/3/2008  | 0345      | 556-10 | R. Schilowsky | J   | F   | JF, blk backward Z                                    |
| 64     | 9/3/2008  | 0300      | 556-10 | H. Obrien     | J   | M   | JM  |
| 65     | 9/2/2008  | 0515      | 556-5  | M. Grenier    |     |     |   |
| 66     | 9/2/2008  | 0449      | 556-2  | B. Krueger    | A   | F   | orange upside triangle w/dot                          |
| 67     | 9/4/2008  | 2009      | 556-2  | B. Krueger    | J   | F   | JF, brown O w/ vertical line                          |
| 68     | 9/3/2008  | 0530      | 556-3  | H. Cooper     | A   | M   | caught @ 0535, AM, brown roman numeral I              |
| 69     | 9/16/2008 | 2218      | 520-2  | L. Van Fleet  | A   | M   | resight prior wks capture, blk roman numeral II,      |
| 70     | 9/16/2008 | 2230      | 520-2  | L. Van Fleet  | A   | F   | caught AF, blk dot                                    |
| 71     | 9/16/2008 | 0315      | 520-2  | L. Van Fleet  | J   | F   | caught J.Martinez' I., wk1                            |
| 72     | 9/16/2008 | 0315      | 520-2  | L. Van Fleet  |     |     | new   |
| 73     | 9/17/2008 | 0215      | 520-2  | L. Van Fleet  | J   | M   | SB0838, blk horz line w/dot                           |
| 74     | 9/16/2008 | 0350      | 518-1  | S. Chrisman   | J   | F   | caught 0455, blue V                                   |
| 75     | 9/16/2008 | 0515      | 518-1  | S. Chrisman   |     |     | no success by 0700                                    |
| 76     | 9/17/2008 | 2300      | 518-1  | S. Chrisman   |     |     | resight, blk II                                       |
| 77     | 9/17/2008 | 2320      | 518-1  | S. Chrisman   | J   | M   | caught 0300, blue ^                                   |
| 78     | 9/18/2008 | 0220      | 518-1  | S. Chrisman   | J   | M   | caught, did not mark.                                 |
| 79     | 9/16/2008 | 0320      | 527-2  | R. Schilowsky | J   | F   | trapped @ 0345, blk S                                 |
| 80     | 9/16/2008 | 0405      | 527-2  | R. Schilowsky | A   | M   | recapture, blue H                                     |
| 81     | 9/17/2008 | 0300      | 527-2  | R. Schilowsky | A   | F   | trapped @ 0335, blk box                               |
| 82     | 9/18/2008 | 0300      | 527-2  | R. Schilowsky | A   | F   | trapped @ 0330, not marked                            |
| 83     | 9/16/2008 | 0500      | 510-2  | J. Heyward    |     |     |   |
| 84     | 9/17/2008 | 0000      | 510-2  | J. Heyward    |     |     |   |
| 85     | 9/17/2008 | 0045      | 510-2  | J. Heyward    |     |     | trapped @ 0300, blue V w/dot                          |

| Obs. # | Date      | Obs. Time | Colony | Observer   | Age | Sex | Comments   |
|--------|-----------|-----------|--------|------------|-----|-----|--|
| 86     | 9/16/2008 | 0320      | 510-5  | H. Cooper  |     |     |  |
| 87     | 9/17/2008 | 2045      | 510-5  | H. Cooper  | J   | F   | trapped @ 230, brown U                           |
| 88     | 9/16/2008 | 2304      | 527-1  | N. Steere  |     |     | recap, grn O w/ horizontal line                  |
| 89     | 9/16/2008 | 2339      | 527-1  | N. Steere  | J   | F   | black Box on top of box                          |
| 90     | 9/17/2008 | 2031      | 527-1  | N. Steere  |     |     |  |
| 91     | 9/18/2008 | 2254      | 527-1  | N. Steere  | A   | M   | caught, blk si                                   |
| 92     | 9/16/2008 | 2343      | 529-1  | B. Krueger | J   | F   | caught, marked blk W                             |
| 93     | 9/16/2008 | 0014      | 529-1  | B. Krueger | A   | F   | caught, blk solid square                         |
| 94     | 9/16/2008 | 0045      | 529-1  | B. Krueger |     |     | resight, blk triangle                            |
| 95     | 9/16/2008 | 0555      | 529-1  | B. Krueger |     |     | did not catch, unmarked                          |
| 96     | 9/17/2008 | 2022      | 529-1  | B. Krueger | J   | M   | caught, marked w/ blk M                          |
| 97     | 9/17/2008 | 0055      | 529-1  | B. Krueger |     |     | unmarked, did not catch.                         |
| 98     | 9/17/2008 | 0259      | 529-1  | B. Krueger |     |     | unmarked, did not catch.                         |
| 99     | 9/18/2008 | 0022      | 529-1  | B. Krueger | J   | M   | resight, brown T                                 |
| 100    | 9/18/2008 | 0353      | 529-1  | B. Krueger |     |     | caught, released unmarked, too late on last day. |
| 101    | 9/18/2008 | 0449      | 529-1  | B. Krueger |     |     | unmarked, did not catch.                         |
| 102    | 9/18/2008 | 0450      | 529-1  | B. Krueger |     |     | caught late, unmarked released.                  |
| 103    | 9/16/2008 | 0034      | 515    | T. Filipi  | A   | M   | unmarked, brown H                                |
| 104    | 9/16/2008 | 0229      | 515    | T. Filipi  | A   | F   | unmarked brown upside triangle w/dot             |

**Table 3. Population estimates for the black-footed ferret in Shirley Basin, Wyoming using correlated density estimate developed by Grenier (2008). Estimates were developed for the same area and were similar between years.**

| <b>Survey Year</b> | <b>N<sub>hat</sub><br/>(Population Estimate)</b> | <b>Lower CI<br/>(95 %)</b> | <b>Upper CI<br/>(95 %)</b> | <b>High strata<br/>density<br/>(No. / ha)</b> | <b>Low strata<br/>density<br/>(No. / ha)</b> |
|--------------------|--|----------------------------|----------------------------|---|--|
| 2006               | 229  | 160                        | 289                        | 0.033   | 0.017  |
| 2008               | 239  | 177                        | 303                        | 0.030   | 0.026  |
|                    |  |                            |                            |   |  |

**Table 4. Results of the 54 black-footed ferrets captured during spotlighting surveys in Shirley Basin, Wyoming during the summer of 2008. A total of 23 adults (16 female, 7 male) and 31 juveniles (12 female, 19 male) were captured and marked with passive integrated transponders during nine survey nights. Blood samples were taken from 37 of the captured black-footed ferrets.**

| Capture Number | Transponder Anterior | Transponder Posterior | Date    | Colony Number | Observer      | Shirley Basin Number | Age | Sex |
|----------------|----------------------|-----------------------|---------|---------------|---------------|----------------------|-----|-----|
| 1              | 095-799-519          |                       | 8/19/08 | 527-2         | S. Cornell    | 0755                 | A   | M   |
| 2              | 095-821-522          |                       | 8/19/08 | 554-2         | B. Zook       | 0808                 | J   | M   |
| 3              | 095-815-271          |                       | 8/19/08 | 519-1         | J. Martinez   | 0756                 | A   | F   |
| 4              | 095-819-313          |                       | 8/19/08 | 559-2         | S. Naylor     | 0809                 | J   | M   |
| 5              | 095-805-599          |                       | 8/19/08 | 559-2         | S. Naylor     | 0757                 | A   | F   |
| 6              | 095-801-785          |                       | 8/19/08 | 558-1         | H. Cooper     | 0758                 | A   | M   |
| 7              | 081-112-054          | 081-260-881           | 8/19/08 | 558-1         | H. Cooper     | 0663                 | A   | F   |
| 8              | 095-791-295          |                       | 8/19/08 | 558-1         | H. Cooper     | 0810                 | J   | M   |
| 9              | 095-831-364          |                       | 8/19/08 | 554-1         | M. Haas       | 0811                 | J   | M   |
| 10             | 095-821-064          |                       | 8/19/08 | 519-1         | J. Martinez   | 0812                 | J   | M   |
| 11             | 095-826-849          |                       | 8/20/08 | 554-2         | M. Haas       | 0813                 | J   | M   |
| 12             | 095-811-363          |                       | 8/20/08 | 559-2         | J. Heyward    | 0759                 | A   | F   |
| 13             | 095-793-803          |                       | 8/20/08 | 554-2         | S. Cornell    | 0760                 | A   | F   |
| 14             | 095-804-332          |                       | 8/20/08 | 509           | C. Smith      | 0814                 | J   | M   |
| 15             | 095-804-121          |                       | 8/21/08 | 554-1         | M. Grenier    | 0761                 | A   | F   |
| 16             | 095-804-841          |                       | 8/21/08 | 559-2         | H. Cooper     | 0815                 | J   | M   |
| 17             | 095-818-586          |                       | 8/21/08 | 559-2         | H. Cooper     | 0816                 | J   | M   |
| 18             | 095-812-351          |                       | 8/21/08 | 554-1         | M. Haas       | 0817                 | J   | M   |
| 19             | 095-816-787          |                       | 9/2/08  | 556-10        | R. Schilowsky | 0818                 | J   | F   |
| 20             | 095-821-575          |                       | 9/2/08  | 556-4         | L. Van Fleet  | 0762                 | A   | F   |
| 21             | 095-801-360          |                       | 9/2/08  | 556-4         | L. Van Fleet  | 0819                 | J   | M   |
| 22             | 095-805-292          |                       | 9/2/08  | 556-6         | J. Heyward    | 0820                 | J   | F   |
| 23             | 095-821-805          |                       | 9/2/08  | 556-6         | J. Heyward    | 0821                 | J   | M   |
| 24             | 071-543-610          | 072-086-611           | 9/2/08  | 556-2         | B. Krueger    | 0575                 | A   | F   |
| 25             | 095-804-333          |                       | 9/2/08  | 556-4         | L. Van Fleet  | 0822                 | J   | F   |

| Capture Number | Transponder Anterior | Transponder Posterior | Date    | Colony Number | Observer      | Shirley Basin Number | Age | Sex |
|----------------|----------------------|-----------------------|---------|---------------|---------------|----------------------|-----|-----|
| 26             | 081-094-534          | 081-112-595           | 9/3/08  | 556-6         | J. Heyward    | 0638                 | A   | F   |
| 27             | 095-813-831          |                       | 9/3/08  | 556-5         | M. Grenier    | 0763                 | A   | M   |
| 28             | 095-808-083          |                       | 9/3/08  | 556-4         | L. Van Fleet  | 0823                 | J   | M   |
| 29             | 095-791-304          |                       | 9/3/08  | 556-7         | H. O'Brien    | 0764                 | A   | F   |
| 30             | 095-796-343          |                       | 9/3/08  | 556-10        | R. Schilowsky | 0824                 | J   | M   |
| 31             | 095-812-047          |                       | 9/3/08  | 556-10        | R. Schilowsky | 0825                 | J   | F   |
| 32             | 095-832-575          |                       | 9/3/08  | 556-3         | H. Cooper     | 0765                 | A   | M   |
| 33             | 095-812-067          |                       | 9/3/08  | 556-7         | H. O'Brien    | 0826                 | J   | M   |
| 34             | 095-827-634          |                       | 9/4/08  | 556-2         | B. Krueger    | 0827                 | J   | F   |
| 35             | 095-810-064          |                       | 9/16/08 | 527-2         | R. Schilowsky | 0750                 | A   | M   |
| 36             | 095-823-277          |                       | 9/16/08 | 520-2         | L. Van Fleet  | 0768                 | A   | F   |
| 37             | 095-815-017          |                       | 9/16/08 | 520-2         | L. Van Fleet  | 0802                 | J   | F   |
| 38             | 095-792-630          |                       | 9/16/08 | 527-1         | N. Steere     | 0831                 | J   | F   |
| 39             | 095-828-098          |                       | 9/16/08 | 529-1         | B. Krueger    | 0835                 | J   | F   |
| 40             | 095-796-069          |                       | 9/16/08 | 515           | T. Filipi     | 0769                 | A   | M   |
| 41             | 095-809-260          |                       | 9/16/08 | 529-1         | B. Krueger    | 0770                 | A   | F   |
| 42             | 095-812-874          |                       | 9/16/08 | 515           | T. Filipi     | 0771                 | A   | F   |
| 43             | 095-803-064          |                       | 9/16/08 | 527-2         | R. Schilowsky | 0836                 | J   | F   |
| 44             | 095-810-514          |                       | 9/16/08 | 518           | S. Chrisman   | 0837                 | J   | F   |
| 45             | 095-809-007          |                       | 9/17/08 | 520-2         | L. Van Fleet  | 0838                 | J   | M   |
| 46             | 095-820-612          |                       | 9/17/08 | 510-2         | J. Heyward    | 0839                 | J   | M   |
| 47             | 095-810-098          |                       | 9/17/08 | 510-5         | H. Cooper     | 0840                 | J   | F   |
| 48             | 095-832-512          |                       | 9/17/08 | 518           | S. Chrisman   | 0841                 | J   | M   |
| 49             | 095-811-540          |                       | 9/17/08 | 527-2         | R. Schilowsky | 0772                 | A   | F   |
| 50             | 095-801-552          |                       | 9/17/08 | 527-1         | N. Steere     | 0842                 | J   | F   |
| 51             | 095-805-880          |                       | 9/18/08 | 527-1         | N. Steere     | 0773                 | A   | M   |
| 52             | 081-073-853          | 081-089-030           | 9/18/08 | 520-2         | L. Van Fleet  | 0562                 | A   | F   |
| 53             | 095-819-031          |                       | 9/18/08 | 518-1         | S. Chrisman   | 0843                 | J   | M   |
| 54             | 095-831-326          |                       | 9/18/08 | 527-2         | R. Schilowsky | 0774                 | A   | F   |

**Table 5. Results of serology tests for 37 black-footed ferrets that were captured in Shirley Basin, Wyoming, during the summer of 2008. Test results and their interpretation are presented. The two black-footed ferrets that were positive for canine distemper were false positives and resulted from incomplete protection from vaccination in 2006.**

| SB # | Age/<br>Sex | Y. Pestis<br>Result | F.<br>Tularemia<br>Result | Canine<br>Distemper<br>Virus Titer | Lead<br>Result | Titer | Previous<br>Vaccination | Exposure | Levels<br>(ppm) |
|------|-------------|---------------------|---------------------------|------------------------------------|----------------|-------|-------------------------|----------|-----------------|
| 0562 | AF          | Negative            | Negative                  | 1:164                              | Positive       | 1:16  | Yes                     | No       | <0.05           |
| 0575 | AF          | Negative            | Positive                  | 1:128                              | Negative       | <1:4  | No                      | No       | <0.05           |
| 0638 | AF          | Negative            | Negative                  | <1:4                               | Positive       | 1:164 | Yes                     | No       | <0.05           |
| 0663 | AF          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | No                      | No       | <0.05           |
| 0750 | AM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0755 | AM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0756 | AF          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0757 | AF          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0758 | AM          | Negative            | Negative                  | <1:4                               | Negative       | <1:8  | -                       | No       | <0.05           |
| 0760 | AF          | Negative            | Negative                  | 1:4                                | Negative       | <1:4  | -                       | No       | <0.05           |
| 0761 | AF          | Negative            | Negative                  | 1:4                                | Negative       | <1:4  | -                       | No       | <0.05           |
| 0762 | AF          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0763 | AM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0768 | AF          | Negative            | Negative                  | 1:4                                | Negative       | <1:4  | -                       | No       | <0.05           |
| 0769 | AM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0770 | AF          | Negative            | Negative                  | 1:132                              | Negative       | <1:4  | -                       | No       | <0.05           |
| 0771 | AF          | Negative            | Negative                  | 1:4                                | Negative       | <1:4  | -                       | No       | <0.05           |
| 0772 | AF          | Negative            | Negative                  | <1:4                               | Negative       | <1:8  | -                       | No       | <0.05           |
| 0774 | AF          | Negative            | Negative                  | 1:4                                | Negative       | <1:8  | -                       | -        | -               |
| 0802 | JF          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0808 | JM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0811 | JM          | Negative            | Negative                  | 1:4                                | Negative       | <1:4  | -                       | No       | <0.05           |
| 0812 | JM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0815 | JM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0816 | JM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0817 | JM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0819 | JM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0820 | JF          | Negative            | Negative                  | <1:4                               | Negative       | <1:8  | -                       | No       | <0.05           |

| SB # | Age/<br>Sex | Y. Pestis<br>Result | F.<br>Tularemia<br>Result | Canine<br>Distemper<br>Virus Titer | Lead<br>Result | Titer | Previous<br>Vaccination | Exposure | Levels<br>(ppm) |
|------|-------------|---------------------|---------------------------|------------------------------------|----------------|-------|-------------------------|----------|-----------------|
| 0822 | JF          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0823 | JM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0824 | JM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |
| 0836 | JF          | Negative            | Negative                  | 1:4                                | Negative       | <1:4  | -                       | No       | <0.05           |
| 0840 | JF          | Negative            | Negative                  | <1:4                               | Negative       | <1:8  | -                       | -        | -               |
| 0841 | JM          | Negative            | Negative                  | 1:8                                | Negative       | <1:8  | -                       | No       | <0.05           |
| 0842 | JF          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | -        | -               |
| 0843 | JM          | Negative            | Negative                  | <1:4                               | Negative       | <1:4  | -                       | No       | <0.05           |

**SPECIES OF GREATEST CONSERVATION NEED**

# **ROCKY MOUNTAIN POPULATION OF TRUMPETER SWANS – WYOMING FLOCK COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Species of Greatest Conservation Need – Trumpeter Swan

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Susan Patla, Nongame Biologist

## **INTRODUCTION**

This report summarizes management activities and monitoring data for Trumpeter Swans in Wyoming for the 2008 nesting season and the 2008/2009 winter season. The Trumpeter Swan is on Wyoming's Species of Greatest Conservation Need (SGCN) list with a Native Species Status ranking of 2 (NSS2). Trumpeter Swans in Wyoming are considered, for management purposes, a breeding segment of the Tri-State Area Flocks of the U.S. segment of the Rocky Mountain Population (RMP) of Trumpeter Swans [U.S. Fish and Wildlife Service (USFWS) 1998]. Monitoring swans in western Wyoming requires interagency coordination and effort; a list of individuals who provided data for this effort can be found in the Acknowledgements Section.

This year's report contains updates of tables contained in previous Annual Completion Reports, but extensive text sections have been abbreviated or eliminated. For background and historical data, readers should refer to earlier Annual Completion Reports. These are available from the Wyoming Game and Fish Department (Department) Nongame Program, Lander Regional Office or Jackson Regional Office.

## **ROCKY MOUNTAIN POPULATION WINTER SURVEY RESULTS 2008/2009**

Winter aerial surveys of Tri-State Area Flocks were completed in early February 2009 (Dubovsky 2010, not yet available). The Department flew Wyoming's survey outside of Yellowstone National Park (YNP) on February 3-4 in conjunction with the Pacific Flyway Mid-Winter Goose/waterfowl survey. Weather was calm and clear on both days except for lingering morning fog on February 4th. Total flight time was slightly over 9 hours. In the Tri-State area, a total of 5,102 Trumpeter Swans were counted: 4,230 white birds (yearlings and older age classes) and 872 cygnets (Table 1). Cygnets comprised 17% of the total, the same as the previous year. The number of total swans counted in the Tri-State represents the first increase since 2006 after two years of slightly declining numbers.

In Wyoming, total number of swans wintering (n=840) increased slightly compared to the previous years (3% increase) (Table 1). Of the total swans counted in Wyoming, 10% were in YNP; 46% along the Snake River in the vicinity of Jackson, Wyoming; 17% in the Salt River drainage (n=141), and 17% in the Green River drainage, including Seedskaadee National Wildlife Refuge (NWR) (n=172), and near Boulder and Daniel (n=15). An additional 38 swans were counted in the Central Flyway (36 west of Dubois in the Wind River drainage and 2 near Casper). Proportion of cygnets was low at 13%, compared to 18% in the two previous years (Table 1).

Freeze up happened quickly in early November, with most non-moving water frozen by mid-November. Numbers peaked quickly at the National Elk Refuge staging area on the Flat Creek Marsh the second week of November, and swans dispersed within a week. Similar to the previous winter, there was no significant thawing during the winter season until late March/early April.

### **TRI-STATE FALL SURVEY RESULTS AND PRODUCTIVITY TRENDS – 2008**

A cooperative inter-agency survey effort is conducted annually in September to obtain a total count of Trumpeter Swans in the U.S. Breeding Segment of the RMP using both aerial and ground surveys. Results are published by the USFWS (Dubovsky 2009a, 2009b). Aerial surveys in 2008 were conducted from 16-17 September. The Wyoming portion was flown on 17 September.

Total number of resident swans (n= 427, adults plus cygnets) in the Tri-state Area Flocks in 2008 was 14% lower than the previous year (n=498) (Table 2). Swans counted within the Tri-State Area in 2008 were distributed as follows among the three states: 38% in Wyoming (n=163), 27% in Idaho (n=114), and 34% in Montana (n=147). The number of white birds increased slightly Wyoming and decreased in Montana and slightly in Idaho to the previous year. The decline in total number of swans resulted mostly from a decrease in the number of cygnets counted, which declined 58% compared to the 2007 survey, and was the lowest since 1993. Numbers continue to remain below objective (Pacific Flyway Council 2008).

### **WYOMING FLOCK PRODUCTION OUTSIDE YELLOWSTONE NATIONAL PARK – 2008**

A total of 121 white birds (adults/subadults) and 34 cygnets were counted in Wyoming outside of YNP in September 2008 (Table 2). Compared to the previous year's record-breaking production (n=59 cygnets), number of cygnets was 39% lower but number of white birds was 17% higher.

In 2008, aerial surveys to document occupancy and productivity were conducted on 9 June and 7-8 July, in addition to conducting additional ground surveys during the nesting season. Pairs occupied 35 sites, 16 pairs initiated incubation, 12 pairs hatched 39 young, and 12 pairs fledged at least one young (Table 3a). Although all categories are lower than last year's record

numbers, all productivity parameters still exceeded 1990-2007 means (Table 3a). Productivity of successful nests (n=12, those that hatched at least one egg) measured 3.25 young hatched per successful pair and 2.83 young fledged per successful pair.

Production parameters for the Green River expansion flock in 2008 continued to exceed those in the core area, except that number of young hatched per successful pair was higher in the core (Table 3b). Four pair nested at Seedskaadee NWR and fledged three broods for a total of ten cygnets (Table 4) accounting for 48% of birds fledged in the Green River Basin and 29% of the State's total.

Table 4 provides a summary of occupancy and productivity data for individual nesting territories in Wyoming over the last decade, 1998-2008. Following are site-specific notes for some of the 2008 nesting territories:

**Indian Lake, Caribou-Targhee National Forest (CTNF)** – a pair occupied this site but did not appear to initiate nest building, perhaps a result of late ice-off.

**Rock Lake, Caribou-Targhee National Forest (CTNF)** – a pair occupied this site but did not appear to initiate nesting.

**Junco Lake, Caribou-Targhee National Forest (CTNF)** – no pair was observed.

**Upper Glade Creek Marsh, J.D. Rockefeller Parkway (GTNP)** – no swans were seen and the marsh remained partially frozen on June 9.

**Steamboat Mountain, Nickel and Dime Creeks (GTNP)** – a pair was on site but no nest was observed.

**Glade Cliff Slough, Grand Teton National Park (GTNP)** – a pair was seen out on the main river channel on 9 June. In July, they were observed in the nesting slough on the west side of the river near the south end of the Glade cliff bands, but no nest structure or young were observed.

**Glade Creek South (GTNP)** – a pair was by the nest platform in June but no young were found later.

**Arizona Lake (BTNF)** – a pair constructed a nest site in the channel south of the main lake and incubated, but no young were observed.

**Swan Lake (GTNP)** – a pair occupied the slough south of the lake again but no nest was observed on 9 June. Two young hatched and fledged from this site.

**Christian Pond (GTNP)** – no swans were observed again on this site throughout the season. Water depth continues to decrease and the shallow water wetland will likely dry up if this trend continues. An assessment of hydrology and recreation use is needed at this site.

**Two Ocean Lake (GTNP)** – no pairs were observed in June or during the summer months. Three swans were observed on the fall survey.

**Emma Matilda Lake (GTNP)** – one swan was seen on the fall survey.

**Elk Ranch Reservoir (GTNP)** – a pair occupied the site in early June but no nest activity was observed. A third swan was observed in July. Water level was very low in June. Future plans for this reservoir should include improving the site for nesting swans and other waterfowl. This site is used by a number of swans and ducks in the spring when it opens up and during fall migration.

**Hedrick Pond (GTNP)** – park personnel reported a pair on 30 May but not after.

**Main Marsh Flat Creek (NER)** – four pairs were observed in May. Two pairs initiated nesting, with the first by 29 May. One pair produced three young.

**Pierre's Ponds (NER)** – a lone swan was observed in May.

**Romney Ponds (NER)** – a pair initiated nesting by 20 May in the same location as last year's nest on Romney #2. Four young hatched and fledged.

**Puzzleface Pond (formerly Skyline)** – a few swans were observed in May, but none occupied the site this summer.

**South Park WMA Habitat Pond #2** – a pair occupied this pond and molted on site, but no nest activity was noted.

**Kibby Pond, Alpine** – no swans were observed this year.

**Alpine Wetland** – a pair occupied the site again this year but did not construct a nest. Water levels fluctuated due to beaver activity in the wetland complex. One subadult was seen in July.

**Lily Lake (BTNF)** – no swan use was observed again this year. Lack of security, low water level, and poor vegetation diversity at this site reduce the chances for successful nesting by swans.

**Enos Lake (BTNF)** – three swans were observed on 7 July, but not during the fall flight.

**Atlantic Creek (BTNF)** – this site was not checked this year; no reports from field. No swans were observed in the area in recent years.

**Upper Slide Lake (BTNF)** – a pair occupied this site and was by the nest site on the June flight but not after that date.

**Mosquito Lake (BTNF)** – a pair was on the nest slough in June and was seen on the main lake in July and September with no young.

**Wagon Creek Potholes** – a pair was in the area but not at the same site where a pair was shot last year.

**Wagon Creek Lake** – a pair was reported once in July.

**Rock Crib Lake** – three swans were observed in June and one in September.

**Mud Lake (BTNF)** – water level was low in June and a pair was seen on the river. The pair was back at the site in July but no young were observed. The pair was gone by September.

**Carney Ranch, Green River** – a pair was seen on the nest site in the slough north of the previous site. Water level was low in June but the swans were incubating. Adults were still on the nest in July; no young hatched; may have been predated.

**Marsh Creek Pothole** – no swans were seen on the 2007 nest site or other potholes.

**Kendall Wetland** – a pair nested on the main middle pond and raised one young. In July, the pair and young were in the marsh area west of the main ponds. This is likely the same pair that nested in the Marsh Creek pothole last year and then hiked the young over to Kendall's in August.

**Kitchen Reservoir, CL Bar Ranch** – a pair nested at the traditional site and raised three young. Another pair occupied the middle reservoir to the north; thought they may have built a nest but this was not confirmed.

**QY Bar Ranch Reservoir** – a pair was observed in July and September, but no nest or young were seen. A group of three subadults was also observed on another pond on this ranch in July.

**Fayette Ranch Pond, New Fork River** – no swans were seen during the June flight, but a pair with four small young was observed 8 July but not after that date. Pair was observed in September without young.

**Swift Ranch Paradise Road Pond** – no swans were observed during the flight, but a brood of five was found during a Breeding Bird Survey in June. Four fledged. The actual nest site was not determined, but the brood rearing habitat was at the site of a proposed wetland project near the New Fork River.

**Barden (Oliver) Slough, New Fork** – the site was not occupied this year but the water level appeared good.

**Swift Reservoir** – six swans (three pairs) were observed in July but not in the fall.

**Ferry Island, Green River** – a pair nested and produced three young on the slough below a bluff north of the Fear access site and east of the river. This is the second year that a pair produced young in this area.

**La Barge, Voorhees Exxon Road Pond** – the pond filled this year but heavy grazing kept cattails and other cover along shore from growing. Wind caused turbulence that kept sediments stirred up. Some limited swan use.

**Seedskaadee NWR:**

**Hamp Unit** – a pair occupied this site but no young were produced.

**Headquarters Marsh** – a pair occupied this site but no young were produced.

**Hawley Main Marsh** – two pairs nested on the main marsh in Pool 1 and 2. At least three other subadult pairs were observed on the marsh in early June. In July, after young hatched, an additional 10 white swans were observed on the marsh. Concern remains that a large number of subadults may be interfering with the nesting pairs. The pair on Pool 1 produced one leucistic cygnet of three hatched.

**Sage Pool Wetland** – for the second year, a pair nested on this wetland south of Hwy. 28. They produced three leucistic cygnets that appeared to survive throughout the winter (Seedskaadee NWR reports).

## **MORTALITIES**

Sixteen mortalities were documented in 2008/2009, a fairly average number for Wyoming (Table 5). One occurred in spring of 2008 and the others from February to early May 2009. Two swans collided with power lines and a pair was hit by a vehicle near Boulder. A captive pair in Jackson killed one subadult in mid-March that entered their small pond. A group of six dead swans was observed during an aerial waterfowl survey in early May 2009 at the south end of the Salt River near Afton. This site of open sloughs near the river winters over 60 swans. Five of the six carcasses were too decayed to determine the cause of mortality; one entire carcass will be sent to the Wyoming State Veterinary Laboratory for analysis. It is not unusual to pick up a number of mortalities at winter concentration areas, but we will work with the landowner to monitor this site next winter to collect mortalities during the winter for analysis.

## **SIGHTINGS OF MARKED SWANS**

Observations of marked Trumpeter Swans in Wyoming are summarized in Table 6. The total number of neck-collared swans observed continues to decline as older collars and birds are lost. One green-collared swan marked in Idaho (31E) attempted to nest at the Alpine wetland this year. One leg-banded mortality found in Star Valley was a bird banded in Idaho in 2004 for the Idaho cygnet translocation study.

## **HABITAT IMPROVEMENT PROJECTS**

Three proposals for swan wetland restoration projects in the Pinedale area were submitted for funding through the Natural Resources Conservation Service Wetland Reserve Program (WRP) and the Wyoming Wildlife Natural Resource Trust Fund (WWNRT) in January 2007. Funding was obtained from the WRP program for two projects on private land, and the Department secured matching funds through the WWNRT. Additional funding for the Rimfire Ranch ponds was obtained through the Wyoming Landscape Conservation Initiative/Bureau of Land Management Healthy Lands Program for both the 2007 and 2008 funding cycles. Additional funding was also obtained through the USFWS Partners Program for the Budd Friendly Pond. Construction work was completed in fall 2008 on the Friendly Pond near Big Piney, and on four ponds on the Rimfire Ranch near Daniel. Work was almost completed on the Duck Creek Pond near Pinedale, as well. New proposals have been submitted for two projects on ranches on the New Fork River near Boulder, Wyoming.

## **RANGE EXPANSION EFFORTS IN WYOMING – SALT RIVER**

The number of wintering swans declined this year ( $n=133$  white birds and 8 cygnets = 141 total) in the Salt River drainage after documenting a record number during the Mid-Winter Survey in 2007/2008: 174 adults and 43 cygnets = 217 total. The highest concentration in February of 2009 occurred again along the river south of Grover Highway down to Swift Creek ( $n=88$ ). The largest group (over 50 swans) was observed in a wetland complex adjacent to the river just south of the Clark's barn area. This spring we documented six mortalities at this site, most having died earlier in the winter.

A pair occupied the Alpine wetland again this year but did not appear to initiate nesting activity.

The formation of the Star Valley Land Trust, affiliated with the Wyoming Stock Growers Agricultural Land Trust, may create funding opportunities in the future to develop wetland restoration projects for swan summer and winter habitat improvements.

## **RANGE EXPANSION EFFORTS IN WYOMING – GREEN RIVER**

In 2008, the number of young hatched in the Green River basin range expansion area ( $n=16$ ) exceeded that in the core Snake River/Jackson area ( $n=13$ ) but was 57% lower than the number hatched the previous year ( $n=37$ ). Pairs occupied a total of 15 nest sites in the Green River basin, compared to 16 the previous year. For the second year, pairs at Seedskaadee NWR produced fewer cygnets ( $n=10$ ) than sites to the north ( $n=16$ ). Overcrowding of the main wetland complex on the refuge by subadult birds may be affecting productivity of nesting pairs.

Swans pioneered nesting activity at a new site in 2008 on the Swift Ranch near Boulder in the New Fork drainage.

Total number of swans in the Green River expansion area was 82 on the fall 2008 survey. Distribution continues to increase with a total of 23 swans observed on the Green River north of the Warren Bridge (19 adults, 4 cygnets), 15 on the New Fork River (11 adults, 4 cygnets), 12 on the Green River north of Fontenelle Reservoir (9 adults, 23cygnets), and 31 at Seedskadee NWR (21 adults, 10 cygnets).

On the Mid-Winter Survey, 161 total swans were observed south of the Fontenelle Dam to Big Island, plus an additional 11 found at Flaming Gorge in Linwood Bay, Utah. Fifteen adults wintered along Forty Rod Creek near the Daniel Fish Hatchery, the most northern wintering habitat that stays open along the Green River corridor.

## **FUTURE MANAGEMENT OBJECTIVES**

The Department's Nongame Program will continue to focus on developing and funding wetland habitat improvement and restoration projects in the Green River drainage (Lockman 2005), and also the Salt River and Snake River areas as opportunities arise. This will require forming multiple partnerships and seeking funding from a wide variety of sources. Given the increasing number of pairs and productivity, and continuing drought conditions, it is urgent that the Department plays a lead role in swan habitat work. To obtain funding needed for costly habitat work, large-scale grants from the North American Wetlands Conservation Act should be developed. We have had excellent success obtaining funding in 2007/2008 from the recently created Wyoming Wildlife Natural Resource Trust Fund and from the Wyoming Landscape Conservation Initiative.

Another future management goal is to assess the continued decline in the number of nesting pairs and productivity in the core Snake River area. It is hoped that a research project can be developed with the University of Wyoming to conduct a viability/risk analysis of this segment of Wyoming's resident swan population.

## **PRESENTATIONS**

A PowerPoint presentation was prepared on the Green River Expansion Project and given at the Trumpeter Swan Society Conference in Whitehorse, Yukon Territory in April 2008. A summary of Trumpeter Swan management was also presented at the Wyoming Game and Fish Commission meeting in November 2008 in Jackson.

## **ACKNOWLEDGEMENTS**

The Department would like to thank the following individuals for their valuable contributions to the Trumpeter Swan monitoring effort: Sue Wolff, Kathy McFarland, and Sarah Dewey (GTNP); Eric Cole (NER); John Martin, Natalie Fath, and Bart McDermott (Seedskadee NWR); Terry Hershey (BTNF); Pat Hnilicka (USFWS); Bill Long (Wyoming Wetlands Society); Dave Stinson (Sky Aviation); Bert Raynes (Jackson Hole Bird Club); and Debra Patla,

Doug Sobey, and Pegi Sobey (volunteers). Many other Department personnel and interested citizens contributed observations of swans throughout the State, and we appreciate their contributions to the program.

## **LITERATURE CITED**

- Dubovsky, J. A. 2009. Trumpeter Swan Survey of the Rocky Mountain Population, U. S. Breeding Segment, Fall 2008. U.S. Fish and Wildlife Service, Migratory Birds and State Program, Mountain-Prairie Region, Lakewood, CO. January 2, 2008. Unpublished report.
- Dubovsky, J. A. In press. Trumpeter Swan Survey of the Rocky Mountain Population, Winter 2009. U.S. Fish and Wildlife Service, Migratory Birds and State Program, Mountain-Prairie Region, Lakewood, CO. Unpublished report (not yet completed).
- Lockman, D. 2005. Wyoming Green River Basin Trumpeter Swan Summer Habitat Project. February 14, 2005. Wyoming Game and Fish Department Nongame Program, Lander. Unpublished report.
- Pacific Flyway Council Subcommittee on Rocky Mountain Trumpeter Swans. 2008. Pacific Flyway Management Plan for the Rocky Mountain Population of Trumpeter Swans. Pacific Flyway Study Committee, [c/o USFWS, DMBM], Portland, OR. Unpublished report.
- United States Fish and Wildlife Service. 1998. Pacific Flyway Management Plan for the Rocky Mountain Population of Trumpeter Swans. Pacific Flyway Study Committee, (c/o USFWS, MBM), Portland, OR. Unpublished report.

**Table 1. Mid-winter Trumpeter Swan survey for the Rocky Mountain Population in Wyoming and the Tri-State Area, 1989-2008.**

| Year | Age Group | Yellowstone National Park | Snake River | Other Wyoming | Wyoming Total | Tri-State Total |
|------|-----------|---------------------------|-------------|---------------|---------------|-----------------|
| 1989 | Adult     | 96                        | 182         | 15            | 293           | 1452            |
|      | Cygnets   | 21                        | 32          | 7             | 60            | 291             |
|      | Total     | 117                       | 214         | 22            | 353           | 1743            |
| 1990 | Adult     | 78                        | 154         | 15            | 247           | 1591            |
|      | Cygnets   | 32                        | 42          | 4             | 78            | 416             |
|      | Total     | 110                       | 196         | 19            | 325           | 2007            |
| 1991 | Adult     | 61                        | 187         | 38            | 286           | 1589            |
|      | Cygnets   | 14                        | 34          | 13            | 61            | 342             |
|      | Total     | 75                        | 221         | 51            | 347           | 1931            |
| 1992 | Adult     | 108                       | 63          | 141           | 312           | 1731            |
|      | Cygnets   | 4                         | 17          | 13            | 34            | 472             |
|      | Total     | 112                       | 80          | 154           | 346           | 2203            |
| 1993 | Adult     | 178                       | 222         | 71            | 471           | 1780            |
|      | Cygnets   | 39                        | 55          | 9             | 103           | 455             |
|      | Total     | 217                       | 277         | 80            | 574           | 2235            |
| 1994 | Adult     | 137                       | 198         | 55            | 390           | 1882            |
|      | Cygnets   | 24                        | 60          | 14            | 98            | 644             |
|      | Total     | 161                       | 258         | 69            | 488           | 2526            |
| 1995 | Adult     | 141                       | 256         | 71            | 468           | 2012            |
|      | Cygnets   | 41                        | 61          | 30            | 132           | 668             |
|      | Total     | 182                       | 317         | 101           | 600           | 2680            |
| 1996 | Adult     | 130                       | 255         | 89            | 474           | 2129            |
|      | Cygnets   | 24                        | 72          | 12            | 108           | 580             |
|      | Total     | 154                       | 327         | 101           | 582           | 2709            |
| 1997 | Adult     | 74                        | 224         | 59            | 420           | 2268            |
|      | Cygnets   | 3                         | 62          | 16            | 105           | 431             |
|      | Total     | 77                        | 286         | 75            | 525           | 2699            |
| 1998 | Adult     | NS <sup>b</sup>           | 142         | 124           | 266           | 1756            |
|      | Cygnets   | NS                        | 26          | 13            | 39            | 307             |
|      | Total     | NS                        | 168         | 139           | 305           | 2063            |
| 1999 | Adult     | 291                       | 187         | 131           | 609           | 2698            |
|      | Cygnets   | 54                        | 44          | 21            | 119           | 772             |
|      | Total     | 345                       | 231         | 152           | 728           | 3470            |

| Year | Age Group | Yellowstone National Park | Snake River | Other Wyoming | Wyoming Total | Tri-State Total |
|------|-----------|---------------------------|-------------|---------------|---------------|-----------------|
| 2000 | Adult     | 87                        | 161         | 46            | 294           | 2694            |
|      | Cygnets   | 13                        | 60          | 5             | 78            | 746             |
|      | Total     | 100                       | 221         | 51            | 372           | 3440            |
| 2001 | Adult     | 53                        | 251         | 117           | 421           | 3198            |
|      | Cygnets   | 11                        | 38          | 25            | 74            | 719             |
|      | Total     | 64                        | 289         | 142           | 495           | 3917            |
| 2002 | Adult     | 131                       | 337         | 110           | 578           | 3814            |
|      | Cygnets   | 13                        | 61          | 11            | 85            | 54              |
|      | Total     | 144                       | 398         | 121           | 663           | 4360            |
| 2003 | Adult     | 146                       | 254         | 100           | 500           | 3365            |
|      | Cygnets   | 34                        | 45          | 13            | 92            | 532             |
|      | Total     | 180                       | 299         | 113           | 592           | 3897            |
| 2004 | Adult     | 149                       | 307         | 155           | 611           | 3785            |
|      | Cygnets   | 33                        | 18          | 40            | 91            | 746             |
|      | Total     | 182                       | 325         | 195           | 702           | 4531            |
| 2005 | Adult     | 124                       | 367         | 194           | 685           | 4147            |
|      | Cygnets   | 30                        | 109         | 57            | 196           | 1143            |
|      | Total     | 154                       | 476         | 246           | 881           | 5290            |
| 2006 | Adult     | 121                       | 413         | 242           | 776           | 4203            |
|      | Cygnets   | 14                        | 58          | 53            | 125           | 1209            |
|      | Total     | 135                       | 471         | 295           | 901           | 5412            |
| 2007 | Adult     | 144                       | 420         | 280           | 844           | 3604            |
|      | Cygnets   | 25                        | 84          | 71            | 180           | 893             |
|      | Total     | 169                       | 504         | 351           | 1024          | 4619            |
| 2008 | Adult     | 65                        | 316         | 287           | 668           | 3744            |
|      | Cygnets   | 7                         | 63          | 79            | 149           | 790             |
|      | Total     | 72                        | 379         | 366           | 817           | 4545            |
| 2009 | Adult     | 88                        | 321         | 319           | 728           | 4230            |
|      | Cygnets   | 2                         | 63          | 47            | 112           | 872             |
|      | Total     | 90                        | 384         | 366           | 840           | 5102            |

<sup>a</sup> Includes observations from the Salt River, Green River, Wind River, North Platte River, Bighorn River, and Cody lakes.

<sup>b</sup> NS = not surveyed.

**Table 2. Fall Trumpeter Swan survey results for the Tri-State Area, 1989-2008. <sup>a</sup>**

| Year | Age Group | Montana | Idaho | Wyoming YNP | Wyoming Outside YNP | Tri-State Total |
|------|-----------|---------|-------|-------------|---------------------|-----------------|
| 1989 | Adult     | 294     | 101   | 25          | 85                  | 505             |
|      | Cygnets   | 23      | 16    | 5           | 16                  | 60              |
|      | Total     | 317     | 117   | 30          | 101                 | 565             |
| 1990 | Adult     | 245     | 92    | 25          | 70                  | 432             |
|      | Cygnets   | 108     | 28    | 3           | 8                   | 147             |
|      | Total     | 353     | 120   | 28          | 78                  | 559             |
| 1991 | Adult     | 176     | 138   | 30          | 70                  | 414             |
|      | Cygnets   | 60      | 26    | 3           | 2                   | 91              |
|      | Total     | 236     | 164   | 33          | 5                   | 505             |
| 1992 | Adult     | 156     | 109   | 26          | 99                  | 390             |
|      | Cygnets   | 74      | 8     | 4           | 6                   | 92              |
|      | Total     | 230     | 117   | 30          | 105                 | 482             |
| 1993 | Adult     | 60      | 94    | 26          | 68                  | 248             |
|      | Cygnets   | 16      | 6     | 0           | 8                   | 30              |
|      | Total     | 76      | 100   | 26          | 76                  | 278             |
| 1994 | Adult     | 70      | 79    | 30          | 60                  | 239             |
|      | Cygnets   | 48      | 49    | 5           | 18                  | 120             |
|      | Total     | 118     | 128   | 35          | 78                  | 359             |
| 1995 | Adult     | 84      | 118   |             | 105                 | 307             |
|      | Cygnets   | 17      | 21    |             | 17                  | 55              |
|      | Total     | 101     | 139   |             | 122                 | 362             |
| 1996 | Adult     | 95      | 127   | 20          | 74                  | 316             |
|      | Cygnets   | 36      | 20    | 1           | 6                   | 63              |
|      | Total     | 131     | 147   | 21          | 80                  | 379             |
| 1997 | Adult     | 90      | 112   | 18          | 92                  | 312             |
|      | Cygnets   | 22      | 19    | 0           | 17                  | 58              |
|      | Total     | 112     | 131   | 18          | 109                 | 370             |
| 1998 | Adult     | 105     | 110   | 20          | 69                  | 304             |
|      | Cygnets   | 35      | 37    | 3           | 15                  | 90              |
|      | Total     | 140     | 147   | 23          | 84                  | 394             |
| 1999 | Adult     | 120     | 103   | 20          | 69                  | 312             |
|      | Cygnets   | 21      | 23    | 0           | 12                  | 56              |
|      | Total     | 141     | 126   | 20          | 81                  | 368             |

| Year              | Age Group | Montana | Idaho | Wyoming YNP | Wyoming Outside YNP | Tri-State Total |
|-------------------|-----------|---------|-------|-------------|---------------------|-----------------|
| 2000 <sup>c</sup> | Adult     | 127     | 102   | 20          | 69                  | 318             |
|                   | Cygnets   | 24      | 40    | 7           | 26                  | 97              |
|                   | Total     | 151     | 142   | 27          | 95                  | 413             |
| 2001 <sup>d</sup> | Adult     | 140     | 124   | 17          | 81                  | 362             |
|                   | Cygnets   | 9       | 23    | 0           | 22                  | 54              |
|                   | Total     | 149     | 147   | 17          | 103                 | 416             |
| 2002 <sup>e</sup> | Adult     | 76      | 103   | 22          | 72                  | 273             |
|                   | Cygnets   | 18      | 14    | 4           | 17                  | 53              |
|                   | Total     | 94      | 117   | 26          | 89                  | 326             |
| 2003              | Adult     | 89      | 100   | 16          | 86                  | 291             |
|                   | Cygnets   | 29      | 27    | 4           | 35                  | 95              |
|                   | Total     | 118     | 127   | 20          | 121                 | 386             |
| 2004              | Adult     | 89      | 112   | 16          | 74                  | 291             |
|                   | Cygnets   | 32      | 23    | 2           | 37                  | 94              |
|                   | Total     | 121     | 135   | 18          | 111                 | 385             |
| 2005              | Adult     | 112     | 136   | 18          | 89                  | 355             |
|                   | Cygnets   | 40      | 22    | 1           | 35                  | 98              |
|                   | Total     | 152     | 158   | 19          | 124                 | 453             |
| 2006              | Adult     | 117     | 132   | 14          | 114                 | 377             |
|                   | Cygnets   | 17      | 39    | 0           | 26                  | 82              |
|                   | Total     | 134     | 171   | 14          | 140                 | 459             |
| 2007              | Adult     | 157     | 113   | 10          | 103                 | 383             |
|                   | Cygnets   | 41      | 15    | 0           | 59                  | 115             |
|                   | Total     | 198     | 128   | 10          | 162                 | 498             |
| 2008              | Adult     | 140     | 112   | 6           | 121                 | 379             |
|                   | Cygnets   | 7       | 5     | 2           | 34                  | 48              |
|                   | Total     | 147     | 117   | 8           | 155                 | 427             |

<sup>a</sup> Data from Gomez 2000 and Department Annual Completion Reports.

<sup>b</sup> Wyoming Outside YNP for these years includes data for entire state including YNP.

<sup>c</sup> Wyoming Outside YNP results do not include 12 yearlings and 5 cygnets (grafted to Kitchen Reservoir pair when one day old) released in summer 2000 (Wyoming Wetland Society captive flock).

<sup>d</sup> Wyoming Outside YNP results do not include three yearlings and five cygnets (grafted to Kitchen Reservoir pair when one day old) released in 2001 (Wyoming Wetland Society captive flock). Note: one cygnet was lost at Skyline Pond after fall survey flight.

<sup>e</sup> Wyoming Outside YNP results do not include five yearlings released in 2002 (Wyoming Wetland Society captive flock).

**Table 3a. Occupancy and productivity of Trumpeter Swan nesting territories in Wyoming outside of Yellowstone National Park, 1990-2008. Mean and standard deviation are shown for the period 1990-2007.**

| Year             | Sites Occupied | Nesting Pairs | Pairs with Hatchlings | Pairs with Fledglings | Number Hatched | Number Fledged  |
|------------------|----------------|---------------|-----------------------|-----------------------|----------------|-----------------|
| 1990             | 19             | 13            | 4                     | 3                     | 11             | 8               |
| 1991             | 22             | 8             | 2                     | 2                     | 3              | 2               |
| 1992             | 29             | 10            | 5                     | 3                     | 17             | 9               |
| 1993             | 24             | 11            | 7                     | 5                     | 15             | 8               |
| 1994             | 20             | 13            | 8                     | 5                     | 29             | 18              |
| 1995             | 22             | 12            | 7                     | 5                     | 25             | 15              |
| 1996             | 21             | 13            | 5                     | 4                     | 12             | 4               |
| 1997             | 26             | 16            | 3                     | 4                     | 22             | 17              |
| 1998             | 25             | 18            | 10                    | 7                     | 26             | 15              |
| 1999             | 24             | 15            | 6                     | 6                     | 19             | 12              |
| 2000             | 26             | 16            | 10 <sup>a</sup>       | 9 <sup>a</sup>        | 35             | 26 <sup>a</sup> |
| 2001             | 28             | 17            | 10 <sup>a</sup>       | 8 <sup>a</sup>        | 29             | 21 <sup>a</sup> |
| 2002             | 24             | 10            | 9                     | 8                     | 23             | 17              |
| 2003             | 26             | 18            | 13                    | 11                    | 42             | 35              |
| 2004             | 22             | 17            | 14                    | 11                    | 54             | 37              |
| 2005             | 24             | 16            | 11                    | 10                    | 38             | 35              |
| 2006             | 24             | 18            | 12                    | 8                     | 33             | 26              |
| 2007             | 35             | 26            | 20                    | 18                    | 74             | 59              |
| 2008             | 35             | 16            | 12                    | 11                    | 39             | 34              |
| <i>1990-2007</i> |                |               |                       |                       |                |                 |
| <i>Mean</i>      | <i>23.9</i>    | <i>14.2</i>   | <i>8.0</i>            | <i>6.4</i>            | <i>25.5</i>    | <i>17.9</i>     |
| <i>SD</i>        | <i>2.7</i>     | <i>3.2</i>    | <i>3.5</i>            | <i>2.9</i>            | <i>12.6</i>    | <i>10.8</i>     |

<sup>a</sup> Does not include Kitchen pair, where eggs were collected and five-day-old young were grafted to a pair successfully in 2000 (four fledged) and 2001 (five fledged).

**Table 3b. Occupancy and productivity data for Trumpeter Swan nesting territories in Wyoming outside of Yellowstone National Park by drainage, 2008 compared to 2007.**

| <b>Drainage</b>              | <b># Occupied</b> | <b># Nesting pairs</b> | <b># Broods hatched</b> | <b># Young hatched</b> | <b># Young fledged</b> | <b>#Hatched/<br/>successful pair</b> |
|------------------------------|-------------------|------------------------|-------------------------|------------------------|------------------------|--------------------------------------|
| <i>Snake River Core</i>      |                   |                        |                         |                        |                        |                                      |
| 2007                         | 17                | 11                     | 9                       | 37                     | 31                     | 4.11                                 |
| 2008                         | 15                | 7                      | 4                       | 13                     | 13                     | 3.25                                 |
| <i>Green River Expansion</i> |                   |                        |                         |                        |                        |                                      |
| 2007                         | 16                | 13                     | 11                      | 37                     | 28                     | 3.36                                 |
| 2008                         | 18                | 9                      | 8                       | 26                     | 21                     | 2.62                                 |
| <i>Salt River Expansion</i>  |                   |                        |                         |                        |                        |                                      |
| 2007                         | 2                 | 1                      | 0                       | 0                      | 0                      | 0                                    |
| 2008                         | 1                 | 0                      | 0                       | 0                      | 0                      | 0                                    |

**Table 4. Trumpeter Swan territorial site occupancy and production status for Wyoming outside Yellowstone National Park, 1997-2008. <sup>a</sup>**

| Site  | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|------|------|------|------|------|------|------|------|------|------|------|------|
| <i>Caribou-Targhee National Forest</i>          |      |      |      |      |      |      |      |      |      |      |      |      |
| Ernest Lake                                     | ---  | ---  | ---  | ---  | ---  | NB   | NB   | ---  | NB   | ---  | ---  | ---  |
| Bergman Marsh                                   |      |      | N51  | N43  | N00C | ---  | NB   | ---  | ---  | ---  | ---  | ---  |
| Indian Lake                                     | N10  | N00  | ---  | ---  | ---  | N33  | N33  | N55  | N00  | N10  | N44  | O    |
| Widget Lake                                     | ---  | ---  | ---  | ---  | ---  | ---  | F    | ---  | ---  | ---  | ---  | ---  |
| Fall River Slough                               |      |      |      |      |      |      |      |      |      |      | N00  | ---  |
| Loon Lake                                       |      |      |      | OL   | ---  | ---  | F    | ---  | ---  | ---  | ---  | ---  |
| Rock Lake                                       | 1A   | ---  | ---  | ---  | ---  | ---  | ---  | OL   | OM   | N00  | ---  | O    |
| Junco Lake                                      | OM   | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | N00  | ---  | ---  |
| Fish Lake                                       | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  |
| Squirrel Meadows                                |      |      |      | OL   | OL   | NB   | ---  | ---  | OL   | ---  | ---  | ---  |
| Moose Lake                                      |      |      |      |      |      | NB   | ---  | ---  | ---  | ---  | ---  | ---  |
| Alpine Wetland north                            | N10  | ---  | ---  | ---  | OL   | 1A   | NB   | NB   | NB   | NB   | N00  | ---  |
| Alpine Wetland south                            |      |      |      |      |      |      |      |      |      |      | NB   | O    |
| <i>Grand Teton National Park</i>                |      |      |      |      |      |      |      |      |      |      |      |      |
| Upper Glade Marsh                               |      |      |      |      |      |      |      |      | N00  | OM   | ---  | ---  |
| Steamboat Mountain                              |      |      |      |      |      | N43  | OM   | ---  | N00  | ---  | N43  | O    |
| Glade Cliff Slough                              |      |      |      |      |      |      |      |      |      | N00  | N10  | O    |
| Glade South                                     | OM   | OM   | N11  | O    | N22  | OM   | N00  | N10  | N22  | N00  | O    | O    |
| Christian Pond                                  | N44  | N22  | N42  | N42  | OM   | 1A   | ---  | ---  | ---  | ---  | ---  | ---  |
| Arizona Lake                                    | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | OM   | N20  | N40  | N00  |
| Emma Matilda                                    | ---  | ---  | ---  | ---  | OM   | 1A   | NB   | ---  | ---  | NB   | NB   | ---  |
| Two Ocean Lake                                  | ---  | ---  | ---  | N42  | N53  | N32  | N30  | N00  | OM   | OM   | ---  | ---  |
| Swan Lake                                       | N00  | N00  | N00  | O    | N00  | O    | N00  | N33  | NB   | OL   | OM   | N22  |
| Hedrick Pond                                    | N00  | N00  | N00  | N20  | N20C | O    | O    | ---  | NB   | 1A   | O    | ---  |
| Elk Ranch                                       | N55  | N21  | OM   | O    | O    |
| Cow Lake  | OM   | O    | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  |
| Spread Creek Ponds                              | ---  | ---  | ---  | ---  | ---  | NB   | ---  | ---  | ---  | ---  | ---  | ---  |
| Cygnets Lake                                    | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  |
| Polecat Slough                                  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | 1A   |
| <i>National Elk Refuge</i>                      |      |      |      |      |      |      |      |      |      |      |      |      |
| Highway Pond                                    | OM   | N00  | O    | N44  | N32  | N11  | N10  | ---  | N00  | ---  | N55  | ---  |
| NE Marsh  | N00  | N11  | N00  | N31  | N00  | N42  | N33  | N44  | ---  | N32  | NB   | O    |
| SE Marsh  |      |      | N00  | N32  | OM   | N00  | N11  | N43  | O    | N11  | N42  | N00  |
| Central Marsh                                   |      |      |      |      | N33  | N00  | ---  | N22  | N44  | N33  | N57  | N33  |
| Pierre's Ponds                                  | N00  | N40  | ---  | N00  | OM   | N11  | N33  | OM   | O    | OM   | ---  | ---  |
| Romney Ponds                                    |      |      |      |      |      |      |      | OM   | OL   | NB   | N44  | N44  |
| <i>Jackson Area</i>                             |      |      |      |      |      |      |      |      |      |      |      |      |
| Skyline/Puzzleface                              | OM   | OM   | OM   | OM   | N30  | OM   | OM   | O    | NB   | ---  | ---  | ---  |
| WGF South Park                                  | 1A   | ---  | ---  | ---  | ---  | ---  | ---  | ---  | 1A   | OL   | OM   | OM   |
| Pinto/Halfmoon                                  | OM   | OM   | N00  | N66  | N44  | N11  | O    | N31  | N55  | N33  | N66  | N44  |
| Tracy Lake, Buffalo V                           |      |      |      |      |      |      |      |      |      |      |      | OL   |
| <i>Salt River Private</i>                       |      |      |      |      |      |      |      |      |      |      |      |      |
| Kibby/Salt River Cove                           |      | N22  | OM   | N00  | N00  | N00  | N00  | N00  | NB   | ---  | ---  | ---  |
| Etna/Jackknife area                             |      |      |      |      |      |      |      |      |      | NB   | ---  | OL   |
| <i>Bridger-Teton National Forest North Zone</i> |      |      |      |      |      |      |      |      |      |      |      |      |
| Bridger Lake                                    | OM   | ---  | OL   | OL   | OL   | ---  | ---  | ---  | ---  | ---  | ---  | ---  |
| Atlantic Creek                                  | N33  | N22  | N22  | O    | O    | ---  | ---  | ---  | ---  | ---  | ---  | ---  |
| Enos North                                      | N00  | N00  | ---  | N22  | OM   | OM   | N44  | ---  | ---  | NB   | NB   | NB-3 |
| Enos South                                      | OM   | ---  | N32  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  |
| Lily Lake                                       | ---  | ---  | OL   | OL   | OM   | N00  | N20  | ---  | ---  | ---  | ---  | ---  |
| Lower Slide Lake                                | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  |
| Upper Slide Lake                                | N00  | N66  | N00C | N00C | N22  | NB   | OM   | N11  | N22  | N00  | OM   | OM   |
| Grizzly Lake pothole                            | OM   | ---  | OL   | ---  | ---  | ---  | ---  | ---  | ---  | Dry  | Dry  | ---  |
| Burnt Fork                                      | N11  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  | ---  |

| Site  | 1997 | 1998 | 1999 | 2000                | 2001                | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|------|------|------|---------------------|---------------------|------|------|------|------|------|------|------|
| Soda Lake                                       | ---  | ---  | ---  | ---                 | ---                 | ---  | ---  | ---  | ---  | ---  | ---  | ---  |
| <i>Bridger-Teton National Forest South Zone</i> |      |      |      |                     |                     |      |      |      |      |      |      |      |
| Wagon Creek Lake                                | ---  | ---  | ---  | O                   | O                   | NB   | O    | O    | ---  | ---  | ---  | NB   |
| Rock Crib                                       | OM   | ---  | ---  | ---                 | ---                 | ---  | O    | ---  | ---  | ---  | ---  | NB   |
| Wagon Creek Pothole                             |      |      |      |                     |                     |      |      |      |      |      | N00  | ---  |
| Mosquito Lake                                   | OM   | ---  | OL   | O                   | N00                 | OM   | 1A   | OL   | ---  | NB   | N32  | N00  |
| Roaring Fork P.                                 | OM   | ---  | ---  | OL                  | O                   | ---  | ---  | ---  | ---  | ---  | ---  | ---  |
| Mud Lake  | N00  | N20  | N00  | N00                 | ---                 | N20  | ---  | N50  | N20  | N20  | N52  | OE   |
| <i>Green/New Fork Rivers Private</i>            |      |      |      |                     |                     |      |      |      |      |      |      |      |
| Carney oxbow                                    |      |      |      |                     |                     |      |      | N55  | N22  | N00  | N44  | N00  |
| Marsh Creek Pothole                             |      |      |      |                     |                     |      |      |      |      |      | N22  | ---  |
| Kendall Wetland                                 |      |      |      |                     | OL                  | OM   | N00  | N00  | NB   | NB   | OL   | N11  |
| Q Y Bar Reservoir                               |      |      |      |                     |                     |      |      |      |      |      | O    | O    |
| Kitchen Reservoir South                         |      |      | N00  | C<br>N54<br>grafted | C<br>N55<br>grafted | N44  | N54  | N44  | N22  | N33  | N54  | N53  |
| Kitchen Reservoir North                         |      |      |      |                     | NB                  | NB   | NB   | NB   | OM   | OM   | OM   | O    |
| Fayette New Fork                                |      |      |      |                     |                     |      |      |      |      | NB   | N33  | N40  |
| Barden Slough                                   |      |      |      | N00                 | N00                 | ---  | N00  | OM   | OM   | OM   | ---  |      |
| Swift New Fork                                  |      |      |      |                     |                     |      |      |      |      |      |      | N54  |
| Big Sandy Reservoir                             | ---  | ---  | ---  | ---                 |                     | ---  | ---  | ---  | ---  | NS   | ---  | nc   |
| Swift Reservoir                                 |      |      |      |                     |                     | OM   | NB   | NB   | ---  | OL   | OL   | NB   |
| Ferry Island                                    |      |      |      |                     |                     |      |      |      |      |      | N22  | N33  |
| Shafer Slough                                   |      |      |      |                     | OM                  | ---  | NB   | ---  | ---  | NB   | ---  | ---  |
| LaBarge Pond                                    |      |      |      |                     |                     | ---  | ---  | ---  | ---  | ---  | ---  | OL   |
| <i>Seedskaadee National Wildlife Refuge</i>     |      |      |      |                     |                     |      |      |      |      |      |      |      |
| Hawley Pool 6                                   | N55  | N42  | N44  | N44                 | N44                 | Dry  | N44  | N65  | N77  | N00  | NB   | NB   |
| Hawley Pool 1                                   | 1A   | OM   | OM   | ---                 | N11                 | NB   | N44  | N60  | N65  | N54  | N22  | N33  |
| Hawley Pool 2                                   |      |      |      |                     |                     |      | N44  | N54  | N00  | N66  | N33  | N66  |
| Hawley Pool 3                                   |      |      |      |                     |                     |      | N43  | ---  | N33  | ---  | NB   | NB   |
| Hamp Unit                                       |      |      |      |                     |                     |      |      |      | N33  | N44  | N53  | O    |
| Sage Pools                                      |      |      |      |                     |                     |      |      |      |      |      | N31  | N33  |
| <i>Other Wyoming</i>                            |      |      |      |                     |                     |      |      |      |      |      |      |      |
| Swamp Lake, Cody                                | 1A   | ---  | ---  | 1A                  | 1A                  | 1A   | 1A   | ---  | ---  | ---  | ---  | nc   |
| Colony eastern WY                               | N00  | OM   | ?    | ?                   | OUID                | 1A   | NB   | NB   | NS   | NS   | ---  | ---  |
| Trail Lake, Dubois                              |      |      |      |                     |                     |      |      |      | OM   | OM   | ---  | ---  |

<sup>a</sup> Key to Table 4 Codes:

|      |  |
|------|--|
| O    | Pair occupied territory through nest period, did not attempt to nest, and did not molt on site.    |
| OE   | Pair only observed early season on site (new code added 2008).                                     |
| OM   | Pair occupied territory through nest period, did not attempt to nest, but molted on site.          |
| OL   | Pair appeared late in season (new code added 2000 not counted as an occupied site for season).     |
| OUID | Pair occupied the site, status of pair unidentified or status of site as a territory unidentified. |
| N42  | Pair nested, laid eggs, hatched four eggs, and fledged two cygnets.                                |
| ---  | No occupancy of site by a pair.  |
| C    | Eggs collected for captive rearing project (new code added 2000).                                  |
| 1A   | Only one adult observed at the site.   |
| ?    | Number or status of occupancy unknown.   |
| NB   | Non-breeding birds present during some portion of nesting season (new category added 2002).        |
| F    | Swans present fall survey flight only (category added 2003).                                       |
| NS   | Not surveyed.  |

**Table 5. Summary of Trumpeter Swan annual mortalities in Wyoming showing age class and probable cause of death, 1991 through spring 2009. Mortality of cygnets includes only those lost post fledge count in September, does not include brood reduction during the nesting season.**

| Year <sup>a</sup>        | Total # Died | # of Adults <sup>b</sup> | # of Yearlings | # of Cygnets | Collision  | Predation  | Shot      | Infection | Unknown    |
|--------------------------|--------------|--------------------------|----------------|--------------|------------|------------|-----------|-----------|------------|
| 1991-1995                | 38           | 21                       |                | 17           | 12         | 4          | 10        | 1         | 11         |
| 1995/1996                | 11           | 9                        |                | 2            | 5          |            | 2         |           | 4          |
| 1996/1997                | 8            | 3                        |                | 5            | 4          |            |           |           | 4          |
| 1997/1998                | 5            | No data                  |                |              |            |            |           |           |            |
| 1998/1999                | 10           | 8                        |                | 2            | 2          | 1          |           | 1         | 6          |
| 1999/2000                | 10           | 7                        |                | 3            | 6          | 2          | 1         |           | 1          |
| 2000/2001                | 34           | 18                       | 4              | 12           | 6          | 5          |           |           | 23         |
| 2001/2002                | 14           | 8                        | 3              | 3            | 3          | 2          |           |           | 9          |
| 2002/2003                | 12           | 6                        | 2              | 4            | 1          | 1          | 2         |           | 8          |
| 2003/2004                | 38           | 21                       | 7              | 10           | 3          | 5          |           | 5         | 25         |
| 2004/2005                | 9            | 3                        | 2              | 4            | 0          | 6          |           |           | 3          |
| 2005/2006 <sup>c</sup>   | 49           | 27                       | ?              | 11           | 1          |            | 1         |           | 47         |
| 2006/2007                | 10           | 8                        |                | 2            |            |            |           |           | 10         |
| 2007/2008                | 11           | 7                        | 1              | 3            | 4          | 1          | 2         | 1         | 3          |
| 2008/2009                | 16           | 11                       | 3              | 2            | 4          | 1          |           |           | 11         |
| <i>Total<sup>d</sup></i> | <i>213</i>   | <i>124</i>               | <i>22</i>      | <i>56</i>    | <i>30</i>  | <i>24</i>  | <i>6</i>  | <i>7</i>  | <i>146</i> |
| <i>Percent</i>           |              | <i>62%</i>               | <i>11%</i>     | <i>28%</i>   | <i>14%</i> | <i>11%</i> | <i>3%</i> | <i>3%</i> | <i>69%</i> |

<sup>a</sup> Mortality total for years 1991-1995 is not broken out by individual years; the following years' data are recorded for 15 April through 14 April for each period, but also includes carcasses/remains found after snow melt in May.

<sup>b</sup> Swans with all white plumage over one year of age; likely some yearlings are included in this group.

<sup>c</sup> Age not determined for 11 reported mortalities. Necropsy reports not completed on 14 specimens submitted to lab.

<sup>d</sup> Summary statistics are calculated only for the years 1998-2008.

**Table 6. Summary of Trumpeter Swan neck collars and leg bands observed in Wyoming or eastern Idaho, 15 April 2008 through 14 April 2009. Codes for age at marking: HY = hatch year (cygnet), AHY = after hatch year (yearling or older), SY = second year (yearling), ASY = after second year (adult older than yearling). HSP=Harriman State Park.**

| Neck Collar | Leg Band or Patagial Tag | Date      | Location                                | Origin/Notes on Current status   | Sex | Age |
|-------------|--------------------------|-----------|---|--|-----|-----|
| 31E green   |                          | June 2008 | Alpine Wetland                          | With mate, seen previous winter in Salt River drainage; Collared and released HSP Nov. 14, 2001  | F   | HY  |
| 6H3 green   |                          | 12/4/08   | Boyles Hill Pond/Valley Springs Jackson | Collared HSP Nov. 93 adult, released Summer Lake/ mate + 4 cygnets                               |     | ASY |
| OE9 green   |                          | 2/19/09   | Spring Creeks, Crescent H Ranch Jackson | With mate; could not obtain history but likely Idaho release                                     |     |     |
|             | 1939-01764               | 5/8/09    | Clark's Barn area, Salt River           | Decayed, found with 5 other dead swans at site where > 60 winter; bird banded Nov. 8, 2004 Idaho |     |     |

**TRUMPETER SWAN SUMMER HABITAT ENHANCEMENT PROJECT,  
GREEN RIVER BASIN, WYOMING  
COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Species of Greatest Conservation Need – Trumpeter Swan

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Susan Patla, Nongame Biologist

## **INTRODUCTION**

Limited distribution and a low number of nesting pairs of Trumpeter Swans have been identified as major factors limiting population growth for this resident species in the Greater Yellowstone Area, including western Wyoming, by the Pacific Flyway Rocky Mountain Trumpeter Swan Management Plan (Subcommittee 2008) and in the Wyoming Game and Fish Department's (Department) Comprehensive Wildlife Conservation Strategy (Department 2005).

Range expansion efforts by the Department began as early as 1988 to establish a breeding population of swans in the Green River Basin of southwestern Wyoming through release of captive-raised swans (Patla and Oakleaf 2004). Traditionally, nest sites were occupied only in the Snake River drainage in the northwestern corner of the State. Due to range expansion efforts, over 15 new pairs have become established in the Green River Basin, and production of cygnets has steadily increasing in recent years. Since 2003, pairs have fledged a total of 128 cygnets in the expansion area.

To provide for future swan nesting habitat in the Green River Basin, the Department obtained a State Wildlife Grant in 2003 with the following objectives: 1) to identify and survey potential swan summer habitat on private and public lands in the Green River basin, 2) to prepare site management plans for high priority wetland projects, and 3) to identify potential funding partners so priority projects can be completed in a timely fashion to keep ahead of swan habitat needs. Preliminary plans were developed for 22 wetland projects (Lockman and Patla 2005) and management prescriptions written for landowners interested in developing ponds for swans (Patla and Lockman 2004).

## **METHODS**

In 2006, we began to search for potential funding sources and started to develop grant proposals, working with landowners who were willing to proceed with wetland developments on

their properties. The first major grant for swan habitat work was obtained in 2007 through the Bureau of Land Management (BLM) and Wyoming Landscape Conservation Initiative (WLCI) program. In 2008, additional funding was obtained through the Pinedale Natural Resource Conservation Service (NRCS) office, the Wyoming Wildlife and Natural Resource Trust (WWNRT), and the U.S. Fish and Wildlife Service (USFWS) Partnership Program. Construction work was initiated on three projects in 2008 on three different ranches in Daniel, Big Piney, and Pinedale.

## **RESULTS**

Following is a summary of the three wetland projects where construction was initiated in 2008:

### **Rimfire Ranch, Daniel, WY**

The goal of this project is to create a 19-20 acre (7-8 ha) wetland complex to provide summer habitat for Trumpeter Swan and other wetland associated species. This project was identified as a high priority wetland site in the Department's "Trumpeter Swan Summer Enhancement Project in the Green River Basin" (State Wildlife Grants Project 2004-2005). The WWNRT grant of \$107,315 received was a match for a \$150,000 grant obtained through the BLM Healthy Lands Initiative/WLCI in September 2007. An additional \$198,000 was received from BLM/WLCI in 2008.

The 3,750 acre (1,518 ha) Rimfire Ranch is located in the Soap Hole Basin along Cottonwood Creek west of the Green River south of Daniel, Wyoming. Upland habitat consists of irrigated and dry meadow pastureland and sagebrush grasslands. In addition to the Cottonwood Creek drainage, other wetland habitat includes springs, irrigation ditches, and potholes. Two constructed 5-acre (2-ha) wetland ponds provide some open water habitat as well. The ranch lies in a major flyway for trumpeter swan and other waterfowl. Trumpeter swans occur seasonally on the ranch during spring and fall migration. Many species of waterbirds and landbirds of conservation concern also nest and migrate in the area. The ranch provides year round habitat for sage grouse, and seasonal habitat for big game species including moose, proghorn, and mule deer.

Engineering plans, wetland delineations, permits, and water rights were completed for this project in spring 2008. As a result of ongoing drought conditions in the Pinedale area and increasing cost for materials and fuel, the project was modified based on initial bids and consultations with the landowner and engineer. One pond was dropped from the project plan (Project Pond). EnerCrest Construction, Inc. was awarded the contract for this project, and construction was initiated in late August 2008 on four ponds: Trumpeter, Sago, Alexander, and Sophia. Jack Doyle, project engineer, completed final inspection reviews, and the WLCI and Department review team inspected the project in October 2008 (Figures 1 and 2). The ponds were partially filled at that time. Fencing and seeding/revegetation of the dikes were finished in spring 2009. Sophia, Alexander, and Trumpeter Ponds were filled in spring 2008, but the water level at Sago Pond is being kept lower due to additional work that needs to be completed in fall

2009 on the spillway for the Trumpeter Pond and the dike between Trumpeter and Sago Ponds. Additional revegetation work will be completed, as well, in summer and fall 2009. This is an impressive complex of ponds in the dry Soapholes area, and they should attract large numbers of migrating waterfowl this fall. Nongame personnel will work with the landowner to set up a monitoring program, and also track wildlife use through scheduled surveys.

### **Duck Creek Wetland Project, Pinedale, WY**

The objective of this project is to create a permanent, shallow, open water wetland pond 8-9 acres (3-4 ha) in size with depths ranging from 6-28 inches (20-92 cm) to provide summer nesting and foraging habitat for Trumpeter Swans and other waterfowl and waterbird species. This was planned as a flow-through system using available irrigation water that returns to Duck Creek. The design includes two islands for nesting and loafing. This project was identified as a high priority site by the Department's Green River Basin Trumpeter Swan Habitat Project (Lockman and Patla 2005). The WWNRT awarded a grant for the Duck Creek wetland project in 2007. The NRCS provided matching funds through the 2007 Farm Bill Wetland Reserve Program.

This site lies in a major flight corridor for Trumpeter Swans that summer in the upper New Fork and Green River drainages and winter along the Green River south of Fontenelle Dam. Important mule deer and pronghorn migration routes exist directly west of the property. Historically, the irrigated meadows on the ranch were hayed in the summer and grazed intensively by livestock spring, fall, and winter. The new owner, Mike Fenn, desires to manage the ranch to increase the diversity and quality of wildlife habitat. He has excluded grazing from the riparian zone to restore willow habitat along Duck Creek and to improve fish habitat in the creek. He wants to develop a wetland for Trumpeter Swans and other waterfowl in a portion of low lying irrigated meadow. Improved hydrology and decreased grazing pressure will increase upland cover and forage for other wildlife such as elk and pronghorn that pass through the area. The majority of the ranch is grassland/irrigated meadow with a small area of sagebrush habitat.

Engineering surveys were completed in winter/spring 2008 by Jack Doyle Construction. Work began in late fall 2008 (Wright Brothers) and was completed by early summer 2009. The landowner began filling the pond in July 2009, and it has been holding water very well (Figure 3). Overall, the landowner is very pleased with the results to date. Remaining work includes vegetation work (reseeding and some transplanting). Some minor earth moving work on the north end by the islands and intake channel was completed in July 2009. The wetland is already providing habitat for waterfowl and other bird species (Figure 4). In August 2009, I observed over a dozen Canada Geese; five or six species of ducks, including Mallard and teal broods; Wilson's Snipe; and Willet in addition to over 15 Wilson's Phalaropes. Water quality appeared excellent, and some aquatic vegetation is beginning to develop. I will work with the landowner to monitor vegetation development and to establish plants that are important for swan nutrition.

## **Friendly Pond Project, Big Piney, WY**

The goal of the project is to construct a 5.5 acre (2 ha) permanent, shallow water pond of 13.07 acre-feet capacity with average depth of 2.4 feet (0.7 m) to provide resting, nesting and foraging habitat for swans and other waterfowl. Plans call for construction of a low level dike 1,380 feet (421 m) long with maximum height of 8 feet (2.4 m) and side slopes of 3:1 and 2:1. There will be a pair of land islands and one floating island. The open water area will be 400 feet (122 m) in length to provide sufficient distance for swans to land and take off. A deep-water area, 40 x 100 feet (12 x 30 m) wide and 12 feet (4 m) deep will provide limited fishery opportunity. Water supply for the pond is from a small drainage called Friendly Creek.

This site is located in the North Piney Creek drainage that empties into the Green River near Big Piney. Two major reservoirs (Sixty-seven and McNitch) are located a few miles to the south. This area is a major flight corridor for migrating waterfowl and for some Trumpeter Swans that summer in the upper Green River drainage and winter along the Green River south of Fontenelle Dam. The landowners want to develop a wetland/sanctuary for Trumpeter Swans and other waterfowl in an isolated section of low-lying shrub habitat on the property that does not have open water habitat. Although this project was not one identified in the Department's Green River Basin Trumpeter Swan Habitat Project, it met the necessary criteria for creating valuable swan summer habitat.

The project received initial funding by the NRCS to cover planning (\$9,000) and some construction costs (\$15,000). Matching funds were obtained in 2008 from the WWNRT (\$37,500). Jack Doyle completed engineering plans. Rod Bennett, Bennett R.S. Construction, was selected to construct the pond. Due to rising construction and material costs since the original estimate was made, it was determined in August 2008 that additional funding would be needed to complete the project. The Department requested that Mark Hogan, USFWS Partners Program, review the proposal. He did and, after visiting with the landowner, agreed to provide an additional \$10,000 needed for project completion.

Construction was completed on this project in late summer 2008, the pond was filled in late summer/fall, and the final invoice was submitted and paid. The NRCS staff and Department biologist inspected construction work during separate visits in October 2008. The dike was reseeded in spring and vegetation growth was good this summer. Some aquatic plants have started to establish. The landowner is extremely pleased with the pond, and reported that a pair of swans stopped by for one day in May 2009. Many other species of ducks, Wilson's Phalaropes, Spotted Sandpipers, Killdeer and Wilson's Snipe used the pond site this first year.

Both the NRCS and Department will continue to conduct monitoring visits. Monitoring will focus on vegetation establishment, control of Canadian thistle, and wildlife use of the area.

## **DISCUSSION**

Construction and management of shallow water wetland ponds on private lands in the Green River Basin is very important for providing additional summer habitat for nesting pairs and subadult swans as the population expands in this part of the state. Successful completion of

projects requires time to build partnerships, obtain funding, coordinate with landowners and other agencies, and monitor in the post-construction period. The program has met with enthusiastic support from interested landowners and funding agencies. We have obtained funding for an additional project in 2009 on the Swift Ranch in Boulder on the New Fork River from the WWNRT and WLCI. We hope to initiate a minimum of one project per year, depending on landowner interest and funding opportunities.

## **LITERATURE CITED**

- Lockman, D., and S. Patla. 2005. Wyoming Green River Basin Trumpeter Swan summer habitat project. February 14, 2005. Wyoming Game and Fish Department Nongame Program, Lander. Unpublished report.
- Patla, S., and D. Lockman. 2004. Considerations and prescriptions for the design, construction, and management of shallow-water wetlands for spring through fall use by Trumpeter Swans (*Cygnus buccinator*) in western Wyoming. Wyoming Game and Fish Department Nongame Program, Lander. November 2004. Unpublished report.
- Patla, S., and B. Oakleaf. 2004. Summary and update of Trumpeter Swan range expansion efforts in Wyoming, 1988-2003. Bulletin of the Trumpeter Swan Society 32:116-118.
- Subcommittee on Rocky Mountain Trumpeter Swans. 2008. Pacific Flyway Management Plan for the Rocky Mountain Population of Trumpeter Swans. Pacific Flyway Study Committee, [c/o USFWS, DMBM], Portland, OR. Unpublished report.
- Wyoming Game and Fish Department. 2005. A Comprehensive Conservation Wildlife Strategy for Wyoming. Wyoming Game and Fish Department, Cheyenne.



**Figure 1. WLCI inspection tour of the Rimfire Ranch wetland project lead, Sago Pond in the background. October 27, 2008.**



**Figure 2. Newly filled Alexander Pond, Rimfire Ranch. October 27, 2008.**



**Figure 3. Duck Creek wetland, east side of new dike by Duck Creek, looking northeast. August 4, 2009.**



**Figure 4. Brood of Mallards on Duck Creek Wetland. August 4, 2009.**



**Figure 5. Friendly Pond, Big Piney, the first year the pond was filled. August 24, 2009.**



**Figure 6. Bill and Carrie Budd on the new dike at Friendly Pond. August 24, 2009.**

# **HARLEQUIN DUCK INVENTORIES AND TECHNIQUE DEVELOPMENT COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Species of Greatest Conservation Need / State Wildlife Grants Funding –  
Harlequin Duck

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Susan Patla, Nongame Biologist  
Bob Oakleaf, Nongame Coordinator

## **INTRODUCTION**

Harlequin Ducks occur in disjunct populations associated with Pacific and Atlantic coastlines in North America and Asia. Harlequins winter and molt in coastal habitats and migrate inland to nest along swift flowing mountain streams. In western North America, the breeding range extends from Alaska, British Columbia, Washington, and Oregon to eastern slopes of the continental divide in Alberta and Montana, and south to southeastern Idaho and northwestern Wyoming (American Ornithologists' Union 1983).

Objectives for monitoring Harlequin Ducks in Wyoming include surveys of designated drainages every five years for occupancy (aerial surveys) and productivity (ground surveys) (Wyoming Game and Fish Department 2005, CWCS Appendix VII). Monitoring efforts are coordinated with Grand Teton National Park (GTNP), Yellowstone National Park (YNP), the Shoshone National Forest (SNF), Bridger-Teton National Forest (BTNF), and Caribou-Targhee National Forest (CTNF). We initiated this monitoring protocol in 2002 to test the use of helicopter surveys to determine number of nesting pairs in historic Harlequin Duck habitat in GTNP and potential habitat on the BTNF during the pre-nesting period in May. The purpose of these surveys was to provide data for an initial statewide estimate of the number of breeding pairs, refine helicopter inventory techniques, and develop a statewide plan for monitoring population trends of Harlequin Ducks in Wyoming (Oakleaf et al. 2003).

Results from the 2002 monitoring study indicated the value of using helicopters for surveying remote backcountry habitat in the pre-nesting season that would be inaccessible by ground surveys, given snow conditions and terrain. A total of 7 pairs of Harlequin Ducks were observed in historic nesting habitat in GTNP (baseline transects), and 20 additional pairs were documented in the Teton Wilderness area on the BTNF, increasing both known numbers and distribution of this species in the state. A backcountry brood survey in August 2002 in the Teton Wilderness confirmed that Harlequin Ducks were nesting successfully where pairs had been observed in May with a total of 13 young observed. In contrast, however, few harlequins were

observed in the southern portion of the BTNF during spring aerial surveys, even though habitat appeared adequate and recent records existed of breeding pairs.

Based on results from 2002 and previous surveys, we estimated at least 70 breeding pairs of Harlequin Ducks in Wyoming. As detection rates can be as low as 50% for harlequin surveys, given the difficulty of observing this species, this should be considered a minimum estimate (Oakleaf et al. 2003).

In 2007, we conducted the five-year follow-up monitoring effort. Funding for the 2007 monitoring effort was obtained through the State Wildlife Grants Program for Wyoming, and from the Shoshone National Forest. Objectives for these surveys included: 1) helicopter surveys of documented occupied nesting streams in GTNP and in the Teton Wilderness area of the BTNF previously surveyed in 2002, 2) selected backcountry stream segments in YNP difficult to survey by foot, and 3) streams in the Shoshone National Forest (SNF) west of Cody where nesting pairs had been reported in the previous decade (Laurion and Oakleaf 1995, Laurion et al. 1997, Oakleaf 1999). We also conducted some brood surveys on selected stream segments in August in the Teton Wilderness and GTNP.

Results from the 2007 survey indicated a much lower number of nesting pairs, especially on certain drainages. Comparing results from only those transects surveyed in both 2002 and 2007, total number of pairs observed was 67% lower in 2007 ( $n=27$  in 2002), and total number of harlequins counted (including pairs and individuals) was 70% lower ( $n=60$  in 2002). The largest reduction in number of harlequins observed was in the Teton Wilderness area of the BTNF. In 2002, on previously unsurveyed stream segments, a substantial population of 44 ducks (20 pairs and 4 individuals) was documented. In contrast, we documented only four pairs in the same survey area in May 2007, an 80% reduction in number of pairs and 82% reduction in total number of ducks observed. Few ducks were found on the SNF survey segments as well. In GTNP (the baseline sample area), numbers observed were also reduced compared to 2002 but to a much lesser extent. Total number observed equaled 10, a 38% reduction compared to 2002 ( $n=16$ ).

In 2008, we received funding from the SNF and BTNF to conduct follow-up aerial monitoring surveys to assess whether the low numbers of nesting pairs observed in 2007 reflected an annual fluctuation (a result of low water flows in May) or, perhaps, a more systemic decline in nesting pairs compared to 2002 results. In addition, we conducted a brood survey in August in GTNP to collect data on brood numbers in stream segments not surveyed in 2007.

## **METHODS**

Aerial surveys for breeding pairs of Harlequin Ducks were conducted in 2008 with a Bell B3 Jet Ranger helicopter on 28 May (BTNF and SNF) and 29 May (SNF). The helicopter was flown along drainages at approximately 34 mph (55 kph) and 65-164 feet (20-50 m) above ground. A pilot and two Wyoming Game and Fish Department (Department) biologists experienced in Harlequin Duck aerial surveys were aboard (one in the front seat and one in back behind the first observer). Flight following was conducted through SALECS. Data collected

included GPS locations, and number and gender of harlequins observed, as well as other wildlife species of interest. A volunteer (Jake Briggs) conducted additional ground surveys in June-August on the west slope of the Teton Range in historic nesting habitat. Department biologists conducted brood surveys in August 2008 along selected stream segments in GTNP to document productivity and to compare number of broods observed with number of pairs observed during aerial surveys in the pre-nesting period. As in previous years, we sent out a press release in May and sent posters out to local agencies to solicit observations from the public.

## **RESULTS**

A total of 197 miles (318 km) of streams were surveyed for harlequins by helicopter in northwestern Wyoming on 28-29 May 2008, including 98 miles (158.1 km) in BTNF and 99 miles (160.3 km) in SNF (Table 1).

A total of 44 harlequins were observed: 19 pairs and 6 individuals (Tables 2 and 3). Comparing results from only those transects surveyed in all three years in the Teton Wilderness (2002, 2007, and 2008) total number of pairs observed in 2008 was similar to results from 2002 (19 pairs compared to 20) and much higher than 2007 (19 compared to 4). The South Fork (SF) Shoshone River was surveyed in 2007 and 2008. We found no ducks in 2007 and 3 individuals in 2008.

A brood survey was conducted in GTNP on 11-15 August 2008 along portions of Berry and Owl Creeks (total 7.1 km surveyed). One group of 9 fully feathered young was observed on Berry Creek below the convergence with Owl Creek. No adults were found.

## **OTHER REPORTED OBSERVATIONS**

On 4 June 2008, a pair of harlequins was observed on the SF Shoshone River near the mouth of Clearwater Creek (Table 4).

A single male Harlequin Duck was reported from the Wind River four miles west of Dubois just below the confluence with Warm Springs Creek on 19 May 2008 (Cynthia Boyhan, personal communication) and another male was reported on 29 May 2008 in Dubois on the Wind River (Gary Keimig, personal communication).

In the Wind River Range, a pair of harlequins was observed on 3 July 2008 in the southern end of Titcomb Basin (Morgan Graham, personal communication). We also received a late report from the previous year that a female and 6 young were seen in early September 2007 in the big meadow below Gannett Peak at the confluence of the Ink Wells trail and Glacier Trail (Meredith Taylor, personal communication).

No harlequins were found on Teton or Darby Creeks on the west slope of the Tetons, or on Cascade Creek in GTNP (Jake Briggs, personal communication).

Our press release also resulted in an interesting report from the summer of 2001. A male harlequin was reported from La Prele Creek (southwest of Douglas) in the La Prele Gorge. They watched this duck for over 10 minutes (Jeff Cowley, personal communication).

## **DISCUSSION**

Monitoring results in 2008 of known occupied Harlequin Duck habitat were similar to results from 2002, the first year we conducted helicopter spring surveys. These data indicate that the low numbers we observed in 2007 reflected variable annual conditions rather than a serious decline in number of nesting pairs occupying streams in western Wyoming. The low number of detections can be the result of a number of different factors, including timing of surveys, survey conditions, insufficient monitoring methods, annual variability in number of nesting pairs, or actual population declines. We suspect that in 2007 harlequins may have returned to nesting streams but departed quickly in response to low water conditions that year. Low water conditions would increase vulnerability of harlequins to predation from Bald Eagles and Peregrine Falcons (known predators of harlequins), and might also decrease the availability of secure nest sites. Snow pack and water levels were at or exceeded long-term averages in most mountain ranges in western Wyoming in 2008, so conditions were much improved over 2007.

Repeating portions of the aerial surveys in 2008 allowed us to confirm that some streams in Wyoming continue to be occupied by a fair number of harlequin pairs. We did not document ducks, however, on some streams on the SNF where previous records exist, such as on Crandall Creek, Hoodoo Creek, and the Clark's Fork River. Volunteer surveys also failed to find ducks on the west slope of the Tetons on the CTNF, and in Cascade Canyon in GTNP. Perhaps streams where only a few pairs have been documented in the past indicate that conditions on these streams are less than optimal and in some years, at least, they are not occupied. The probability of detecting ducks when only a few occupy a stream also likely decreases the chances of observing them on a one or two day survey. We encourage the U.S. Forest Service and other land management agencies to solicit input from the public for observations of ducks, and also to support aerial monitoring surveys at a minimum of every five years especially on drainages that are occupied by a number of pairs. Coordinating monitoring efforts with Montana and Idaho would also be helpful to track the regional population to determine if population trends are occurring in the Rocky Mountain segment of this population. Other research projects that could provide valuable insight into the overall status of this nesting population would include a genetic analysis and satellite tracking to determine migration paths and timing of migratory movements.

The next five year aerial monitoring survey should occur in 2012 if funding is available. Drainages recommended to be surveyed are shown in Table 5 (Oakleaf et al. 2003).

## **ACKNOWLEDGMENTS**

This work would not have been possible without funding provided by the Shoshone and Bridger-Teton National Forests. We thank Lynette Otto, SNF Forest Biologist, for her support and interest. We appreciate the volunteer effort by Jake Briggs on the Caribou-Targhee National

Forest and in Grand Teton National Park. Grand Teton National Park staff offered valuable logistical support for survey work in the Park. In particular, we thank Susan Wolff and Rick Guerri of GTNP. We are grateful overall for the outstanding interest shown by Wyoming citizens and visitors in the Harlequin Duck and other nongame species that enrich the Wyoming landscape.

## **LITERATURE CITED**

- American Ornithologists' Union. 1983. Check-list of North American Birds, 6th Edition. Allen Press, Inc., Lawrence, KS. 877pp.
- Laurion, T., and B. Oakleaf. 1995. Harlequin duck survey – Shoshone National Forest. Pages 10-19 in B. Luce, editor. 1995 Interim Completion Report – Sensitive Species Inventory. Wyoming Game and Fish Department Nongame Program, Lander. 42pp.
- Laurion, T., B. Oakleaf, and B. Luce. 1997. Special inventories for sensitive species on Shoshone National Forest. Pages 1-19 in B. Oakleaf, editor. 1997 Interim Completion Report – Sensitive Species Inventory. Wyoming Game and Fish Department, Lander. 31pp.
- Oakleaf, B. 1999. Harlequin Duck surveys on the Shoshone National Forest completion report. Pages 74-82 in A. O. Cerovski, editor. Threatened, Endangered, and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department Nongame Program, Lander. 298pp.
- Oakleaf, B., S. Patla, and K. Taylor. 2003. Harlequin Duck Inventories and Technique Development. Unpublished report. Wyoming Game and Fish Department Nongame Program, Lander. 13pp.
- Wyoming Game and Fish Department. 2005. A Comprehensive Conservation Wildlife Strategy for Wyoming. Wyoming Game and Fish Department, Cheyenne.

**Table 1. Drainages included in the Wyoming Game and Fish Department's helicopter surveys for Harlequin Ducks in May 2008. UTM's are NAD 27 datum.**

| #                        | Drainage Name                    | Date | Time <sup>a</sup> | Start UTM      | End UTM        | Km           |
|--------------------------|----------------------------------|------|-------------------|----------------|----------------|--------------|
| 1                        | Thorofare Creek                  | 5/28 | 0746              | 593909-4875210 | 570579-4888553 | 35.8         |
| 2                        | Yellowstone River                | 5/28 | 0905              | 573448-4881295 | 585799-4871088 | 39.9         |
| 3                        | SF Buffalo                       | 5/28 | 1123              | 584725-4863153 | 563734-4855544 | 36.8         |
| 4                        | NF Buffalo                       | 5/28 | 1230              | 563734-4855544 | 577606-4866560 | 35.2         |
| 5                        | Soda Fork                        | 5/28 | 1243              | 564302-4861681 | 572839-4862473 | 10.4         |
| 6                        | SF Shoshone                      | 5/28 | 1331              | 599606-4863769 | 628140-4910056 | 70.8         |
| 7                        | NF Crandall Creek                | 5/29 | 0735              | 606095-4966345 | 598007-4968207 | 10.8         |
| 8                        | Main Crandall Creek              | 5/29 | 0812              | 610037-4967891 | 595992-4963415 | 18.0         |
| 9                        | Hoodoo Creek                     | 5/29 | 0842              | 603761-4965367 | 601994-4962867 | 6.9          |
| 10                       | Muddy Creek                      | 5/29 | 0900              | 606413-4976491 | 605839-4981219 | 6.6          |
| 11                       | Lake Creek                       | 5/29 | 0904              | 602332-4975766 | 602486-4980223 | 8.4          |
| 12                       | Main Crandall Creek <sup>b</sup> | 5/30 | 0803              |                |                |              |
| 13                       | Hoodoo Creek <sup>b</sup>        | 5/30 | 0849              |                |                |              |
| 14                       | NF Crandall Creek <sup>b</sup>   | 5/30 | 0903              |                |                |              |
| 15                       | Lake Creek <sup>b</sup>          | 5/30 | 0916              |                |                |              |
| 16                       | Clark's Fork River <sup>b</sup>  | 5/30 | 0933              | 590542-4984461 | 623500-4964466 | 38.8         |
| <i>Total Km Surveyed</i> |                                  |      |                   |                |                | <i>318.4</i> |

<sup>a</sup> Times listed are for the start of surveys for each drainage and are Daylight Savings, Mountain Standard Time.

<sup>b</sup> Portions of these drainages were surveyed twice to recheck for ducks that may have been missed. Repeated kilometers are not added to the length of the drainage surveyed.

**Table 2. Observations of Harlequin Ducks (HARD) from helicopter surveys, May 2008, comparing results to monitoring survey results from 2002 and 2007.**

| Drainage Name     | 2002                    |            |       | 2007                    |            |       | 2008                    |                      |       |
|-------------------|-------------------------|------------|-------|-------------------------|------------|-------|-------------------------|----------------------|-------|
|                   | Number of HARD Observed |            |       | Number of HARD Observed |            |       | Number of HARD Observed |                      |       |
|                   | Pairs                   | Not Paired | Total | Pairs                   | Not Paired | Total | Pairs                   | Not Paired           | Total |
| Thorofare Creek   |                         |            |       |                         |            |       |                         |                      |       |
| Open Creek        | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| Silvertip Creek   | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| Yellowstone River | 7                       |            | 14    | 2                       |            | 4     | 5                       |                      | 10    |
| NF Buffalo Creek  | 6                       |            | 12    | 1                       |            | 2     | 4                       |                      | 8     |
| SF Buffalo Creek  | 1                       | 3          | 5     | 0                       |            | 0     | 4                       |                      | 8     |
| Soda Fork Buffalo | 0                       |            | 0     | 0                       |            | 0     | 0                       |                      | 0     |
| Wind River        | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| Fish Creek        | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| Moose Creek       | 5                       |            | 10    | 4                       |            | 8     |                         | Not surveyed in 2008 |       |
| Berry Creek       | 1                       |            | 2     | 1                       |            | 2     |                         | Not surveyed in 2008 |       |
| Owl Creek         |                         | 1          | 1     | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| Snake River YNP   | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| Coulter Creek     | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| Wolverine Creek   | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| Lewis River       | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| Torrey Creek      | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| Jakeys Fork       | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| Crandall Creek    | Not surveyed in 2002    |            |       | 0                       | 1          | 1     | 0                       |                      | 0     |
| Hoodoo Creek      | Not surveyed in 2002    |            |       | 0                       |            | 0     | 0                       |                      | 0     |
| Clarks Fork       | Not surveyed in 2002    |            |       | 0                       |            | 0     | 0                       |                      | 0     |
| Lake Creek        | Not surveyed in 2002    |            |       | 0                       |            | 0     | 0                       |                      | 0     |
| Sunlight Creek    | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| NF Shoshone       | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| SF Shoshone       | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | 3                    | 3     |
| Needles Creek     | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |
| Greybull River    | Not surveyed in 2002    |            |       | 0                       |            | 0     |                         | Not surveyed in 2008 |       |

**Table 3. Summary of Harlequin Ducks (HARD) observed during helicopter surveys, May 2008.**

| <b>Date</b>  | <b>Drainage</b>   | <b>Total Km</b> | <b># HARD pairs</b> | <b>Singles</b>  | <b>Total HADU</b> |
|--------------|-------------------|-----------------|---------------------|-----------------|-------------------|
| 5/28/08      | Thorofare Creek   | 35.8            | 6                   | 1 m, 2 f        | 15                |
| 5/28/08      | Yellowstone River | 39.9            | 5                   |                 | 10                |
| 5/28/08      | NF Buffalo Fork   | 35.2            | 4                   |                 | 8                 |
| 5/28/08      | SF Buffalo Fork   | 36.8            | 4                   |                 | 8                 |
| 5/28/08      | SF Shoshone       | 70.8            | 0                   | 1 m, 2 f        | 3                 |
| <i>Total</i> |                   | <i>218.5</i>    | <i>19</i>           | <i>2 m, 4 f</i> | <i>44</i>         |

**Table 4. Summary of reported observations of Harlequin Ducks in 2008.**

| <b>Date</b>   | <b>Drainage</b>        | <b># HARD pairs</b> | <b>Singles</b>     | <b>UTM easting</b> | <b>UTM northing</b> |
|---------------|------------------------|---------------------|--------------------|--------------------|---------------------|
| 5/14/08       | Yellowstone River      | 1                   | 4                  | 578889             | 4878145             |
| 5/19/09       | Wind River             |                     | 1 male             | 603785             | 4823713             |
| 6/4/08        | NF Shoshone R          | 1                   |                    | 605953             | 4923602             |
| 7/3/08        | Titcomb Basin          | 1                   |                    | 611193             | 4773458             |
| Sept.<br>2007 | Gannett Peak<br>meadow |                     | Female+ 6<br>young | 615795             | 4788793             |

**Table 5. Wyoming streams and rivers recommended for monitoring Harlequin Ducks.**

| <b>Streams and Rivers in the Harlequin Duck Survey Area</b>                                     | <b>% Known Population</b> | <b>Cumulative %</b> | <b>Estimated Time (Hrs.)<sup>a</sup></b> | <b>Potential Contributors</b> |
|---|---------------------------|---------------------|--|-------------------------------|
| Upper Yellowstone River & tributaries, Thorofare Creek & Buffalo Forks (56, 24, 25, 33, 34, 35) | 32                        | 32                  | 7  | YNP, BTNF                     |
| Moose, Owl, and Berry Creeks, Snake and Bechler Rivers (30, 31, 32, 37, 59)                     | 22                        | 54                  | 4  | YNP, GTNP                     |
| Yellowstone and Lamar Rivers and occupied tributaries (55, 54)                                  | 21                        | 75                  | 4  | YNP                           |
| Clarks Fork River, Crandall, Lake, and Sunlight Creeks (50 – 53)                                | 7                         | 82                  | 4  | SNF                           |
| Boulder, Fremont, Pine ,Torrey, Jakeys Fork, and Dinwoody Creeks (1, 5, 6, 59, 60)              | 7                         | 89                  | 6  | BTNF, SNF                     |
| Streams and Rivers on the West Slope of the Tetons (58)   | 5                         | 94                  | 4  | BTNF                          |

<sup>a</sup> Estimated flight time includes ferry time to the nearest airport but assumes the use of a gas truck at Blackrock Ranger Station for the Thorofare area. Does not include ferry time to and from home station of air service.

## **COMMON LOON SURVEYS COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Species of Greatest Conservation Need – Common Loon

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Andrea Orabona, Nongame Bird Biologist

### **INTRODUCTION**

The Common Loon is classified as a Wyoming Game and Fish Department (Department) Species of Greatest Conservation Need with a Native Species Status of one because of its vulnerability to human disturbance and environmental degradation, and its limited abundance and restricted distribution in Wyoming (Wyoming Game and Fish Department 2005). Loons can be observed statewide during spring and fall migration and nonbreeding loons can be found throughout the state during the summer. However, suitable breeding habitat is restricted to the northwest corner of Wyoming and is easily lost or degraded due to human disturbance and habitat changes. In 2008, known Common Loon nesting areas were surveyed to document lake occupancy, productivity, and survival of young.

### **METHODS**

The timeline for Common Loon surveys is as follows: lake occupancy surveys are conducted in early to mid-June, productivity surveys are conducted in mid- to late July, and follow up surveys to determine initial survival of young are conducted in mid-to late August.

Adult and young loons are best observed during early morning and early evening hours. Observers sit quietly in an area that provides a vantage point over the lake to be surveyed, and search the lake and adjacent shoreline for loon activity. Each lake is surveyed for 45 minutes to one hour to ensure that loons that are not immediately visible are not overlooked. Observers record the number of adult and young loons detected, loon activity and behavior (e.g. diving, hunting, feeding self or young, calling, flying, loafing, agitated, defensive), and other species observed or heard. Additional comments, such as human activity; new or on-going disturbances; the location of paved, dirt, and two-track roads; and shoreline habitat, are also recorded.

## **RESULTS AND DISCUSSION**

A total of eight lakes outside of Yellowstone National Park were included in the 2008 results for nesting Common Loons. Seven of the lakes have a past history of Common Loon breeding activity. One site, Emma Matilda Lake, had an adult loon present on 28 June 1987 and was added to the survey schedule in 2008 after a photograph was submitted in 2007 of an adult loon with a loonlet on the lake.

During the June lake occupancy survey, adult loon pairs were observed on five of the eight lakes surveyed. During the July productivity survey, a single adult loon, adult loon pairs, or three adult loons (on one lake) were observed on five of the eight lakes visited, but only a single loonlet was observed on one lake. During the August young survival survey, adult loons were observed on two of the eight lakes surveyed and the same single loonlet was observed on one lake.

Summary data for 2008 and previous years are presented in Table 1.

Common Loon lake occupancy and productivity data for Wyoming are presented in Table 2. In 2007, there was a personnel change in Yellowstone National Park and loon surveys were not continued by Park personnel. It is unfortunate to lose continuity in the long-term data set of this Species of Greatest Conservation Need, especially at a time when other factors appear to be threatening the ability of loons to continue to successfully reproduce at these historic sites in the State.

In addition to incompatible changes occurring to Common Loon nesting habitat due to drought and climate change, an increase in human presence and disturbance may also be negatively affecting the ability of loons to breed successfully at some of the nesting sites. This issue will be discussed with the U.S. Forest Service during the 2009 survey to ensure that a viable population of loons continues to thrive at these historic nesting lakes in northwestern Wyoming.

For several of the past years, due to persistent drought and the effects of climate change that cause ice-off to happen sooner, some loon pairs arrived earlier on the breeding grounds and produced young as early as the first or second week in June. Although this was not the case in 2008, we will continue to track the timing of the breeding season and incorporate any long-term or permanent seasonal shift into the timing of our surveys.

## **ACKNOWLEDGEMENTS**

The Nongame Program would like to acknowledge the following Department personnel for their valuable contributions to the 2008 Common Loon monitoring efforts: Meredith Haas, Joslin Heyward, Ron Lockwood, and Susan Patla.

## **LITERATURE CITED**

Wyoming Game and Fish Department. 2005. A Comprehensive Conservation Wildlife Strategy for Wyoming. Wyoming Game and Fish Department, Cheyenne.

**Table 1. Summary of Common Loon occupancy (June), productivity (July), and young survival (August) surveys from 1987 through 2008. Excludes Yellowstone National Park. Adult loons are depicted by the letter A and juvenile loons are depicted by the letter J.**

| Year | Arizona Lake |                | Bergman Reservoir |    | Emma Matilda Lake |    | Fish Lake       |    | Indian Lake |                | Junco Lake |    | Loon Lake |                | Moose Lake |                | Total Loons |    |
|------|--------------|----------------|-------------------|----|-------------------|----|-----------------|----|-------------|----------------|------------|----|-----------|----------------|------------|----------------|-------------|----|
|      | A            | J              | A                 | J  | A                 | J  | A               | J  | A           | J              | A          | J  | A         | J              | A          | J              | A           | J  |
| 1987 | 1            | 2              | 2                 | 1  | 1                 | ns | 0               | 0  | 2           | 2              | 1          | 1  | 2         | 1              | 2          | 2              | 11          | 9  |
| 1988 | 2            | 1              | 2                 | 2  | ns                | ns | 0               | 0  | 2           | 1              | 2          | 2  | 2         | 2              | 2          | 2              | 12          | 10 |
| 1989 | 2            | - <sup>a</sup> | 2                 | -  | ns                | ns | ns <sup>b</sup> | ns | 4           | 1              | 2          | 1  | 2         | 2              | 2          | -              | 14          | 4  |
| 1990 | 4            | -              | 2                 | -  | ns                | ns | ns              | ns | 2           | 2              | 2          | 1  | 2         | 1              | 2          | 2              | 14          | 6  |
| 1991 | ns           | ns             | ns                | ns | ns                | ns | ns              | ns | ns          | ns             | ns         | ns | ns        | ns             | ns         | ns             | ns          | ns |
| 1992 | 2            | -              | 2 <sup>c</sup>    | -  | ns                | ns | 2               | -  | 2           | 1 <sup>d</sup> | 2          | -  | 2         | ?e             | 2          | ?              | 12          | ?  |
| 1993 | 2            | -              | 2 <sup>c</sup>    | ?  | ns                | ns | 1               | ?  | 3           | -              | 2          | -  | 2         | 1              | 2          | ?              | 12          | ?  |
| 1994 | 2            | 1              | 2                 | -  | ns                | ns | 2               | -  | 0           | 0              | 0          | 0  | 2         | 1              | 2          | 1              | 10          | 3  |
| 1995 | 2            | 1              | 2 <sup>c</sup>    | -  | ns                | ns | 0               | 0  | 2           | -              | 0          | 0  | 1         | 2              | 0          | 0              | 5           | 3  |
| 1996 | 2            | -              | 1 <sup>c</sup>    | -  | ns                | ns | 2 <sup>f</sup>  | -  | 2           | 1              | 2          | -  | 2         | 2              | 2          | -              | 10          | 3  |
| 1997 | 2            | 1              | 0                 | 0  | ns                | ns | 1               | -  | 2           | 2              | 0          | 0  | 2         | 2              | 2          | 1              | 9           | 6  |
| 1998 | 0            | 0              | 0                 | 0  | ns                | ns | 0               | 0  | 1           | 2              | 0          | 0  | 1         | -              | 2          | 1              | 4           | 3  |
| 1999 | 2            | 2              | 0                 | 0  | ns                | ns | 2               | -  | 2           | 2              | 0          | 0  | 2         | -              | 2          | -              | 10          | 4  |
| 2000 | 2            | 1              | 1 <sup>c</sup>    | 0  | ns                | ns | 2 <sup>f</sup>  | -  | 2           | 2              | 2          | 1  | 2         | 1              | 2          | -              | 10          | 5  |
| 2001 | 0            | 0              | 0                 | 0  | ns                | ns | 2 <sup>f</sup>  | -  | 2           | 1              | 2          | -  | 2         | 1              | 2          | 1              | 8           | 3  |
| 2002 | 1            | 0              | 1 <sup>c</sup>    | 0  | ns                | ns | 1 <sup>f</sup>  | 0  | 2           | 1              | 2          | -  | 2         | 1              | 1          | -              | 8           | 2  |
| 2003 | 2            | 1              | 1 <sup>c</sup>    | 0  | ns                | ns | 1               | 0  | 2           | 1              | 1          | -  | 2         | 0 <sup>g</sup> | 2          | 2              | 10          | 4  |
| 2004 | 2            | 0              | 2 <sup>c</sup>    | 0  | ns                | ns | 3 <sup>f</sup>  | 0  | 4           | 0              | 1          | 0  | 2         | 2              | 2          | 0              | 11          | 2  |
| 2005 | 2            | 0              | 1 <sup>c</sup>    | 0  | ns                | ns | 2               | 0  | 2           | 2              | 0          | 0  | 2         | 0 <sup>g</sup> | 2          | 0 <sup>g</sup> | 10          | 2  |
| 2006 | 2            | 0              | 2 <sup>c</sup>    | 0  | ns                | ns | 3 <sup>f</sup>  | 0  | 2           | 2              | 0          | 0  | 2         | 2              | 2          | 2              | 8           | 4  |
| 2007 | 2            | 2              | 1 <sup>c</sup>    | 0  | 1                 | 1  | 1 <sup>f</sup>  | 0  | 2           | 1              | 2          | 0  | 2         | 0 <sup>g</sup> | 2          | 0 <sup>g</sup> | 11          | 4  |

| Year | Arizona Lake |   | Bergman Reservoir |   | Emma Matilda Lake |   | Fish Lake |   | Indian Lake |   | Junco Lake |   | Loon Lake      |                | Moose Lake |   | Total Loons |   |
|------|--------------|---|-------------------|---|-------------------|---|-----------|---|-------------|---|------------|---|----------------|----------------|------------|---|-------------|---|
|      | A            | J | A                 | J | A                 | J | A         | J | A           | J | A          | J | A              | J              | A          | J | A           | J |
| 2008 | 1            | 0 | 0                 | 0 | 2                 | - | 0         | 0 | 2           | 1 | 0          | 0 | 3 <sup>h</sup> | 0 <sup>g</sup> | 2          | 0 | 9           | 1 |

- <sup>a</sup> A dash (-) indicates that young were not observed during the survey; however, due to the secretive nature of loons, juveniles may have been present but hidden from view.
- <sup>b</sup> ns = not surveyed.
- <sup>c</sup> Most likely the adult(s) from the Indian Lake pair using this site for foraging; not included in total.
- <sup>d</sup> A nest with 1 egg was observed; it is unknown if the egg hatched and the juvenile loon survived.
- <sup>e</sup> A question mark (?) indicates that a June nesting status survey was conducted only; these lakes were not surveyed in July so productivity was unknown.
- <sup>f</sup> Most likely the same individual(s) that use several lakes in the vicinity of Fish Lake for foraging and/or nesting; not included in total.
- <sup>g</sup> Increased human activities that are incompatible with nesting may be responsible for this pair's failure to produce young.
- <sup>h</sup> The third individual is most likely one of the same loons that nest or forage in the vicinity of Loon Lake.

**Table 2. Common Loon nesting, productivity, and young survival data for Wyoming, 1987-2008 (2007 and 2008 data are incomplete due to a change of personnel in Yellowstone National Park).**

| Year | Outside Yellowstone Nat'l Park |         |                  | Yellowstone National Park |         |                  | Wyoming Total   |         |                  |
|------|--------------------------------|---------|------------------|---------------------------|---------|------------------|-----------------|---------|------------------|
|      | # Pairs                        | # Young | # Lakes w/ Young | # Pairs                   | # Young | # Lakes w/ Young | # Pairs         | # Young | # Lakes w/ Young |
| 1987 | 6                              | 9       | 6                | na <sup>a</sup>           | na      | na               | in <sup>b</sup> | in      | in               |
| 1988 | 6                              | 10      | 6                | na                        | na      | na               | in              | in      | in               |
| 1989 | 6                              | 4       | 3                | na                        | na      | na               | in              | in      | in               |
| 1990 | 6                              | 6       | 4                | 11                        | 9       | 9                | 17              | 15      | 13               |
| 1991 | ns <sup>c</sup>                | ns      | ns               | 9                         | na      | na               | in              | in      | in               |
| 1992 | 6                              | ns      | ns               | 11                        | 6       | 4                | 17              | in      | in               |
| 1993 | 5                              | ns      | ns               | 12                        | 6       | 4                | 17              | in      | in               |
| 1994 | 5                              | 3       | 3                | 12                        | 12      | 8                | 17              | 15      | 11               |
| 1995 | 3                              | 3       | 2                | 13 <sup>d</sup>           | 8       | 12               | 16              | 11      | 14               |
| 1996 | 5                              | 3       | 2                | 5                         | 4       | 4                | 10              | 7       | 6                |
| 1997 | 4                              | 6       | 4                | 5                         | 6       | 5                | 9               | 12      | 9                |
| 1998 | 2                              | 3       | 2                | 12                        | 8       | 6                | 14              | 11      | 8                |
| 1999 | 4                              | 4       | 2                | 14                        | 2       | 2                | 18              | 6       | 4                |
| 2000 | 5                              | 5       | 4                | 9                         | 8       | 9                | 14              | 13      | 13               |
| 2001 | 4                              | 3       | 3                | 9                         | 7       | 9                | 13              | 10      | 12               |
| 2002 | 3                              | 2       | 2                | 9                         | 5       | 4                | 12              | 7       | 6                |
| 2003 | 4                              | 4       | 4                | 8                         | 1       | 1                | 12              | 4       | 5                |
| 2004 | 5                              | 2       | 1                | 9                         | 3       | 2                | 14              | 5       | 3                |
| 2005 | 5                              | 2       | 1                | 8                         | 4       | 3                | 13              | 6       | 4                |
| 2006 | 4                              | 4       | 2                | 9                         | 6       | 4                | 13              | 10      | 6                |
| 2007 | 6                              | 4       | 3                | na                        | na      | na               | in              | in      | in               |

| Year | Outside Yellowstone Nat'l Park |         |                  | Yellowstone National Park |         |                  | Wyoming Total |         |                  |
|------|--------------------------------|---------|------------------|---------------------------|---------|------------------|---------------|---------|------------------|
|      | # Pairs                        | # Young | # Lakes w/ Young | # Pairs                   | # Young | # Lakes w/ Young | # Pairs       | # Young | # Lakes w/ Young |
| 2008 | 5                              | 1       | 1                | na                        | na      | na               | in            | in      | in               |

- <sup>a</sup> na = data are not available.
- <sup>b</sup> in = State totals are incomplete.
- <sup>c</sup> ns = not surveyed.
- <sup>d</sup> Two pairs nested on the same lake.

## **BALD EAGLE COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Species of Greatest Conservation Need – Bald Eagle

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Susan Patla, Nongame Biologist  
Bob Oakleaf, Nongame Coordinator  
Eric Cole, Biologist, National Elk Refuge  
Susan Wolff, Biologist, Grand Teton National Park  
John Marten, Biologist, Seedskafee National Wildlife Refuge

### **INTRODUCTION**

The U.S. Fish and Wildlife Service (USFWS) declassified the Bald Eagle in July 2007 so it is no longer listed under the federal Endangered Species Act as a threatened species in the western United States. However, it still receives protection under the federal Bald and Golden Eagle Protection Act. The Wyoming Game and Fish Department (Department) initiated statewide monitoring for Bald Eagles in 1978. Currently, the Nongame Program monitors all nest territories in the Snake River (Greater Yellowstone area) and in the upper Green River basin south to Seedskafee National Wildlife Refuge using aerial and ground surveys to determine occupancy and productivity. Regional Department biologists check a proportion of known nests in other drainages in the state for occupancy, and a smaller number for productivity, including the upper North Platte River near Saratoga and several drainages near Sheridan. Federal biologists provide additional data for their respective management units, and a few consultant firms also provide observations from project sites. The Department continues to receive and respond to numerous requests by other state and federal agencies and the public for information on nesting status, productivity, and mitigation measures for Bald Eagles in Wyoming.

### **POPULATION TRENDS – NESTING**

The distribution of nesting Bald Eagles in Wyoming can be found in previous Annual Completion Reports. Bald Eagles nesting in northwestern Wyoming are part of a significant nesting population in the Rocky Mountain West. The population extends into Idaho and Montana. Recovery of the species centered in Jackson Hole and the Greater Yellowstone area along the Snake River and its tributaries. The highest density of Bald Eagles still occurs in this part of the State, but nesting pairs are now found along all major drainages in Wyoming. Over the past decade, an increase in the number of nesting pairs has been documented in the Green

River Basin.

## **MONITORING METHODS**

### **Occupancy and Productivity**

#### *Aerial Surveys Western Wyoming*

In 2008, aerial monitoring surveys were conducted by Susan Patla on 2 and 3 April (incubation survey approximately 15 hours) and 9 June (productivity survey 5 hours). Known nest sites were checked along the main stem and tributaries of the Snake River, Gros Ventre River, Salt River, New Fork River, and Green River (from Green River Lakes south to Fontenelle Dam). Seedskafee National Wildlife Refuge (SNWR) staff provided nesting data for the refuge. The incubation survey was flown in an Arctic Tern (Sky Aviation; Dave Stinson, pilot) and the productivity survey in a Cessna 205 (France Flight Service, Dwight France, pilot). Nongame Program personnel collected data on nest sites at additional locations in conjunction with other aerial survey work. Data collected on aerial surveys included number of adults and young observed, Geographic Positioning System nest locations, and nest tree species and condition. New nest trees were photographed, when possible.

#### *Ground Surveys*

A number of Department biologists, federal agency biologists, and private consulting firms provided occupancy and productivity data from sites throughout the State. Ground surveys were also conducted at some accessible nest sites in the Department's Jackson and Pinedale Regions to confirm flight results or to collect additional data. Volunteers also provided data for some territories on onset of incubation and hatch dates. Ground surveys were conducted using spotting scopes at sufficient distances from nest sites to prevent disturbance. Observation times range from a few minutes to 1-2 hours, depending on visibility, pair behavior, and nest status.

### **Banding Effort and Contaminant Study**

A small-scale leg banding effort has been ongoing since the 1990s by Dr. Al Harmata (Montana State University) and Dr. George Montopoli (Yuma State University and Grand Teton National Park). Nestlings in selected territories in Grand Teton National Park and the Snake River Wyoming Unit of the Greater Yellowstone Bald Eagle Management Area are banded between 6-10 weeks of age with USFWS locking leg bands. In 2006 and 2007, nestlings were also sampled for contaminants including mercury (Hg), lead (Pb), and selenium (Se) and other heavy metals.

### **Mortality Data**

Reports of injured and dead Bald Eagles are followed up, when possible, to determine cause of injury/death and to collect carcasses. If carcasses are fresh and cause of death uncertain, they are frozen and submitted to the Wyoming State Veterinary Laboratory in Laramie for analysis. Partial and old remains are sent to the National Eagle Repository for distribution to

Native Americans for religious purposes. There are likely other eagle mortalities that have been recorded in the Department's Wildlife Observation System database.

## **MONITORING RESULTS AND DISCUSSION**

### **Occupancy and Productivity**

Statewide results are summarized in Table 1. Population management objectives have been exceeded since 1987 and the State population continues to increase, although carrying capacity may have been reached in portions of some river drainages, such as the main stem of the Snake River in Wyoming. In 2008, occupancy data were obtained for 84% of the known territories in Wyoming (157 out of 188 total) and productivity data for 58% (91/157) of the territories checked for occupancy. We documented a total of 12 new nesting territories in 2008. The number of mature young counted was identical to results from 2007: 126 young were tallied, averaging 1.14 young per nest checked for productivity.

State biologists increased monitoring efforts outside of the Greater Yellowstone area, checking 54 nest territories compared to 44 the previous year. Numbers of nests checked for occupancy in Yellowstone National Park (YNP) dropped from 34 to 19, a result of a change in nest observers, the first in 20 years. Known nests had not been georeferenced in the past, making it difficult for new observers to locate historic nest sites during aerial surveys. Additional surveys over the next 2-3 years should correct this problem (Baril and Smith, Yellowstone Bird Monitoring Report 2008).

### **Banding and Contaminant Data 2008**

A total of 10 nestlings were banded in 2008 in the Jackson Region (Table 2). Results from contamination testing conducted 2006-2008 are presented below in Table 3 (Montopoli et al. 2009, draft report). Analyses (geometric mean) showed an increase in mercury and lead in nestlings from 2006-2007, and then a decrease in 2008. Mean selenium showed a slight increase in 2008. Selenium levels were elevated at one nest site in GTNP, and the study also found elevated arsenic levels at a nest site on private land along the Snake River (data available upon request).

### **Mortality Data 2008**

There were 6 bald eagle mortalities that we investigated in 2008 and recovered two eagles that had been banded back in the 1980s:

1. On March 19, an adult was hit by a truck in the Snake River Canyon, milepost 12.
2. A fisherman found a decomposed adult in the East Table boat access site in the Snake River Canyon. The bird had a USFWS leg-band: 629-15994. This bird was 22 years old. Dr. Al Harmata banded this nestling on 17 June 1985 at the Butler Creek nest site near Munger Mountain south of Jackson. This was the first bird recorded with pied juvenile plumage in the Jackson area. Light colored talons were visible on the remains.

3. A Department warden found a dead adult near Afton in a row of cottonwoods in June. We looked for a possible nest site (none is know is this area) but did not locate one.
4. Another Bald Eagle was picked up in the Bryon Flats area by a local land owner. This bird was banded on 3 June 2002 at the Oliver nest site, Jackson: FWS 629-46014.
5. An injured adult was picked up on the edge of Shoshone Lake by campers and later died. This bird was leg-banded (FWS 619-29224). A necropsy by the state lab (#08011076) confirmed lead poisoning. Liver lead level measured 2.24 ppm. This bird was banded on 27 May 2000 at the Oliver nest site, Jackson.
6. A hunter found another banded adult eagle with a broken neck on 11 October 2008 in the cottonwoods on the Department's South Park Wildlife Habitat Management Area. It had a color leg-band and a USFWS silver band: 629-26972. This bird was banded as a nestling at Van Point, Palisades Reservoir, Idaho on 26 June 1987 by Mike Whitfield, so it was 20 years old.

## **ACKNOWLEDGMENTS**

The Department greatly appreciates the efforts of the following individuals for providing data on nesting Bald Eagles in 2008: Don DeLong [(Bridger-Teton National Forest (BTNF)], Cory Mlodik (BTNF), Debra Patla (volunteer), Hamilton Smith (Biota Research and Consultants, Inc.), Doug and Peg Soby (volunteers), Diane Thomas (TRC Solutions), Jeff Weinstein (Wyoming Department of Transportation), and Kathy McFarland (Grand Teton National Park). In addition, we wish to thank the following Department biologists for their data collection efforts: Greg Anderson, Justin Binfet, Tom Easterly, Stan Harter, Martin Hicks, Bart Kroger, Andrea Orabona, Will Schultz, Dan Thiele, Tim Thomas, and Laurie Van Fleet.

**Table 1. Production of Bald Eagles in Wyoming, 2008.**

| Population Index   | Wyoming Portion of GYE <sup>a</sup> | Green River <sup>b</sup> | Bear River | Other Wyoming (N of I-80) | Other Wyoming (S of I-80) | Statewide Total |
|--|-------------------------------------|--------------------------|------------|---------------------------|---------------------------|-----------------|
| Territories checked for occupancy                        | 70                                  | 32                       | 1          | 27                        | 27                        | 157             |
| Number of territories occupied                           | 59                                  | 25                       | 1          | 20                        | 21                        | 126             |
| Percent occupied   | 84%                                 | 78%                      | 100%       | 74%                       | 78%                       | 80%             |
| Territories checked for productivity                     | 38                                  | 22                       | 1          | 13                        | 17                        | 91              |
| Territories that produced young                          | 28                                  | 19                       | 1          | 10                        | 11                        | 69              |
| Percent successful (young produced) <sup>e</sup>         | 74%                                 | 86%                      | 100%       | 77%                       | 65%                       | 76%             |
| Number of mature young produced <sup>f</sup>             | 42                                  | 32                       | 1          | 13                        | 16                        | 104             |
| Number of mature young/territory checked                 | 1.11                                | 1.45                     | 1.00       | 1.00                      | 0.94                      | 1.14            |
| Number of territories considered unoccupied <sup>g</sup> | 6                                   | 6                        | 0          | 3                         | 7                         | 23              |
| Number of new territories found in 2007 <sup>h</sup>     | 4                                   | 0                        | 0          | 3                         | 5                         | 12              |

<sup>a</sup> Includes 3 pairs (2 fledged) in Lincoln County (Salt River), and 15 pairs (7 fledged) in Yellowstone National Park (Lisa Baril, YNP).

<sup>b</sup> Aerial surveys from Green River Lakes to Fontenelle Dam; ground surveys on the Seedskeadee National Wildlife Refuge.

<sup>c</sup> Includes the Wind River, the Popo Agie River, the Big Horn Basin, Casper, Sheridan, Cody, and Lusk areas.

<sup>d</sup> Includes the North Platte and Little Snake Rivers. Note: an additional 5 nests could not be located.

<sup>e</sup> Percentage of territories checked for productivity where young were documented; not all occupied territories had productivity checks.

<sup>f</sup> Mature young at most territories is the number of fully feathered nestlings counted prior to fledging in June and July.

<sup>g</sup> Territories that have not been occupied for the previous five years and are no longer checked by the Department.

<sup>h</sup> New territories are included in totals for the year.

**Table 2. Nestling Bald Eagle banding data for 2008 in the Snake River drainage, Jackson, Wyoming. (Data were provided by George Montopoli.)**

| Date    | Nest Site         | Band Number | Age Class | Leg Banded | Metals | Contaminants | AZ genetics |
|---------|-------------------|-------------|-----------|------------|--------|--------------|-------------|
| 5/31/08 | Hoback Junction   | 679-02451   | 6-7 weeks | R          | Y      | Y            | Y           |
| 5/31/08 | Ford's South      | 679-02455   | 6 weeks   | L          | Y      | Y            |             |
| 5/31/08 | Crane Creek Ranch | 679-02452   | 7-8 weeks | R          | Y      | Y            | N           |
| 5/31/08 | Crane Creek Ranch | 679-02453   | 7-8 weeks | R          | Y      | Y            | N           |
| 5/31/08 | Crane Creek Ranch | 679-02454   | 7-8 weeks | R          | Y      | Y            | N           |
| 6/07/08 | Moose             | 679-02456   | 7 weeks   | L          | Y      | Y            | Y           |
| 6/07/08 | Moose             | 679-02457   | 7 weeks   | L          | Y      | Y            | N           |
| 6/07/08 | 4 Lazy F          | 679-02458   | 7 weeks   | L          | Y      | Y            | N           |
| 6/07/08 | 4 Lazy F          | 679-02459   | 7 weeks   | L          | Y      | N            | N           |
| 6/18/08 | Lower Slide Lake  | 679-02460   | 7 weeks   | R          | Y      | Y            | N           |

**Table 3. A comparison of Hg, Pb, and Se concentrations (ppm wet weight) in nestling Bald Eagles by year and nest site.**

| Nest Site              | Hg           |              |              | Pb            |               |              | Se           |              |              |
|------------------------|--------------|--------------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|
|                        | 2006         | 2007         | 2008         | 2006          | 2007          | 2008         | 2006         | 2007         | 2008         |
| 4LazyF Ranch           | 0.150        | 0.204        | 0.270        | 0.003         | 0.019         | 0.021        | 0.755        | 1.415        | 3.363        |
|                        | 0.261        | 0.210        | 0.261        | 0.003         | 0.028         | 0.021        | 0.823        | 1.758        | 3.183        |
|                        | --           | 0.563        |              | --            | 0.089         |              | --           | 1.285        |              |
| Crane Creek Ranch      |              |              | 0.131        |               |               | 0.026        |              |              | 1.800        |
|                        |              |              | 0.112        |               |               | 0.050        |              |              | 1.636        |
|                        |              |              | 0.138        |               |               | 0.025        |              |              | 1.448        |
| Elbow Nest             | 0.614        | 0.697        |              | 0.004         | 0.011         |              | 1.477        | 1.316        |              |
|                        | --           | 0.742        |              | --            | 0.011         |              | --           | 1.599        |              |
| Ford's South           |              |              | 0.312        |               |               | 0.020        |              |              | 2.325        |
| Hoback Junction        | --           | 0.358        | 0.275        | --            | 0.014         | 0.021        | --           | 1.044        | 1.654        |
| Lower Slide Lake       | 0.975        | 0.539        | 0.310        | 0.006         | 0.011         | 0.021        | 1.191        | 0.980        | 1.191        |
|                        | --           | 0.575        |              | --            | 0.012         |              | --           | 1.270        |              |
| Moose Nest             | 0.096        | 0.230        | 0.083        | 0.008         | 0.012         | 0.019        | 0.505        | 1.896        | 1.024        |
|                        | 0.291        | --           | 0.162        | 0.003         | --            | 0.032        | 0.619        | --           | 1.504        |
| Oxbow Bend             | --           | 0.797        |              | --            | 0.193         |              | --           | 1.783        |              |
| Refuge Nest            | 0.115        | 0.146        |              | 0.006         | 0.012         |              | 3.498        | 2.722        |              |
|                        | 0.142        | --           |              | 0.007         | --            |              | 3.648        | --           |              |
| Spaulding Bay          | --           | 0.360        |              | --            | 0.021         |              | --           | 0.549        |              |
|                        | --           | 0.367        |              | --            | 0.166         |              | --           | 0.574        |              |
| Triangle X Ranch       | 0.212        | 0.342        |              | 0.014         | 0.142         |              | 0.542        | 1.019        |              |
|                        | 0.242        | 0.407        |              | 0.005         | 0.120         |              | 0.654        | 1.318        |              |
| <i>Arithmetic Mean</i> | <i>0.310</i> | <i>0.436</i> |              | <i>0.0059</i> | <i>0.0574</i> |              | <i>1.371</i> | <i>1.369</i> |              |
| <i>Geometric Mean</i>  | <i>0.237</i> | <i>0.388</i> | <i>0.187</i> | <i>0.0052</i> | <i>0.0304</i> | <i>0.024</i> | <i>1.045</i> | <i>1.256</i> | <i>1.781</i> |

**DISTRIBUTION AND ABUNDANCE OF BREEDING FERRUGINOUS HAWK PAIRS  
IN SOUTHCENTRAL WYOMING  
COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Species of Greatest Conservation Need – Ferruginous Hawk

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Loren Ayers, Volunteer  
Bob Oakleaf, Nongame Coordinator  
Todd Filipi, Nongame Biologist

## **INTRODUCTION**

The Ferruginous Hawk is listed as a Species of Greatest Conservation Need in Wyoming due to sensitivity to human disturbance, a restricted distribution, habitat degradation, inter-specific competition, and potential loss of the prey base (Wyoming Game and Fish Department 2005, Section III, Appendix II). Additional population data are needed, and the recommended monitoring strategy is to obtain and compare annual breeding pair density estimates from aerial surveys of established blocks (Wyoming Game and Fish Department 2005, Appendix VII). This report provides information on the distribution and abundance of breeding Ferruginous Hawk pairs for a 302 mile<sup>2</sup> (783 km<sup>2</sup>) study area in southcentral Wyoming in 1993, 1994, and 2008.

## **STUDY AREA**

The 302 mile<sup>2</sup> (783 km<sup>2</sup>) Baggs Study Area (BSA) is located approximately 9 miles (14 km) north of Baggs, Wyoming (41°15' N, 107° 45' W). Study area boundaries were identical in 1993, 1994, and 2008 (Figure 1, Ayers 1996). The original placement in 1993 was based on a suspected high nesting density of Ferruginous Hawks; however, boundaries were delineated prior to conducting field surveys. Elevation ranged from 6,000-7,710 feet (1830-2350m). The southwest portion of the study area contained extensive soil cliffs and spurs that ranged from approximately 7-400 feet (2-150 m) tall. Most of these features were devoid of vegetation. Soils in the eastern portion of the study area were sandy loams, and the topography consisted of moderate to steep hills, ridges, and escarpments <500 feet (150 m) in height. The hills and ridges of the northeast and southeast corners tapered into sagebrush flats toward the central portion of the study area. These flats contained numerous small rock piles, hills, and narrow ephemeral drainages. Drainage patterns outside these flats consisted of rocky, steep draws that emptied into shallow, meandering drainages (Compton 1975). Vegetation on the BSA included desert shrub, sagebrush-steppe and juniper cover types. Dominant plant species are described by

Compton (1975) and Knight (1994). Desert shrub covered approximately 40% of the BSA around the base of ridges and spurs of the western portion of the study area. Sagebrush vegetation types were dominant in the eastern portion of the study area (totaling ~45% of the area) and Utah juniper mainly corresponded with the hilly northeastern and southeastern regions, which comprised 15% of the study area.

## **METHODS**

Steenhof (1987) recommended using the term “breeding attempt” to denote reproductive pairs which laid an egg. Since close examination of Ferruginous Hawk nests was rarely possible, we used the following evidence to indicate breeding attempts during the 1993-1994 study: 1) An adult in incubation posture on two or more occasions; 2) A single, prolonged bout of incubation (>15 minutes); 3) Egg remains in or near nests associated with a defensive or regularly attending adult or pair; or 4) Eggs or young in a nest attended by an adult.

In 2008, we used less restrictive evidence categories, which were more suitable for nest observations made during aerial surveys. Evidence of breeding attempts included: 1) Nests with fresh material and an adult nearby; 2) Two adults associated with a nest; 3) An adult in incubation posture, or 4) Eggs or young in a nest (B. Oakleaf, Wyoming Game and Fish Department, personal communication).

From March to August of 1993 and 1994, we systematically searched the Baggs Study Area for all raptor stick nests on foot and from all-terrain vehicles, vehicles, airplanes, and helicopters. Each section of the study area was searched 2-8 times depending on the complexity of the terrain and vegetation cover. Ground-based searches averaged 3.9 hours/0.4 mile<sup>2</sup> (1 km<sup>2</sup>) (over 3,000 hours for the entire study area) and aerial searches averaged 7 minutes/0.4 miles (1 km) (~90 hours total).

In 2008, we used GIS to re-plot all known nests from the 1993-1994 study. We added north-south transects at 0.25 mile (0.4 km) increments across the entire study area. Transect length ranged from 11-21 miles (18-34 km). We exported the resulting latitude and longitude coordinates for nests and transect start and stop points to a Garmin 76 GPS for navigation and data recording.

On 28, 29, and 30 April 2008 and 6 and 7 May 2008, we used Cessna 185 (France Flying Service, Rawlins, WY) to check the presence and occupancy status of raptor nests known from the 1993-1994 study and to search for new nests. On 28 April, a single observer (Loren Ayers) and the pilot (Dwight France) subjectively searched for specific nests without following transects. Systematic aerial surveys were conducted on 29 and 30 April by two observers (Loren Ayers and Todd Filipi) and the pilot (Dwight France) by following every-other transect (i.e., odd numbered transects) to achieve 0.5 mile (0.8 km) spacing between transects (Table 1). We completed 27 of these transects, spread evenly across the study area. Data collected during surveys included the latitude and longitude of all nests and raptors observed; raptor nest condition, substrate, and status (occupied or empty); species; and bird behavior, as applicable. We also recorded the location of Greater Sage-Grouse leks and the number of birds seen. On 6

May 2008, we used aerial surveys to view nests which were not seen on previous days and to confirm specific observations by subjectively flying to targeted nests or locations. On 7 May 2008, a single observer (Todd Filipi) repeated this process to complete the aerial survey coverage for 2008. Aerial surveys were augmented with ground checks of nest status conducted on five days from 27 April through 5 May 2008 (Loren Ayers) and six surveyor-days from 8 May through 21 June 2008 (Filipi, Steere, Cooper).

## RESULTS AND DISCUSSION

During the two-year study from 1993-1994, 63 breeding attempts were identified at 55 unique nests (Table 2). Twenty-four Ferruginous Hawk breeding pairs were located in 1993 and 39 in 1994, resulting in a density of 1 pair/12.5 mile<sup>2</sup> (20.1 km<sup>2</sup>) in 1994. The higher count in 1994 was most likely a reflection of a more complete count versus an actual increase in breeding pairs. In 1994, we identified four territorial non-breeding pairs in addition to the 39 breeding pairs on the BSA. Assuming this was a complete count, breeding pairs comprised 91% of the territorial population (Ayers 1996).

Ferruginous Hawk nests were located on lone juniper (23%), juniper groves (25%), exposed soil hills (17%), rock piles (12%), rims and cliffs (9%), stone pedestals (8%), artificial nesting structures (4%), and sagebrush (2%) (Ayers 1996).

Phenological data showed that 70-83% of the breeding pairs were associated with nests between 25 April and 20 May, suggesting that single-visit surveys (e.g., occupancy surveys) be conducted during this period.

Reproductive attributes in 1993-1994 suggested a strong breeding population of Ferruginous Hawks: the density of breeding pairs [1 pair/12.5 mile<sup>2</sup> (20.1 km<sup>2</sup>)], proportion of breeding pairs in the local population (91%), nest success rate (66.7%) (Ayers 1996), and nest site reoccupancy (45%) (Ayers 1996) were similar or higher than rates noted in other regional studies (recall, however, the Baggs Study Area was placed on a suspected raptor concentration area).

During five days of aerial surveys and 11 surveyor-days of ground surveys on the BSA between 27 April and 9 June 2008, 11 Ferruginous Hawk breeding attempts were detected, several lone adult Ferruginous Hawks were located, at least 1 pair was found which could not be associated with a nest, and 6-8 unoccupied Ferruginous Hawk nests that had been refurbished in the past year were located (Table 2). Of the 11 Ferruginous Hawk breeding attempts documented in 2008 (Table 2), 6 were in nests used by Ferruginous Hawk pairs in 1993-1994 (H31 on the southeast map; 37b, 60, 70, and 86 on the northcentral map; and 43A on the northwest map), 3 (including a defensive pair near a nest) were associated with nests that were empty or were used by Swainson's Hawk pairs in 1993-1994 (H206B and S19 on the southeast map, 188 on the northwest map), and 2 were in new nests (169302-02, an artificial nest structure erected by the BLM in 1998, and N2008, both on the northwest map).

We also located nine Red-tailed Hawk, three Golden Eagle, one Great Horned Owl, and no Swainson's Hawk breeding attempts (surveys were conducted too early for Swainson's Hawks). Red-tailed Hawks and Golden Eagles (adults and immature birds) were frequently seen on the study area during aerial and ground surveys. Golden Eagle breeding pairs definitely were not as common in 2008 as in 1993 at the peak of the white-tailed jackrabbit cycle (3 in 2008 versus 16 in 1993). There were no Golden Eagle breeding attempts recorded on the Baggs Study area in 1994. Ayers (1996) documented 20 breeding Red-tailed Hawk pairs in 1994, but survey effort for this species was very low in 2008 and visibility bias for Red-tailed Hawk nests is high so comparison of those data would not be helpful. American Kestrel, Common Raven, and Wyoming ground squirrel were also common on the study area (Ayers did not recall seeing Common Ravens on the BSA in 1993-1994). There were no prairie dogs or prairie dog colonies seen on the BSA in 2008, but it was early in the year and the weather was cool to cold during that period. Four Greater Sage-Grouse leks were recorded on the eastern edge of the study area.

In 1993-1994, a minimum of 70% and a maximum of 83% of Ferruginous Hawk pairs were incubating between 25 April and 20 May, which was the same time period in which the 2008 surveys were conducted. Assuming that breeding phenology and nest failure rates are comparable between 1993-1994 and 2008, the 2008 count data ( $n = 11$ ) can be adjusted to roughly account for breeding attempts that were missed due to improper timing. This provided an estimate of 13-16 breeding pairs on the Baggs Study Area in 2008 ( $11/0.83$  and  $11/0.70$ , respectively). It should also be noted that the survey effort in 2008 was vastly lower than the exhaustive effort put forth in 1993-1994. It is almost certain that additional Ferruginous Hawk nests were overlooked in the 2008 survey. An omission rate of 10%, for example, would further inflate the estimated breeding population size to 14-18 pairs.

Even with the coarse adjustments for lack of population closure and visibility bias, the estimated number of Ferruginous Hawk breeding attempts on the Baggs Study Area was less than half of the 1994 population size (18 versus 39 pairs, respectively). Gas development on the Baggs Study Area between the study periods was surprisingly light; three intense but localized developments were noted in 2008. Wyoming ground squirrels seemed relatively abundant during the survey period in 2008. Examination of Breeding Bird Survey (BBS) trend data (Table 3), maps, and count trend graphs provided little assistance in interpreting survey results; however, the statistically significant positive trends for U.S. Fish and Wildlife Service Region 6, the United States, and the Great Plains Roughlands were encouraging (Sauer et al. 2008). Also, despite the disconcerting appearance of the trend map for a large portion of Wyoming, there was no statistically significant trend in Ferruginous Hawk abundance in Wyoming (Table 3). It may be slightly interesting to note the nearly cyclical pattern of the Ferruginous Hawk count data for the Wamsutter BBS route, which, along with the Rawlins and Cheyenne routes, suggest slightly higher Ferruginous Hawk counts in the early to mid 1990s. Unfortunately, little more can be done at this point to place the 2008 survey results into a more meaningful context or explain the apparent decline in the density of Ferruginous Hawk pairs on the Baggs Study Area.

## LITERATURE CITED

- Ayers, L. W. 1996. An aerial sightability model and reproductive parameters for nesting Ferruginous Hawks (*Buteo regalis*) in southcentral Wyoming. M.S. Thesis, University of Wyoming, Laramie. 158pp.
- Compton, T. 1975. Mule deer and elk relationships in the western Sierra Madre area of southcentral Wyoming. Wildlife Technical Report Number 1, Wyoming Game and Fish Department, Cheyenne. 125pp.
- Knight, D. H. 1994. Mountains and Plains; the Ecology of Wyoming Landscapes. Yale University Press, New Haven, CT. 338pp.
- Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 – 2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, MD.
- Steenhof, K. 1987. Assessing raptor reproductive success and productivity. Pages 157-170 in B. A. Giron Pendleton, B. SA. Millsap, K. W. Cline, and D. M. Bird, editors. Raptor Management Techniques Manual. National Wildlife Federation, Washington, D.C.
- Wyoming Game and Fish Department. 2005. A Comprehensive Wildlife Conservation Strategy for Wyoming. Wyoming Game and Fish Department, Cheyenne. Online: <http://gf.state.wy.us/wildlife/CompConvStrategy/index.asp>.

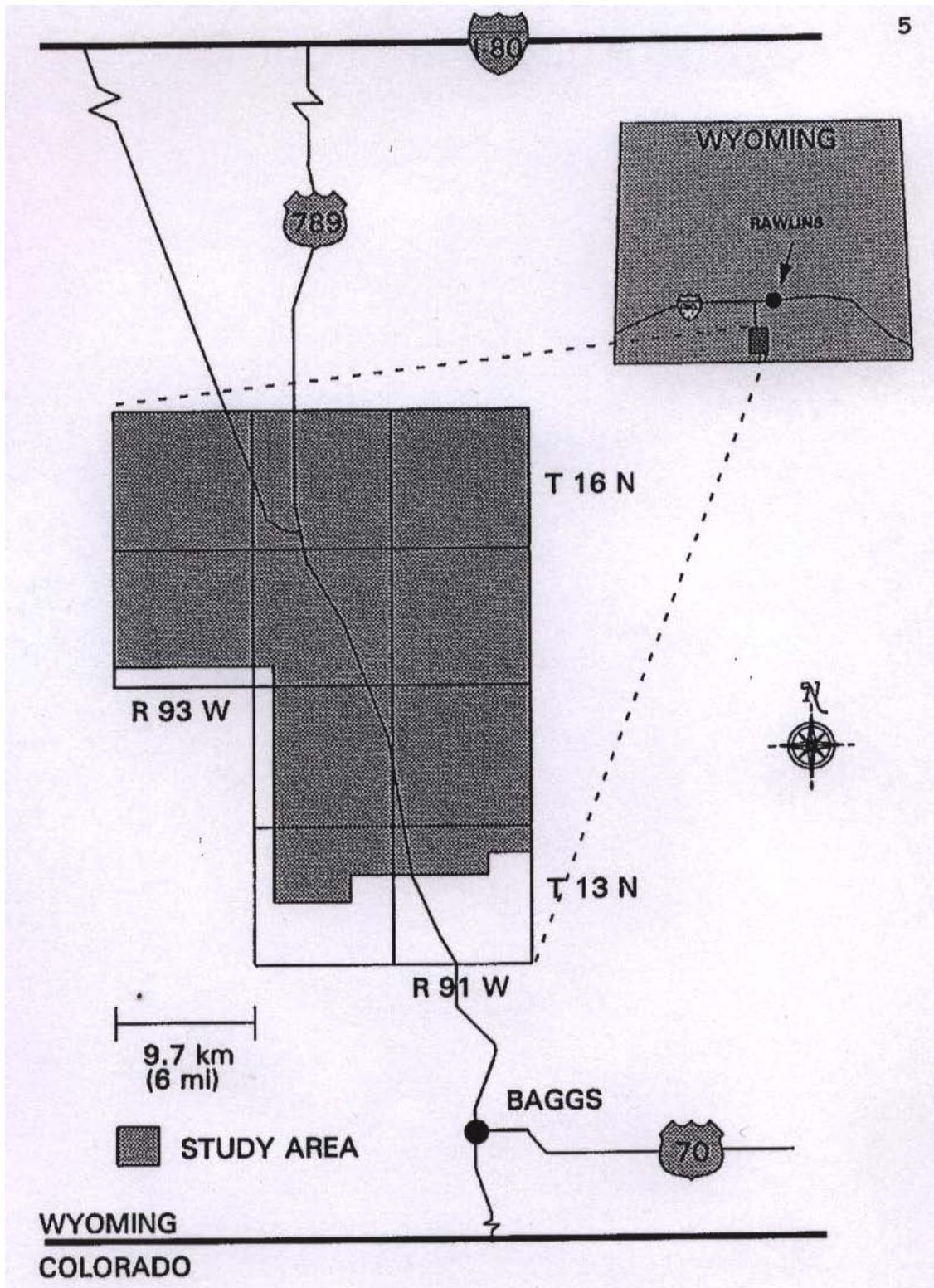


Figure 1. Location and boundaries of the Baggs Study Area (BSA) in southcentral Wyoming used for fixed-wing aerial sightability trials on Ferruginous Hawk nests in 1993 and 1994.

**Table 1. Transect start and stop-point coordinates designed for 2008 aerial surveys on the Baggs Study Area. Only odd numbered transects were flown.**

| <b>Transect</b> | <b>Direction</b> | <b>Latitude</b> | <b>Longitude</b> |
|-----------------|------------------|-----------------|------------------|
| 1               | N                | 41.3979         | -107.5702        |
| 1               | S                | 41.1192         | -107.5592        |
| 2               | N                | 41.3978         | -107.5750        |
| 2               | S                | 41.1193         | -107.5640        |
| 3               | N                | 41.3978         | -107.5798        |
| 3               | S                | 41.1192         | -107.5688        |
| 4               | N                | 41.3978         | -107.5846        |
| 4               | S                | 41.1193         | -107.5736        |
| 5               | N                | 41.3978         | -107.5894        |
| 5               | S                | 41.1193         | -107.5784        |
| 6               | N                | 41.3978         | -107.5942        |
| 6               | S                | 41.1193         | -107.5832        |
| 7               | N                | 41.3979         | -107.5990        |
| 7               | S                | 41.1193         | -107.5880        |
| 8               | N                | 41.3979         | -107.6038        |
| 8               | S                | 41.1193         | -107.5928        |
| 9               | N                | 41.3979         | -107.6087        |
| 9               | S                | 41.1193         | -107.5976        |
| 10              | N                | 41.3979         | -107.6135        |
| 10              | S                | 41.1193         | -107.6024        |
| 11              | N                | 41.3979         | -107.6183        |
| 11              | S                | 41.1193         | -107.6072        |
| 12              | N                | 41.3980         | -107.6231        |
| 12              | S                | 41.1067         | -107.6115        |
| 13              | N                | 41.3980         | -107.6279        |
| 13              | S                | 41.1048         | -107.6162        |
| 14              | N                | 41.3980         | -107.6327        |
| 14              | S                | 41.1048         | -107.6210        |
| 15              | N                | 41.3980         | -107.6375        |
| 15              | S                | 41.1048         | -107.6258        |
| 16              | N                | 41.3980         | -107.6423        |
| 16              | S                | 41.1048         | -107.6306        |
| 17              | N                | 41.3979         | -107.6472        |
| 17              | S                | 41.1048         | -107.6353        |
| 18              | N                | 41.3979         | -107.6520        |
| 18              | S                | 41.1048         | -107.6401        |
| 19              | N                | 41.3980         | -107.6568        |
| 19              | S                | 41.1048         | -107.6449        |

| <b>Transect</b> | <b>Direction</b> | <b>Latitude</b> | <b>Longitude</b> |
|-----------------|------------------|-----------------|------------------|
| 20              | N                | 41.3980         | -107.6616        |
| 20              | S                | 41.1048         | -107.6497        |
| 21              | N                | 41.3980         | -107.6664        |
| 21              | S                | 41.1048         | -107.6545        |
| 22              | N                | 41.3980         | -107.6712        |
| 22              | S                | 41.1048         | -107.6593        |
| 23              | N                | 41.3980         | -107.6760        |
| 23              | S                | 41.1048         | -107.6641        |
| 24              | N                | 41.3980         | -107.6808        |
| 24              | S                | 41.1048         | -107.6689        |
| 25              | N                | 41.3981         | -107.6857        |
| 25              | S                | 41.1048         | -107.6737        |
| 26              | N                | 41.3981         | -107.6905        |
| 26              | S                | 41.1048         | -107.6785        |
| 27              | N                | 41.3981         | -107.6953        |
| 27              | S                | 41.1048         | -107.6833        |
| 28              | N                | 41.3981         | -107.7001        |
| 28              | S                | 41.1048         | -107.6880        |
| 29              | N                | 41.3981         | -107.7049        |
| 29              | S                | 41.1049         | -107.6928        |
| 30              | N                | 41.3981         | -107.7097        |
| 30              | S                | 41.1049         | -107.6976        |
| 31              | N                | 41.3981         | -107.7145        |
| 31              | S                | 41.1049         | -107.7024        |
| 32              | N                | 41.3981         | -107.7193        |
| 32              | S                | 41.1049         | -107.7072        |
| 33              | N                | 41.3981         | -107.7242        |
| 33              | S                | 41.1049         | -107.7120        |
| 34              | N                | 41.3981         | -107.7290        |
| 34              | S                | 41.1049         | -107.7168        |
| 35              | N                | 41.3982         | -107.7338        |
| 35              | S                | 41.1049         | -107.7216        |
| 36              | N                | 41.3982         | -107.7386        |
| 36              | S                | 41.1049         | -107.7264        |
| 37              | N                | 41.3982         | -107.7434        |
| 37              | S                | 41.0904         | -107.7306        |
| 38              | N                | 41.3983         | -107.7482        |
| 38              | S                | 41.0904         | -107.7354        |
| 39              | N                | 41.3983         | -107.7530        |
| 39              | S                | 41.0904         | -107.7401        |
| 40              | N                | 41.3983         | -107.7579        |
| 40              | S                | 41.0904         | -107.7449        |

| <b>Transect</b> | <b>Direction</b> | <b>Latitude</b> | <b>Longitude</b> |
|-----------------|------------------|-----------------|------------------|
| 41              | N                | 41.3984         | -107.7627        |
| 41              | S                | 41.0904         | -107.7497        |
| 42              | N                | 41.3985         | -107.7675        |
| 42              | S                | 41.0904         | -107.7545        |
| 43              | N                | 41.3984         | -107.7723        |
| 43              | S                | 41.0904         | -107.7593        |
| 44              | N                | 41.3984         | -107.7771        |
| 44              | S                | 41.0905         | -107.7641        |
| 45              | N                | 41.3985         | -107.7819        |
| 45              | S                | 41.0905         | -107.7689        |
| 46              | N                | 41.3985         | -107.7867        |
| 46              | S                | 41.0905         | -107.7737        |
| 47              | N                | 41.3985         | -107.7915        |
| 47              | S                | 41.0904         | -107.7785        |
| 48              | N                | 41.3985         | -107.7964        |
| 48              | S                | 41.0905         | -107.7833        |
| 49              | N                | 41.3985         | -107.8012        |
| 49              | S                | 41.2354         | -107.7942        |
| 50              | N                | 41.3985         | -107.8060        |
| 50              | S                | 41.2354         | -107.7990        |
| 51              | N                | 41.3985         | -107.8108        |
| 51              | S                | 41.2356         | -107.8038        |
| 52              | N                | 41.3985         | -107.8156        |
| 52              | S                | 41.2356         | -107.8086        |
| 53              | N                | 41.3985         | -107.8204        |
| 53              | S                | 41.2357         | -107.8134        |
| 54              | N                | 41.3985         | -107.8252        |
| 54              | S                | 41.2357         | -107.8182        |
| 55              | N                | 41.3985         | -107.8300        |
| 55              | S                | 41.2357         | -107.8230        |
| 56              | N                | 41.3985         | -107.8349        |
| 56              | S                | 41.2357         | -107.8278        |
| 57              | N                | 41.3985         | -107.8397        |
| 57              | S                | 41.2357         | -107.8326        |
| 58              | N                | 41.3985         | -107.8445        |
| 58              | S                | 41.2358         | -107.8374        |
| 59              | N                | 41.3985         | -107.8493        |
| 59              | S                | 41.2358         | -107.8422        |
| 60              | N                | 41.3986         | -107.8541        |
| 60              | S                | 41.2358         | -107.8470        |
| 61              | N                | 41.3986         | -107.8589        |
| 61              | S                | 41.2358         | -107.8518        |

| <b>Transect</b> | <b>Direction</b> | <b>Latitude</b> | <b>Longitude</b> |
|-----------------|------------------|-----------------|------------------|
| 62              | N                | 41.3986         | -107.8637        |
| 62              | S                | 41.2358         | -107.8566        |
| 63              | N                | 41.3986         | -107.8686        |
| 63              | S                | 41.2359         | -107.8614        |
| 64              | N                | 41.3986         | -107.8734        |
| 64              | S                | 41.2358         | -107.8662        |
| 65              | N                | 41.3986         | -107.8782        |
| 65              | S                | 41.2359         | -107.8710        |
| 66              | N                | 41.3986         | -107.8830        |
| 66              | S                | 41.2360         | -107.8758        |
| 67              | N                | 41.3986         | -107.8878        |
| 67              | S                | 41.2360         | -107.8806        |
| 68              | N                | 41.3987         | -107.8926        |
| 68              | S                | 41.2359         | -107.8854        |
| 69              | N                | 41.3987         | -107.8974        |
| 69              | S                | 41.2360         | -107.8902        |
| 70              | N                | 41.3987         | -107.9022        |
| 70              | S                | 41.2359         | -107.8950        |
| 71              | N                | 41.3987         | -107.9071        |
| 71              | S                | 41.2359         | -107.8998        |
| 72              | N                | 41.3987         | -107.9119        |
| 72              | S                | 41.2359         | -107.9046        |
| 73              | N                | 41.3987         | -107.9167        |
| 73              | S                | 41.2360         | -107.9094        |
| 74              | N                | 41.3988         | -107.9215        |
| 74              | S                | 41.2358         | -107.9142        |

**Table 2. Ferruginous Hawk nest occupancy results for the Baggs Study Area in 1993, 1994, and 2008.**

| USGS Quad Map | Nest ID          | Latitude | Longitude  | Nest Substrate                        | 1993 Occupied | 1994 Occupied | 2008 Occupied |
|---------------|------------------|----------|------------|---------------------------------------|---------------|---------------|---------------|
| Baggs         | 001C             | 41.12142 | -107.65577 | Rim / Cliff                           | No            | Yes           | No            |
| Blue Gap      | 060              | 41.33341 | -107.73944 | Lone juniper                          | Yes           | Yes           | Yes           |
| Blue Gap      | 064              | 41.33693 | -107.69679 | Rock pile                             | No            | Yes           | No            |
| Blue Gap      | 065              | 41.32442 | -107.67181 | Rock pile                             | Yes           | No            | No            |
| Blue Gap      | 069              | 41.37083 | -107.69981 | Rock pile                             | Yes           | No            | No            |
| Blue Gap      | 070              | 41.36538 | -107.71634 | Lone juniper                          | Yes           | Yes           | Yes           |
| Blue Gap      | 086              | 41.35990 | -107.72228 | Lone juniper                          | Found in 1994 | Yes           | Yes           |
| Blue Gap      | 089              | 41.30761 | -107.73321 | Rock pedestal                         | No            | Yes           | No            |
| Blue Gap      | 063A             | 41.33639 | -107.68253 | Rock pile                             | Yes           | No            | No            |
| Blue Gap      | H18A             | 41.27524 | -107.66660 | Rock pedestal                         | Yes           | No            | Not relocated |
| Blue Gap      | 129a             | 41.25673 | -107.69266 | Rock pedestal                         | No            | Yes           | No            |
| Dixon         | H29A             | 41.11875 | -107.61594 | Juniper grove                         | Yes           | No            | No            |
| Dixon         | H29B             | 41.11888 | -107.61553 | Juniper grove                         | No            | Yes           | No            |
| Doty Mountain | 071C             | 41.37906 | -107.68598 | Rock pile                             | No            | Yes           | No            |
| Mexican Flats | 058              | 41.26135 | -107.81758 | Soil hill                             | No            | Yes           | No            |
| Mexican Flats | 078              | 41.35261 | -107.75003 | Lone juniper                          | Yes           | No            | No            |
| Mexican Flats | 188              | 41.27328 | -107.83815 | Soil hill                             | No            | No            | Yes           |
| Mexican Flats | 254              | 41.36479 | -107.79382 | Soil spur                             | No            | Yes           | No            |
| Mexican Flats | 036A             | 41.28022 | -107.86637 | Rock pedestal                         | Yes           | No            | No            |
| Mexican Flats | 036B             | 41.28246 | -107.86004 | Soil hill                             | No            | Yes           | No            |
| Mexican Flats | 037a             | 41.30599 | -107.77841 | Artificial nest structure             | No            | Yes           | Yes           |
| Mexican Flats | 81b              | 41.36380 | -107.75266 | Juniper grove                         | No            | Yes           | No            |
| Mexican Flats | T16N R93W Sec. 2 | No data  | No data    | New artificial nest structure in 2008 | Not present   | Not present   | Yes           |

| <b>USGS Quad Map</b> | <b>Nest ID</b> | <b>Latitude</b> | <b>Longitude</b> | <b>Nest Substrate</b>     | <b>1993 Occupied</b> | <b>1994 Occupied</b> | <b>2008 Occupied</b> |
|----------------------|----------------|-----------------|------------------|---------------------------|----------------------|----------------------|----------------------|
| Peach Orchard Flats  | 003            | 41.17391        | -107.68680       | Rim / Cliff               | Yes                  | Yes                  | No                   |
| Peach Orchard Flats  | 015            | 41.21047        | -107.71059       | Soil hill                 | Yes                  | No                   | No                   |
| Peach Orchard Flats  | 144            | 41.24340        | -107.63626       | Juniper grove             | No                   | Yes                  | No                   |
| Peach Orchard Flats  | 236            | 41.20540        | -107.63617       | Lone juniper              | Found in 1994        | Yes                  | No                   |
| Peach Orchard Flats  | 259            | 41.18339        | -107.74556       | Soil hill                 | Found in 1994        | Yes                  | Not relocated        |
| Peach Orchard Flats  | 013A           | 41.17201        | -107.72678       | Soil hill                 | Yes                  | No                   | No                   |
| Peach Orchard Flats  | 016a           | 41.20955        | -107.71232       | Rim / Cliff               | No                   | Yes                  | No                   |
| Peach Orchard Flats  | H45            | 41.14719        | -107.63998       | Rock pedestal             | Yes                  | Yes                  | No                   |
| Peach Orchard Flats  | H57            | 41.20037        | -107.65645       | Lone juniper              | Yes                  | No                   | Not relocated        |
| Peach Orchard Flats  | H58            | 41.21685        | -107.64343       | Lone juniper              | No                   | Yes                  | Not relocated        |
| Peach Orchard Flats  | H64(A)         | 41.20071        | -107.62676       | Juniper grove             | Yes                  | No                   | Not relocated        |
| Peach Orchard Flats  | H64(B)         | 41.19838        | -107.62790       | Juniper grove             | No                   | Yes                  | Not relocated        |
| Peach Orchard Flats  | 013B           | 41.17192        | -107.72670       | Soil spur                 | No                   | Yes                  | No                   |
| Smiley Draw          | 181            | 41.15755        | -107.58194       | Lone juniper              | Yes                  | Yes                  | No                   |
| Smiley Draw          | 205            | 41.13272        | -107.60419       | Juniper grove             | No                   | Yes                  | No                   |
| Smiley Draw          | 211            | 41.20740        | -107.59558       | Lone juniper              | No                   | Yes                  | Not relocated        |
| Smiley Draw          | 214            | 41.22614        | -107.59549       | Sagebrush                 | No                   | Yes                  | Fallen               |
| Smiley Draw          | 219            | 41.21913        | -107.62252       | Juniper grove             | Found in 1994        | Yes                  | No                   |
| Smiley Draw          | H203           | 41.15541        | -107.61665       | Juniper grove             | No                   | Yes                  | No                   |
| Smiley Draw          | H26            | 41.15452        | -107.62401       | Juniper grove             | Yes                  | No                   | No                   |
| Smiley Draw          | H31            | 41.20310        | -107.58320       | Artificial nest structure | Yes                  | Yes                  | Yes                  |

| USGS Quad Map                       | Nest ID | Latitude | Longitude  | Nest Substrate | 1993 Occupied | 1994 Occupied | 2008 Occupied  |
|-------------------------------------|---------|----------|------------|----------------|---------------|---------------|----------------|
| Smiley Draw                         | H32(2)  | 41.21119 | -107.59919 | Lone juniper   | No            | Yes           | No             |
| Smiley Draw                         | H40A    | 41.16950 | -107.62528 | Juniper grove  | Yes           | No            | No             |
| Smiley Draw                         | H40B    | 41.16769 | -107.62330 | Juniper grove  | No            | Yes           | No             |
| Smiley Draw                         | S07A    | 41.23588 | -107.61482 | Juniper grove  | Yes           | No            | Not relocated  |
| Smiley Draw                         | S07B    | 41.23243 | -107.61602 | Juniper grove  | No            | Yes           | Not relocated  |
| Smiley Draw                         | S16     | 41.14106 | -107.60123 | Juniper grove  | No            | Yes           | No             |
| Smiley Draw                         | S20     | 41.12787 | -107.57375 | Lone juniper   | Yes           | Yes           | No             |
| Smiley Draw                         | S21     | 41.18723 | -107.60337 | Lone juniper   | No            | Yes           | No             |
| Smiley Draw                         | H206B   | 41.15009 | -107.60082 | Juniper        | Found in 1994 | No            | Defensive pair |
| Smiley Draw                         | S19     | 41.15901 | -107.58244 | Lone juniper   | No            | No            | Yes            |
| South Barrel Springs                | 047     | 41.34529 | -107.89514 | Soil hill      | Yes           | Yes           | Fallen         |
| South Barrel Springs                | 042A    | 41.30893 | -107.89445 | Soil hill      | Yes           | No            | No             |
| South Barrel Springs                | 043A    | 41.29435 | -107.89599 | Soil hill      | Yes           | No            | Yes            |
| South Barrel Springs                | 043B    | 41.29339 | -107.89694 | Rim / Cliff    | No            | Yes           | No             |
| South Barrel Springs                | 044C    | 41.28181 | -107.90036 | Rock pile      | No            | Yes           | No             |
| South Barrel Springs                | N2008   | 41.30200 | -107.89550 | Soil cliff     | Found in 2008 | Found in 2008 | Yes            |
| <i>Total Nests Located Per Year</i> |         |          |            |                | 24            | 39            | 11             |

**Table 3. Breeding Bird Survey trend results for the Ferruginous hawk from 1966-2007.<sup>a</sup>**

| <b>Area</b>                             | <b>Estimate</b> | <b>P Value</b> | <b>Number of Routes</b> | <b>Variance</b> | <b>Average Count</b> |
|---|-----------------|----------------|-------------------------|-----------------|----------------------|
| Western BBS Region                      | 2.19            | 0.11091        | 132                     | 1.8506          | 0.28                 |
| USFWS Region 6                          | 2.58            | 0.04428        | 177                     | 1.6156          | 0.40                 |
| United States                           | 2.38            | 0.01679        | 230                     | 0.9697          | 0.29                 |
| GP Roughlands                           | 5.44            | 0.04788        | 48                      | 7.1378          | 0.34                 |
| Wyoming Basin                           | -0.72           | 0.83957        | 23                      | 12.5115         | 0.53                 |
| Wyoming                                 | -0.30           | 0.91304        | 48                      | 7.6084          | 0.52                 |
| Central Mixed Grass Prairie (1966-2007) | -6.1            | 0.21000        | 8                       |                 |                      |
| Central Mixed Grass Prairie (1980-2007) | -17.1           | 0.21000        | 6                       |                 |                      |

<sup>a</sup> Source: Sauer et al. 2008.

# **RAPTOR NESTING SURVEY COST-SHARE AGREEMENT COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Species of Greatest Conservation Need – Raptors

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Andrea Orabona, Nongame Bird Biologist

## **INTRODUCTION**

The purpose of this study is to provide baseline data on raptor nesting activity associated with lands administered by the Bureau of Land Management (BLM) Newcastle Field Office, and to inventory known and document new nest locations on the U.S. Forest Service Thunder Basin National Grassland (TBNG) in northeastern Wyoming.

A cost-share agreement to survey for nesting raptors was initiated in 1996 between the BLM, TBNG, and Wyoming Game and Fish Department (Department) and has continued each year since, excluding 2003 and 2007. In 1997-2002, 2004-2006, and 2008, priority survey areas included specific portions of the TBNG and regions of the BLM Newcastle Resource Area that had not been previously surveyed, including lands proposed for coal bed methane production. Surveys in 2008 focused on two priority areas within the BLM Newcastle Resource Area and seven priority areas within the TBNG.

Funding for this cooperative effort was provided by the BLM and TBNG. The Department conducted all aerial surveys.

## **METHODS**

The 2008 survey followed similar study parameters detailed in previous years' raptor nest survey reports. Survey transects were established at 0.5-mile (0.8 km) intervals. Transects were flown in an Arctic Tern fixed-wing aircraft from 4 April through 16 May. The Department's Nongame Coordinator, Bob Oakleaf, Nongame Biologist, Todd Filipi, and Nongame Bird Biologist, Andrea Orabona, conducted all aerial surveys. No ground surveys or follow-up aerial surveys were conducted in 2008.

A Geographic Positioning System (GPS) unit was used to record nest locations and maintain accurate flight patterns on survey transects. Each located nest was observed for evidence of nesting activity and the presence of adult birds, young birds, or eggs. The physical

condition of each observed nest and the primary habitat type in which the nest occurred were also noted. All raptor nests encountered, regardless of activity status or condition, were recorded. Observations were recorded at each nest using the field names and codes presented in Appendix I.

## RESULTS AND DISCUSSION

Approximately 77 hours of flight time was expended to search for, locate, and observe nests during the survey. Inventories were not completed in all priority areas due the expenditure of all available funds. Surveys were completed in the BLM's two priority areas and three of TBNG's seven priority areas. Approximately 450 miles<sup>2</sup> (1,165 km<sup>2</sup>) and 600 miles<sup>2</sup> (1,555 km<sup>2</sup>) were surveyed for the BLM and TBNG, respectively.

Results of nesting surveys are summarized in Tables 1 and 2 for the BLM and TBNG, respectively. Nest and substrate codes used during the survey and in the data tables are presented in Tables 3 and 4, respectively. Specific nest locations and other information recorded during aerial flights are presented in Appendix I.

A total of 259 raptor nests were located within the BLM-administered priority areas (Table 1). Observers located 124 occupied diurnal raptor nests, including Ferruginous Hawk (n = 9), Golden Eagle (n = 53), Red-tailed Hawk (n = 61), and Prairie Falcon (n = 1). Additional occupied nests included Great Horned Owl (n = 17) and unknown raptors (n = 4). Numerous unoccupied nests and unoccupied nests in varying degrees of disrepair were also recorded (n = 114).

A total of 109 raptor nests were located within the Thunder Basin National Grassland priority areas (Table 2). Surveys located 52 occupied diurnal raptor nests, including Bald Eagle (n = 1), Ferruginous Hawk (n = 7), Golden Eagle (n = 13), and Red-tailed Hawk (n = 31). Additional occupied nests included Great Horned Owl (n = 9) and unknown raptors (3). A total of 37 unoccupied nests or unoccupied nests in varying degrees of disrepair were also recorded. Two flocks of approximately 30 Greater Sage-Grouse each were also detected.

The 1996, 1997, and 1998 surveys were conducted to coincide with the timing of the incubation, hatching, and pre-fledging stages for Ferruginous Hawks and the nestling stage (post-hatching and pre-fledging) for Golden Eagles. The surveys in 1999-2008 (excluding 2003 and 2007 when surveys were not conducted) were initiated two to three weeks earlier than previous years due to slightly different project objectives in 1999 and to avoid the observation problems with early leaf-out that occurred in 1998. Therefore, the 1999-2005 surveys coincided with the timing of the incubation and hatching stages for Ferruginous Hawks and the incubation, hatching, and nestling stages for Golden Eagles. The 2006 and 2008 surveys were planned for the same time frame as 1999-2005; however, delays in obtaining the necessary pre-survey paperwork precluded initiating the 2006 inventory until late April, and a prolonged, cool, wet spring in 2008 appears to have affected the initiation of nesting for some raptors, particularly Ferruginous and Swainson's Hawks, thus the timing of the start of the survey in early April may

not have been conducive to the timing of nest initiation and detectability of occupied nests for these species.

A few biases have been noted during past surveys that should receive consideration during future efforts or evaluations of results. Swainson’s Hawk nests often deteriorate during the winter, and their delayed spring arrival compared to other raptors means that this species may be missed during surveys in late April or early May. Based on the absence of Swainson’s Hawk detections in 2008, this was particularly evident in 2008. Falcons cannot be adequately detected with fixed wing aircraft surveys, and the absence of records for raptor species known to occupy habitats in northeastern Wyoming should not be considered documentation that they do not occur in the survey areas. Adequate ground or helicopter surveys would be required to document nesting falcons, neither of which was conducted in 2008.

**Table 1. A summary of the 2008 raptor nest survey for the Bureau of Land Management Casper Field Office Priority Area.**

| <b>Species</b>   | <b>OCCU</b> | <b>UNOC</b> | <b>UNDI</b> | <b>UNDE</b> | <b>Total Nests</b> |
|------------------|-------------|-------------|-------------|-------------|--------------------|
| Ferruginous Hawk | 9           | 12          | 3           | 3           | 27                 |
| Great Horned Owl | 17          | -           | -           | -           | 17                 |
| Golden Eagle     | 53          | 18          | 6           | 1           | 78                 |
| Prairie Falcon   | 1           | -           | -           | -           | 1                  |
| Red-tailed Hawk  | 61          | 59          | 8           | -           | 128                |
| Unknown raptor   | 4           | 1           | 3           | -           | 8                  |
| <i>Total</i>     | <i>145</i>  | <i>90</i>   | <i>20</i>   | <i>4</i>    | <i>259</i>         |

| <b>Key</b> |  |
|------------|--|
| OCCU       | An occupied nest in which a breeding attempt was made, indicated by a recent and well-used perch near the nest, the presence of two adults at or near the nest, fresh lining material in the nest, an incubating or brooding adult, eggs or young in the nest, or fledged young near the nest. |
| UNOC       | An unoccupied nest that is in good condition but with no apparent recent use or adult presence at the time of the observation.   |
| UNDI       | An unoccupied, dilapidated nest in a state of ruin due to weather, natural aging, and/or neglect.  |
| UNDE       | An unoccupied nest showing no sign of raptor activity that is destroyed to the point that it is no longer useable without major reconstruction. These nests, for all practical purposes, have disappeared.   |

**Table 2. A summary of the 2008 raptor nest survey for the Thunder Basin National Grassland Priority Areas.**

| <b>Species</b>     | <b>OCCU</b> | <b>UNOC</b> | <b>UNDI</b> | <b>UNDE</b> | <b>Total Nests</b> |
|--------------------|-------------|-------------|-------------|-------------|--------------------|
| Bald Eagle         | 1           | -           | -           | -           | 1                  |
| Ferruginous Hawk   | 7           | 9           | 7           | -           | 23                 |
| Golden Eagle       | 13          | 4           | -           | -           | 17                 |
| Great Horned Owl   | 9           | -           | -           | -           | 9                  |
| Red-tailed Hawk    | 31          | 23          | -           | -           | 54                 |
| Unknown raptor     | 3           | 1           | 1           | -           | 5                  |
| <i>Total Nests</i> | <i>64</i>   | <i>37</i>   | <i>8</i>    | <i>0</i>    | <i>109</i>         |

| <b>Key</b> |  |
|------------|--|
| OCCU       | An occupied nest in which a breeding attempt was made, indicated by a recent and well-used perch near the nest, the presence of two adults at or near the nest, fresh lining material in the nest, an incubating or brooding adult, eggs or young in the nest, or fledged young near the nest. |
| UNOC       | An unoccupied nest that is in good condition but with no apparent recent use or adult presence at the time of the observation.   |
| UNDI       | An unoccupied, dilapidated nest in a state of ruin due to weather, natural aging, and/or neglect.  |
| UNDE       | An unoccupied nest showing no sign of raptor activity that is destroyed to the point that it is no longer useable without major reconstruction. These nests, for all practical purposes, have disappeared.   |

**Table 3. Nest code abbreviations used during the 2008 raptor nest survey.**

| <b>Nest Code</b> | <b>Definition</b>  |
|------------------|--|
| OCCU             | An occupied nest in which a breeding attempt was made, indicated by a recent and well-used perch near the nest, two adults at or near the nest, fresh lining material in the nest, an incubating or brooding adult, eggs or young in the nest, or fledged young near the nest. |
| UNOC             | An unoccupied nest that is in good condition but with no apparent recent use or adult presence at the time of the observation.   |
| UNDI             | An unoccupied, dilapidated nest in a state of ruin due to weather, natural aging, and/or neglect.  |
| UNDE             | An unoccupied nest showing no sign of raptor activity and that is destroyed to the point that it is no longer useable without major reconstruction. These nests, for all practical purposes, have disappeared.   |
| OCFA             | An occupied nest that failed to fledge any young.  |
| GONE             | A nest that was located during a previous study but has been completely destroyed with no sign of nest material during the current study.  |
| ?                | A nest whose status was undetermined during subsequent surveys in the same nesting season.   |

**Table 4. Substrate code abbreviations used during the 2008 raptor nest survey.**

| <b>Substrate Code</b> | <b>Definition</b>         |
|-----------------------|---------------------------|
| ANS                   | Artificial Nest Structure |
| CKB                   | Creek Bank                |
| CLF                   | Cliff                     |
| CTD                   | Cottonwood (dead)         |
| CTL                   | Cottonwood (live)         |
| ELL                   | Elm (live)                |
| GHS                   | Ground or Hillside        |
| MMS                   | Manmade Structure         |
| POD                   | Ponderosa Pine (dead)     |
| POL                   | Ponderosa Pine (live)     |
| ROC                   | Rock Outcrop              |
| RUS                   | Russian Olive             |
| WIL                   | Willow (live)             |

# **PEREGRINE FALCON NEST SURVEYS COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Species of Greatest Conservation Need – Peregrine Falcon

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Bob Oakleaf, Nongame Coordinator  
Susan Patla, Nongame Biologist

## **INTRODUCTION**

Plans to re-establish Peregrine Falcons in Wyoming were developed from analysis of historical distribution and evaluation of potential habitat during survey work (1978-1980). The goal of reintroduction was to establish and maintain a self-sustaining breeding nucleus in the wild. Objectives were to annually release approximately 15 peregrines and establish 30 breeding pairs in Wyoming by 1996. The program was coordinated with Idaho and Montana to ensure maximum results to re-establish this species.

## **RESULTS AND DISCUSSION**

Results of Peregrine Falcon reintroduction and monitoring efforts are detailed in previous Nongame Program Annual Completion Reports and annual reports completed by The Peregrine Fund, Inc. In Wyoming, 384 Peregrine Falcons were released (1980-1995), with at least 325 (85%) surviving to dispersal (1 month post-release). No peregrines have been released since 1995 because objectives were attained in 1994-1995.

Following extirpation and subsequent reintroductions of Peregrine Falcons, nesting was first documented in 1984. At least 793 nesting attempts have been recorded at 87 sites in Wyoming from 1984 through 2008. At least 1,279 young were produced with a minimum of 1.6 young fledged per nesting attempt. Surveys during 2008 recorded 29 pairs fledging at least 45 young (1.5 young/pair). This 2008 statewide total includes results from two pairs in Yellowstone National Park that fledged three young in 2007 (D. Smith, Yellowstone National Park, personal communication). A summary of monitoring results during recent years is presented in Table 1.

Since 2005, surveys have especially focused on 30 known sites that are selected prior to field efforts by using Microsoft's random select excel program. Ten sites are selected for each of three areas: Yellowstone National Park, west of the continental divide outside of Yellowstone National Park, and the rest of Wyoming east of the continental divide. Several additional sites

are observed annually during other surveys and are included in Table 1. Results of surveys of randomly selected sites are shown in Table 2.

Unfortunately, Yellowstone National Park was able to adequately survey only two of the randomly select sites for the Park in 2008. Although the number of sites receiving adequate survey was less than desired, results in 2008 indicate that all 22 of the statewide random select sites were occupied and produced an average of 1.5 young per site. Extrapolating these results to the known statewide total of 87 nesting sites indicates there were at least 87 pairs of Peregrine Falcons producing 122 young in 2008. These calculations compare favorably to the recommendation presented in The Comprehensive Wildlife Conservation Strategy for Wyoming of maintaining at least 70 nesting pairs that annually fledge 100 young (Wyoming Game and Fish Department 2005). However, recent nesting success and production appears to be somewhat lower than previous years (Tables 1 and 2). Detailed evaluation of reproductive performance will be completed following collection of 2009 surveys and increased participation by Yellowstone National Park. In addition, the national monitoring effort which occurs every three years will be completed in 2009 and provide comparative data for a regional perspective.

#### **LITERATURE CITED**

Wyoming Game and Fish Department. 2005. A Comprehensive Conservation Wildlife Strategy for Wyoming. Wyoming Game and Fish Department, Cheyenne.

**Table 1. Peregrine Falcon productivity in Wyoming, 1998 – 2008.**

| Year | Number of Nest Sites |         |          |                | Young Fledged | Young per Occupied Site |
|------|----------------------|---------|----------|----------------|---------------|-------------------------|
|      | Known                | Checked | Occupied | Successful (%) |               |                         |
| 1998 | 47                   | 44      | 44       | 35(79)         | 84            | 1.9                     |
| 1999 | 47                   | 42      | 42       | 25(59)         | 57            | 1.4                     |
| 2000 | 52                   | 46      | 46       | 40(87)         | 83            | 1.8                     |
| 2001 | 56                   | 42      | 42       | 39(93)         | 81            | 1.9                     |
| 2002 | 63                   | 60      | 59       | 49(83)         | 97            | 1.6                     |
| 2003 | 67                   | 58      | 58       | 50(86)         | 107           | 1.8                     |
| 2004 | 72                   | 66      | 65       | 56(97)         | 130           | 2.0                     |
| 2005 | 75                   | 64      | 64       | 45(70)         | 99            | 1.7                     |
| 2006 | 85                   | 61      | 61       | 44(72)         | 101           | 1.7                     |
| 2007 | 86                   | 54      | 51       | 36(71)         | 75            | 1.5                     |
| 2008 | 87                   | 29      | 29       | 19(65)         | 45            | 1.5                     |

**Table 2. Peregrine Falcon productivity of 30 random select sites in Wyoming.**

| Year | Number of Nest Sites |          |                | Young Fledged | Young per Occupied Site |
|------|----------------------|----------|----------------|---------------|-------------------------|
|      | Checked              | Occupied | Successful (%) |               |                         |
| 2005 | 30                   | 30       | 21(70)         | 51            | 1.7                     |
| 2006 | 30                   | 30       | 22(73)         | 49            | 1.6                     |
| 2007 | 30                   | 27       | 19(70)         | 40            | 1.5                     |
| 2008 | 22                   | 22       | 13(60)         | 30            | 1.4                     |

# UPLAND SANDPIPER POPULATION MONITORING IN WYOMING COMPLETION REPORT

STATE OF WYOMING

NONGAME BIRDS: Species of Greatest Conservation Need – Upland Sandpiper

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Bryce Krueger, Prairie Ecologist

## INTRODUCTION

The Upland Sandpiper is designated a Species of Greatest Conservation Need by the Wyoming Game and Fish Department (Department). It has a Native Species Status of 4 because its population status and trends are unknown, its habitat is vulnerable to loss, and it is sensitive to human disturbance (Wyoming Game and Fish Department 2005). Beginning in 2005, the Department initiated the Landowner Incentive Program (LIP) to implement habitat improvements on private lands for sensitive species. Grasslands and Upland Sandpipers were among the systems and species selected for LIP attention. Although Upland Sandpipers are currently monitored through the joint effort described in Monitoring Wyoming's Birds: The Plan for Count-based Monitoring (Leukering et al. 2003), more detailed information is required to conserve Upland Sandpipers in Wyoming. Four Upland Sandpiper survey routes were established and conducted in 2006 and 2007 to monitor Upland Sandpiper trends in several focus areas near Sheridan, Glendo, and Douglas, Wyoming (Krueger 2007 and 2008).

## METHODS

Road-based surveys were conducted through tracts of Upland Sandpiper habitat and concentration areas using Breeding Bird Survey protocol (U.S. Geological Survey 2001) and previously established routes (Krueger 2007). A few stop locations were modified to combine two previous Glendo routes and make the other routes more efficient. All Upland Sandpipers heard or seen at each survey stop were recorded.

## RESULTS

Surveys were conducted along four routes: one on the east side of Glendo Reservoir, one north of the town of Douglas, one west of the town of Sheridan (Sheridan 1), and one east of the town of Sheridan (Sheridan 2) (Table 1). All Upland Sandpipers that were detected were

recorded, as well as incidental sightings of species of interest heard and seen along the routes (Tables 2 and 3). No Sage Sparrows or Sage Thrashers were detected during these surveys.

## **DISCUSSION**

The surveys conducted during this period provided the data necessary to continue monitoring Upland Sandpiper population trends in Wyoming. If surveys continue over the next several years, researchers will soon have access to meaningful trend data. In the near future, observations of Upland Sandpipers, Brewer's Sparrows, and Sage Thrashers will help identify potential LIP habitat improvement project areas and clarify the habitat needs of these species in Wyoming.

## **LITERATURE CITED**

- Krueger, B. 2007. Upland Sandpiper population monitoring in Wyoming, a planning survey, completion report. Pages 91-95 in A.O. Cerovski, editor. Threatened, Endangered, and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department, Cheyenne. 252pp.
- Krueger, B. 2008. Upland Sandpiper population monitoring in Wyoming completion report. Pages 79-83 in A.O. Cerovski, editor. Threatened, Endangered, and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department, Cheyenne. 273pp.
- Leukering, T., M. F. Carter, A. Panjabi, D. Faulkner, and R. Levad. 2003. Monitoring Wyoming's birds: the plan for count-based monitoring. Pages 575-601 in S. H. Nicholoff, compiler. Wyoming Bird Conservation Plan, Version 2.0. Wyoming Partners In Flight. Wyoming Game and Fish Department, Lander. Online:  
<http://www.blm.gov/wildlife/plan/WY/menu>.
- United States Geological Survey (USGS). 2001. Breeding Bird Survey Data. USGS Patuxent Wildlife Research Center, Laurel, Maryland, USA. Online:  
<http://www/pwrc.usgs.gov/bbs/index.html>.
- Wyoming Game and Fish Department. 2005. A Comprehensive Wildlife Conservation Strategy for Wyoming. Wyoming Game and Fish Department, Cheyenne. Online:  
<http://gf.state.wy.us/wildlife/CompConvStrategy/index.asp>.

**Table 1. Survey stop locations for Upland Sandpipers and other species of interest during July 2008, recorded using the Universe Transverse Mercator grid system (Zone 13T, North American Datum 1983).**

| Douglas Survey Route |         |          | Glendo Survey Route |         |          | Sheridan 1 Survey Route |         |          | Sheridan 2 Survey Route |         |          |
|----------------------|---------|----------|---------------------|---------|----------|-------------------------|---------|----------|-------------------------|---------|----------|
| Stop ID              | Easting | Northing | Stop ID             | Easting | Northing | Stop ID                 | Easting | Northing | Stop ID                 | Easting | Northing |
| D 1                  | 474386  | 4741250  | G 1                 | 505382  | 4703944  | S1 1                    | 349511  | 4963143  | S2 1                    | 331405  | 4957644  |
| D 2                  | 475165  | 4741394  | G 2                 | 506212  | 4703887  | S1 2                    | 350042  | 4963616  | S2 2                    | 331007  | 4958217  |
| D 3                  | 475971  | 4741403  | G 3                 | 506694  | 4703265  | S1 3                    | 350590  | 4964352  | S2 3                    | 330585  | 4958912  |
| D 4                  | 476795  | 4741414  | G 4                 | 507225  | 4703012  | S1 4                    | 351405  | 4964344  | S2 4                    | 329776  | 4958922  |
| D 5                  | 477608  | 4741423  | G 5                 | 508101  | 4703037  | S1 5                    | 352250  | 4964301  | S2 5                    | 328959  | 4958984  |
| D 6                  | 478410  | 4741421  | G 6                 | 507837  | 4706109  | S1 6                    | 353009  | 4964638  | S2 6                    | 327749  | 4958655  |
| D 7                  | 479246  | 4741418  | G 7                 | 507266  | 4706430  | S1 7                    | 353252  | 4964143  | S2 7                    | 327059  | 4958126  |
| D 8                  | 480052  | 4741417  | G 8                 | 507216  | 4707285  | S1 8                    | 353232  | 4963323  | S2 8                    | 328342  | 4959469  |
| D 9                  | 480858  | 4741415  | G 9                 | 506845  | 4707738  | S1 9                    | 353634  | 4962683  | S2 9                    | 328043  | 4960262  |
| D 10                 | 481736  | 4741410  | G 10                | 506131  | 4707782  | S1 10                   | 353621  | 4961947  | S2 10                   | 327805  | 4961068  |
| D 11                 | 482560  | 4741409  | G 11                | 505447  | 4707738  | S1 11                   | 353990  | 4961224  | S2 11                   | 327660  | 4961748  |
| D 12                 | 483361  | 4741411  | G 12                | 507203  | 4708164  | S1 12                   | 354502  | 4960626  | S2 12                   | 326945  | 4962117  |
| D 13                 | 484170  | 4741419  | G 13                | 507208  | 4709129  | S1 13                   | 354844  | 4959843  | S2 13                   | 326344  | 4962484  |
| D 14                 | 484987  | 4741420  | G 14                | 507218  | 4709850  | S1 14                   | 355507  | 4959802  | S2 14                   | 325440  | 4963091  |
| D 15                 | 485826  | 4741425  | G 15                | 507221  | 4710653  | S1 15                   | 351054  | 4965014  | S2 15                   | 325130  | 4963770  |
| D 16                 | 486601  | 4741429  | G 16                | 506757  | 4711019  | S1 16                   | 351290  | 4965833  | S2 16                   | 324716  | 4964442  |
| D 17                 | 487211  | 4741608  | G 17                | 505929  | 4711023  | S1 17                   | 351303  | 4966660  | S2 17                   | 324593  | 4965291  |
| D 18                 | 487198  | 4742384  | G 18                | 505624  | 4711522  | S1 18                   | 351322  | 4967477  | S2 18                   | 323929  | 4965752  |
| D 19                 | 487362  | 4743045  | G 19                | 505625  | 4712120  | S1 19                   | 351752  | 4968065  | S2 19                   | 323208  | 4966069  |
| D 20                 | 488178  | 4743037  | G 20                | 505611  | 4712955  | S1 20                   | 352253  | 4968626  | S2 20                   | 322605  | 4966540  |
| D 21                 | 488981  | 4743029  | G 21                | 505568  | 4713849  | S1 21                   | 352356  | 4969332  | S2 21                   | 322064  | 4967332  |
| D 22                 | 489794  | 4743027  | G 22                | 507559  | 4707736  | S1 22                   | 352645  | 4970186  | S2 22                   | 321661  | 4968832  |
| D 23                 | 490547  | 4743018  | G 23                | 508253  | 4707425  | S1 23                   | 353121  | 4970818  | S2 23                   | 321667  | 4969664  |
| D 24                 | 491372  | 4743031  | G 24                | 508753  | 4706779  | S1 24                   | 353369  | 4971574  | S2 24                   | 321643  | 4970245  |
| D 25                 | 492173  | 4743044  | G 25                | 509280  | 4706144  | S1 25                   | 353164  | 4972277  | S2 25                   | 328706  | 4974014  |
| D 26                 | 492831  | 4743051  | G 26                | 510066  | 4706114  | S1 26                   | 353135  | 4973180  | S2 26                   | 328223  | 4973357  |
| D 27                 | 493642  | 4743065  | G 27                | 510902  | 4706121  | S1 27                   | 352955  | 4974069  | S2 27                   | 327884  | 4972376  |

| Douglas Survey Route |         |          | Glendo Survey Route |         |          | Sheridan 1 Survey Route |         |          | Sheridan 2 Survey Route |         |          |
|----------------------|---------|----------|---------------------|---------|----------|-------------------------|---------|----------|-------------------------|---------|----------|
| Stop ID              | Easting | Northing | Stop ID             | Easting | Northing | Stop ID                 | Easting | Northing | Stop ID                 | Easting | Northing |
| D 28                 | 494183  | 4743672  | G 28                | 512118  | 4706135  | S1 28                   | 352834  | 4974948  | S2 28                   | 327635  | 4971581  |
| D 29                 | 494120  | 4744725  | G 29                | 512129  | 4705447  | S1 29                   | 352856  | 4975898  | S2 29                   | 327577  | 4970809  |
| D 30                 | 494107  | 4745557  | G 30                | 512133  | 4704550  | S1 30                   | 352782  | 4976676  | S2 30                   | 327332  | 4970077  |
| D 31                 | 494114  | 4746309  | G 31                | 512761  | 4704256  | S1 31                   | 352562  | 4977471  | S2 31                   | 327383  | 4968510  |
| D 32                 | 494499  | 4746819  | G 32                | 513531  | 4704280  | S1 32                   | 352807  | 4978305  | S2 32                   | 327368  | 4967767  |
| D 33                 | 495069  | 4747515  | G 33                | 514247  | 4704082  | S1 33                   | 353373  | 4978886  | S2 33                   | 327350  | 4966954  |
| D 34                 | 495360  | 4748145  | G 34                | 514867  | 4703609  | S1 34                   | 354009  | 4979364  | S2 34                   | 327328  | 4966023  |
| D 35                 | 490541  | 4743830  | G 35                | 515405  | 4703051  | S1 35                   | 354295  | 4980110  | S2 35                   | 327323  | 4965337  |
| D 36                 | 489855  | 4744265  | G 36                | 516075  | 4702707  | S1 36                   | 354844  | 4980687  | S2 36                   | 328163  | 4965267  |
| D 37                 | 489220  | 4744680  | G 37                | 516511  | 4702168  | S1 37                   | 354916  | 4981457  | S2 37                   | 329003  | 4964623  |
| D 38                 | 488414  | 4744672  | G 38                | 517009  | 4701516  | S1 38                   | 354719  | 4982402  | S2 38                   | 329848  | 4964232  |
| D 39                 | 487603  | 4744664  | G 39                | 522149  | 4699763  | S1 39                   | 355053  | 4982844  | S2 39                   | 330526  | 4963768  |
| D 40                 | 486773  | 4744651  | G 40                | 522950  | 4699795  | S1 40                   | 355808  | 4982960  | S2 40                   | 331361  | 4963725  |
| D 41                 | 485960  | 4744629  | G 41                | 525060  | 4710410  | S1 41                   | 359095  | 4983969  | S2 41                   | 332211  | 4963681  |
| D 42                 | 485152  | 4744624  | G 42                | 524791  | 4711164  | S1 42                   | 359838  | 4983505  | S2 42                   | 333055  | 4963641  |
| D 43                 | 484358  | 4744622  | G 43                | 524108  | 4711130  | S1 43                   | 360633  | 4983078  | S2 43                   | 333831  | 4963627  |
| D 44                 | 483545  | 4744636  | G 44                | 523399  | 4711095  | S1 44                   | 361443  | 4982587  | S2 44                   | 334617  | 4963779  |
| D 45                 | 482688  | 4744655  | G 45                | 522590  | 4711154  | S1 45                   | 362015  | 4982145  | S2 45                   | 335365  | 4963992  |
| D 46                 | 481913  | 4744830  | G 46                | 521798  | 4711206  |                         |         |          | S2 46                   | 336059  | 4964429  |
| D 47                 | 481133  | 4744675  | G 47                | 520904  | 4711199  |                         |         |          | S2 47                   | 336858  | 4964724  |
| D 48                 | 480330  | 4744681  | G 48                | 520017  | 4711240  |                         |         |          | S2 48                   | 337439  | 4965189  |
| D 49                 | 479492  | 4744687  | G 49                | 519236  | 4711227  |                         |         |          | S2 49                   | 338293  | 4965115  |
| D 50                 | 478675  | 4744683  | G 50                | 518447  | 4711225  |                         |         |          | S2 50                   | 339088  | 4965068  |
| D 51                 | 477858  | 4744694  | G 51                | 517616  | 4711177  |                         |         |          |                         |         |          |
|                      |         |          | G 52                | 516792  | 4711131  |                         |         |          |                         |         |          |
|                      |         |          | G 53                | 515950  | 4711111  |                         |         |          |                         |         |          |
|                      |         |          | G 54                | 515070  | 4711083  |                         |         |          |                         |         |          |
|                      |         |          | G 55                | 514236  | 4711030  |                         |         |          |                         |         |          |
|                      |         |          | G 56                | 513138  | 4711011  |                         |         |          |                         |         |          |
|                      |         |          | G 57                | 512294  | 4710994  |                         |         |          |                         |         |          |
|                      |         |          | G 58                | 511487  | 4710987  |                         |         |          |                         |         |          |

| Douglas Survey Route |         | Glendo Survey Route |         | Sheridan 1 Survey Route |         | Sheridan 2 Survey Route |         |
|----------------------|---------|---------------------|---------|-------------------------|---------|-------------------------|---------|
| Stop ID              | Easting | Stop ID             | Easting | Stop ID                 | Easting | Stop ID                 | Easting |
|                      |         | G 59                | 510657  |                         |         |                         |         |
|                      |         | G 60                | 509851  |                         |         |                         |         |
|                      |         | G 61                | 509056  |                         |         |                         |         |
|                      |         | G 62                | 508257  |                         |         |                         |         |

**Table 2. Individual birds of interest identified through vocalizations and/or sightings for each survey route during July 2008.**

| Survey Route | Date   | Upland Sandpiper |               | Brewer's Sparrow | Sage Thrasher | Vehicles <sup>a</sup> |
|--------------|--------|------------------|---------------|------------------|---------------|-----------------------|
|              |        | Sightings        | Vocalizations |                  |               |                       |
| Glendo       | 4 July | 30               | 23            | 0                | 0             | 3                     |
| Sheridan 1   | 6 July | 0                | 0             | 0                | 0             | 10                    |
| Sheridan 2   | 5 July | 0                | 13            | 1                | 0             | 4                     |
| Douglas      | 7 July | 0                | 9             | 37               | 0             | 1                     |
| <i>Total</i> |        | <i>30</i>        | <i>45</i>     | <i>38</i>        | <i>0</i>      | <i>18</i>             |

<sup>a</sup> The total number of vehicles that passed the observer during survey stops.

**Table 3. Observations of Upland Sandpipers and other species of interest during July 2008, recorded using the Universe Transverse Mercator grid system (Zone 13T, North American Datum 1983).**

| Route  | Date   | Stop ID | Upland Sandpiper Sightings | Upland Sandpiper Vocalizations | Brewer's Sparrow | Vehicles <sup>a</sup> | Comments <sup>b</sup>                     |
|--------|--------|---------|----------------------------|--------------------------------|------------------|-----------------------|---|
| Glendo | 4 July | 1       |                            |                                |                  |                       | Start 0455, Sky 0, Wind 1, Temp 59F       |
| Glendo | 4 July | 2       |                            |                                |                  | 1                     |   |
| Glendo | 4 July | 8       | 1                          |                                |                  |                       | Fly over - can hear others towards stop 9 |
| Glendo | 4 July | 9       | 6                          | 3                              |                  | 1                     |   |
| Glendo | 4 July | 13      | 10                         | 2                              |                  |                       |   |
| Glendo | 4 July | 15      |                            |                                |                  |                       | 2 GRSP in uncut tame hay pasture          |
| Glendo | 4 July | 16      |                            |                                |                  |                       | 1 GRSP in uncut tame hay pasture          |
| Glendo | 4 July | 17      |                            | 1                              |                  |                       | 1 GRSP in uncut tame hay pasture          |
| Glendo | 4 July | 18      | 2                          |                                |                  |                       | Different UPSAs than stop 17              |
| Glendo | 4 July | 19      |                            | 2                              |                  |                       | Heard 1 SACR                              |
| Glendo | 4 July | 24      | 2                          | 1                              |                  |                       | Vocalizations > 200 yards away            |
| Glendo | 4 July | 26      |                            | 2                              |                  |                       | Vocalizations > 200 yards away            |
| Glendo | 4 July | 27      |                            |                                |                  |                       | 3 GRSP in uncut tame hay pasture          |
| Glendo | 4 July | 29      | 4                          |                                |                  |                       |   |
| Glendo | 4 July | 31      | 2                          | 2                              |                  |                       |   |
| Glendo | 4 July | 32      |                            | 4                              |                  |                       | 2 UPSAs > 200 yards away                  |
| Glendo | 4 July | 33      | 1                          |                                |                  |                       |   |
| Glendo | 4 July | 40      |                            | 2                              |                  |                       |   |
| Glendo | 4 July | 41      |                            | 1                              |                  |                       | Vocalizations > 200 yards away            |
| Glendo | 4 July | 43      |                            | 2                              |                  |                       | Vocalizations > 200 yards away            |
| Glendo | 4 July | 48      |                            | 1                              |                  |                       | Vocalizations > 200 yards away            |
| Glendo | 4 July | 49      | 1                          |                                |                  |                       |   |
| Glendo | 4 July | 50      |                            |                                |                  |                       | Saw 2 BUOW                                |
| Glendo | 4 July | 55      |                            |                                |                  | 1                     |   |
| Glendo | 4 July | 60      | 1                          |                                |                  |                       |   |
| Glendo | 4 July | 62      |                            |                                |                  |                       | End 1015, Sky 0, Wind 1, Temp 89F         |

| Route      | Date   | Stop ID | Upland Sandpiper |               | Brewer's Sparrow | Vehicles <sup>a</sup> | Comments <sup>b</sup>               |
|------------|--------|---------|------------------|---------------|------------------|-----------------------|-------------------------------------|
|            |        |         | Sightings        | Vocalizations |                  |                       |                                     |
| Sheridan 2 | 5 July | 1       |                  |               |                  |                       | Start 0508, Sky 2, Wind 3, Temp 72F |
| Sheridan 2 | 5 July | 3       |                  |               |                  | 1                     |                                     |
| Sheridan 2 | 5 July | 14      |                  |               |                  | 1                     |                                     |
| Sheridan 2 | 5 July | 16      |                  |               |                  | 1                     |                                     |
| Sheridan 2 | 5 July | 18      |                  |               |                  |                       | Saw 1 SACR                          |
| Sheridan 2 | 5 July | 20      |                  |               |                  | 1                     |                                     |
| Sheridan 2 | 5 July | 22      |                  |               |                  | 1                     |                                     |
| Sheridan 2 | 5 July | 30      |                  |               |                  | 1                     |                                     |
| Sheridan 2 | 5 July | 39      |                  |               |                  | 1                     |                                     |
| Sheridan 2 | 5 July | 40      |                  |               |                  | 1                     |                                     |
| Sheridan 2 | 5 July | 49      |                  |               |                  | 2                     |                                     |
| Sheridan 2 | 5 July | 50      |                  |               |                  |                       | End 0938, Sky 0, Wind 3, Temp 76F   |
| Sheridan 1 | 6 July | 1       |                  |               |                  |                       | Start 0512, Sky 1, Wind 1, Temp 55F |
| Sheridan 1 | 6 July | 4       |                  |               |                  |                       | 1 GRSP in tame rangeland            |
| Sheridan 1 | 6 July | 5       |                  | 1             |                  |                       |                                     |
| Sheridan 1 | 6 July | 13      |                  |               | 1                |                       |                                     |
| Sheridan 1 | 6 July | 17      |                  | 4             |                  | 1                     |                                     |
| Sheridan 1 | 6 July | 19      |                  |               |                  | 1                     |                                     |
| Sheridan 1 | 6 July | 20      |                  | 1             |                  |                       |                                     |
| Sheridan 1 | 6 July | 21      |                  | 2             |                  |                       |                                     |
| Sheridan 1 | 6 July | 22      |                  | 2             |                  |                       |                                     |
| Sheridan 1 | 6 July | 23      |                  |               |                  |                       | Heard 1 SACR                        |
| Sheridan 1 | 6 July | 24      |                  |               |                  | 1                     |                                     |
| Sheridan 1 | 6 July | 25      |                  | 3             |                  |                       |                                     |
| Sheridan 1 | 6 July | 37      |                  |               |                  | 1                     |                                     |
| Sheridan 1 | 6 July | 45      |                  |               |                  |                       | End 0925, Sky 1, Wind 2, Temp 75F   |
| Douglas    | 7 July | 1       |                  |               | 2                |                       | Start 0530, Sky 1, Wind 1, Temp 53F |
| Douglas    | 7 July | 3       |                  |               | 2                |                       |                                     |
| Douglas    | 7 July | 4       |                  |               | 3                |                       |                                     |
| Douglas    | 7 July | 5       |                  |               | 4                |                       |                                     |

| Route   | Date   | Stop ID | Upland Sandpiper |               | Brewer's Sparrow | Vehicles <sup>a</sup> | Comments <sup>b</sup>             |
|---------|--------|---------|------------------|---------------|------------------|-----------------------|-----------------------------------|
|         |        |         | Sightings        | Vocalizations |                  |                       |                                   |
| Douglas | 7 July | 6       |                  |               | 1                |                       |                                   |
| Douglas | 7 July | 8       |                  |               | 2                |                       |                                   |
| Douglas | 7 July | 9       |                  |               | 2                |                       |                                   |
| Douglas | 7 July | 10      |                  |               | 2                |                       |                                   |
| Douglas | 7 July | 11      |                  |               | 2                |                       |                                   |
| Douglas | 7 July | 12      |                  |               | 2                |                       |                                   |
| Douglas | 7 July | 13      |                  |               | 1                |                       |                                   |
| Douglas | 7 July | 16      |                  |               | 4                |                       | 1 CASP                            |
| Douglas | 7 July | 17      |                  |               | 1                |                       | 1 CASP                            |
| Douglas | 7 July | 18      |                  |               | 3                |                       |                                   |
| Douglas | 7 July | 20      |                  |               | 1                |                       |                                   |
| Douglas | 7 July | 24      |                  |               | 1                |                       |                                   |
| Douglas | 7 July | 25      |                  | 2             |                  |                       |                                   |
| Douglas | 7 July | 27      |                  | 1             |                  |                       | Heard 1 GRSP                      |
| Douglas | 7 July | 28      |                  |               |                  |                       | Heard 1 BRSP                      |
| Douglas | 7 July | 31      |                  |               | 1                |                       | 1 GRSP                            |
| Douglas | 7 July | 32      |                  | 1             |                  |                       | Vocalizations > 200 yards away    |
| Douglas | 7 July | 33      |                  |               | 1                |                       |                                   |
| Douglas | 7 July | 34      |                  | 5             |                  |                       |                                   |
| Douglas | 7 July | 41      |                  |               | 1                | 1                     |                                   |
| Douglas | 7 July | 44      |                  |               | 1                |                       |                                   |
| Douglas | 7 July | 51      |                  |               |                  |                       | End 0953, Sky 1, Wind 3, Temp 73F |

<sup>a</sup> The total number of vehicles that passed the observer during survey stops.

<sup>b</sup> Start, End, Sky, Wind, and Temperature data were collected according to USGS (2001) protocol.

GRSP = Grasshopper Sparrow, SACR = Sandhill Crane, BUOW = Burrowing Owl, CASP = Cassin's Sparrow.

# **LONG-BILLED CURLEW SURVEYS IN WESTERN WYOMING COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Species of Greatest Conservation Need – Long-billed Curlew

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Andrea Orabona, Nongame Bird Biologist

## **INTRODUCTION**

The purpose of the Long-billed Curlew surveys in 2008 was to provide an indication of curlew population trends in portions of their breeding range in Wyoming. Surveys were conducted along the same routes as in previous years so long-term monitoring of Long-billed Curlew populations can be accomplished in the Pinedale/ Merna, Cody, and Jackson areas. Additional routes may be added in eastern Wyoming.

## **METHODS**

Cochrane (1983) conducted roadside curlew surveys from 8 May to 19 July 1982, modifying the Breeding Bird Survey (BBS) technique (Robbins and VanVelzen 1967) to sample the greatest number of birds over the greatest distance (Cochrane and Oakleaf 1982). Surveys began 20 minutes before sunrise, with visual counts made every 0.5-mile (0.8 km) along the survey route using nine power binoculars. Curlews that were heard calling but that could not be located during the five-minute stop were excluded from the count, whereas those observed while driving between stops were included. Flocks were defined as groups of five or more individuals observed together.

In 1987, Cochrane's survey routes and methods were replicated. Since 1991, however, Long-billed Curlew survey methodology was modified to include both the number of curlews seen and heard to better represent the total number of curlews present along each route. Starting in 2007, survey methodology was further modified to correspond with the U.S. Fish and Wildlife Service (USFWS) and U.S. Geological Survey (USGS) rangewide survey and monitoring guidelines for Long-billed Curlews (Jones et al. 2003) and subsequent results (Stanley and Skagen 2007).

The number of stops on each route conducted in 2008 depended on the amount of suitable curlew habitat available to survey. As in past years, the Horse Creek survey route contained 17 stops and the New Fork route contained 9 stops. The Chapman Bench route has

varied slightly depending on the observer, with 10 stops conducted between 1992 and 1995, 15 stops conducted between 1996 and 2000, and 17 stops conducted between 2001 and the present. The Grand Teton National Park (GTNP) Hayfields route contained 23 stops; however, in past years, this route contained 20 stops but was modified in 1997 due to a washout of the Mormon Row Road and the likelihood that the Ditch Creek crossing may never be repaired. The three additional stops were added to ensure that the route ended in the same place, but the observer has since modified this route back to 20 stops that occur in curlew habitat. Curlew surveys on the National Elk Refuge were discontinued due to lack of curlews on the survey route. However, a new route was located and trial surveys were conducted in 2006, and one official survey conducted in 2008 and is included in this report. Locations of each survey route have been reported in previous Nongame Completion Reports and are maintained in the Nongame files at the Department's Lander Regional Office.

Typically, two Long-billed Curlew surveys are conducted along the same routes that Cochrane surveyed in 1981 and 1982. In 2008, each survey was conducted twice: Horse Creek on 14 May and 27 May, New Fork on 13 and 22 May, Chapman Bench on 15 and 16 May, and GTNP Hayfields on 9 and 25 May. The new route initiated on the National Elk Refuge (NER) near Jackson was conducted on 20 May. Total number of curlews seen at each stop, those that were heard but could not be seen, and those that were both seen and heard was all recorded. For each survey, results were converted to number of curlews seen per mile (per km) of road surveyed so data could be compared between-years for each route.

## **RESULTS**

All Long-billed Curlew survey data (number of curlews seen and heard, and comments made during each survey) are located in the Nongame files at the Department's Lander Regional Office. Total number of individual Long-billed Curlews detected on each survey route is as follows: 30 and 43 on Horse Creek, 4 and 0 (weather was overcast with rain and snow, so this route was not included in Table 1) on New Fork, 8 and 11 on Chapman Bench, 11 and 6 on the GTNP Hayfields route, and 6 on the NER route. The average number of curlews recorded per mile (per km) on each route is presented in Table 1. This includes curlews that were observed, those that were heard but not seen, and those that were both observed and heard, but does not include duplicate detections that may have occurred.

Long-billed Curlews have been detected on 25 Breeding Bird Survey (BBS) since 1968 when BBS routes were initiated in Wyoming; 18 of these routes were conducted in 2007 with a total of 37 curlews observed on 7 of the 18 routes (Table 2). Counts in previous years have fluctuated from a low of 1 curlew recorded on 1 of 15 routes completed in 1998, to a high of 19 curlews recorded on 8 of the 16 routes conducted in 1999.

## **DISCUSSION**

Several factors must be considered when comparing survey results between years. Curlew counts vary from one survey to the next due to weather conditions affecting visibility,

fluctuations in noise levels, and actual fluctuations in curlew numbers. Therefore, it is beneficial to conduct a minimum of two surveys along each route per year for a better indication of the presence of curlews. Also, starting in 1991, the number of curlews that were seen only, heard only, and those that were both seen and heard have been recorded on each route. When taking audio identification data into consideration, the number of curlews per mile (per km) is higher than if visual identification alone is used. Therefore, recording both audio and visual curlew observations better represents the actual number of curlews present along each route than either observation alone. In addition, based on the rangewide survey conducted by the USFWS and USGS in 2004 and 2005, it was determined that surveys in Wyoming are better conducted slightly earlier in the season (21 April – 15 May) to better detect curlews during the pre-incubation and courtship stages when they are easier to detect (Jones et al. 2003). Surveys conducted later in the breeding season may not be indicative of the breeding population because they may detect groups of non-breeders and failed nesters loafing in the area (Stephanie Jones, U.S. Fish and Wildlife Service, personnel communication).

The number of curlews detected on BBS routes in Wyoming has also fluctuated, making it difficult to determine trends using this methodology. In past years, significant declines in Long-billed Curlew populations have been reported. Some speculation may offer possibilities for this apparent decline. On some routes, changes in observers may have led to fewer or no curlews being heard, depending on the expertise of each observer. To help minimize observer bias, one of the goals of the BBS program is to retain the same observer on each BBS route. Uncontrollable factors that occur while running BBS routes, such as reduced visibility and birds not calling or calling outside of hearing range, may also affect the number of curlews recorded.

## **ACKNOWLEDGEMENTS**

The Nongame Program would like to acknowledge the following Department personnel for their valuable contributions to the 2008 Long-billed Curlew monitoring effort: Doug Brimeyer, Dean Clause, Doug McWhirter, Susan Patla, and Scott Smith.

## **LITERATURE CITED**

- Cochrane, J. F., and B. Oakleaf. 1982. Long-billed Curlew survey evaluations with notes on distribution, abundance, and habitat use in Wyoming. Wyoming Game and Fish Department Special Projects Report, Cheyenne. 24pp.
- Cochrane, J. F. 1983. Long-billed Curlew habitat and land-use relationships in western Wyoming. M.S. Thesis, University of Wyoming, Laramie. 136pp.
- Jones, S. L., T. R. Stanley, PhD., S. K. Skagen, PhD., R. L. Redmond. 2003. Long-billed Curlew (*Numenius americanus*) Rangewide Survey and Monitoring Guidelines. Final: December 11, 2003.

Robbins, C. S., and W. T. VanVelzen. 1967. The breeding bird survey, 1966. U.S. Department of Interior Bureau of Sport Fisheries and Wildlife Special Scientific Report on Wildlife 102.

Stanley, T. R., and S. K. Skagen. 2007. Estimating the breeding population of Long-billed Curlews in the Unites States. *Journal of Wildlife Management* 71(8):2556-2564.

**Table 1. Long-billed Curlew (LBCU) survey route results, 1987 and 1991-2008.<sup>a</sup>**

| Year              | Horse Creek Route |                            | New Fork Route  |                            | Chapman Bench Route |                            | Grand Teton NP Hayfields Route |                            | National Elk Refuge Route |                            |
|-------------------|-------------------|----------------------------|-----------------|----------------------------|---------------------|----------------------------|--------------------------------|----------------------------|---------------------------|----------------------------|
|                   | Number of LBCU    | LBCU Density No./Mile (Km) | Number of LBCU  | LBCU Density No./Mile (Km) | Number of LBCU      | LBCU Density No./Mile (Km) | Number of LBCU                 | LBCU Density No./Mile (Km) | Number of LBCU            | LBCU Density No./Mile (Km) |
| 1987              | 11 <sup>b</sup>   | 1.4 (0.9)                  | 13 <sup>b</sup> | 3.3 (2.0)                  | --                  | --                         | --                             | --                         | --                        | --                         |
| 1991              | 75 <sup>b</sup>   | 9.4 (5.8)                  | 25 <sup>b</sup> | 6.3 (3.9)                  | --                  | --                         | --                             | --                         | --                        | --                         |
| 1992              | 53                | 6.6 (4.1)                  | 7               | 1.8 (1.1)                  | 26 <sup>b</sup>     | 5.8 (3.6)                  | --                             | --                         | --                        | --                         |
| 1993              | 65                | 8.1 (5.1)                  | 5               | 1.3 (0.8)                  | 14 <sup>b</sup>     | 3.1 (1.9)                  | 10 <sup>b</sup>                | 1.1 (0.7)                  | --                        | --                         |
| 1994              | 45                | 5.6 (3.5)                  | 11              | 2.8 (1.7)                  | 7 <sup>b</sup>      | 1.6 (1.0)                  | --                             | --                         | --                        | --                         |
| 1995              | 53 <sup>b</sup>   | 6.6 (4.1)                  | 12 <sup>b</sup> | 3.0 (1.9)                  | 0 <sup>b</sup>      | 0.0 (0.0)                  | 19 <sup>b</sup>                | 2.0 (1.2)                  | --                        | --                         |
| 1996              | 113               | 14.1 (8.8)                 | 17              | 4.3 (2.6)                  | 7                   | 1.0 (0.6)                  | 3                              | 0.3 (0.2)                  | --                        | --                         |
| 1997              | 40                | 5.0 (3.1)                  | 42              | 10.5 (6.5)                 | 0 <sup>b</sup>      | 0.0 (0.0)                  | 7                              | 0.6 (0.4)                  | --                        | --                         |
| 1998              | 43                | 5.4 (3.3)                  | 10              | 2.5 (1.6)                  | 5                   | 0.7 (0.4)                  | 14                             | 1.3 (0.8)                  | --                        | --                         |
| 1999              | 39                | 4.9 (3.0)                  | 10              | 2.5 (1.6)                  | 3                   | 0.4 (0.3)                  | 13                             | 1.2 (0.7)                  | --                        | --                         |
| 2000              | 42                | 5.3 (3.3)                  | 5               | 1.3 (0.8)                  | 8                   | 1.1 (0.7)                  | --                             | --                         | --                        | --                         |
| 2001              | 32                | 4.0 (2.5)                  | 8               | 2.0 (1.2)                  | 0                   | 0.0 (0.0)                  | 12                             | 1.1 (0.7)                  | --                        | --                         |
| 2002              | 31                | 3.9 (2.4)                  | 6               | 1.5 (0.9)                  | 6                   | 0.8 (0.5)                  | 10                             | 0.9 (0.6)                  | --                        | --                         |
| 2003              | 33                | 4.1 (2.6)                  | 9               | 2.3 (1.4)                  | 7                   | 0.9 (0.5)                  | 5                              | 0.5 (0.3)                  | --                        | --                         |
| 2004              | 31                | 3.9 (2.4)                  | 9               | 2.3 (1.4)                  | 6                   | 0.8 (0.5)                  | 8                              | 0.8 (0.5)                  | --                        | --                         |
| 2004 <sup>c</sup> | 81                | 10.1 (6.3)                 | 2               | 0.5 (0.3)                  | --                  | --                         | --                             | --                         | --                        | --                         |
| 2005              | 32                | 4.0 (2.5)                  | 9               | 2.3 (1.4)                  | 5                   | 0.6 (0.4)                  | --                             | --                         | --                        | --                         |
| 2006              | 26                | 2.0 (3.3)                  | 12              | 1.9 (3.0)                  | 7                   | 0.9 (0.5)                  | 14                             | 1.5 (0.9)                  | --                        | --                         |
| 2007              | 26                | 2.0 (3.3)                  | 13              | 3.3 (2.0)                  | 7                   | 0.9 (0.5)                  | 5                              | 0.5 (0.3)                  | --                        | --                         |
| 2008              | 37                | 4.6 (2.9)                  | 4               | 1.0 (0.6)                  | 10                  | 1.3 (0.8)                  | 9                              | 0.9 (0.6)                  | 6                         | 0.9 (0.5)                  |

<sup>a</sup> If more than one survey was conducted, the average number of curlews recorded was used.

<sup>b</sup> Only one survey was conducted.

<sup>c</sup> Results from the 12 May survey using USFWS protocol.

**Table 2. Breeding Bird Survey data for Long-billed Curlews, 1980-2008. A blank indicates a year when a survey was not conducted. An asterisk identifies the routes most useful for monitoring this species.**

| Route #                    | Route Name         | Year      |           |           |           |           |          |          |          |          |           |          |           |          |          |          |           |          |          |           | Route Total |           |            |      |
|----------------------------|--------------------|-----------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|-----------|----------|-----------|----------|----------|----------|-----------|----------|----------|-----------|-------------|-----------|------------|------|
|                            |                    | 1980      | 1981      | 1982      | 1983      | 1984      | 1985     | 1986     | 1987     | 1988     | 1989      | 1990     | 1991      | 1992     | 1993     | 1994     | 1995      | 1996     | 1997     | 1998      |             | 1999      | 2000       | 2001 |
| 9                          | Dubois             | 0         | 0         | 0         | 0         | 0         | 0        | 0        | 0        | 0        | 1         | 0        | 0         | 0        | 0        |          |           | 0        | 0        |           |             |           |            | 1    |
| 15                         | Fontenelle         |           |           | 0         | 0         | 0         |          | 0        | 2        | 0        | 0         | 0        | 0         | 0        | 0        | 0        | 0         | 0        | 0        | 0         | 1           | 0         | 0          | 3    |
| 28                         | Yoder              | 0         | 0         | 0         |           |           | 0        | 0        | 0        | 1        | 0         | 0        | 0         | 0        | 0        | 0        | 0         | 0        | 0        | 0         | 0           | 0         | 0          | 1    |
| 32                         | Hunter Peak        |           |           |           | 0         | 0         | 0        |          | 0        | 0        | 0         |          | 0         | 0        | 0        | 0        | 0         | 0        | 0        | 0         |             | 0         | 0          | 0    |
| *33                        | Clark              |           |           |           |           |           |          |          |          |          | 0         | 2        | 3         |          |          |          |           |          |          |           |             | 4         | 1          | 10   |
| *36                        | Moose              | 0         | 0         | 0         | 0         | 1         | 0        | 2        | 0        | 1        | 2         | 2        | 0         | 0        | 0        | 0        | 2         | 4        | 4        | 0         | 4           | 0         |            | 24   |
| 45                         | Recluse            | 0         |           | 0         | 0         |           | 0        | 0        | 0        | 0        | 2         | 1        | 3         | 0        | 0        | 0        | 0         | 0        | 0        | 0         | 0           | 0         | 2          | 9    |
| 46                         | Soda Well          | 0         | 0         | 0         | 0         |           |          | 0        | 0        | 0        | 0         | 0        | 0         | 0        | 0        | 0        | 0         | 0        | 0        | 0         |             |           | 0          | 0    |
| 48                         | Seely <sup>a</sup> |           |           |           |           |           |          |          |          |          | 2         | 0        | 0         | 0        | 0        | 0        | 0         | 0        | 0        | 0         | 0           | 0         | 0          | 2    |
| 64                         | Sussex             |           |           |           |           |           |          |          |          |          |           | 0        | 0         | 0        | 0        | 0        | 0         | 0        | 0        | 0         |             |           | 0          | 0    |
| 67                         | Highlight          | 0         | 0         | 0         |           |           |          |          | 0        | 0        | 0         | 0        | 1         |          |          |          |           |          |          |           |             |           |            | 1    |
| *69                        | Newcastle          |           |           |           |           |           |          |          | 1        | 4        | 0         |          | 2         | 0        | 2        | 0        | 0         | 0        | 0        | 0         | 1           | 0         | 0          | 10   |
| 71                         | Soda Lake          | 0         | 0         | 0         | 0         | 0         | 0        |          | 0        |          | 0         | 3        | 1         | 0        | 0        | 0        | 0         | 0        | 0        |           |             |           | 0          | 4    |
| *74                        | Boulder            |           |           | 0         | 2         | 2         |          |          |          |          |           | 0        |           |          |          | 0        | 0         |          | 0        | 0         | 3           |           |            | 7    |
| *75                        | Big Sandy          | 0         |           |           | 0         |           |          | 0        | 2        | 7        | 5         |          | 3         |          | 6        |          | 8         | 0        | 0        | 3         | 1           | 5         | 40         |      |
| 76                         | Farson             |           |           |           | 1         |           |          |          |          |          |           |          |           |          |          | 0        |           |          |          |           |             |           | 1          | 1    |
| *82                        | Lamont             |           |           |           |           |           |          |          | 1        | 0        | 0         | 1        | 1         | 0        | 0        | 0        | 1         | 0        | 0        | 1         | 2           | 1         | 9          | 9    |
| 83                         | Pathfinder         |           |           | 1         | 0         | 0         |          |          | 0        | 0        | 0         | 0        |           | 0        | 0        | 0        | 0         | 0        | 0        | 0         | 0           | 0         | 0          | 1    |
| *89                        | Meadowdale         |           |           |           | 0         | 13        | 0        |          |          |          | 0         | 2        | 0         | 0        |          | 0        | 0         |          |          |           |             |           |            | 15   |
| *90                        | Lusk               |           |           | 7         | 9         | 0         |          |          | 0        | 0        | 0         | 0        | 1         | 0        | 0        | 0        |           |          | 0        | 5         | 1           | 0         | 23         | 23   |
| *93                        | Mountain View      | 11        | 10        | 9         | 5         |           |          | 0        |          | 0        | 0         | 0        |           |          |          |          |           |          |          | 0         |             |           |            | 35   |
| 104                        | Walcott            |           |           |           | 0         |           |          |          |          | 0        | 0         | 0        | 0         | 0        | 0        | 0        | 0         | 0        | 0        | 0         | 0           | 0         | 0          | 0    |
| 150                        | Govt. Valley       |           |           |           |           |           |          |          |          |          |           |          | 0         | 0        | 0        | 0        | 0         | 0        | 3        | 0         | 1           | 0         | 2          | 6    |
| 173                        | Ryegrass           | 1         | 0         | 0         | 0         | 1         | 0        |          | 1        |          |           |          |           |          | 0        |          | 0         | 0        | 0        | 0         | 0           | 1         | 0          | 4    |
| 195                        | Seedskaatee        | 0         | 2         | 0         | 0         | 0         | 0        |          |          |          |           |          | 0         | 1        | 0        | 0        | 0         | 0        | 0        | 0         | 0           | 0         | 0          | 3    |
| 206                        | Caballa Creek      |           |           |           |           |           |          |          |          |          |           |          |           | 4        | 0        | 0        | 0         | 0        | 0        | 1         | 0           | 0         | 0          | 5    |
| <i>Total Observed/Year</i> |                    | <i>12</i> | <i>12</i> | <i>17</i> | <i>17</i> | <i>17</i> | <i>0</i> | <i>2</i> | <i>1</i> | <i>7</i> | <i>14</i> | <i>9</i> | <i>19</i> | <i>1</i> | <i>8</i> | <i>2</i> | <i>13</i> | <i>7</i> | <i>1</i> | <i>19</i> | <i>9</i>    | <i>11</i> | <i>214</i> |      |

| Route #                    | Route Name           | Year |      |      |      |      |      |      |     |   |   | Route Total |
|----------------------------|----------------------|------|------|------|------|------|------|------|-----|---|---|-------------|
|                            |                      | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |     |   |   |             |
| 9                          | Dubois               |      |      |      |      |      |      |      |     |   | 1 | 2           |
| 15                         | Fontenelle           | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0   | 0 | 0 | 4           |
| 28                         | Yoder                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0 | 0 | 1           |
| 32                         | Hunter Peak          | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0   | 0 | 0 | 1           |
| *33                        | Clark                | 1    | 0    | 4    | 0    | 0    | 0    | 0    | 0   | 0 | 0 | 15          |
| *36                        | Moose                |      | 1    | 0    |      |      |      |      |     |   |   | 25          |
| 45                         | Recluse              | 2    | 1    | 2    |      | 0    | 0    | 0    | 0   | 0 |   | 13          |
| 46                         | Soda Well            |      |      |      |      | 0    | 4    |      |     |   |   | 4           |
| 48                         | Seely <sup>a</sup>   |      |      |      |      |      |      |      |     |   |   | 2           |
| 64                         | Sussex               |      |      |      |      | 2    | 0    | 0    | 0   | 0 | 0 | 2           |
| 67                         | Highlight            |      |      |      |      |      | 0    |      |     |   |   | 1           |
| *69                        | Newcastle            |      |      |      |      | 1    | 7    | 6    | 24  |   |   |             |
| 71                         | Soda Lake            | 0    | 0    |      | 0    |      |      |      |     |   |   | 4           |
| *74                        | Boulder              | 0    | 0    |      |      | 1    | 2    | 0    | 10  |   |   |             |
| *75                        | Big Sandy            |      |      |      | 0    | 1    | 19   | 6    | 66  |   |   |             |
| 76                         | Farson               | 5    |      |      |      | 0    | 0    | 0    | 6   |   |   |             |
| *82                        | Lamont               | 0    |      | 0    |      |      |      |      | 9   |   |   |             |
| 83                         | Pathfinder           | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 2   |   |   |             |
| *89                        | Meadowvale           | 0    | 0    |      |      |      |      |      | 15  |   |   |             |
| *90                        | Lusk                 |      |      | 4    | 4    | 1    | 1    | 3    | 36  |   |   |             |
| *93                        | Mountain View        | 0    | 1    |      |      | 0    |      |      | 36  |   |   |             |
| 104                        | Walcott              | 0    |      |      |      |      | 3    | 1    | 4   |   |   |             |
| 148                        | Seely 2 <sup>a</sup> | 0    |      | 2    | 0    | 0    | 0    | 0    | 2   |   |   |             |
| 150                        | Gov't. Valley        | 0    | 0    | 0    | 0    |      | 0    | 0    | 6   |   |   |             |
| 173                        | Ryegrass             | 0    | 3    | 1    |      | 0    | 0    | 0    | 8   |   |   |             |
| 195                        | Seedskadee           | 2    | 0    |      |      |      |      |      | 5   |   |   |             |
| 206                        | Caballa Creek        | 0    | 0    |      | 0    | 0    | 0    | 0    | 5   |   |   |             |
| <i>Total Observed/Year</i> |                      | 11   | 6    | 13   | 4    | 7    | 37   | 17   | 308 |   |   |             |

<sup>a</sup> Route #48 (Seely) was modified in 2002 and is now #148 (Seely 2).

# **SURVEYS FOR AVIAN SPECIES OF GREATEST CONSERVATION NEED COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Species of Greatest Conservation Need / Governor's ESA Funding –  
American Bittern, Burrowing Owl, Northern Pygmy-Owl, Yellow-billed Cuckoo

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Lee Knox, Nongame Biologist  
Andrea Orabona, Nongame Bird Biologist

## **INTRODUCTION**

Two seasonal Nongame Biologists were hired to focus survey efforts on several of the Wyoming Game and Fish Department's (Department) Species of Greatest Conservation Need (SGCN) (Wyoming Game and Fish Department 2005). Species were chosen based on either a need to continue survey work previously initiated or because baseline data were lacking. Surveys were conducted from June through September for the American Bittern, Burrowing Owl, Northern Pygmy Owl, and Yellow-billed Cuckoo during the appropriate detection period(s) for each species.

The American Bittern is a wetland obligate, preferring tall emergent vegetation, but can also be found less abundantly in low vegetation wetlands. Nests are a platform of reeds, sedges, and cattails, and are typically located over water in dense emergent vegetation (Gibbs et al. 1992). The American Bittern is found scattered throughout Wyoming's marshes, but is only known to breed in nine general regions.

The American Bittern is a summer resident in Wyoming and is classified as Species of Greatest Conservation Need with a Native Species Status of 3 (NSS3). American Bitterns are sensitive to human disturbances and summer breeding habitat is restricted and susceptible to loss (Wyoming Game and Fish Department 2005).

The Burrowing Owl prefers open prairie, grassland, desert, and shrub-steppe habitats. Habitat must be well drained, level to gently sloping terrain, with little to no vegetation. Burrowing Owls depend on fossorial mammal burrows for nesting, roosting, and escape (Haug et al. 1993). In Wyoming, Burrowing Owls are found throughout the State, but are most commonly found in the south and eastern portions.

The Burrowing Owl is an uncommon summer resident in Wyoming, and is classified as a Species of Greatest Conservation Need with a Native Species Status of 4 (NSS4) due to population status and trends that are unknown, but suspected to be stable, habitat that is

vulnerable to loss, and the species' sensitivity to human disturbance. Burrowing Owls are most greatly impacted by the elimination of fossorial mammals through control programs, and habitat loss due to urbanization or cropland conversion (Wyoming Game and Fish Department 2005).

The Northern Pygmy-Owl is most readily found in coniferous to mixed coniferous/deciduous forests with scattered openings, but can also be found in stands of cottonwood and aspen. They nest in abandoned woodpecker cavities and natural tree cavities (Holt and Peterson 2000). In Wyoming, Northern Pygmy-Owls are found in the State's mountainous regions, particularly in the northwest corner.

The Northern Pygmy- Owl is a year-round resident in Wyoming, and is classified as a Species of Greatest Conservation Need with a Native Species Status of 4 (NSS4) due to population status and trends that are unknown but thought to be stable. Although habitat is restricted and vulnerable to loss, there is no current significant loss of habitat. Loss due to timber harvest, particularly of older forests and snags, and reduction of prey and excavator species are a concern (Wyoming Game and Fish Department 2005).

The Yellow-billed Cuckoo is a riparian obligate species that inhabits extensive areas of dense thickets and mature, deciduous gallery forests near water. Throughout its range, the Yellow-billed Cuckoo breeds in large stands of cottonwood-riparian habitat below 7,000 feet (2100 m). In the Rocky Mountain West, stand size is a minimum of 5 acres (2 ha), with a canopy height of 16-98 feet (5-30 m) and a 6-16-foot (2-5 m) understory of dense, shrubby vegetation for nest sites.

The Yellow-billed Cuckoo is an uncommon summer resident in Wyoming, and is classified by the Department as a Species of Greatest Conservation Need with a Native Species Status of 2 (NSS2). Breeding populations are restricted in number and distribution, and preferred habitat is limited in distribution and experiencing ongoing significant loss (Wyoming Game and Fish Department 2005). Across its range, this species is extremely sensitive to habitat fragmentation and deterioration, incompatible livestock grazing, and the invasion of tamarisk in riparian corridors (Hughes 1999, Laymon and Halterman 1987, Laymon 2000, USFWS 2000). It is also negatively impacted by scarcity of prey, particularly tent caterpillars, when pesticides are applied in its preferred habitat (Laymon and Halterman 1987).

## **METHODS**

### **American Bittern Survey Method**

A call broadcast survey method is used to detect the presence of American Bitterns during the breeding season (15 May – 30 June). A minimum of three replicates is recommended to ensure that at least one survey occurs while bitterns are vocal. Transects should be located along the edge of suitable marsh habitat with approximately 1,300 feet (400 m) between each stop to eliminate double-counting of individual bitterns. Surveys should be conducted in the early evening hours, starting at approximately 1945 to 2000 hours and ending by 2145 hours. If bitterns are heard calling earlier or later than this time frame, survey hours can be adjusted

accordingly. Surveys can also be conducted during the early morning hours; however, previous survey efforts during this time frame were not successful in detecting bitterns at this site.

At each stop, the observer should start with a five-minute passive listening period. All American Bitterns heard or seen during this time frame are recorded on the data sheet and their locations are marked on the map of the survey route. The American Bittern call is then played for one minute. All American Bitterns heard or seen during this time frame are recorded on the data sheet and their locations are marked on the map of the survey route. The observer should end with a one minute post call playback listening period. Again, all American Bitterns heard or seen during this time frame are recorded on the data sheet and their locations are marked on the survey route map. At each stop, the observer should note if the same bitterns are heard or observed at more than one stop to avoid double counting individuals. All other species heard or observed should also be recorded.

### **Burrowing Owl Survey Method**

A call broadcast survey method is used to detect Burrowing Owls during the portion of the breeding season when they can be most readily detected (15 May – 15 June). Surveys should be conducted every two weeks. Survey transects should be concentrated along existing roads or two-tracks in prairie dog towns, with approximately ½ mile (0.8 km) between stops (the actual stop point should provide an optimal viewing radius of the area). The survey time frame can occur at two different times during the day, morning (1/2 hour before sunrise to 0900 hours) and evening (1 ½ hours before sunset to ½ hour after sunset). Surveys should not be conducted if it is raining or the wind speed is 12 miles/hour (19 km/hour) or above.

All surveys should be conducted from a vehicle because Burrowing Owls may hide if the observer is on foot. At each stop, the observer starts with a three minute passive listening period while searching the town with binoculars, staying as still as possible during the search and recording all adult and juvenile Burrowing Owls detected. The male Burrowing Owl “coo-coo” call is then played for three minutes, alternating 30 seconds of the call with 30 seconds of a silent listening period. All Burrowing Owls, as well as other species detected, should be recorded at each stop, taking care not to double count individuals. When moving between prairie dog towns within a complex, the observer should not continue the count until the next town has been reached.

### **Northern Pygmy-Owl Survey Method**

A call broadcast survey method is used to detect Northern Pygmy-Owls during the peak of the breeding season (1 April – 31 April) and during the late summer/early autumn hunting period (1 September – 30 October). Each survey route should be conducted twice, with a minimum of two weeks between replicate surveys.

Observers should stop every 0.5 mile (0.8 km) using the odometer reading and take a GPS location at each stop. Stops can also be marked with fluorescent flags or ribbon if previously scouted.

Surveys should begin no earlier than ½ hour after sunset and continue no later than 2300 hours. The first two to three hours after dark appears to be the most vocal period for most forest owl species. Weather conditions should be calm [wind less than 5 miles/hour (8 km/hour)] and without heavy precipitation.

At each stop, all lights should be extinguished prior to beginning the survey. Observers should alternate between listening and playing the owl call. Calls should be broadcast on each side of the trail or road and played about twice as loud as an owl would normally call. Observers should begin by listening for two minutes, play the Northern Pygmy-Owl call for two minutes, listen for a response for two minutes, play the tape for another two minutes, and listen for a final two minutes. All owls observed and/or heard should be recorded on the survey forms, as well as other information requested. To reduce the potential of enticing predation on smaller owls by Great Horned Owls, observers should discontinue calling smaller species if a Great Horned Owl has been heard at the stop.

### **Yellow-billed Cuckoo Survey Method**

The following methods were adapted from Laymon (1998), Reynolds and Hinckley (2005), and USDI Bureau of Reclamation Fisheries and Wildlife Resources Group (2007).

A call broadcast survey technique is used to detect Yellow-billed Cuckoos during the breeding season (15 June – 10 August). A minimum of three surveys should be conducted on each route during this time frame. Survey dates should be spaced 10 to 14 days apart to increase the chance detection by surveying during the various stages of the nesting cycle. Survey periods are broken up into three segments: 1) 15 June – 4 July to determine territory establishment or nesting, 2) 5 July – 24 July to detect late-arriving males, and 3) 25 July – 10 August to determine those territories that have been occupied throughout the entire nesting season. Surveys are conducted between the hours of 0630 and 1200, and may also be conducted in the evening between 1800 and 2000; however, results from this survey period have not been compared to known populations detected during the earlier time frame in States where cuckoos occur. Surveys should not be conducted if the temperature exceeds 100° F (38° C), the wind speed exceeds 8 mph (13 kph), or during steady rainfall. Survey stops are located every 656 feet (200 meters) along the edge of preferred cuckoo habitat. If the habitat patch is wider than 328 feet (100 m), additional transects should be added accordingly. Suitable habitat patches are 5 acres (2 ha) or larger, and should be separated from adjacent habitat patches by 984 feet (300 m).

At each stop, the observer first conducts a 5-minute passive listening period. If cuckoos are detected, the total number is recorded on the data sheet in that block. If cuckoos are not detected, “ND” for “no detection” is placed in that block. The Yellow-billed Cuckoo “kowlp” call is then played five times, with a 60-second pause between each call. The call should project at least 328 feet (100 m) with a minimum of distortion. The total number of cuckoos detected at each stop is placed in the appropriate block on the data sheet. If a cuckoo is detected while the “kowlp” call is being played, the call should not be repeated on that stop. If cuckoos are not detected, “ND” for “no detection” is placed in the corresponding block on the data sheet. Other Species of Greatest Conservation Need or species of interest should also be noted at each stop along the survey route, and the total number of cuckoos detected on each route should be

included on the bottom of the data sheet. Weather, start and stop times, and other comments should also be recorded.

## **RESULTS AND DISCUSSION**

American Bittern surveys were conducted during June and July on four established transects in the Cokeville Meadows National Wildlife Refuge. Three replicate surveys were conducted on each transect. An average of 8.0, 3.7, 0.3, and 0.3 bitterns were detected on the Thornock, Bartlett, Peterson, and Diamond tracts, respectively (Table 1). These results are similar to past surveys with the Thornock tract having the most bitterns, followed by the Bartlett tract, and with the Peterson and Diamond tracts having few detections of American Bitterns. Habitat characteristics are slightly different on each of the tracts, which results in differences in the number of bitterns detected.

Morning and evening surveys were conducted for Burrowing Owls near Lysite and Lost Cabin in late July. These sites were chosen based on the presence of prairie dog colonies and a lack of Burrowing Owl sightings in this degree block or latilong (number 11), although Burrowing Owls have been observed in all four surrounding latilongs. Known prairie dog towns mapped previously by the Department were used to establish Burrowing Owl survey routes. A total of 19 white-tailed prairie dog towns were established as survey routes but only 16 were accessible by vehicle. Routes were surveyed morning and evening for three days; no Burrowing Owls were detected on any transect.

Northern Pygmy-Owl surveys were conducted in the Sierra Madre Mountains near Encampment in late September during the autumn detection period. Four survey sites were determined previously, but only two survey routes were completed due to inclement weather. During the two night surveys, no Northern Pygmy-Owls were detected. Although the species of conifer present on the east slope of the Sierra Madre Mountains is appropriate for Northern Pygmy-Owls, other habitat characteristics appear unsuitable for nesting, and no additional pygmy-owl survey efforts will be expended in this area.

Due to a full work schedule in June, the first surveys for Yellow-billed Cuckoos were conducted in early July. Two additional replicates were conducted in late July and early August on the Bighorn River and a second replicate was conducted in early August on the Shoshone River. The third replicate on the Bighorn River was conducted on foot along the riparian habitat rather than from the river due to boat motor problems. In addition, late runoff and excessive flooding caused abnormally high and dangerous flows on the Shoshone River, which prohibited biologists from conducting the survey on the river. In addition, survey efforts on foot within riparian habitat along the Shoshone River were limited due to access problems from overland water flows. A total of 18 and 12 hours were spent surveying for Yellow-billed Cuckoos on the Bighorn and Shoshone Rivers, respectively. One Yellow-billed Cuckoo was detected along the Bighorn River transect, and no cuckoos were detected along the Shoshone River in the limited area surveyed.

## ACKNOWLEDGEMENTS

Project financing was provided by the State of Wyoming through the Governor's ESA funding, for which the Department is extremely grateful. We would also like to acknowledge the following Department personnel for their contributions to the 2008 avian Species of Greatest Conservation Need monitoring effort: Meredith Haas and Joslin Heyward.

## LITERATURE CITED

- Gibbs, J. P., S. Melvin, and F. A. Reid. 1992. American Bittern (*Botaurus lentiginosus*). In: A. Poole, P. Stettenheim, and F. Gill, editors. The Birds of North American, No. 18. The Birds of North America, Inc., Philadelphia, PA.
- Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. Burrowing Owl (*Speotyto cunicularia*). In: A. Poole, P. Stettenheim, and F. Gill, editors. The Birds of North American, No. 61. The Birds of North America, Inc., Philadelphia, PA.
- Holt, D. W., J. L. Petersen. 2000. Northern Pygmy-Owl (*Glaucidium gnoma*). In: A. Poole, P. Stettenheim, and F. Gill, editors. The Birds of North American, No.494. The Birds of North America, Inc., Philadelphia, PA.
- Hughes, J. M. 1999. Yellow-billed Cuckoo (*Coccyzus americanus*). In: A. Poole and F. Gill, editors. The Birds of North America, No. 418. The Birds of North America, Inc., Philadelphia, PA.
- Laymon, S. A., and M. Halterman. 1987. Can the Western Subspecies of the Yellow-billed Cuckoo be Saved from Extinction? *Western Birds* 18(1):19-25.
- Laymon, S. A. 2000. Supporting information for the listing of the western yellow-billed cuckoo. Prepared for: Field Supervisor, USFWS, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Room W-2605, Sacramento, CA 95825. Submitted 17 April 2000.
- Reynolds, T. D., and C. I. Hinckley. 2005. A Survey for Yellow-billed Cuckoo in Recorded Historic and Other Likely Locations in Idaho. TREC, Inc., Rigby, ID.
- USDI Bureau of Reclamation Fisheries and Wildlife Resources Group. 2007. 2006 Yellow-billed Cuckoo Study Results, San Marcial, NM. 21pp.
- U.S. Fish and Wildlife Service. 2000. Notice of 90-day finding for a petition to list the yellow-billed cuckoo as endangered and commencement of a status review. *Federal Register*: February 17, 2000, 66(33):8104-8107). Available online: [www.fws.gov/cno/news/2000/2000-36.htm](http://www.fws.gov/cno/news/2000/2000-36.htm).
- Wyoming Game and Fish Department. 2005. A Comprehensive Wildlife Conservation Strategy for Wyoming. Wyoming Game and Fish Department, Cheyenne.

**Table 1. Results of the 2008 American Bittern (AMBI) survey on the Cokeville Meadows National Wildlife Refuge.**

| <b>Tract Name<br/>Miles (Km) Surveyed</b> | <b>Survey<br/>Date</b> | <b>Number of<br/>AMBI Detected</b> | <b>AMBI Density<br/>Number/Mile (Km)</b> |
|---|------------------------|------------------------------------|--|
| Thornock Tract<br>1.0 mile (1.6 km)       | June 10                | 10                                 | 10 (6.3)                                 |
|   | June 24                | 5                                  | 5 (3.1)                                  |
|   | June 30                | 9                                  | 9 (5.6)                                  |
|   | <i>Average</i>         | <i>8.0</i>                         | <i>8 (5)</i>                             |
| Bartlett Tract<br>1.2 miles (2.0 km)      | June 10                | 5                                  | 4.2 (2.5)                                |
|   | June 24                | 2                                  | 1.7 (1.0)                                |
|   | June 30                | 4                                  | 3.3 (2.0)                                |
|   | <i>Average</i>         | <i>3.7</i>                         | <i>3.1 (1.9)</i>                         |
| Peterson Tract<br>2.0 miles (3.2 km)      | June 12                | 1                                  | 0.5 (0.3)                                |
|   | June 25                | 0                                  | 0  |
|   | July 2                 | 0                                  | 0  |
|   | <i>Average</i>         | <i>0.3</i>                         | <i>0.2 (0.1)</i>                         |
| Diamond Tract<br>1.7 miles (2.7 km)       | June 11                | 0                                  | 0  |
|   | June 23                | 1                                  | 0.6 (0.4)                                |
|   | July 1                 | 0                                  | 0  |
|   | <i>Average</i>         | <i>0.3</i>                         | <i>0.2 (0.1)</i>                         |

## **FOREST OWL SURVEYS COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Species of Greatest Conservation Need / Governor's ESA Funding – Boreal Owl, Great Gray Owl

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Lee Knox Nongame Biologist  
Andrea Orabona, Nongame Bird Biologist

### **INTRODUCTION**

The Boreal Owl and the Great Gray Owl are classified as Species of Greatest Conservation Need (SGCN) with a Native Species Status of 4 (NSS4) by the Wyoming Game and Fish Department (Department) due to population status and trends that are unknown but suspected to be stable, and habitat that is restricted or vulnerable but without recent or on-going significant loss (Wyoming Game and Fish Department 2005). Both owls are also classified as Sensitive Species by the U.S. Forest Service (USFS).

As birds of prey, owls are located at the top of the food chain, which makes them vulnerable to stress and changes in their habitat, as well as excellent indicators of environmental health (Takats et al. 2001). Both Boreal and Great Gray Owls are particularly sensitive to habitat loss or conversion, particularly from incompatible timber harvesting (e.g., clearcutting), which reduces populations of their primary sources of prey; changes or removes the forest structure needed for foraging, roosting, cover, and protection; and reduces or eliminates trees with nest cavities (Bull and Duncan 1993, Hayward and Hayward 1993).

In the Rocky Mountain region, Boreal Owls typically inhabit mature, high elevation subalpine forests comprised of Englemann spruce, subalpine fir, and mature lodgepole pine, with some use of mature aspen stands that are interspersed with the conifer species listed above (Garber et al. 1991). Forests should have many small openings or an open stand structure for foraging, and trees large enough for Northern Flicker cavities (Boreal Owls nest in relatively large cavities). Based on 31 records, the elevational range for Boreal Owls in Wyoming during the breeding season is 6,560 to 10,630 feet (2,000 to 3,240 m) (Garber et al. 1991).

In Wyoming, the Great Gray Owl inhabits mature coniferous and mixed coniferous/aspen forests with scattered meadow openings. It hunts over meadows within the forest and in nearby open areas. It usually nests near bogs or clearings, in the top of large broken-off tree trunks, in nests of other large birds, or on the top of clumps of mistletoe.

Boreal and Great Gray Owls are primarily nocturnal, making casual observations and documentation of presence in a particular area difficult. Forest owl transect surveys conducted at night during the peak of the breeding season for these species provide presence and density data and can be used as a baseline for additional, more specific population or nesting productivity surveys, if desired.

## **METHODS**

The call broadcast survey method is a widely recognized technique for detecting owls during the breeding season (Fuller and Mosher 1987, Takats et al. 2001). Additionally, this is an effective method for increasing owl detection rates when compared to passive observational techniques (Fuller and Mosher 1981, Johnson et al. 1981, Francis and Bradstreet 1997, Hardy and Morrison 2000, Takats et al. 2001, Conway and Simon 2003).

Surveys were conducted during the peak breeding season when Boreal and Great Gray Owl males were calling (1 March – 15 April for the Boreal Owl and 1 February – 31 March for the Great Gray Owl). Survey routes were previously established for Boreal Owls during 1998-2001 and 2005. Surveys in 2008/2009 were conducted along routes that were not completed during the 2006 season due to inclement weather and time constraints. Surveys were conducted at night using snowmobiles, with routes located and marked prior to sunset (Cerovski 1999). Fluorescent flagging was used to mark points every 0.5 mile (0.8 km); however, the distance between some stops was slightly longer due to habitat variations. All routes and stops were recorded using a Garmin GPS 12xl unit, datum NAD83. Total survey length depended upon the amount of appropriate habitat that was available and the number of stops that could be included within the survey timeframe.

Surveys began no earlier than ½ hour after sunset, and continue no later than midnight (2400 hours). The first few hours after dark appear to be the most vocal period for most forest owl species. Weather conditions had to be calm [wind less than 5 miles/hour (8 km/hour)] and without heavy precipitation.

At each stop, all lights were extinguished prior to beginning the survey. Calls were broadcasted on each side of the trail or road and played about twice as loud as an owl would normally call. Observers listened for 3 minutes, played the desired call for 20-30 seconds, listened for a response for 2 minutes, played the call for another 20-30 seconds, listened for a response for 2 minutes, played the call for another 20-30 seconds, and listened for a final 2 minutes. When surveying for multiple species, we started with the smaller owls first before proceeding to the larger owls, and always ended the survey if a larger owl responded to the call of a smaller owl to reduce the likelihood of predation on the smaller species. All owls detected were recorded, as well as other information requested on the survey data sheet.

## **RESULTS AND DISCUSSION**

A summary of all Boreal and Great Gray Owl surveys we have conducted to date is presented in Table 1. As the results indicate, both of these forest owls are known to occupy the Shoshone National Forest (SNF) and Bridger-Teton National Forest (BTNF).

In 2008, we planned to conduct forest owl surveys on 10 of the 12 routes that were conducted in previous years, but were able to complete only five routes (Table 1). One route (Union Pass Trail Z) was not even attempted because timber harvest operations shifted the habitat characteristics of this site from a mature forest to a regenerating forest, making the area unsuitable for forest owls. Heavy snowfall prohibited us from conducting the Brooks Lake Creek, Smith's Fork, and Upper Gray's River routes, and equipment failure prevented the completion of the Middle Fork of Long Creek route.

In 2009, we again attempted to conduct the four routes that were not completed in 2008 (Table 1). On the SNF, the Middle Fork of Long Creek survey route was attempted on 17 March 2009 but not completed due to poor snow conditions and bodily injury. The route was completed on 27 March 2009 by personnel from the USFS SNF. One Great Horned Owl was documented along the route, but no Boreal or Great Gray Owls were detected. The Brooks Lake Creek route was completed by USFS SNF personnel on 26 March 2009; no owls were detected. On the BTNF, the Smith's Fork route was attempted twice, once on 4 March 2009 and again on 12 March 2009. Department personnel were unable to complete the route both times due to inclement weather, but all stops were surveyed once during a combination of both attempts. No owls were detected during either portion of the survey. The Gray's River transect on the BTNF was completed on 12 March 2009; however, no owls were detected along the route.

The limited number of Boreal Owls and lack of Great Gray Owls responding to the call broadcast survey, especially compared to earlier surveys for the Boreal Owl, may be related to: 1) a noticeable increase in snowmobile use on both forests between the earlier surveys and the winter of 2008/2009 that may have caused a shift in habitat occupancy due to noise and disturbance factors, 2) habitat suitability changes due to the climate change and drought related increase in beetle killed conifer trees, and/or 3) the timing of the surveys, which may have occurred toward the end of the breeding season so males may not have been as vocal as they would have been earlier in the season.

As in previous years, the 2008/2009 survey was conducted in mature Englemann spruce-subalpine fir and mixed mature spruce-fir/mature lodgepole pine habitats with scattered small to large openings. These habitats are necessary to provide breeding habitat for both Boreal and Great Gray Owls. The importance of maintaining these mature forest habitat conditions within the Shoshone and Bridger-Teton National Forests cannot be overstated, and care should be taken to restrict habitat loss via removal of mature spruce-fir and lodgepole pine stands. In addition, the effects of human disturbance and noise may factor into the lack of owls detected on both forests and should be explored further because, unlike weather-related changes to the forests, human induced alterations can be managed, minimized, and mitigated.

## **ACKNOWLEDGEMENTS**

Funding for this project was provided by the State of Wyoming through the Governor's ESA program, for which we are especially thankful. We would also like to thank the following Wyoming Game and Fish Department and U.S. Forest Service personnel for their valuable contributions to the 2008/2009 Boreal and Great Gray Owl surveys: Todd Filipi and Laurie Van Fleet (Department), and Diane Probasco (USFS SNF).

## LITERATURE CITED

- Cerovski, A. 1999. Boreal Owl surveys on the Shoshone National Forest, completion report. Pages 104-110 in Threatened, Endangered and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department, Cheyenne. 298pp.
- Conway, C. J., and J. C. Simon. 2003. Comparison of detection probability associated with burrowing owl survey methods. *Journal of Wildlife Management* 67(3):501-511.
- Garber, C. S., R. L. Wallen, and K. E. Duffy. 1991. Distribution of boreal owl observation records in Wyoming. *Journal of Raptor Research* 25(4):120-122.
- Francis, C. M., and M. S. W. Bradstreet. 1997. Monitoring boreal forest owls in Ontario using tape playback surveys with volunteers. Pages 175-184 in J. R. Duncan, D. H Johnson, and T. H. Nicholls, editors. *Biology and Conservation of Owls of the Northern Hemisphere*, 2nd International Symposium. USDA Forest Service General Technical Report NC-190. 635pp.
- Fuller, M. R., and J. A. Mosher. 1981. Methods of detecting and counting raptors: a review. Pages 235-246 in C. J. Ralph and J. M. Scott, editors. *Estimating the Numbers of Terrestrial Birds*. Cooper Ornithological Society, Studies in Avian Biology 6. The Blackburn Press, Caldwell, NJ. 630pp.
- Fuller, M. R., and J. A. Mosher. 1987. Raptor survey techniques. Pages 37-65 in B. A. Giron Pendleton, B. A. Millsap, K. W. Cline, and D. M. Bird, editors. *Raptor Management Techniques Manual*. National Wildlife Federation, Washington, D.C. 420pp.
- Hardy, P. C., and M. L. Morrison. 2000. Factors affecting the detection of elf owls and western screech owls. *Wildlife Society Bulletin*. 28(2):333-342.
- Johnson, R. R, B. T. Brown, L. T. Haight, and J. M Simpson. 1981. Playback recordings as a special avian censusing technique. *Studies in Avian Biology* 6:68-75.
- Takats, D. L., C. M. Francis, G. L. Holroyd, J. R. Duncan, K. M. Mazur, R. J. Cannings, W. Harris, and D. Holt. 2001. Guidelines for Nocturnal Owl Monitoring in North America. Beaverhill Bird Observatory and Bird Studies Canada, Edmonton, Alberta. 32pp. Online: <http://www.bsc-eoc.org/download/owlguidelines.pdf>.
- Wyoming Game and Fish Department. 2005. A Comprehensive Conservation Wildlife Strategy for Wyoming. Wyoming Game and Fish Department, Cheyenne.

**Table 1. Summary of the Boreal Owl (BOOW) and Great Gray Owl (GGOW) presence/absence surveys on the Shoshone and Bridger-Teton National Forests, Wyoming. The notation “NS” indicates that this species was not included in the survey.**

| Survey Location<br>Survey Route      | Survey<br>Date | Total Miles<br>(Km)<br>Surveyed   | Number of<br>BOOW<br>Detected | BOOW Density<br>Number/Mile<br>(Km) | Number of<br>GGOW<br>Detected | GGOW Density<br>Number/Mile<br>(Km) |
|--------------------------------------|----------------|---|-------------------------------|-------------------------------------|-------------------------------|-------------------------------------|
| <i>Shoshone National Forest</i>      |                |   |                               |                                     |                               |                                     |
| Beartooth Highway                    | 3/26/1998      | 4.5 (7.2)   | 1                             | 0.2 (0.1)                           | NS                            | NS                                  |
|                                      | 3/18/2008      | 4.0 (6.4)   | 0                             | 0                                   | 1                             | 0.3 (0.2)                           |
|                                      | 3/19/1998      | 3.5 (5.6)   | 2                             | 0.6 (0.4)                           | NS                            | NS                                  |
| Brooks Lake Creek                    | 3/25/2008      | Survey was attempted but could not be conducted due to heavy snowfall.                        |                               |                                     |                               |                                     |
|                                      | 3/26/2009      | 3.5 (5.6)   | 0                             | 0                                   | 0                             | 0                                   |
| Brooks Lake Road                     | 3/9/1998       | 3.5 (5.6)   | 0                             | 0                                   | NS                            | NS                                  |
|                                      | 3/1/1999       |   | 0                             | 0                                   | NS                            | NS                                  |
|                                      | 3/20/2008      | 1.5 (2.4)   | 1                             | 0.7 (0.4)                           | 0                             | 0                                   |
| Christina Lake Trail                 | 3/4/1999       | 4.5 (7.2)   | 0                             | 0                                   | NS                            | NS                                  |
|                                      | 3/25/1999      |   | 0                             | 0                                   | NS                            | NS                                  |
|                                      | 3/11/1999      | 4.0 (6.4)   | 1                             | 0.3 (0.2)                           | NS                            | NS                                  |
| Middle Fork of Long Creek            | 3/12/2008      | Survey was attempted but could not be conducted due to equipment failure.                     |                               |                                     |                               |                                     |
|                                      | 3/17/2009      | Survey was attempted but could not be conducted due to poor snow conditions and injury.       |                               |                                     |                               |                                     |
|                                      | 3/27/2009      | 4.0 (6.4)   | 0                             | 0                                   | 0                             | 0                                   |
| Moccasin Basin Road                  | 3/10/1998      | 3.3 (5.3)   | 2                             | 0.6 (0.4)                           | NS                            | NS                                  |
|                                      | 3/11/2008      | 3.0 (4.8)   | 0                             | 0                                   | 0                             | 0                                   |
|                                      | 3/18/1998      | 5.0 (8.0)   | 2                             | 0.4 (0.3)                           | NS                            | NS                                  |
| 3/19/2008                            | 0              |   | 0                             | 0                                   | 0                             |                                     |
| Pelham Lake Road                     | 4/1/2008       | 4.0 (6.4)   | 0                             | 0                                   | 0                             | 0                                   |
|                                      | 3/18/1999      |   | 2                             | 0.5 (0.3)                           | NS                            | NS                                  |
| Union Pass Trail Z                   | 3/6/2008       | Survey was not conducted due to timber harvest that rendered the habitat unsuitable for owls. |                               |                                     |                               |                                     |
|                                      | 3/12/1998      | 3.5 (5.6)   | 2                             | 0.6 (0.4)                           | NS                            | NS                                  |
|                                      | 3/12/2008      |   | 5                             | 1.4 (0.9)                           | 0                             | 0                                   |
| <i>Bridger-Teton National Forest</i> |                |   |                               |                                     |                               |                                     |
| Smith's Fork                         | 3/21/2001      | 4.0 (6.4)   | 5                             | 1.3 (0.8)                           | NS                            | NS                                  |
|                                      | 3/18/2008      | Survey was attempted but could not be conducted due to heavy snowfall.                        |                               |                                     |                               |                                     |
|                                      | 3/4/2009       | 4.0 (6.4)   | 0                             | 0                                   | 0                             | 0                                   |
|                                      | 3/12/2009      |   | 0                             | 0                                   | 0                             | 0                                   |

| Survey Location<br>Survey Route | Survey<br>Date | Total Miles<br>(Km)<br>Surveyed  | Number of<br>BOOW<br>Detected | BOOW Density<br>Number/Mile<br>(Km) | Number of<br>GGOW<br>Detected | GGOW Density<br>Number/Mile<br>(Km) |
|---------------------------------|----------------|--|-------------------------------|-------------------------------------|-------------------------------|-------------------------------------|
| Upper Gray's River              | 3/21/2005      | 5.0 (8.0)  | 3                             | 0.6 (0.4)                           | NS                            | NS                                  |
|                                 | 3/19/2008      | Survey was attempted but could not be conducted due to heavy snowfall. |                               |                                     |                               |                                     |
|                                 | 3/12/2009      | 5.0 (8.0)  | 0                             | 0                                   | 0                             | 0                                   |
| LaBarge Creek                   | 3/29/2000      | 4.5 (7.2)  | 6                             | 1.3 (0.8)                           | NS                            | NS                                  |
|                                 | 3/19/2008      | 3.5 (5.6)  | 1                             | 0.3 (0.2)                           | 0                             | 0                                   |

# FOREST BAT INVENTORIES COMPLETION REPORT

## STATE OF WYOMING

NONGAME MAMMALS – Species of Greatest Conservation Need / State Wildlife Grants Funding, Governor’s ESA Funding – Bats

PERIOD COVERED: 1 July 2008 – 31 September 2008

PREPARED BY: Todd Filipi, Nongame Biologist  
Martin Grenier, Nongame Mammal Biologist  
Summer Chrisman, Nongame Biologist  
Erin Hannelly, Nongame Biologist

## INTRODUCTION

There is a growing concern over the status of bat populations within the United States (Ellison et al. 2003). Bats populations are facing new threats such as disease, climate change, and continued human encroachment that are changing the landscape (e.g., wind energy development). Impacts, however, remain largely unquantified and data in Wyoming are often lacking. The “slow” life histories of bats make them potentially vulnerable to drastic population declines (O’Shea and Bogan 2003). Bats in western forests of Wyoming are potentially facing additional threats due to logging, climate change, and pine bark beetle infestations. To date, statewide inventories for bats that occur in the western forests of Wyoming are lacking (Hester and Grenier 2005).

This report quantifies activities for the first part of a two-year project. Our objectives were to collect data on abundance, distribution, and diversity of bats that occur in forests of Wyoming. Funding for this project was provided by the U.S. Fish and Wildlife Service through State Wildlife Grants money.

## METHODS

We randomly selected 100 6<sup>th</sup>-level Hydrologic Unit Codes (HUCs) (Berelson et al. 2004) across the western forests of Wyoming using ArcMap. HUCs that were located in wilderness areas, National Parks, or on the Wind River Reservation were omitted from the sample. Survey locations within each HUC were selected by identifying bat foraging areas that could easily be mist netted (Hester and Grenier 2005). We set up mist nets (Avinet, Inc., Dryden, NY) using different patterns, depending on the available habitat and landscape. Mist nets were 8.5 feet (2.6 m) tall and ranged in size from 20-60 feet (6-18 m) wide. Nets were opened ½ hour before

sunset and closed after two hours. All captured bats were promptly removed from the nets and processed on site. Species, sex, age, reproduction status, and weight was recorded for each bat captured (Hester and Grenier 2005). Once data were recorded, all bats were released on site. Habitat, net configuration, GPS location (NAD 27), weather conditions, and survey times were also recorded at each location.

We also recorded bat foraging calls at each site using Anabat (Titley Scientific, Queensland, Australia). Anabat detectors were deployed overlooking potential foraging areas in passive mode. We deployed Anabat units about ½ hour before dusk, and collected them about three hours later. All recordings were reviewed. Whenever possible, calls were identified to species using AnaLook software (Titley Scientific, Queensland, Australia), and poor quality calls were identified to species groups using minimum frequency range.

## **RESULTS**

We surveyed 27 HUCs between 7 July and 14 September 2008 (Figure 1). One HUC was surveyed twice. A total of 76 bats representing six different species were captured (Table 1). Of the 76 bats captured, 53 were male, 22 were female, and one was not sexed. One bat escaped before being properly identified or sexed. Only one juvenile bat was captured during the surveys. All 22 of the females captured were in reproductive condition.

We captured bats at 16 of the 27 HUCs (Figures 2-7, Table 1). Fewer bats were captured in early September than in August or July. Capture success likely depended on several factors and varied by location. The most common bat captured was the little brown bat, representing 59% of the total captures. Silver-haired bat, long-legged myotis, and long-eared myotis were the next most commonly captured bats.

A total of 2,549 bat foraging calls were recorded using AnaBat (Table 2). Little brown bat was the most commonly detected bat, and was detected at 21 of the 27 HUCs. Species composition for acoustic detections was similar to captures results. Acoustic survey results are presented in Table 3. AnaBat was passively deployed for approximately 4,070 minutes during the summer of 2008. On average, we recorded <1 call per minute of survey. The 40 khz group of bats were most commonly detected by passive AnaBat units.

## **DISCUSSION**

The forest bat surveys we conducted resulted in new records of reproduction for the silver-haired bat and long-eared in the southern part of the Wyoming Range. No males with descended testes were detected in 2008. Notably, juvenile captures were noticeably absent from our records. Only 1% of all captures were represented by juveniles. These capture rates are considerably lower than expected; however, they could be attributed to site selection. Adult males were over-represented compared to females. Our low capture rates for juveniles could be associated with their close association with females after becoming volant and our inability to select foraging sites for females.

Notably, detections and captures of bats in the Uinta Mountains of southwestern Wyoming were very low. This portion of the state is heavily impacted by mountain pine beetle. We observed very few healthy stands of lodgepole pine. Insects (e.g., moths) were notably absent. Not only were captures low, but we failed to detect bats with Anabat at three of the four HUCs in the Uinta Mountains. It is unclear whether the lack of prey or poor weather conditions contributed to our low success rates in this part of the State. Further investigations of how bat communities are changing with the presence of mountain pine beetle is warranted.

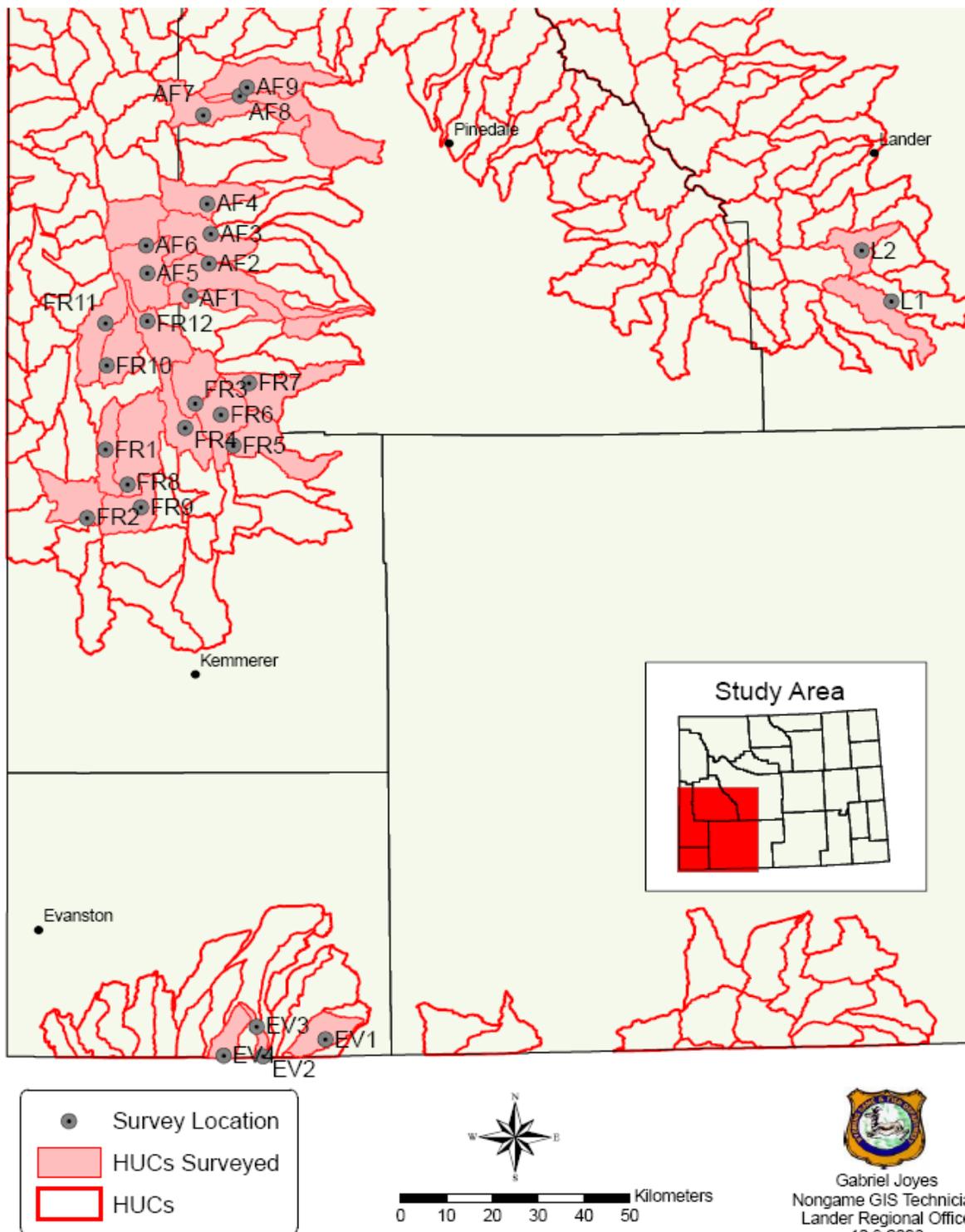
This is the first year of a two-year project. Further discussion will be provided upon the completion of this project.

## **ACKNOWLEDGMENTS**

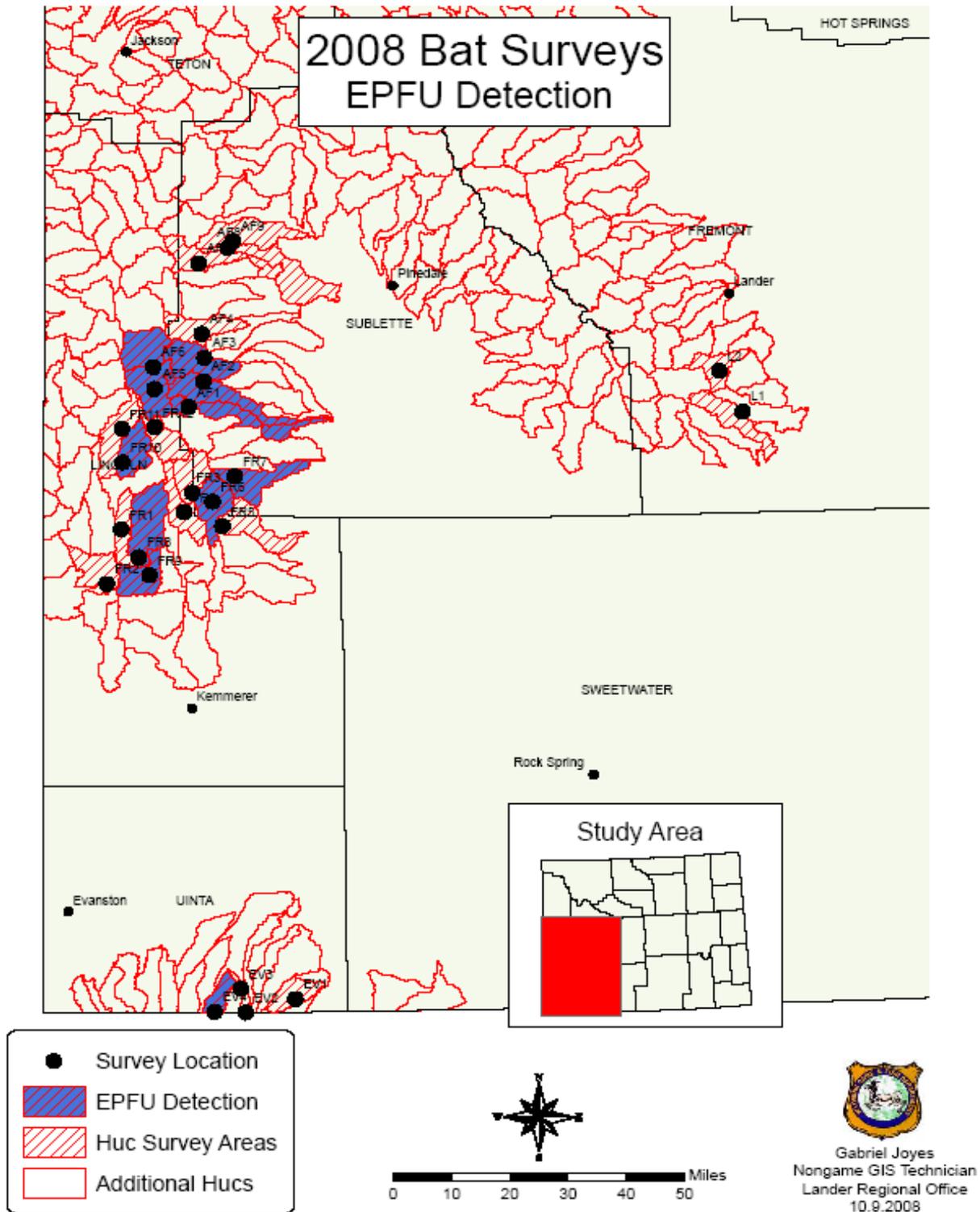
Project financing was provided by the State of Wyoming through the Governor's ESA funding and by State Wildlife Grants funds, for which the Department is extremely grateful. We also extend a special thanks to Wyoming Game and Fish Department personnel Nyssa Whitford and Gabriel Jeyes for their assistance with the GIS related part of the project.

## **LITERATURE CITED**

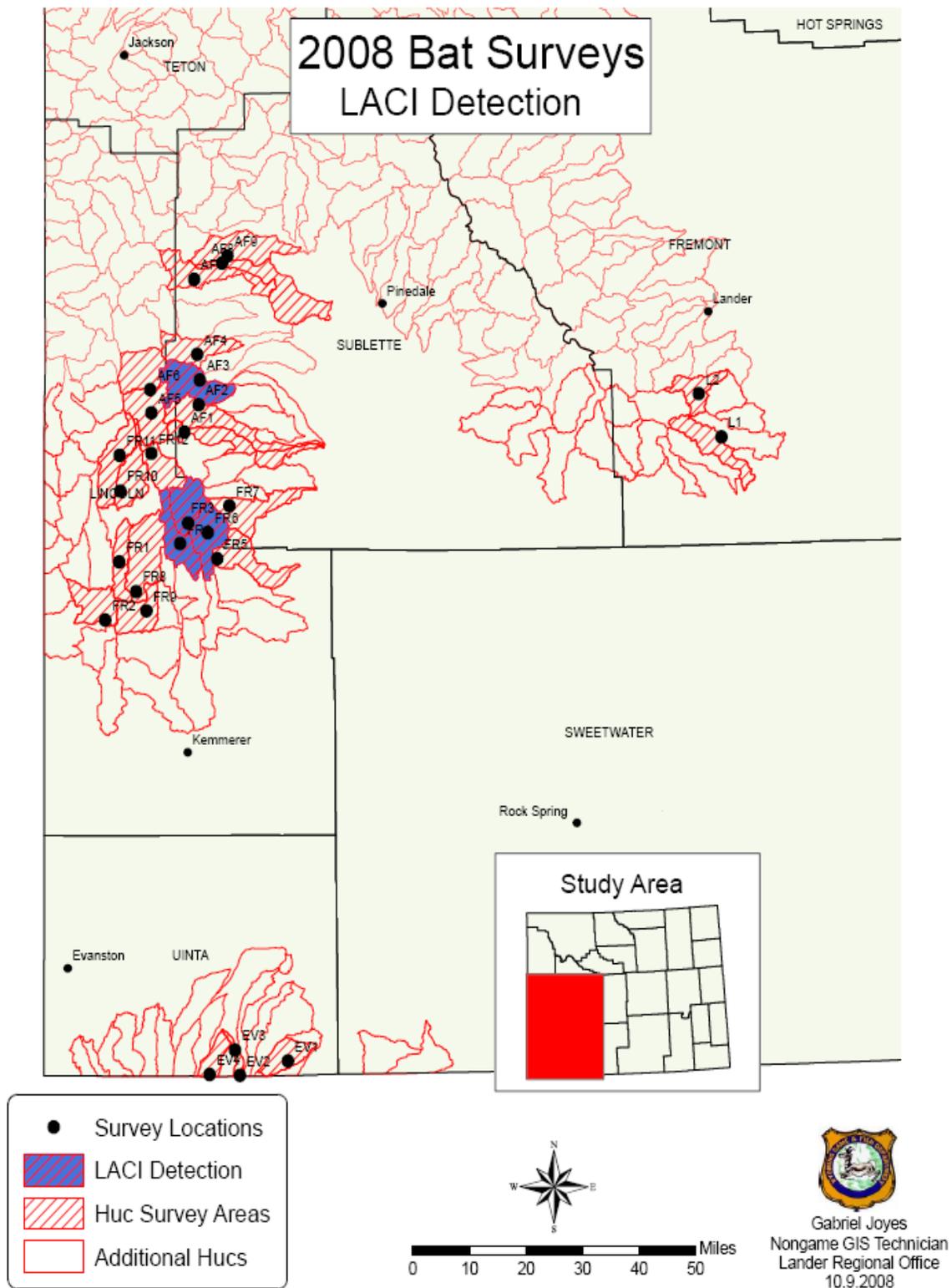
- Berelson, W. L., P. A. Caffrey, and J. D. Hamerlinck. 2004. Mapping hydrologic units for the National Watershed Boundary Dataset. *Journal of the American Water Resources Association* 40(5):1231-1246.
- Ellison, L. E., T. J. O'Shea, M. A. Bogan, A. L. Everette, and D. M. Schneider. 2003. Existing data on colonies of bats in the United States: summary and analysis of the U.S. Geological Survey's bat population database. Pages 127-171 in T. J. O'Shea and M. A. Bogan, editors. *Monitoring Trends in Bat Populations of the United States and Territories: Problems and Prospects*. U.S. Geological Survey, Biological Resources Division, Information and Technology Report, USGS/BRD/ITR 2003-0003. 274pp.
- Hester, S. G., and M. B. Grenier. 2005. *A Conservation Plan for Bats in Wyoming*. Wyoming Game and Fish Department Nongame Program, Lander.
- O'Shea, T. J., and M. A. Bogan. 2003. Introduction. Pages 1-7 in T. J. O'Shea and M. A. Bogan, editors. *Monitoring Trends in Bat Populations of the United States and territories: Problems and Prospects*. U.S. Geological Survey, Biological Resources Division, Information and Technology Report, USGS/BRD/ITR 2003-0003. 274pp.



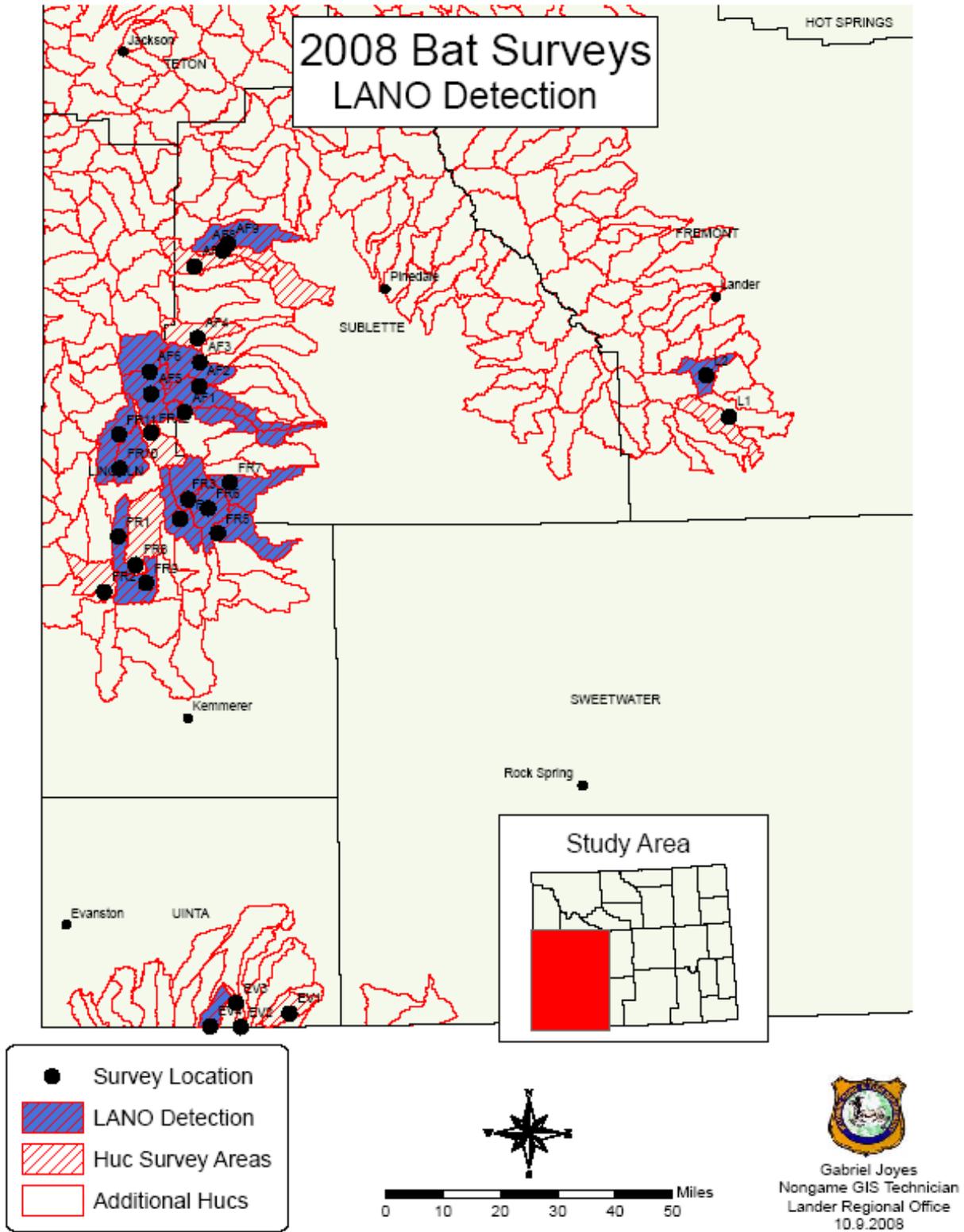
**Figure 1. Twelve digit Hydrological Unit Codes (HUCs) that were surveyed for the presence of bats in Wyoming, 2008.**



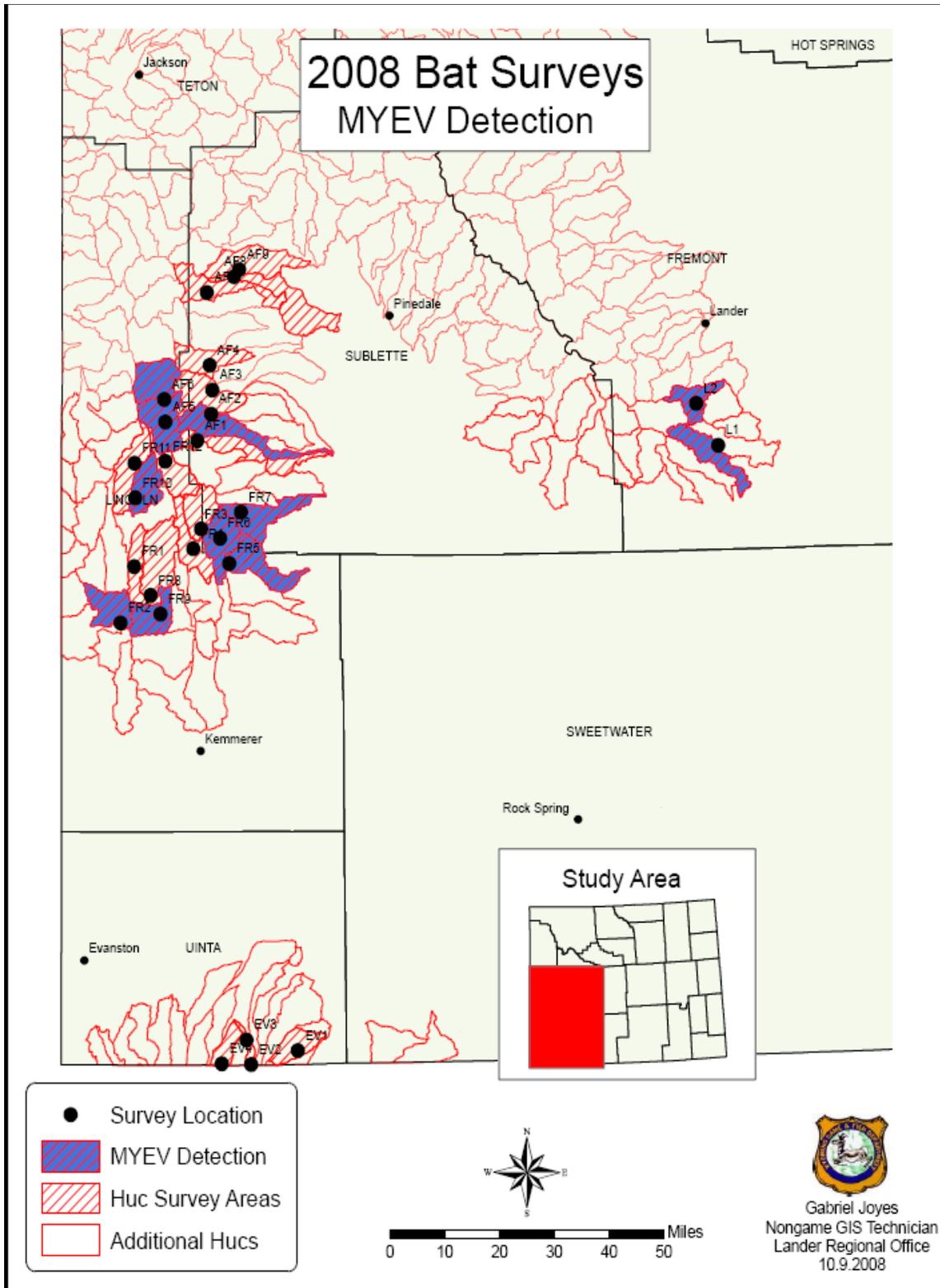
**Figure 2. Twelve digit Hydrological Unit Codes (HUCs) with detections of big brown bat (*Eptesicus fuscus*) in Wyoming, 2008.**



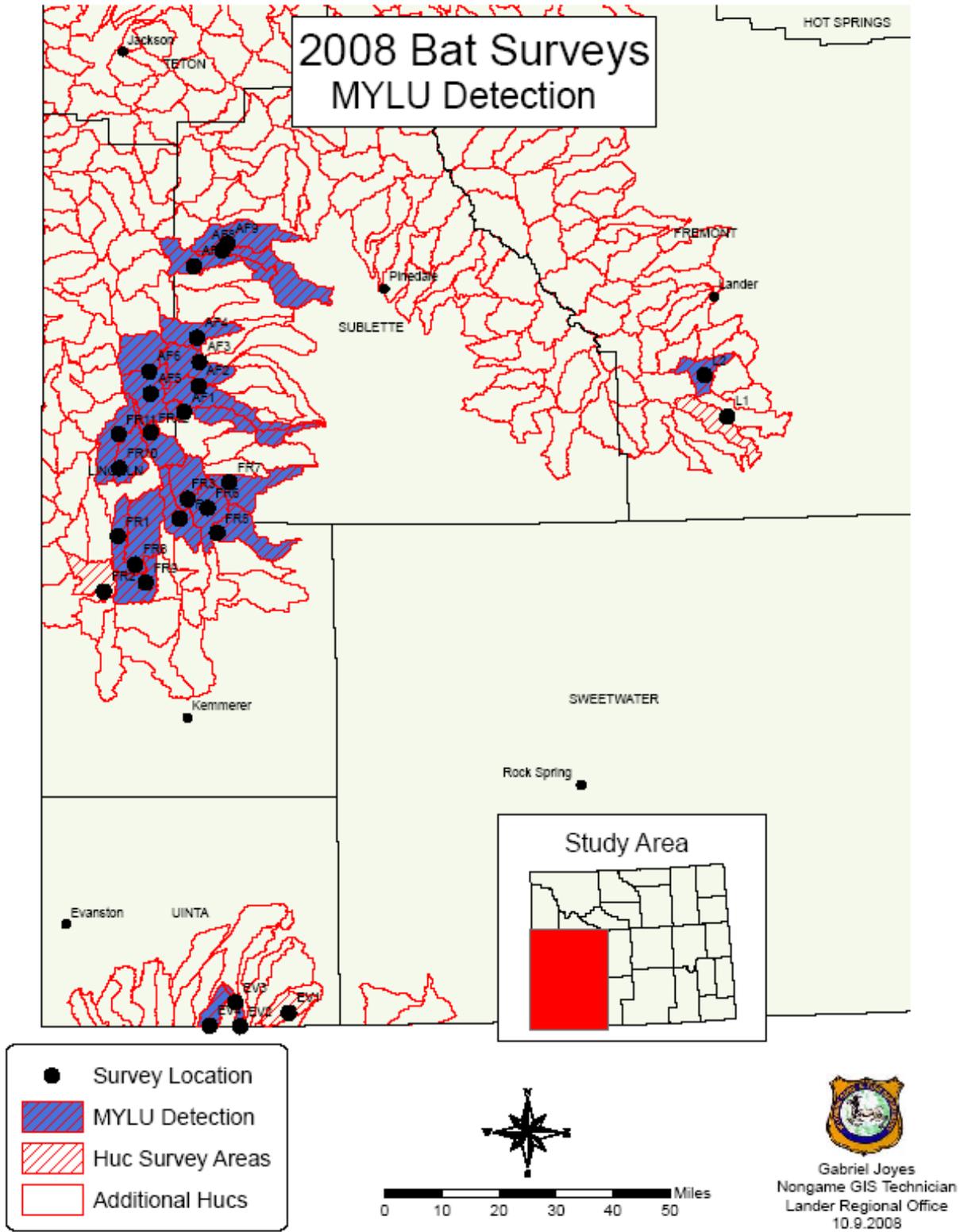
**Figure 3. Twelve digit Hydrological Unit Codes (HUCs) with detections of hoary bat (*Lasiurus cinereus*) in Wyoming, 2008.**



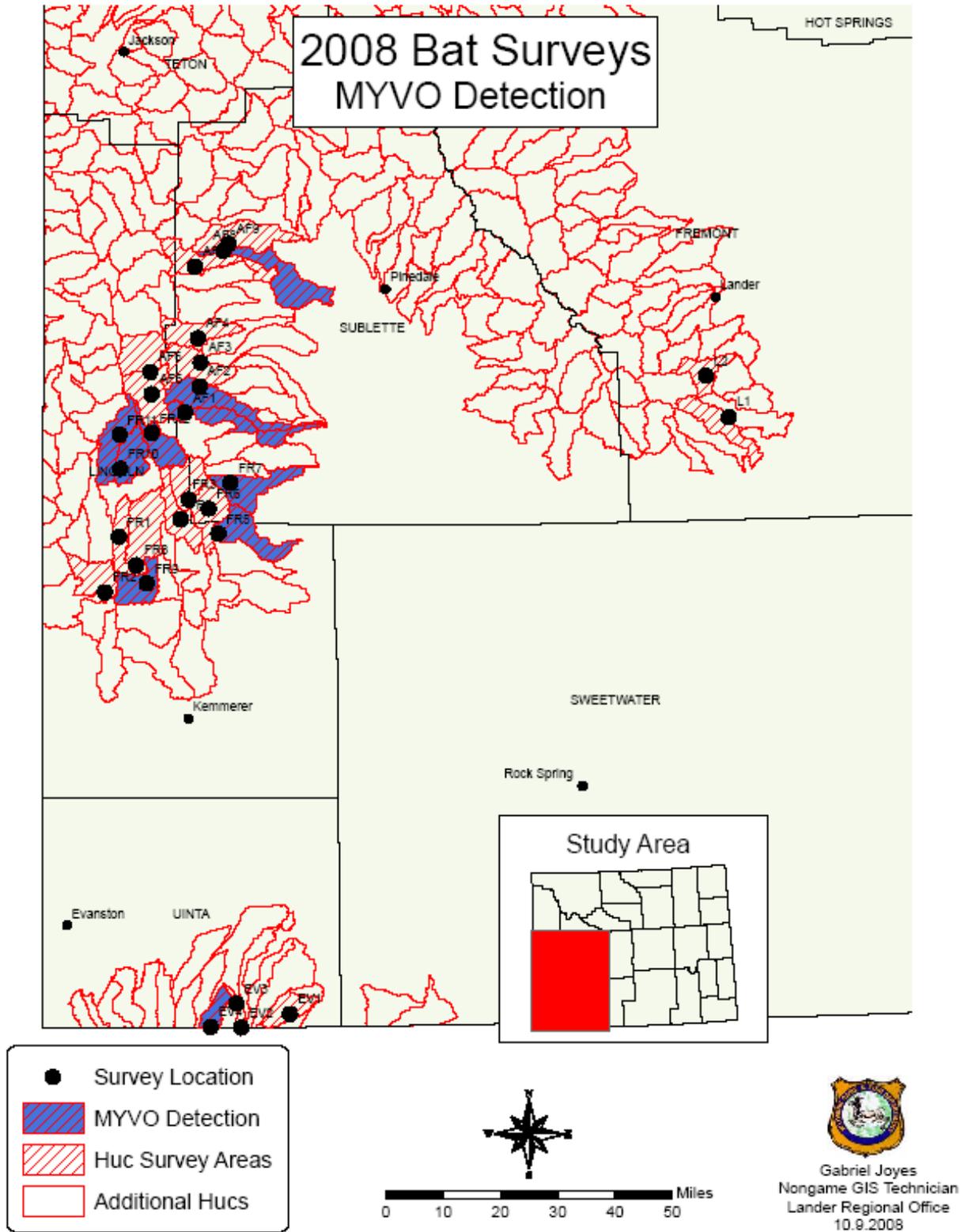
**Figure 4. Twelve digit Hydrological Unit Codes (HUCs) with detections of silver-haired bats (*Lasionycteris noctivagans*) in Wyoming, 2008.**



**Figure 5. Twelve digit Hydrological Unit Codes (HUCs) with detections of long-eared myotis (*Myotis evotis*) in Wyoming, 2008.**



**Figure 6. Twelve digit Hydrological Unit Codes (HUCs) with detections of little brown myotis (*Myotis lucifugus*) in Wyoming, 2008.**



**Figure 7. Twelve digit Hydrological Unit Codes (HUCs) with detections of long-legged myotis (*Myotis volans*) in Wyoming, 2008.**

**Table 1. Bats captured in Hydrological Unit Codes (HUCs) surveyed in Wyoming, 2008.<sup>a</sup>**

| Site          | Date      | Bats Captured | EPFU M/F | LACI M/F | MYEV M/F | MYLU M/F | LANO M/F | MYVO M/F | Unknown |
|---------------|-----------|---------------|----------|----------|----------|----------|----------|----------|---------|
| AF1           | 8/19/2008 | 0             |          |          |          |          |          |          |         |
| AF2           | 8/20/2008 | 3             | 1/0      |          | 0/1      |          | 1/0      |          |         |
| AF3           | 8/21/2008 | 2             | 1/0      |          |          |          | 1/0      |          |         |
| AF4           | 8/22/2008 | 0             |          |          |          |          |          |          |         |
| AF5           | 8/23/2008 | 3             |          |          | 0/1      | 1/0      | 1/0      |          |         |
| AF6           | 8/24/2008 | 0             |          |          |          |          |          |          |         |
| AF7           | 9/2/2008  | 0             |          |          |          |          |          |          |         |
| AF8           | 9/3/2008  | 0             |          |          |          |          |          |          |         |
| AF9           | 9/4/2008  | 0             |          |          |          |          |          |          |         |
| EV1           | 7/8/2008  | 0             |          |          |          |          |          |          |         |
| EV2           | 7/9/2008  | 1             |          |          |          | 1/0      |          |          |         |
| EV3           | 7/10/2008 | 1             |          |          |          | 1/0      |          |          |         |
| EV4           | 7/11/2008 | 0             |          |          |          |          |          |          |         |
| FR1           | 7/12/2008 | 4             |          |          |          | 1/1      | 2/0      |          |         |
| FR10          | 8/6/2008  | 9             |          |          |          | 2/7      |          |          |         |
| FR11          | 8/9/2008  | 5             |          |          |          | 3/1      |          | 1/0      |         |
| FR12          | 8/10/2008 | 1             |          |          |          |          |          | 1/0      |         |
| FR2           | 7/13/2008 | 1             |          |          | 0/1      |          |          |          |         |
| FR3           | 7/25/2008 | 7             |          | 1/0      |          | 4/0      | 2/0      |          |         |
| FR4           | 7/23/2008 | 17            |          | 1/0      |          | 13/1     | 2/0      |          |         |
| FR5           | 7/24/2008 | 2             |          |          |          | 1/0      |          | 0/1      |         |
| FR6           | 7/26/2008 | 8             | 1/0      |          | 0/1      | 3/3      |          |          |         |
| FR7           | 7/27/2008 | 10            |          |          | 3/1      | 1/0      |          | 2/3      |         |
| FR8           | 8/4/2008  | 0             |          |          |          |          |          |          |         |
| FR9           | 8/5/2008  | 2             |          |          |          | 1/0      |          |          | 1       |
| L1            | 9/5/2008  | 0             |          |          |          |          |          |          |         |
| L2            | 9/6/2008  | 0             |          |          |          |          |          |          |         |
| <i>Totals</i> |           | 76            | 3/0      | 2/0      | 3/5      | 32/13    | 9/0      | 4/4      | 1       |

<sup>a</sup> EPFU = *Eptesicus fuscus* (big brown bat)  
LACI = *Lasiurus cinereus* (hoary bat)  
LANO = *Lasionycteris noctivagans* (silver-haired bat)  
MYEV = *Myotis evotis* (long-eared myotis)  
MYLU = *Myotis lucifugus* (little brown bat)  
MYVO = *Myotis volans* (long-legged myotis)

**Table 2. Number of bat calls recorded by species in Hydrological Unit Codes (HUCs) surveyed in Wyoming, 2008. <sup>a</sup>**

| Site          | Date      | Calls Recorded | LACI     | EPFU      | MYEV      | MYLU      | LANO      | MYVO      |
|---------------|-----------|----------------|----------|-----------|-----------|-----------|-----------|-----------|
| AF1           | 8/19/2008 | 169            |          | X         |           | X         | X         | X         |
| AF2           | 8/20/2008 | 162            |          | X         | X         | X         | X         | X         |
| AF3           | 8/21/2008 | 69             | X        | X         |           | X         | X         |           |
| AF4           | 8/22/2008 | 9              |          |           |           | X         |           |           |
| AF5           | 8/23/2008 | 413            |          | X         | X         | X         | X         |           |
| AF6           | 8/24/2008 | 24             |          | X         | X         | X         | X         |           |
| AF7           | 9/2/2008  | 10             |          |           |           | X         |           |           |
| AF8           | 9/3/2008  | 167            |          |           |           | X         |           | X         |
| AF9           | 9/4/2008  | 29             |          |           |           | X         | X         |           |
| EV2           | 7/9/2008  | 0              |          |           |           |           |           |           |
| EV3           | 7/10/2008 | 0              |          |           |           |           |           |           |
| EV4           | 7/11/2008 | 64             |          | X         |           | X         | X         | X         |
| FR1           | 7/12/2008 | 3              |          |           |           |           | X         |           |
| FR10          | 8/6/2008  | 309            |          | X         | X         | X         | X         | X         |
| FR11          | 8/9/2008  | 79             |          |           |           | X         | X         | X         |
| FR12          | 8/10/2008 | 148            |          |           |           | X         |           | X         |
| FR2           | 7/13/2008 | 0              |          |           |           |           |           |           |
| FR3           | 7/25/2008 | 37             |          |           |           | X         | X         |           |
| FR4           | 7/23/2008 | 129            |          |           |           | X         | X         |           |
| FR5           | 7/24/2008 | 183            |          |           | X         | X         | X         | X         |
| FR6           | 7/26/2008 | 85             | X        | X         | X         | X         | X         |           |
| FR7           | 7/27/2008 | 328            |          | X         | X         | X         | X         | X         |
| FR8           | 8/4/2008  | 36             |          | X         |           | X         |           |           |
| FR9           | 8/5/2008  | 84             |          | X         | X         | X         | X         | X         |
| L1            | 9/5/2008  | 4              |          |           | X         |           |           |           |
| L2            | 9/6/2008  | 8              |          |           | X         | X         | X         |           |
| <i>Totals</i> |           | <i>2549</i>    | <i>2</i> | <i>11</i> | <i>10</i> | <i>21</i> | <i>17</i> | <i>10</i> |

<sup>a</sup> EPFU = *Eptesicus fuscus* (big brown bat)  
LACI = *Lasiurus cinereus* (hoary bat)  
LANO = *Lasionycteris noctivagans* (silver-haired bat)  
MYEV = *Myotis evotis* (long-eared myotis)  
MYLU = *Myotis lucifugus* (little brown bat)  
MYVO = *Myotis volans* (long-legged myotis)

**Table 3. Acoustic detections of bats by Hydrological Unic Code (HUCs) in Wyoming, 2008. Survey duration is represented by time, detection rates for the entire survey are represented by calls/minute.**

| Site          | Date      | # of Calls  | Time (Min)  | Calls/Min   | 40 khz | 25 khz | 30 khz | 20 khz |
|---------------|-----------|-------------|-------------|-------------|--------|--------|--------|--------|
| AF1           | 8/19/2008 | 169         | 130         | 1.3         | 0.75   | 0.17   |        |        |
| AF2           | 8/20/2008 | 162         | 145         | 1.12        | 0.44   | 0.09   | 0.18   |        |
| AF3           | 8/21/2008 | 69          | 159         | 0.43        | 0.33   | 0.06   |        | 0.01   |
| AF4           | 8/22/2008 | 9           | 145         | 0.06        | 0.01   |        |        |        |
| AF5           | 8/23/2008 | 413         | 165         | 2.5         | 2.42   | 0.04   | 0.04   |        |
| AF6           | 8/24/2008 | 24          | 147         | 0.16        | 0.1    | 0.03   | 0.01   |        |
| AF7           | 9/2/2008  | 10          | 138         | 0.07        | 0.05   |        |        |        |
| AF8           | 9/3/2008  | 167         | 228         | 0.73        | 0.72   |        |        |        |
| AF9           | 9/4/2008  | 29          | 173         | 0.17        | 0.11   | 0.06   |        |        |
| EV1           | 7/8/2008  | 0           | NA          |             |        |        |        |        |
| EV2           | 7/9/2008  | 0           | 135         | 0           |        |        |        |        |
| EV3           | 7/10/2008 | 0           | 300         | 0           |        |        |        |        |
| EV4           | 7/11/2008 | 64          | 260         | 0.25        | 0.02   | 0.2    |        |        |
| FR1           | 7/12/2008 | 3           | N/A         | N/A         |        |        |        |        |
| FR10          | 8/6/2008  | 309         | 162         | 1.91        | 1.17   | 0.13   | 0.05   |        |
| FR11          | 8/9/2008  | 79          | 124         | 0.64        | 0.35   | 0.01   |        |        |
| FR12          | 8/10/2008 | 148         | 145         | 1.02        | 0.97   |        |        |        |
| FR2           | 7/13/2008 | 0           | 315         | 0           |        |        |        |        |
| FR3           | 7/25/2008 | 37          | 120         | 0.31        | 0.07   | 0.13   |        |        |
| FR4           | 7/23/2008 | 129         | 117         | 1.1         | 0.82   | 0.15   |        |        |
| FR5           | 7/24/2008 | 183         | 135         | 1.36        | 0.48   | 0.3    | 0.23   |        |
| FR6           | 7/26/2008 | 85          | 155         | 0.55        | 0.32   | 0.04   | 0.02   | 0.01   |
| FR7           | 7/27/2008 | 328         | 125         | 2.6         | 1.38   | 0.44   | 0.73   |        |
| FR8           | 8/4/2008  | 36          | 130         | 0.28        | 0.08   | 0.02   |        |        |
| FR9           | 8/5/2008  | 84          | 130         | 0.65        | 0.4    | 0.05   | 0.05   |        |
| L1            | 9/5/2008  | 4           | 113         | 0.04        |        |        | 0.03   |        |
| L2            | 9/6/2008  | 8           | 174         | 0.05        | 0.02   | 0.01   | 0.01   |        |
| <i>Totals</i> |           | <i>2549</i> | <i>4070</i> | <i>0.63</i> | --     | --     | --     | --     |

# **WHITE-TAILED PRAIRIE DOG MAPPING AND BLACK-FOOTED FERRET HABITAT EVALUATION IN WESTERN WYOMING COMPLETION REPORT**

STATE OF WYOMING

NONGAME MAMMALS: Species of Greatest Conservation Need – White-tailed Prairie Dog

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Laurie Van Fleet, Nongame Biologist

## **INTRODUCTION**

Located in Sublette County, the Big Piney white-tailed prairie dog (WTPD) complex is situated in rolling sagebrush-grassland habitat north of the Jonah Natural Gas Fields and in the southwest portion of the Pinedale Anticline. Pre-1995 mapping surveys conducted cooperatively by the Wyoming Game and Fish Department (Department), University of Wyoming, and private consultants estimated the complex at 13,790 acres (5,581 ha) (Grenier 2004) (Figure 1).

The Sweetwater WTPD complex encompasses approximately 14,214 acres (5,752 ha) of high desert sagebrush-grassland (Grenier 2004). Located within Fremont and Sweetwater Counties, the complex was only partially mapped by the Department for WTPD prior to 1995 (Figure 2). However, the complex was impacted by sylvatic plague in the mid 1990s at the same time when other complexes were experiencing declines (B. Oakleaf, Wyoming Game and Fish Department, personal communication). The Department has made no attempts to monitor the impacts until 2002 (Grenier et al. 2003).

Mapping results for 2002 indicated that WTPD colony distribution in the Sweetwater complex had shifted considerably since 1995 (Grenier et al. 2003). Although the complex was larger (occupied more acreage) in 2002, many colonies that were present prior to 1995 were no longer present in 2002 (Figure 2). This was most evident in the northern portion of the complex where no colonies were found in areas where previous mapping efforts had indicated that approximately 8,935 acres (3616 ha) of WTPD colonies were present (Grenier et al. 2003).

This report summarizes techniques, survey areas, and data collected in 2008 on WTPD colonies within the Big Piney complex and the northern portion of the Sweetwater complex. The purpose of these surveys was to quantify changes to WTPD acreage in areas where historic data existed.

## **METHODS**

Colonies were located using 1:100,000 scale land surface maps containing parameters for each complex, and provided the baseline data for locating WTPD colonies (Grenier 2004). Colonies that were encountered but had not been previously mapped were recorded as a new colony. Complexes were searched systematically for new, historic, and previously unknown WTPD colonies.

Mapping was conducted between 1 June and 30 July 2008 while walking the perimeter of an identified colony and recording waypoints on a hand held global positioning system unit (Garmin GPS 12XL). Colonies with boundaries separated by  $\geq 650$  feet (200 m) or more were considered to be unique. Waypoints were downloaded and imported into Global Information System (GIS) software (ArcView 3.2), where individual waypoints were then digitized into polygons. Hectares were calculated in ArcView from the digitized polygons.

### **Big Piney**

Mapping efforts included areas south of Big Piney along Hwy 189, northeast to Boulder and west of Highway 191.

### **Sweetwater**

Mapping efforts were focused in the northern portion of the Sweetwater complex located south of Highway 287/789 to the Fremont and Sweetwater county line and from Beaver Rim east to Crook Mountain.

The 2008 mapping effort in both the Big Piney and Sweetwater complexes were limited to public lands. We did not request access to private lands prior to the mapping effort, and they will not be included in the total WTPD acreage estimate.

## **RESULTS AND DISCUSSION**

### **Big Piney**

The Big Piney mapping effort in 2008 resulted in 13,192 acres (5,339 ha) of WTPD colonies (Figure 3). This is a decrease of approximately 600 acres (243 ha) from pre-1995 estimates. Although several smaller colonies, <200 acres (81 ha) were no longer present, others had converged, creating several large colonies. Some were in excess of 2,000 acres (809 ha). We also noted that sagebrush within this complex was dense and made identifying WTPD burrows from a distance difficult. Several of the colonies were reported as having high numbers of WTPDs.

In 2007, a black-footed ferret skull of unknown age was collected at a WTPD colony within the Big Piney complex (B. Oakleaf, Wyoming Game and Fish Department, personal communication). This colony and several smaller adjacent colonies,  $\bar{x} = 400$  acres (162 ha),

were no longer present when surveys were conducted in 2008 due to the construction of natural gas well pads (L. Solberg, Bureau of Land Management, personal communication).

## **Sweetwater**

In 2008, mapping efforts resulted in 2,084 acres (843 ha) of WTPD colonies within the northern portion of the Sweetwater complex (Figure 4). This is a dramatic increase from 2002 estimates when no colonies were reported. However, the current estimate is still below the historical colonies (pre-1995) estimate of 8,935 acres (3,616 ha). Colonies in 2008 were small and scattered, ranging from 0.35 acres (0.14 ha) to 445 acres (180 ha). WTPDs appear to be slowly recovering from sylvatic plague, which caused their decline in the 1990s.

Access limitations precluded observations of many towns within both complexes. Therefore, surveys were heavily biased toward public lands and associated management, and are not a true representation of complex-wide increases or declines.

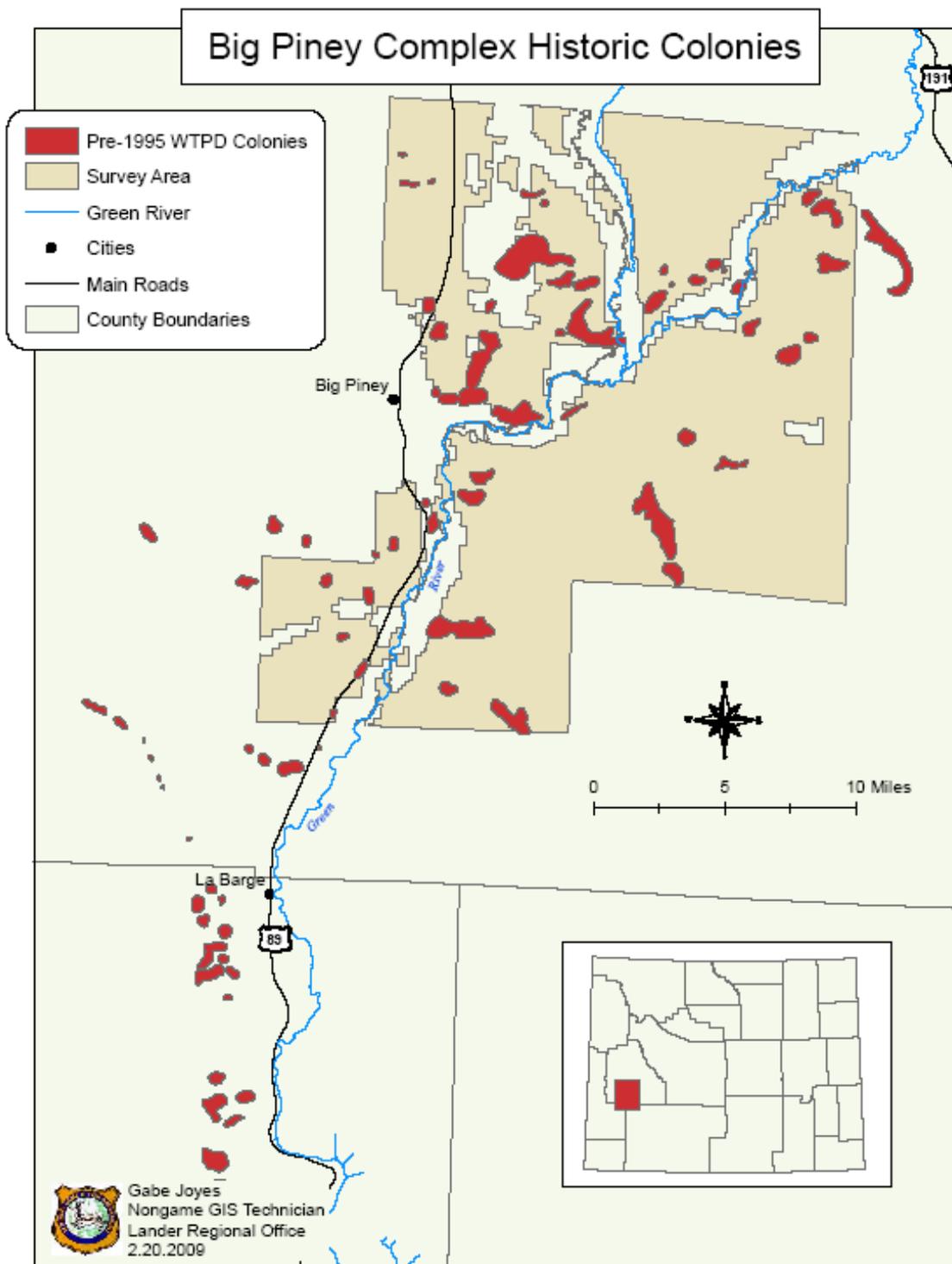
## **ACKNOWLEDGEMENTS**

We would like to thank Wyoming Game and Fish Department personnel Holly Cooper and Nathan Steere for their tireless efforts in mapping these complexes.

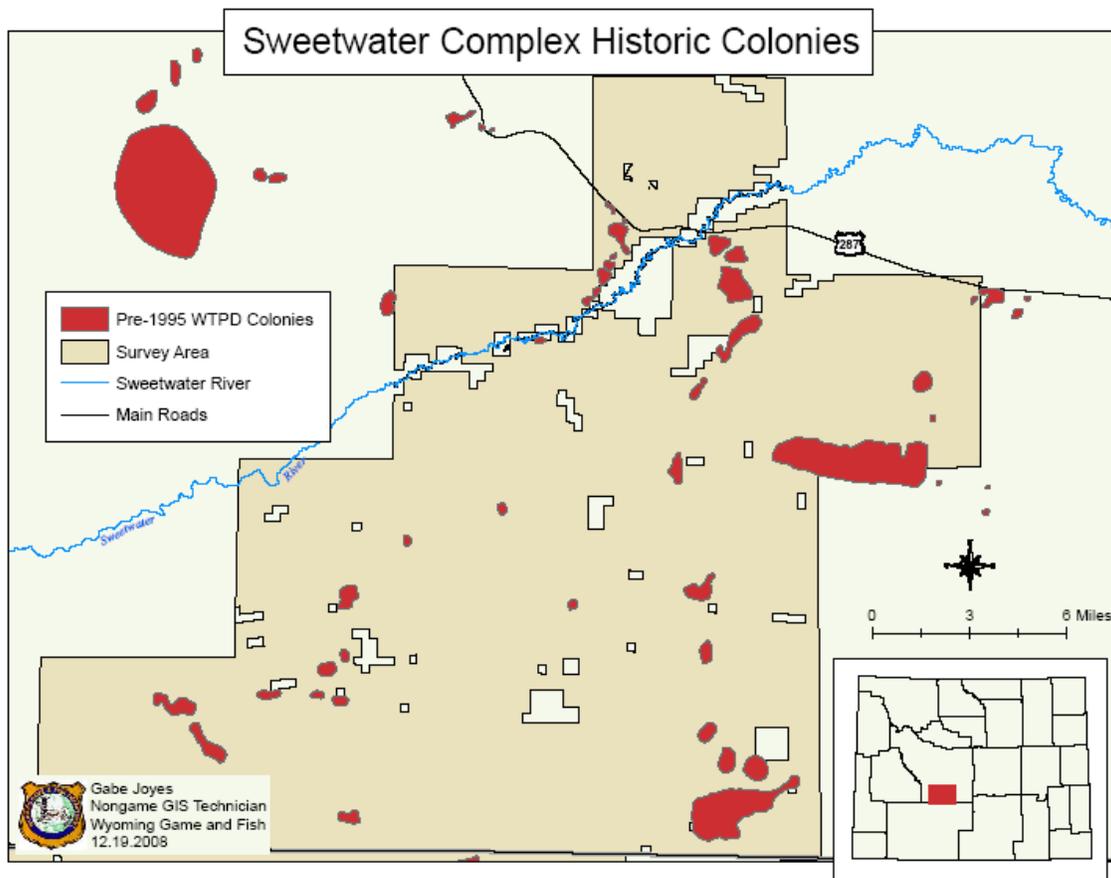
## **LITERATURE CITED**

Grenier, M., A. Carpenter, M. Martin, M. Purcell, and J. Stephens. 2003. Black-footed ferret habitat evaluation of historical white-tailed prairie dog complexes in Wyoming, completion report. Pages 6-13 in A. O. Cerovski, editor. Threatened, Endangered, and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department Nongame Program, Biological Services Section, Cheyenne. 196pp.

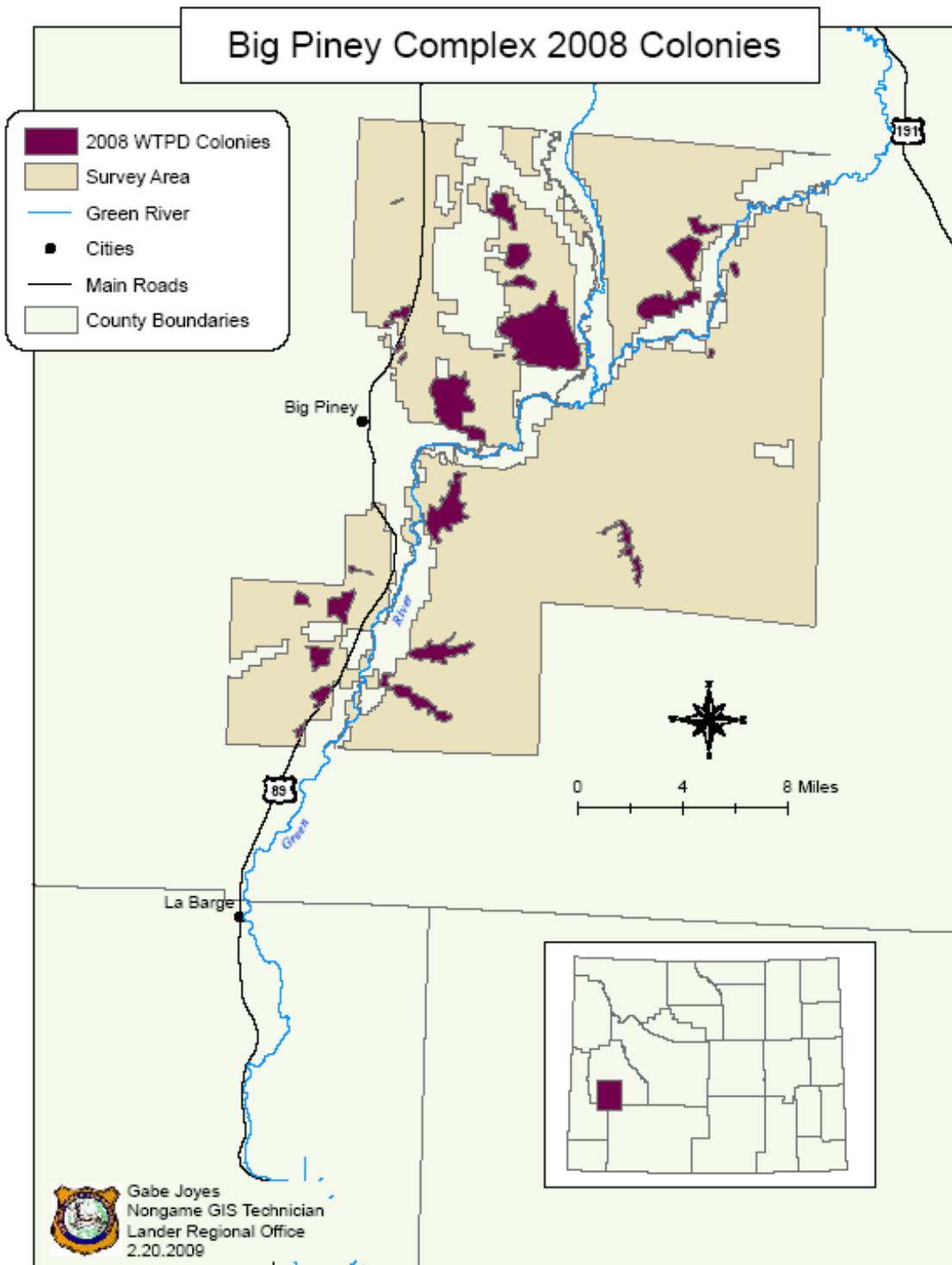
Grenier, M. B. 2004. An evaluation of black-footed ferret block clearances in Wyoming, completion report. Pages 5-18 in A. O. Cerovski, editor. Threatened, Endangered, and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department Nongame Program, Biological Services Section, Cheyenne. 239pp.



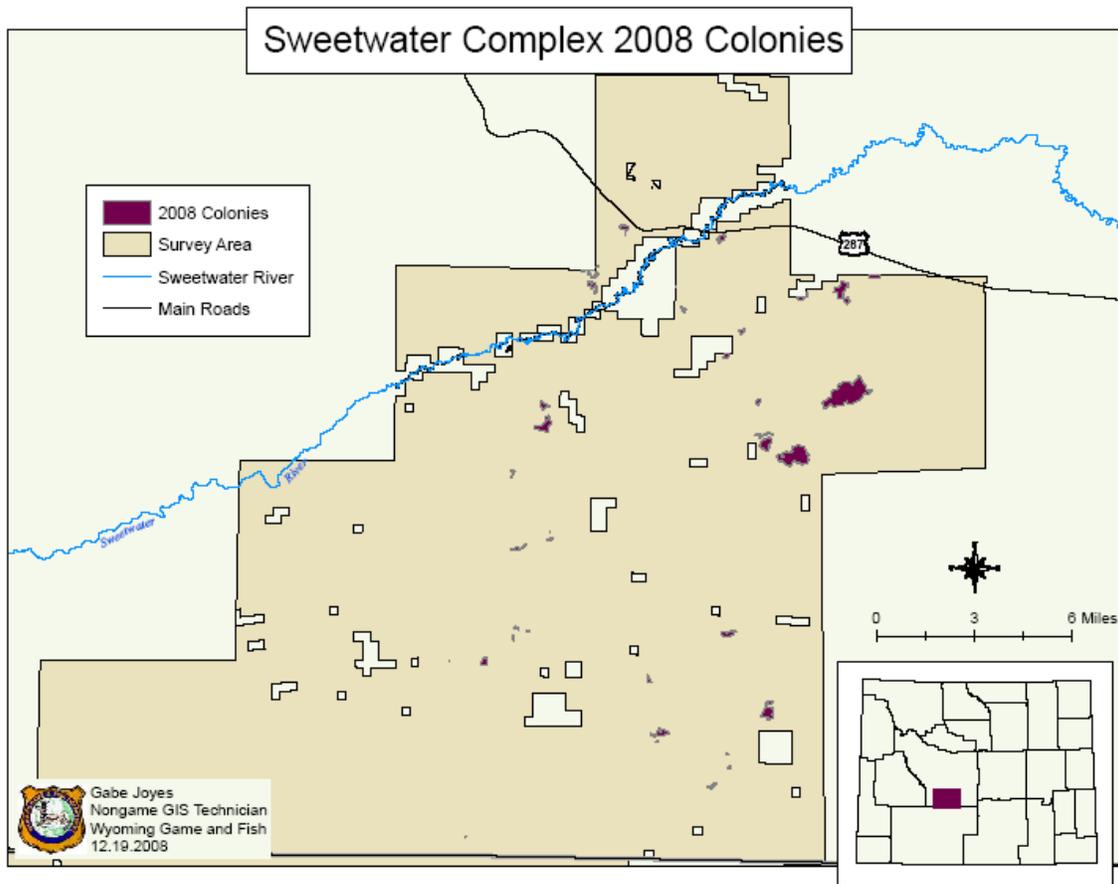
**Figure 1. The Big Piney white-tailed prairie dog complex in the early 1990s includes colonies on both public and private lands.**



**Figure 2. The northern portion of the Sweetwater white-tailed prairie dog complex in the early 1990s shows towns in red. This area includes both private and public lands.**



**Figure 3. The Big Piney Complex mapped in 2008 (the mapping effort was conducted on public lands only).**



**Figure 4. The northern portion of the Sweetwater Complex mapped in 2008 shows small and scattered white-tailed prairie dog colonies. Only colonies on public land were recorded.**

# **WHITE-TAILED PRAIRIE DOG EVALUATION OF SURVEY TECHNIQUES COMPLETION REPORT**

STATE OF WYOMING

NONGAME MAMMALS: Species of Greatest Conservation Need – White-tailed Prairie Dog

PERIOD COVERED: 15 April 2007 – 30 June 2008

PREPARED BY: Martin Grenier, Nongame Mammal Biologist  
Todd Filipi, Nongame Biologist  
Bob Oakleaf, Nongame Coordinator  
Nyssa Whitford, Nongame GIS Analyst

## **INTRODUCTION**

The white-tailed prairie dog (WTPD) was petitioned for listing under the Endangered Species Act in 2002. The U.S. Fish and Wildlife Service will be issuing a finding on the 12-month review in 2010. Meanwhile, limited data are available for this species, making a rangewide (i.e., Colorado, Utah, Montana, and Wyoming) assessment of trends and distribution difficult (Seglund et al. 2006). Consequently, the conservation assessment developed by Seglund et al. (2006) has limited application because the species' current status is poorly known.

Wyoming represents about 75% of the entire species' range. The WTPD is widely distributed in Wyoming and occupies a wide range of habitats (Seglund et al. 2006). Past survey efforts for the WTPD in Wyoming were initiated in the mid 1980s following the rediscovery of the black-footed ferret. The resulting data were aimed at improving conservation efforts for the black-footed ferret and other associated species. Inventories for the WTPD used a wide range of techniques (e.g., ground mapping, aerial flights), and data were digitized in 2000. Notably, although mapping efforts were widespread, only the best available areas for black-footed ferret recovery were targeted. Consequently, the Wyoming Game and Fish Department (Department) identified 18 WTPD complexes, and the balance of the range has received little attention (Grenier 2004).

Currently, there are a broad range of inventory and survey techniques available for prairie dogs (Sidle et al. 2001, White et al. 2005, Grenier et al. 2007). However, few techniques were developed specifically for the WTPD. The WTPD is ecologically and biologically different from other prairie dog species in North America (Tileston and Lechleitner 1966, Hoogland 1995). Consequently, approaches developed for the black-tailed prairie dog have been difficult to implement for the WTPD (Andelt and Seglund 2007).

No formal review of survey methods for the WTPD has been completed to date. Consequently, we initiated this project to evaluate survey methods for the WTPD and recommend a cost effective survey approach for Wyoming. We evaluated techniques based on costs, data collected, and the feasibility of implementation across about 30 million acres (12 million ha) of potential habitat in Wyoming.

## **METHODS**

### **Ground Mapping**

Ground mapping was conducted according to guidelines established by Biggins et al. (1993). Colonies were located by using 7.5-minute U.S. Geological Survey topographic maps that contained results from previous ground mapping efforts. These maps enabled field crews to locate prairie dog colonies more efficiently. Colonies that were encountered from the ground, but had not been previously mapped, were also recorded. Townships were systematically surveyed for the presence of prairie dog colonies. Ground mapping was conducted between 1 June and 30 July in all years. Personnel walked the perimeter of a colony and recorded waypoints on a handheld GPS unit (Garmin GPS 12XL). Colonies with boundaries separated by  $\geq 656$  feet (200 m) were considered to be unique colonies. Landowners were contacted prior to the initiation of surveys. Waypoints were downloaded and imported into ArcMap 9.2. Boundaries were then digitized into polygons and acres (hectares) were calculated using ArcMap 9.2.

### **Occupancy Modeling**

Quadrat selection was completed by overlaying a grid system of 1,640 feet<sup>2</sup> (500 m<sup>2</sup>) quadrats onto a habitat model for the WTPD (Seglund et al. 2006) using ArcMap 9.2. A total of 463,281 quadrats were contained within the suitable habitat boundary in Wyoming. We randomly selected 40 quadrats for this pilot study and homogeneously distributed these 40 quadrats within eight regions of the State. We determined landownership for all 40 plots and attempted to contact all landowners for permission to trespass for the surveys.

Survey guidelines established by Andelt et al. (2003) were followed. Each quadrat was surveyed by walking the perimeter, stopping at each of the four corners, and observing the plot for visible WTPDs for about five minutes. If the observer failed to detect a WTPD, then they proceeded to the next corner. The survey continued until all corners had been visited. If an observer detected a WTPD at any point during the survey, the observer moved on to the next available plot. Personnel surveyed quadrats twice within a seven-day period with a minimum of one day between surveys. We marked the quadrat corners with stakes and flagging during the initial survey and removed them after the second survey was completed. Wind speed, temperature, time spent, soil type, and vegetation cover were recorded on each quadrat. Observations of other Species of Greatest Conservation Need were also recorded, such as Burrowing Owl, Mountain Plover, Ferruginous Hawk, Greater Sage-Grouse, Brewer's Sparrow, Sage Sparrow, pygmy rabbit, Wyoming ground squirrel, swift fox, and pocket gopher.

## **Aerial Surveys**

Fixed-wing aircraft (e.g., Arctic Tern, Super Cub, Cessna 180) were used to survey approximately 200 randomly selected 640 feet<sup>2</sup> (500 m<sup>2</sup>) quadrats. We evaluated whether the survey protocol developed by Andelt et al. (2003) could be modified to include aerial surveys. Quadrats were surveyed from about 590 feet (180 m) above the ground and flew directly through the center of the quadrats on a north/south axis. Personnel recorded the presence of prairie dog burrows, status of burrows (Grenier et al. 2007), and the distance to the nearest colony. We also estimated whether the colony was >25 acres (10 ha) in size.

## **Remote Sensing Mapping**

2006 National Agriculture Imagery Program (NAIP) color photos were analyzed for the presence of WTPD colonies. We systematically searched images by townships within WTPD complexes where ground mapping had been recently completed. When a colony was detected, the colony perimeter was digitized on-screen using ArcMap 9.2. We used ArcMap 9.2 to estimate acres (hectares) of digitized polygons. We then compared the results to previous ground mapping efforts (i.e., 2006 and 2007). We quantified the results by evaluating omission and commission error rates.

## **RESULTS**

### **Ground Mapping**

Approximately 55 prairie dog colonies were mapped, totaling 14,562 acres (5,893 ha) in the Arlington area of Shirley Basin during the month of July. Personnel spent 320 person-hours ground mapping.

### **Occupancy Modeling**

We surveyed 32 of 41 quadrats. Sixteen quadrats were on private property and the remaining 25 were on public lands (e.g., Bureau of Land Management, State of Wyoming land). Personnel spent a total of 27 days in the field to complete the surveys. About 72 person-days were spent conducting 63 surveys on 32 plots. Personnel spent an additional 180 person-hours contacting landowners. We were unable to survey nine plots because landowners were unavailable or they denied personnel access. Notably, about 50% of all landowners contacted ignored our initial efforts to communicate (i.e., letter, phone call).

White-tailed prairie dogs were detected on five of the 32 quadrats surveyed. An additional 11 quadrats had prairie dogs within 0.9 mile (1.5 km) of the quadrats surveyed. WTPDs were detected on both surveys (i.e., >1 day between surveys) at only two of the 32 quadrats. WTPDs were detected at the remaining three quadrats only once during both surveys.

## **Aerial Surveys**

WTPD colonies and burrows were easily detected from the air. However individual prairie dogs often disappeared below ground before the observer in the fixed-wing plane was able to record their presence. Moreover, WTPD generally avoid activity during the hottest part of the day (Orabona-Cerovski 1991). However, during the aerial surveys, we determined that 59 of 200 quadrats had a WTPD colony >25 acres (10 ha) present within the quadrat. Notably, 48 of 59 were classified as healthy colonies. We were able to survey about 10 to 15 plots per hour, including commute time. Aerial surveys cost about \$3,000 to complete all 200 plots.

## **Remote Sensing**

GIS personnel spent about four person-months analyzing and digitizing NAIP imagery for Shirley Basin, Wyoming. The results were highly variable. Some colonies matched very closely with ground mapping efforts, whereas personnel analyzing the photographs did not detect other colonies. Collectively, personnel identified and mapped colonies similar to ground mapping efforts about 60% of the time. About 20% were not detected and an additional 20% were only partially detected.

## **DISCUSSION**

Several different techniques that could be used to monitor WTPD trends in Wyoming were evaluated. Many of these techniques (e.g., ground mapping, occupancy modeling) are effective for monitoring trends of the WTPD on small scales; however, they are extremely costly to implement on a statewide scale. Wyoming contains about 30 million acres (12 million ha) of suitable WTPD habitat dispersed across the western 2/3 of the State (Seglund et al. 2006). This large area makes nearly all ground-based surveys too costly to implement.

Ground mapping and occupancy modeling had similar costs. For occupancy modeling, we estimated that, on average, 0.875 quadrats were surveyed every day. Since we would be required to survey about 400 quadrats in Wyoming (B. Andelt, Colorado State University, personal communication), this approach would require about 460 person-days and a budget of >\$200,000. Ground mapping results suggest that the entire State could be mapped using a similar budget. Unfortunately, ground based surveys have one major disadvantage; personnel must request permission for trespass from landowners in order to conduct the surveys. This can be problematic when landowners do not return calls or deny access. For example, we spent well over 100 person-hours contacting landowners to access 40 quadrats. Based on these data, we estimate that it would take nearly 10 times as much time to contact landowners on 400 plots.

Occupancy modeling also has several other disadvantages. The technique does not identify how many acres of occupied WTPD colonies are present in Wyoming. Therefore, the data collected are not comparable to any previous survey efforts. Although the technique is statistically robust, the survey protocol is extremely restrictive and offsets any benefits of using this approach.

Aerial surveys were the most promising. We determined that when surveys were conducted during peak green-up (i.e., May-June), WTPD mounds were easily detected from the air. Additionally, the burrow entrances could easily be identified and the status of the colony could also be quantified (Grenier et al. 2007). The area of the quadrat that contained WTPD burrows was also easily determined and quantified.

NAIP imagery performance was disappointing. Large areas of very dense WTPD colonies were often undetected by personnel. We determined that timing; picture angle, vegetation type, vegetation height, and color were among the many variables that affected detectability of WTPD colonies within the quadrat. Overall, our success rate using this imagery was about 50%.

Based on this pilot study, we do not recommend using further ground based surveys for range-wide assessment. We recommend that aerial surveys be used to assess status and trend of WTPD colonies contained within a random sample of 1,640 feet<sup>2</sup> (500 m<sup>2</sup>) quadrats. This approach will enable personnel to estimate the total occupied area for the WTPD in Wyoming. From our preliminary results, we believe that Wyoming may have >2.9 million acres (1.2 million) ha of occupied WTPD area.

## **ACKNOWLEDGEMENTS**

Special thanks are extended to all landowners who graciously granted access to their property for the surveys, especially the Booth Land and Livestock Company, Arapahoe Ranch, and Kennecot Uranium. We would also like to thank the following Wyoming Game and Fish Department personnel for their assistance: J. Hunter, K. Olson, D. McWhirter, B. Baker, B. Haley, R. Bredehoft, D. Kerr, R. Iverson, B. Brinegar, M. Hicks, W. Schultz, S. Naylor, A. Kaiser, D. Probasco, and C. Reynolds. Funding for this project was provided by the U.S. Fish and Wildlife Service through the State Wildlife Grants program.

## **LITERATURE CITED**

- Andelt, W. F., G. C. White, P. M. Schnurr, and A. E. Seglund. 2003. Inventory and Monitoring of White-tailed and Gunnison's Prairie Dogs in Colorado and Utah. Unpublished report. Colorado State University, Colorado Division of Wildlife, and Utah Division of Wildlife Resources. Grand Junction, CO.
- Andelt, W. F., and A. E. Seglund. 2007. Protocol for conducting prairie dog occupancy surveys. Unpublished report. Colorado State University and the Colorado Division of Wildlife.
- Biggins, D. E., B. J. Miller, L. R. Hanebury, B. Oakleaf, A. H. Farmer, R. Crete, and A. Dood. 1993. A technique for evaluating black-footed ferret habitat. Pages 73-88 in J. L. Oldenmeyer, D. E. Biggins, B. J. Miller, and C. R. Crete, editors. Management of Prairie Dog Complexes for the Reintroduction of the Black-footed Ferret. Biological Report No. 13. U.S. Fish and Wildlife Service, Washington D.C.

- Grenier, M. 2004. An evaluation of black-footed ferret block clearances in Wyoming completion report. Pages 5-18 in A. O. Cerovski, editor. Threatened, Endangered, and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department Nongame Program, Lander. 178pp.
- Grenier, M., R. Schell, N. Whitford, M. Wells, B. Oakleaf, and M. Hymas. 2007. Black-tailed prairie dog baseline activity status update completion report. Pages 115-122 in A. O. Cerovski, editor. Threatened, Endangered, and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department Nongame Program, Lander. 271pp.
- Hoogland, J. L. 1995. The Black-tailed Prairie Dog: Social Life of a Burrowing Mammal. University of Chicago Press, Chicago, IL.
- Orabona-Cerovski, A. 1991. Habitat characteristics, population dynamics, and behavioral interactions of white-tailed prairie dogs in Shirley Basin, Wyoming. M.S. Thesis, University of Wyoming, Laramie.
- Seglund, A. E., A. E. Ernst, M. Grenier, B. Luce, A. Puchniak, and P. Schnurr. 2006. White-tailed Prairie Dog Conservation Assessment. Unpublished report. Western Association of Fish and Wildlife Agencies, Laramie, WY. 137pp.
- Sidle, J. G., D. H. Johnson, and B. R. Euliss. 2001. Estimated aerial extent of colonies of black-tailed prairie dogs in the northern Great Plains. *Journal of Mammalogy* 82:928-936.
- Tileston, J. V., and R. R. Lechleitner. 1966. Some comparisons of the black-tailed and white-tailed prairie dogs in north-central Colorado. *American Midland Naturalist* 75:292-316.
- White, G. C., J. R. Dennis, and F. M. Pusateri. 2005. Area of black-tailed prairie dog colonies in eastern Colorado. *Wildlife Society Bulletin* 33:265-272.

**ESTIMATE OF ABUNDANCE  
FOR THE WHITE-TAILED PRAIRIE DOG IN WYOMING  
COMPLETION REPORT**

STATE OF WYOMING

NONGAME MAMMALS: Species of Greatest Conservation Need – White-tailed Prairie Dog

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Martin Grenier, Nongame Mammal Biologist  
Todd Filipi, Nongame Biologist

## **INTRODUCTION**

The white-tailed prairie dog (WTPD) was petitioned for listing under the Endangered Species Act in 2002. The U.S. Fish and Wildlife Service will be issuing a finding on the 12-month review in 2010. Meanwhile, limited data are available for this species, making a rangewide (i.e., Colorado, Utah, Montana, and Wyoming) assessment of trends and distribution difficult (Seglund et al. 2006). Wyoming represents about 75% of the entire species' range. The WTPD is widely distributed in Wyoming and occupies a wide range of habitats (Seglund et al. 2006).

Past survey efforts for the WTPD in Wyoming were initiated in the mid 1980s following the rediscovery of the black-footed ferret. The resulting data were aimed at improving conservation efforts for the black-footed ferret and other associated species. Inventories for the WTPD used a wide range of techniques (e.g., ground mapping, aerial flights), and were digitized in 2000. Notably, although mapping efforts were widespread, only the best available areas for black-footed ferret recovery were targeted. Consequently, the Wyoming Game and Fish Department identified 18 WTPD complexes and the balance of the range has received little attention (Grenier 2004).

Grenier et al. (2009) evaluated several survey methods for the WTPD and provided recommendations for a statewide assessment in Wyoming. Using these guidelines, we developed an approach for estimating abundance of the white-tailed prairie dog in Wyoming.

## **METHODS**

Our sampling design follows statistical methods developed by Cochran (1977). We used the WTPD habitat model developed by Seglund et al. (2006) as a base for developing our sampling frame. Using ArcMap 9.2, we overlaid a grid comprised of 1,640 feet<sup>2</sup> (500 m<sup>2</sup>)

quadrats [62 acres (25 ha)] and clipped the grid to the habitat model. We then stratified the 463,281 quadrats into two strata (i.e., high and low). We developed the high strata by buffering all known WTPD colonies and observation points in Wyoming by 2 miles (3.5 km). The low strata encompassed all the remaining areas within the habitat model that did not contain prairie dog records. We then allocated quadrats from each strata proportionally; 42% of our effort was allocated to the high strata and 58% to the low.

Each selected quadrat was overlaid onto a 2006 National Agricultural Imagery Program (NAIP) color photo using ArcMap 9.2. We printed each quadrat and photo onto an 8.5 x 11-inch sheet of paper at a scale of 1 inch = 410 feet (125 m). The centroid of each quadrat was uploaded into a handheld GPS unit as a waypoint. Each quadrat was visited using a fixed-wing aircraft (e.g., Supercub, Cessna 210) during peak green up (i.e., mid-May to mid-June). The observer and pilot flew to the center of each quadrat to evaluate the quadrat and record presence of WTPD colonies. All quadrats were approached in the cardinal directions to facilitate observer orientation and maximize efficiency. When the observer was 820 feet (250 m) from the waypoint (i.e., edge of the quadrat), the observer looked for prairie dog mounds until the other edge of the plot [i.e., >820 feet (250 m) from the centroid] had been crossed. The survey began at 2,460 feet (1,750 m) from the centroid and ended 2,460 feet (1,750 m) beyond the other boundary. Colonies observed beyond the boundaries of the quadrat were recorded as ancillary data; no effort was made to quantify the acreage, and their presence did not contribute to the estimate.

When a colony was located within a quadrat, the observer recorded the portion of the colony that was contained within the quadrat onto the corresponding photograph. This was easily done using landmarks (e.g., roads) and natural features (e.g., drainages) because the observer is able to see the entire quadrat as it is transected (Figure 1). If needed, additional passes were made so the observer could correctly delineate the colony onto the NAIP photograph. Most quadrats only required a single pass. No effort was made to delineate WTPD colonies that extended beyond the grid. We did, however, record this phenomenon as ancillary data, though we did not quantify the acreage. The survey results were digitized, using heads up approaches, in ArcMap 9.2 onto the corresponding NAIP Digital Ortho Quads. We then used ArcMap to summarize the data and calculate acreages for the colonies that occurred within the plots.

Other ancillary data were also recorded during the surveys. First, we recorded the presence of colonies that were near the quadrats. When a WTPD colony was observed near a quadrat, we recorded whether it was <1,640 feet (500 m) or 1,640 feet (500 m) < x >4,920 feet (1,500 m). We made no attempts to quantify the acreage of these colonies. Distance to the quadrat was easily monitored by the pilot as we approached and left the quadrat. The observer also determined whether the colony acres within the plot were healthy or impacted using methods developed by Grenier et al. (2004).

## RESULTS

We randomly selected 600 quadrats from our sampling frame (Table 1). We spent approximately \$15,000 in aerial survey time to complete the surveys. WTPD colonies were present on 272 (68%) quadrats. Most of these (n=206; 76%) had colonies that extended beyond the quadrat. Of the 272 colonies with overlapping quadrats, 228 (84%) were classified as healthy. Additional WTPD colonies (n=256) were recorded within 4,920 feet (1,500 m) of the 600 quadrats 64% of the time. The mean size of quadrats in the high stratum was 61.71 acres (24.97 ha) and the mean in the low was 61.43 acres (24.86 ha) (Tables 2 and 3). Quadrats in the high stratum had a mean WTPD colony area of 9.1 acres (3.68 ha), while those in the low stratum had a mean WTPD colony area about half [mean = 4.15 acres (1.68 ha)].

The habitat model we used estimated potential habitat for the WTPD in Wyoming to be 27,822,847 acres (11,511,356 ha). We estimated that there were 2,893,487 WTPD colony acres (95 % CI: 2,372,597 to 3,414,377 colony acres) (1,170,954 ha) in Wyoming in 2008 (Table 4). We digitized 3,852 acres (1,559 ha) of WTPD colony area from the quadrats surveyed.

## DISCUSSION

Our results suggest that the WTPD is more abundant than we previously believed. Notably, the bulk of the WTPD colony acreage occurs in the southeastern portion of the range in Wyoming in Albany and Carbon Counties. This is not surprising, since this is the same area where the Shirley Basin Black-footed Ferret Management Area occurs. Notably, Grenier et al. (2007) reported dramatic increases in WTPD colony area in some parts of this complex in recent years. However, during our surveys we also noticed that colonies remain small and dispersed across the landscape in other parts of the State.

It is important to frame our estimate in the context of what is known about the historic trends of the WTPD. Historic information suggests that prior to the 1972 ban of strychnine and 1080, many millions of WTPD colony acres were eradicated (Clark 1973, CNE et al. 2002). CNE et al. (2002) guessed that the current occupied area of the WTPD had been reduced to about 8% of its former range. Results from Clark (1973) and Bureau of Sports Fisheries and Wildlife (1961) suggest that, prior to 1972, the area of WTPDs in Wyoming could have been substantially less. However, with the ban of strychnine and 1080, the WTPD was able to recover slowly during the next 37 years. Although our estimate represents several million acres of occupied WTPD area, it is worth noting that the estimate represents only about 10% of the potential area in Wyoming. Our estimates are consistent with historic data, and increases in abundance should be expected since anthropogenic impacts to the WTPD have been minimal since 1972.

In 2007, a pilot study conducted by Grenier et al. (2009) estimated a similar amount of WTPD colony acres in Wyoming. Notably, the pilot study utilized rudimentary approaches [i.e., only tracked quadrats with >10 acres (4 ha)] along with a different group of 200 randomly selected quadrats. Status of colonies was also similar, with 87% of colonies being classified as healthy in 2007 versus 84% in 2009.

Notably, not all colonies were characterized by high densities of burrows and prairie dogs. This suggests that, although prairie dogs are widely distributed in Wyoming, not all colonies have equal conservation value. Colonies with high burrow density and prairie dog abundance in proximity to similar colonies will undoubtedly be more important to obligate and associated species. The colonies in Albany and eastern Carbon Counties have a very high conservation value in Wyoming. These results are expected, given the Wyoming Game and Fish Department's involvement with conservation of prairie obligates species (e.g., black-footed ferret, mountain plover).

## LITERATURE CITED

- Bureau of Sport Fisheries and Wildlife. 1961. 1961 Prairie dog inventory. Unpublished report. Washington, D.C.
- Clark, T. W. 1973. Prairie dogs and black-footed ferrets in Wyoming. Pages 88-101 in R. L. Linder and C. N. Hillman, editors. Proceedings of the Black-footed Ferret and Prairie Dog Workshop. South Dakota State University, Brookings.
- Center for Native Ecosystems, Biodiversity Conservation Alliance, Southern Utah Wilderness Alliance, American Lands Alliance, and Forest Guardians. 2002. Petition for a Rule to List the White-tailed Prairie Dog (*Sciuridae: Cynomys leucurus*) as Threatened or Endangered Under the Endangered Species Act, July 11, 2002. Center for Native Ecosystems, Boulder, CO. 363pp.
- Cochran, W. G. 1977. Sampling Techniques, Third Edition. Wiley and Sons, New York.
- Grenier, M. B. 2004. An evaluation of black-footed ferret block clearances in Wyoming completion report. Pages 5 -18 in A. Cerovski, editor. Threatened, Endangered, and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department Nongame Program, Lander. 239pp.
- Grenier, M. B., B. Oakleaf, K. Taylor, and M. Hymas. 2004. Inventory and monitoring of black-tailed prairie dogs in Wyoming – classification of colonies completion report. Pages 95-113 in A.O. Cerovski, editor. Threatened, Endangered, and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department Nongame Program, Lander. 239pp.
- Grenier, M., J. Artery, J. Kettley, L. Knox, and T. Filipi. 2007. White-tailed prairie dog mapping and black-footed ferret habitat evaluation in the Shirley Basin/Medicine Bow black-footed ferret management area, Wyoming completion report. Pages 131-141 in A. O. Cerovski, editor. Threatened, Endangered, and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department Nongame Program, Lander. 252pp.

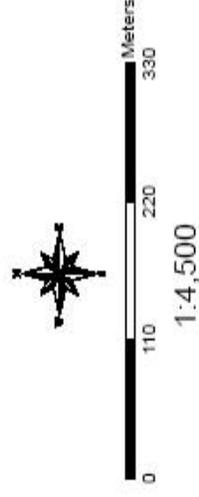
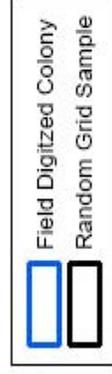
Grenier, M., T. Filipi, B. Oakleaf, and N. Whitford. 2009. White-tailed prairie dog evaluation of survey techniques completion report. Pages 143-148 in A. Cerovski, editor. Threatened, Endangered, and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department Nongame Program, Lander. 306pp.

Seglund, A. E., A. E. Ernst, M. Grenier, B. Luce, A. Puchniak, and P. Schnurr. 2006. White-tailed Prairie Dog Conservation Assessment. Western Association of Fish and Wildlife Agencies. 137pp.

# Example Quadrat



  
Gabriel Joyes  
Nongame GIS Technician  
Lander Regional Office  
9.30.2008



**Figure 1. An example of a 1,640 x 1,640-foot (500 x 500-m) quadrat selected for aerial surveys for the white-tailed prairie dog in Wyoming, 2008. Colony acres were delineated by an observer from a fixed-wing aircraft onto 2006 National Agriculture Imagery Program (NAIP) color imagery. Images were printed onto an 8.5 x 11-inch sheet of paper at a scale of 1 inch = 410 feet (125 m). Survey results were later digitized using ArcMap 9.2.**

**Table 1. Distribution of survey effort by stratum for the white-tailed prairie dog in Wyoming 2008.**

| <b>Stratum</b> | <b>Area (hectares)</b> | <b>Proportion of Effort (%)</b> | <b>Quadrats Sampled / Quadrats Available</b> | <b>Area Sampled (hectares)</b> |
|----------------|------------------------|---------------------------------|--|--------------------------------|
| High           | 4,918,008              | 42                              | 270 / 197,021                                | 6,743                          |
| Low            | 6,593,348              | 58                              | 330 / 266,260                                | 8,203                          |
| <i>Total</i>   | <i>11,511,357</i>      | <i>100</i>                      | <i>600 / 463,281</i>                         | <i>14,946</i>                  |

**Table 2. Quadrats sampled in the high stratum for estimating abundance of the white-tailed prairie dog in Wyoming, 2008.**

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| H01                     | 23.29                          | 0.00   | 0.00  |
| H02                     | 24.99                          | 0.00   | 0.00  |
| H03                     | 24.99                          | 5.90   | 0.10  |
| H04                     | 24.98                          | 31.34  | 0.51  |
| H05                     | 24.99                          | 14.26  | 0.23  |
| H06                     | 24.98                          | 11.21  | 0.18  |
| H07                     | 24.98                          | 10.97  | 0.18  |
| H08                     | 25.00                          | 18.47  | 0.30  |
| H09                     | 24.99                          | 37.01  | 0.60  |
| H10                     | 24.98                          | 0.00   | 0.00  |
| H11                     | 25.00                          | 11.29  | 0.18  |
| H12                     | 24.98                          | 2.98   | 0.05  |
| H13                     | 24.98                          | 0.00   | 0.00  |
| H14                     | 24.97                          | 0.00   | 0.00  |
| H15                     | 24.98                          | 4.98   | 0.08  |
| H16                     | 24.98                          | 5.85   | 0.09  |
| H17                     | 24.98                          | 0.00   | 0.00  |
| H18                     | 24.97                          | 2.10   | 0.03  |
| H19                     | 24.99                          | 8.00   | 0.13  |
| H20                     | 24.99                          | 0.00   | 0.00  |
| H21                     | 24.98                          | 9.29   | 0.15  |
| H22                     | 25.00                          | 0.00   | 0.00  |
| H23                     | 24.98                          | 0.00   | 0.00  |
| H24                     | 24.97                          | 0.00   | 0.00  |
| H25                     | 24.99                          | 3.28   | 0.05  |
| H26                     | 24.99                          | 18.17  | 0.29  |
| H27                     | 25.00                          | 18.67  | 0.30  |
| H28                     | 24.99                          | 10.48  | 0.17  |
| H29                     | 24.98                          | 0.00   | 0.00  |
| H30                     | 24.97                          | 40.99  | 0.66  |
| H31                     | 24.98                          | 0.00   | 0.00  |
| H32                     | 24.98                          | 0.00   | 0.00  |
| H33                     | 24.99                          | 0.00   | 0.00  |
| H34                     | 24.97                          | 0.00   | 0.00  |
| H35                     | 24.99                          | 0.00   | 0.00  |
| H36                     | 24.98                          | 0.00   | 0.00  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| H37                     | 24.97                          | 0.00   | 0.00  |
| H38                     | 25.00                          | 0.00   | 0.00  |
| H39                     | 24.99                          | 0.38   | 0.01  |
| H40                     | 24.99                          | 0.00   | 0.00  |
| H41                     | 24.98                          | 0.00   | 0.00  |
| H42                     | 24.97                          | 4.66   | 0.08  |
| H43                     | 25.00                          | 0.00   | 0.00  |
| H44                     | 24.97                          | 4.28   | 0.07  |
| H45                     | 24.97                          | 9.34   | 0.15  |
| H46                     | 24.98                          | 0.00   | 0.00  |
| H47                     | 24.97                          | 0.00   | 0.00  |
| H48                     | 24.98                          | 0.00   | 0.00  |
| H49                     | 24.97                          | 0.00   | 0.00  |
| H50                     | 24.99                          | 0.00   | 0.00  |
| H51                     | 24.98                          | 3.33   | 0.05  |
| H52                     | 24.97                          | 14.58  | 0.24  |
| H53                     | 24.99                          | 0.00   | 0.00  |
| H54                     | 24.97                          | 55.79  | 0.90  |
| H55                     | 24.97                          | 0.00   | 0.00  |
| H56                     | 24.97                          | 0.00   | 0.00  |
| H57                     | 24.97                          | 5.57   | 0.09  |
| H58                     | 24.98                          | 0.00   | 0.00  |
| H59                     | 24.99                          | 14.52  | 0.24  |
| H60                     | 24.98                          | 0.00   | 0.00  |
| H61                     | 24.97                          | 0.00   | 0.00  |
| H62                     | 24.98                          | 1.94   | 0.03  |
| H63                     | 24.98                          | 0.00   | 0.00  |
| H64                     | 24.98                          | 56.51  | 0.92  |
| H65                     | 24.98                          | 0.00   | 0.00  |
| H66                     | 24.98                          | 0.00   | 0.00  |
| H67                     | 25.00                          | 5.17   | 0.08  |
| H68                     | 24.98                          | 0.00   | 0.00  |
| H69                     | 24.97                          | 0.00   | 0.00  |
| H70                     | 24.98                          | 0.00   | 0.00  |
| H71                     | 25.00                          | 0.00   | 0.00  |
| H72                     | 24.98                          | 0.00   | 0.00  |
| H73                     | 24.99                          | 0.00   | 0.00  |
| H74                     | 24.99                          | 0.00   | 0.00  |
| H75                     | 24.97                          | 0.81   | 0.01  |
| H76                     | 24.97                          | 0.00   | 0.00  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| H77                     | 24.99                          | 0.00   | 0.00  |
| H78                     | 24.98                          | 0.00   | 0.00  |
| H79                     | 24.99                          | 4.92   | 0.08  |
| H80                     | 24.98                          | 0.00   | 0.00  |
| H81                     | 24.98                          | 0.00   | 0.00  |
| H82                     | 24.97                          | 2.81   | 0.05  |
| H83                     | 24.98                          | 4.58   | 0.07  |
| H84                     | 24.97                          | 0.00   | 0.00  |
| H85                     | 24.97                          | 32.39  | 0.52  |
| H86                     | 24.98                          | 44.34  | 0.72  |
| H87                     | 24.99                          | 8.49   | 0.14  |
| H88                     | 24.99                          | 2.53   | 0.04  |
| H89                     | 24.99                          | 0.00   | 0.00  |
| H90                     | 24.99                          | 0.00   | 0.00  |
| H91                     | 24.99                          | 0.00   | 0.00  |
| H92                     | 24.99                          | 15.45  | 0.25  |
| H93                     | 24.99                          | 0.00   | 0.00  |
| H94                     | 24.97                          | 0.00   | 0.00  |
| H95                     | 24.97                          | 12.23  | 0.20  |
| H96                     | 24.97                          | 0.00   | 0.00  |
| H97                     | 24.97                          | 0.00   | 0.00  |
| H98                     | 24.97                          | 3.87   | 0.06  |
| H99                     | 24.98                          | 0.00   | 0.00  |
| H100                    | 24.97                          | 13.74  | 0.22  |
| H101                    | 24.98                          | 17.58  | 0.28  |
| H102                    | 24.97                          | 34.49  | 0.56  |
| H103                    | 24.99                          | 0.00   | 0.00  |
| H104                    | 24.99                          | 0.00   | 0.00  |
| H105                    | 24.98                          | 0.00   | 0.00  |
| H106                    | 24.99                          | 0.00   | 0.00  |
| H107                    | 24.97                          | 3.65   | 0.06  |
| H108                    | 24.97                          | 0.00   | 0.00  |
| H109                    | 24.99                          | 27.33  | 0.44  |
| H110                    | 24.97                          | 0.00   | 0.00  |
| H111                    | 24.99                          | 0.00   | 0.00  |
| H112                    | 24.98                          | 1.78   | 0.03  |
| H113                    | 24.98                          | 0.00   | 0.00  |
| H114                    | 24.98                          | 22.65  | 0.37  |
| H115                    | 24.99                          | 3.39   | 0.05  |
| H116                    | 24.97                          | 35.57  | 0.58  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| H117                    | 24.97                          | 0.00   | 0.00  |
| H118                    | 24.97                          | 0.00   | 0.00  |
| H119                    | 24.99                          | 0.00   | 0.00  |
| H120                    | 24.99                          | 3.78   | 0.06  |
| H121                    | 24.97                          | 0.00   | 0.00  |
| H122                    | 24.98                          | 0.00   | 0.00  |
| H123                    | 24.99                          | 0.00   | 0.00  |
| H124                    | 24.99                          | 0.00   | 0.00  |
| H125                    | 24.97                          | 0.00   | 0.12  |
| H126                    | 24.98                          | 7.18   | 0.00  |
| H127                    | 24.98                          | 0.00   | 0.15  |
| H128                    | 24.98                          | 9.07   | 0.00  |
| H129                    | 24.98                          | 0.00   | 0.00  |
| H130                    | 24.98                          | 0.00   | 0.00  |
| H131                    | 24.99                          | 0.00   | 0.00  |
| H132                    | 24.97                          | 0.00   | 0.70  |
| H133                    | 24.98                          | 43.11  | 0.00  |
| H134                    | 24.97                          | 0.00   | 0.00  |
| H135                    | 24.97                          | 0.00   | 0.00  |
| H136                    | 24.99                          | 0.00   | 0.00  |
| H137                    | 24.98                          | 0.00   | 0.00  |
| H138                    | 24.98                          | 0.00   | 0.10  |
| H139                    | 24.97                          | 6.45   | 0.08  |
| H140                    | 24.98                          | 5.09   | 0.00  |
| H141                    | 24.97                          | 0.00   | 0.00  |
| H142                    | 24.98                          | 0.00   | 0.09  |
| H143                    | 24.97                          | 5.83   | 1.00  |
| H144                    | 24.99                          | 61.70  | 0.55  |
| H145                    | 24.98                          | 33.93  | 0.00  |
| H146                    | 24.98                          | 0.00   | 0.00  |
| H147                    | 24.99                          | 0.00   | 0.00  |
| H148                    | 24.97                          | 0.00   | 0.00  |
| H149                    | 24.99                          | 0.00   | 0.00  |
| H150                    | 24.99                          | 0.00   | 0.67  |
| H151                    | 24.97                          | 41.32  | 0.00  |
| H152                    | 24.97                          | 0.00   | 0.29  |
| H153                    | 24.97                          | 18.04  | 0.00  |
| H154                    | 24.97                          | 0.00   | 0.17  |
| H155                    | 24.97                          | 10.65  | 0.30  |
| H156                    | 24.97                          | 18.67  | 0.00  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| H157                    | 24.97                          | 0.00   | 0.00  |
| H158                    | 24.99                          | 0.00   | 1.00  |
| H159                    | 24.99                          | 61.75  | 0.00  |
| H160                    | 25.00                          | 0.00   | 1.00  |
| H161                    | 24.99                          | 61.76  | 0.00  |
| H162                    | 24.98                          | 0.00   | 0.19  |
| H163                    | 24.99                          | 11.72  | 0.00  |
| H164                    | 24.97                          | 16.14  | 0.26  |
| H165                    | 24.97                          | 16.45  | 0.27  |
| H166                    | 24.97                          | 4.91   | 0.08  |
| H167                    | 24.97                          | 0.00   | 0.00  |
| H168                    | 24.97                          | 0.00   | 0.00  |
| H169                    | 24.97                          | 16.29  | 0.26  |
| H170                    | 24.97                          | 34.31  | 0.56  |
| H171                    | 24.97                          | 27.77  | 0.45  |
| H172                    | 24.98                          | 59.87  | 0.97  |
| H173                    | 24.98                          | 6.31   | 0.10  |
| H174                    | 24.97                          | 0.00   | 0.00  |
| H175                    | 24.97                          | 0.00   | 0.00  |
| H176                    | 24.97                          | 61.71  | 1.00  |
| H177                    | 24.97                          | 26.43  | 0.43  |
| H178                    | 24.98                          | 0.00   | 0.00  |
| H179                    | 24.97                          | 6.41   | 0.10  |
| H180                    | 24.98                          | 60.38  | 0.98  |
| H181                    | 24.98                          | 0.00   | 0.00  |
| H182                    | 24.98                          | 61.71  | 1.00  |
| H183                    | 24.98                          | 33.93  | 0.55  |
| H184                    | 24.98                          | 9.95   | 0.16  |
| H185                    | 24.99                          | 12.90  | 0.21  |
| H186                    | 24.98                          | 0.00   | 0.00  |
| H187                    | 24.98                          | 5.84   | 0.09  |
| H188                    | 24.98                          | 45.42  | 0.74  |
| H189                    | 24.98                          | 0.00   | 0.00  |
| H190                    | 24.98                          | 61.73  | 1.00  |
| H191                    | 24.98                          | 61.72  | 1.00  |
| H192                    | 24.98                          | 61.72  | 1.00  |
| H193                    | 24.98                          | 61.72  | 1.00  |
| H194                    | 24.97                          | 0.00   | 0.00  |
| H195                    | 25.00                          | 29.47  | 0.48  |
| H196                    | 25.00                          | 61.77  | 1.00  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| H197                    | 24.99                          | 61.74  | 1.00  |
| H198                    | 24.97                          | 30.00  | 0.49  |
| H199                    | 24.98                          | 6.14   | 0.10  |
| H200                    | 24.99                          | 61.74  | 1.00  |
| H201                    | 25.00                          | 48.93  | 0.79  |
| H202                    | 24.99                          | 0.00   | 0.00  |
| H203                    | 24.98                          | 51.60  | 0.84  |
| H204                    | 24.98                          | 0.00   | 0.00  |
| H205                    | 24.99                          | 0.00   | 0.00  |
| H206                    | 25.00                          | 0.00   | 0.00  |
| H207                    | 24.98                          | 0.00   | 0.00  |
| H208                    | 24.32                          | 0.00   | 0.00  |
| H209                    | 24.98                          | 0.00   | 0.00  |
| H210                    | 24.98                          | 20.69  | 0.34  |
| H211                    | 24.98                          | 61.72  | 1.00  |
| H212                    | 24.99                          | 0.00   | 0.00  |
| H213                    | 24.98                          | 13.42  | 0.22  |
| H214                    | 24.98                          | 0.00   | 0.00  |
| H215                    | 24.98                          | 18.48  | 0.30  |
| H216                    | 24.97                          | 0.00   | 0.00  |
| H217                    | 24.98                          | 2.03   | 0.03  |
| H218                    | 24.99                          | 0.00   | 0.00  |
| H219                    | 25.00                          | 0.00   | 0.00  |
| H220                    | 24.98                          | 0.83   | 0.01  |
| H221                    | 24.98                          | 23.29  | 0.38  |
| H222                    | 24.98                          | 0.00   | 0.00  |
| H223                    | 25.00                          | 0.00   | 0.00  |
| H224                    | 25.00                          | 0.00   | 0.00  |
| H225                    | 24.97                          | 0.00   | 0.00  |
| H226                    | 24.99                          | 0.00   | 0.00  |
| H227                    | 24.97                          | 0.00   | 0.00  |
| H228                    | 24.99                          | 0.00   | 0.00  |
| H229                    | 24.98                          | 0.00   | 0.00  |
| H230                    | 24.98                          | 0.00   | 0.00  |
| H231                    | 24.99                          | 2.74   | 0.04  |
| H232                    | 24.97                          | 0.00   | 0.00  |
| H233                    | 24.98                          | 0.00   | 0.00  |
| H234                    | 24.99                          | 0.00   | 0.00  |
| H235                    | 24.98                          | 0.00   | 0.00  |
| H236                    | 24.98                          | 0.00   | 0.00  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| H237                    | 24.98                          | 0.00   | 0.00  |
| H238                    | 24.99                          | 0.00   | 0.00  |
| H239                    | 24.97                          | 8.17   | 0.13  |
| H240                    | 24.97                          | 0.00   | 0.00  |
| H241                    | 24.99                          | 0.00   | 0.00  |
| H242                    | 24.99                          | 0.00   | 0.00  |
| H243                    | 24.99                          | 0.00   | 0.00  |
| H244                    | 24.97                          | 0.00   | 0.00  |
| H245                    | 24.99                          | 0.00   | 0.00  |
| H246                    | 24.98                          | 0.00   | 0.00  |
| H247                    | 24.97                          | 0.00   | 0.00  |
| H248                    | 24.97                          | 0.00   | 0.00  |
| H249                    | 24.98                          | 0.00   | 0.00  |
| H250                    | 24.98                          | 0.00   | 0.00  |
| H251                    | 24.98                          | 0.00   | 0.00  |
| H252                    | 24.98                          | 0.00   | 0.00  |
| H253                    | 24.99                          | 0.00   | 0.00  |
| H254                    | 24.97                          | 0.00   | 0.00  |
| H255                    | 24.97                          | 0.00   | 0.00  |
| H256                    | 24.99                          | 0.00   | 0.00  |
| H257                    | 24.99                          | 0.00   | 0.00  |
| H258                    | 24.97                          | 0.00   | 0.00  |
| H259                    | 24.98                          | 0.00   | 0.00  |
| H260                    | 24.97                          | 2.94   | 0.05  |
| H261                    | 24.98                          | 0.00   | 0.00  |
| H262                    | 24.97                          | 49.56  | 0.80  |
| H263                    | 24.98                          | 0.00   | 0.00  |
| H264                    | 24.97                          | 0.00   | 0.00  |
| H265                    | 24.97                          | 14.30  | 0.23  |
| H266                    | 24.98                          | 0.00   | 0.00  |
| H267                    | 24.98                          | 0.00   | 0.00  |
| H268                    | 24.98                          | 0.00   | 0.00  |
| H269                    | 24.98                          | 0.00   | 0.00  |
| H270                    | 24.97                          | 0.00   | 0.00  |

**Table 3. Quadrats sampled in the high stratum for estimating abundance of the white-tailed prairie dog in Wyoming, 2008.**

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| L01                     | 24.06                          | 0.00   | 0.00  |
| L02                     | 24.82                          | 0.00   | 0.00  |
| L03                     | 25.00                          | 0.00   | 0.00  |
| L04                     | 24.99                          | 0.00   | 0.00  |
| L05                     | 25.00                          | 2.64   | 0.11  |
| L06                     | 8.91                           | 0.00   | 0.00  |
| L07                     | 24.98                          | 0.00   | 0.00  |
| L08                     | 25.00                          | 0.00   | 0.00  |
| L09                     | 24.99                          | 0.00   | 0.00  |
| L10                     | 24.99                          | 0.00   | 0.00  |
| L11                     | 24.98                          | 0.00   | 0.00  |
| L12                     | 24.98                          | 5.23   | 0.21  |
| L13                     | 24.98                          | 2.85   | 0.11  |
| L14                     | 24.98                          | 0.00   | 0.00  |
| L15                     | 24.99                          | 0.00   | 0.00  |
| L16                     | 24.98                          | 5.65   | 0.23  |
| L17                     | 24.98                          | 21.93  | 0.88  |
| L18                     | 24.98                          | 0.00   | 0.00  |
| L19                     | 24.98                          | 0.00   | 0.00  |
| L20                     | 24.98                          | 0.00   | 0.00  |
| L21                     | 24.97                          | 0.00   | 0.00  |
| L22                     | 24.99                          | 2.64   | 0.11  |
| L23                     | 24.99                          | 0.00   | 0.00  |
| L24                     | 24.97                          | 0.00   | 0.00  |
| L25                     | 24.97                          | 0.00   | 0.00  |
| L26                     | 24.97                          | 1.54   | 0.06  |
| L27                     | 24.99                          | 0.00   | 0.00  |
| L28                     | 24.97                          | 0.00   | 0.00  |
| L29                     | 24.97                          | 0.00   | 0.00  |
| L30                     | 24.99                          | 0.00   | 0.00  |
| L31                     | 24.98                          | 0.00   | 0.00  |
| L32                     | 24.98                          | 0.00   | 0.00  |
| L33                     | 24.99                          | 0.00   | 0.00  |
| L34                     | 24.98                          | 0.00   | 0.00  |
| L35                     | 24.98                          | 0.00   | 0.00  |
| L36                     | 24.99                          | 5.49   | 0.22  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| L37                     | 24.98                          | 0.00   | 0.00  |
| L38                     | 24.97                          | 0.00   | 0.00  |
| L39                     | 24.97                          | 10.90  | 0.44  |
| L40                     | 25.00                          | 0.00   | 0.00  |
| L41                     | 24.98                          | 0.00   | 0.00  |
| L42                     | 25.00                          | 0.00   | 0.00  |
| L43                     | 24.97                          | 0.00   | 0.00  |
| L44                     | 24.97                          | 0.00   | 0.00  |
| L45                     | 24.97                          | 0.94   | 0.04  |
| L46                     | 24.97                          | 1.74   | 0.07  |
| L47                     | 24.97                          | 0.00   | 0.00  |
| L48                     | 24.97                          | 0.00   | 0.00  |
| L49                     | 24.97                          | 0.00   | 0.00  |
| L50                     | 24.98                          | 8.14   | 0.33  |
| L51                     | 25.00                          | 0.32   | 0.01  |
| L52                     | 24.97                          | 0.00   | 0.00  |
| L53                     | 24.99                          | 0.00   | 0.00  |
| L54                     | 24.99                          | 13.50  | 0.54  |
| L55                     | 24.98                          | 0.00   | 0.00  |
| L56                     | 24.98                          | 1.84   | 0.07  |
| L57                     | 24.99                          | 13.01  | 0.52  |
| L58                     | 24.99                          | 7.03   | 0.28  |
| L59                     | 24.99                          | 0.00   | 0.00  |
| L60                     | 24.99                          | 15.59  | 0.62  |
| L61                     | 24.97                          | 0.00   | 0.00  |
| L62                     | 24.97                          | 0.00   | 0.00  |
| L63                     | 24.99                          | 9.04   | 0.36  |
| L64                     | 24.97                          | 3.25   | 0.13  |
| L65                     | 24.97                          | 0.00   | 0.00  |
| L66                     | 24.98                          | 3.24   | 0.13  |
| L67                     | 24.99                          | 0.00   | 0.00  |
| L68                     | 24.99                          | 0.00   | 0.00  |
| L69                     | 25.00                          | 0.00   | 0.00  |
| L70                     | 24.98                          | 0.00   | 0.00  |
| L71                     | 24.97                          | 0.00   | 0.00  |
| L72                     | 24.97                          | 0.00   | 0.00  |
| L73                     | 24.99                          | 0.00   | 0.00  |
| L74                     | 24.99                          | 0.00   | 0.00  |
| L75                     | 24.97                          | 0.00   | 0.00  |
| L76                     | 24.99                          | 0.00   | 0.00  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| L77                     | 24.97                          | 0.00   | 0.00  |
| L78                     | 24.99                          | 0.00   | 0.00  |
| L79                     | 25.00                          | 0.64   | 0.03  |
| L80                     | 24.97                          | 0.00   | 0.00  |
| L81                     | 24.98                          | 0.00   | 0.00  |
| L82                     | 24.98                          | 0.00   | 0.00  |
| L83                     | 24.97                          | 0.00   | 0.00  |
| L84                     | 24.97                          | 0.00   | 0.00  |
| L85                     | 25.00                          | 14.21  | 0.57  |
| L86                     | 24.97                          | 0.00   | 0.00  |
| L87                     | 24.99                          | 0.00   | 0.00  |
| L88                     | 25.00                          | 1.17   | 0.05  |
| L89                     | 24.97                          | 1.51   | 0.06  |
| L90                     | 24.99                          | 0.00   | 0.00  |
| L91                     | 24.97                          | 0.00   | 0.00  |
| L92                     | 24.98                          | 1.17   | 0.05  |
| L93                     | 25.00                          | 4.61   | 0.18  |
| L94                     | 24.98                          | 0.00   | 0.00  |
| L95                     | 25.00                          | 0.00   | 0.00  |
| L96                     | 24.97                          | 1.87   | 0.07  |
| L97                     | 24.98                          | 0.00   | 0.00  |
| L98                     | 25.00                          | 2.51   | 0.10  |
| L99                     | 24.99                          | 0.00   | 0.00  |
| L100                    | 24.98                          | 1.52   | 0.06  |
| L101                    | 24.99                          | 0.00   | 0.00  |
| L102                    | 24.97                          | 5.60   | 0.22  |
| L103                    | 25.00                          | 2.82   | 0.11  |
| L104                    | 24.97                          | 3.74   | 0.15  |
| L105                    | 24.97                          | 0.00   | 0.00  |
| L106                    | 24.97                          | 0.00   | 0.00  |
| L107                    | 24.99                          | 0.00   | 0.00  |
| L108                    | 24.98                          | 0.00   | 0.00  |
| L109                    | 24.99                          | 0.00   | 0.00  |
| L110                    | 24.99                          | 0.00   | 0.00  |
| L111                    | 25.00                          | 0.00   | 0.00  |
| L112                    | 24.98                          | 0.00   | 0.00  |
| L113                    | 25.00                          | 0.00   | 0.00  |
| L114                    | 24.97                          | 2.83   | 0.11  |
| L115                    | 25.00                          | 0.00   | 0.00  |
| L116                    | 24.98                          | 0.00   | 0.00  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| L117                    | 24.98                          | 1.29   | 0.05  |
| L118                    | 24.98                          | 1.22   | 0.05  |
| L119                    | 25.00                          | 0.00   | 0.00  |
| L120                    | 24.98                          | 0.71   | 0.03  |
| L121                    | 25.00                          | 0.00   | 0.00  |
| L122                    | 24.99                          | 0.00   | 0.00  |
| L123                    | 24.97                          | 0.00   | 0.00  |
| L124                    | 25.00                          | 0.00   | 0.00  |
| L125                    | 24.98                          | 0.00   | 0.00  |
| L126                    | 24.99                          | 10.45  | 0.42  |
| L127                    | 24.97                          | 6.17   | 0.25  |
| L128                    | 24.98                          | 0.00   | 0.00  |
| L129                    | 24.99                          | 2.78   | 0.11  |
| L130                    | 24.98                          | 1.67   | 0.07  |
| L131                    | 24.98                          | 0.00   | 0.00  |
| L132                    | 24.98                          | 0.00   | 0.00  |
| L133                    | 24.98                          | 0.00   | 0.00  |
| L134                    | 24.97                          | 0.00   | 0.00  |
| L135                    | 24.97                          | 23.60  | 0.94  |
| L136                    | 24.97                          | 0.00   | 0.00  |
| L137                    | 24.97                          | 0.00   | 0.00  |
| L138                    | 24.99                          | 11.89  | 0.48  |
| L139                    | 24.99                          | 0.00   | 0.00  |
| L140                    | 24.97                          | 0.00   | 0.00  |
| L141                    | 24.97                          | 0.00   | 0.00  |
| L142                    | 24.97                          | 0.00   | 0.00  |
| L143                    | 24.99                          | 0.00   | 0.00  |
| L144                    | 24.99                          | 0.00   | 0.00  |
| L145                    | 24.97                          | 0.00   | 0.00  |
| L146                    | 24.97                          | 0.00   | 0.00  |
| L147                    | 24.97                          | 0.00   | 0.00  |
| L148                    | 24.97                          | 9.08   | 0.36  |
| L149                    | 24.97                          | 4.50   | 0.18  |
| L150                    | 24.98                          | 0.00   | 0.00  |
| L151                    | 24.99                          | 0.00   | 0.00  |
| L152                    | 24.98                          | 0.00   | 0.00  |
| L153                    | 24.49                          | 0.00   | 0.00  |
| L154                    | 24.98                          | 1.60   | 0.06  |
| L155                    | 24.98                          | 10.86  | 0.43  |
| L156                    | 24.99                          | 15.88  | 0.64  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| L157                    | 24.98                          | 0.00   | 0.00  |
| L158                    | 24.98                          | 0.00   | 0.00  |
| L159                    | 24.99                          | 24.99  | 1.00  |
| L160                    | 24.98                          | 0.00   | 0.00  |
| L161                    | 24.99                          | 0.00   | 0.00  |
| L162                    | 24.98                          | 0.00   | 0.00  |
| L163                    | 24.98                          | 0.00   | 0.00  |
| L164                    | 24.98                          | 0.00   | 0.00  |
| L165                    | 24.97                          | 0.00   | 0.00  |
| L166                    | 24.97                          | 0.00   | 0.00  |
| L167                    | 25.00                          | 0.00   | 0.00  |
| L168                    | 24.97                          | 0.00   | 0.00  |
| L169                    | 24.99                          | 2.90   | 0.12  |
| L170                    | 24.97                          | 0.00   | 0.00  |
| L171                    | 24.98                          | 0.00   | 0.00  |
| L172                    | 24.98                          | 0.00   | 0.00  |
| L173                    | 21.73                          | 0.00   | 0.00  |
| L174                    | 24.99                          | 13.45  | 0.54  |
| L175                    | 24.99                          | 13.34  | 0.53  |
| L176                    | 24.99                          | 0.00   | 0.00  |
| L177                    | 24.98                          | 0.00   | 0.00  |
| L178                    | 24.98                          | 1.87   | 0.08  |
| L179                    | 11.82                          | 0.00   | 0.00  |
| L180                    | 24.97                          | 0.00   | 0.00  |
| L181                    | 24.99                          | 0.00   | 0.00  |
| L182                    | 24.98                          | 0.00   | 0.00  |
| L183                    | 24.97                          | 24.97  | 1.00  |
| L184                    | 24.98                          | 0.00   | 0.00  |
| L185                    | 24.98                          | 0.15   | 0.01  |
| L186                    | 24.98                          | 0.00   | 0.00  |
| L187                    | 24.97                          | 0.90   | 0.04  |
| L188                    | 24.99                          | 0.00   | 0.00  |
| L189                    | 24.98                          | 24.98  | 1.00  |
| L190                    | 24.98                          | 0.37   | 0.01  |
| L191                    | 24.98                          | 24.98  | 1.00  |
| L192                    | 24.98                          | 0.00   | 0.00  |
| L193                    | 24.97                          | 0.00   | 0.00  |
| L194                    | 24.98                          | 24.98  | 1.00  |
| L195                    | 24.99                          | 0.81   | 0.03  |
| L196                    | 24.98                          | 0.00   | 0.00  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| L197                    | 25.00                          | 0.00   | 0.00  |
| L198                    | 25.00                          | 0.00   | 0.00  |
| L199                    | 24.98                          | 0.00   | 0.00  |
| L200                    | 24.98                          | 1.26   | 0.05  |
| L201                    | 24.98                          | 0.00   | 0.00  |
| L202                    | 24.99                          | 0.00   | 0.00  |
| L203                    | 24.98                          | 0.00   | 0.00  |
| L204                    | 24.98                          | 9.80   | 0.39  |
| L205                    | 24.97                          | 0.00   | 0.00  |
| L206                    | 24.98                          | 0.00   | 0.00  |
| L207                    | 24.97                          | 0.00   | 0.00  |
| L208                    | 24.99                          | 0.00   | 0.00  |
| L209                    | 24.99                          | 0.00   | 0.00  |
| L210                    | 24.98                          | 0.00   | 0.00  |
| L211                    | 24.99                          | 0.00   | 0.00  |
| L212                    | 24.98                          | 0.00   | 0.00  |
| L213                    | 24.98                          | 0.00   | 0.00  |
| L214                    | 24.99                          | 0.00   | 0.00  |
| L215                    | 24.98                          | 0.00   | 0.00  |
| L216                    | 24.98                          | 13.32  | 0.53  |
| L217                    | 24.99                          | 0.00   | 0.00  |
| L218                    | 24.99                          | 0.00   | 0.00  |
| L219                    | 24.99                          | 0.00   | 0.00  |
| L220                    | 24.99                          | 0.00   | 0.00  |
| L221                    | 24.98                          | 13.54  | 0.54  |
| L222                    | 24.99                          | 0.00   | 0.00  |
| L223                    | 24.98                          | 0.00   | 0.00  |
| L224                    | 25.00                          | 0.00   | 0.00  |
| L225                    | 24.99                          | 0.00   | 0.00  |
| L226                    | 24.99                          | 0.00   | 0.00  |
| L227                    | 24.99                          | 0.00   | 0.00  |
| L228                    | 24.99                          | 0.00   | 0.00  |
| L229                    | 24.98                          | 0.00   | 0.00  |
| L230                    | 24.98                          | 0.00   | 0.00  |
| L231                    | 24.98                          | 0.00   | 0.00  |
| L232                    | 24.97                          | 0.00   | 0.00  |
| L233                    | 24.97                          | 10.72  | 0.43  |
| L234                    | 24.97                          | 6.76   | 0.27  |
| L235                    | 24.97                          | 0.00   | 0.00  |
| L236                    | 24.97                          | 4.87   | 0.20  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| L237                    | 24.97                          | 0.00   | 0.00  |
| L238                    | 24.97                          | 0.00   | 0.00  |
| L239                    | 24.97                          | 0.00   | 0.00  |
| L240                    | 24.97                          | 0.00   | 0.00  |
| L241                    | 24.97                          | 0.00   | 0.00  |
| L242                    | 24.97                          | 0.59   | 0.02  |
| L243                    | 24.97                          | 0.00   | 0.00  |
| L244                    | 24.97                          | 0.00   | 0.00  |
| L245                    | 24.99                          | 0.00   | 0.00  |
| L246                    | 23.05                          | 0.00   | 0.00  |
| L247                    | 20.73                          | 0.00   | 0.00  |
| L248                    | 24.97                          | 0.00   | 0.00  |
| L249                    | 24.97                          | 0.00   | 0.00  |
| L250                    | 24.97                          | 0.00   | 0.00  |
| L251                    | 24.98                          | 0.00   | 0.00  |
| L252                    | 24.97                          | 0.00   | 0.00  |
| L253                    | 24.99                          | 0.00   | 0.00  |
| L254                    | 24.98                          | 0.00   | 0.00  |
| L255                    | 24.97                          | 3.71   | 0.15  |
| L256                    | 24.99                          | 0.00   | 0.00  |
| L257                    | 24.97                          | 0.00   | 0.00  |
| L258                    | 24.97                          | 0.00   | 0.00  |
| L259                    | 24.97                          | 7.56   | 0.30  |
| L260                    | 24.97                          | 0.00   | 0.00  |
| L261                    | 24.99                          | 0.00   | 0.00  |
| L262                    | 24.97                          | 0.00   | 0.00  |
| L263                    | 24.97                          | 0.00   | 0.00  |
| L264                    | 24.97                          | 0.00   | 0.00  |
| L265                    | 24.99                          | 0.00   | 0.00  |
| L266                    | 24.98                          | 0.00   | 0.00  |
| L267                    | 24.97                          | 0.00   | 0.00  |
| L268                    | 24.97                          | 0.00   | 0.00  |
| L269                    | 24.97                          | 3.79   | 0.15  |
| L270                    | 24.97                          | 0.00   | 0.00  |
| L271                    | 24.97                          | 0.90   | 0.04  |
| L272                    | 24.99                          | 0.00   | 0.00  |
| L273                    | 25.00                          | 0.00   | 0.00  |
| L274                    | 24.97                          | 0.00   | 0.00  |
| L275                    | 24.97                          | 0.00   | 0.00  |
| L276                    | 24.98                          | 0.00   | 0.00  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| L277                    | 25.00                          | 0.00   | 0.00  |
| L278                    | 24.98                          | 0.00   | 0.00  |
| L279                    | 25.00                          | 0.00   | 0.00  |
| L280                    | 24.97                          | 0.00   | 0.00  |
| L281                    | 24.98                          | 0.00   | 0.00  |
| L282                    | 24.97                          | 0.00   | 0.00  |
| L283                    | 24.98                          | 0.00   | 0.00  |
| L284                    | 24.98                          | 0.00   | 0.00  |
| L285                    | 24.97                          | 0.00   | 0.00  |
| L286                    | 24.97                          | 0.00   | 0.00  |
| L287                    | 24.99                          | 24.99  | 1.00  |
| L288                    | 24.97                          | 0.00   | 0.00  |
| L289                    | 24.97                          | 0.00   | 0.00  |
| L290                    | 25.00                          | 2.84   | 0.11  |
| L291                    | 24.98                          | 0.00   | 0.00  |
| L292                    | 24.97                          | 3.13   | 0.13  |
| L293                    | 24.97                          | 0.00   | 0.00  |
| L294                    | 24.98                          | 0.00   | 0.00  |
| L295                    | 24.97                          | 0.00   | 0.00  |
| L296                    | 24.99                          | 0.00   | 0.00  |
| L297                    | 24.98                          | 0.00   | 0.00  |
| L298                    | 24.97                          | 0.00   | 0.00  |
| L299                    | 24.99                          | 0.00   | 0.00  |
| L300                    | 24.97                          | 0.00   | 0.00  |
| L301                    | 24.97                          | 0.00   | 0.00  |
| L302                    | 24.98                          | 0.00   | 0.00  |
| L303                    | 24.97                          | 0.00   | 0.00  |
| L304                    | 24.98                          | 0.00   | 0.00  |
| L305                    | 24.97                          | 4.08   | 0.16  |
| L306                    | 24.97                          | 0.00   | 0.00  |
| L307                    | 24.99                          | 0.00   | 0.00  |
| L308                    | 24.99                          | 0.00   | 0.00  |
| L309                    | 24.97                          | 0.00   | 0.00  |
| L310                    | 24.98                          | 0.00   | 0.00  |
| L311                    | 24.98                          | 0.00   | 0.00  |
| L312                    | 24.97                          | 0.00   | 0.00  |
| L313                    | 24.97                          | 0.00   | 0.00  |
| L314                    | 24.97                          | 0.00   | 0.00  |
| L315                    | 24.97                          | 0.00   | 0.00  |
| L316                    | 24.97                          | 0.00   | 0.00  |

| <b>Sampling Quadrat</b> | <b>Quadrat Area (hectares)</b> | <b>Colony Area within Quadrat (hectares)</b> | <b>Proportion of Colony Area Contained in Quadrat</b> |
|-------------------------|--------------------------------|--|---|
| L317                    | 24.97                          | 0.00   | 0.00  |
| L318                    | 24.97                          | 0.00   | 0.00  |
| L319                    | 24.98                          | 0.00   | 0.00  |
| L320                    | 24.98                          | 0.00   | 0.00  |
| L321                    | 24.98                          | 1.44   | 0.06  |
| L322                    | 24.97                          | 0.00   | 0.00  |
| L323                    | 24.97                          | 0.00   | 0.00  |
| L324                    | 24.97                          | 0.00   | 0.00  |
| L325                    | 24.97                          | 0.00   | 0.00  |
| L326                    | 24.98                          | 0.00   | 0.00  |
| L327                    | 24.98                          | 0.00   | 0.00  |
| L328                    | 24.97                          | 0.00   | 0.00  |
| L329                    | 24.97                          | 0.00   | 0.00  |
| L330                    | 24.97                          | 0.00   | 0.00  |

**Table 4. Distribution of estimated colony hectares for the white-tailed prairie dog by stratum using fixed-wing quadrat sampling in Wyoming, 2008.**

| <b>Stratum</b> | <b>Area (Hectares)</b> | <b>Estimated Colony Hectares</b> | <b>95% CI</b>              | <b>CV (%)</b> |
|----------------|------------------------|----------------------------------|----------------------------|---------------|
| High           | 4,918,008              | 725,324                          | 562,250 – 888,398          | 11.5          |
| Low            | 6,593,348              | 445,654                          | 312,072 – 579,236          | 15.29         |
| <i>Total</i>   | <i>11,511,357</i>      | <i>1,170,978</i>                 | <i>960,176 – 1,381,779</i> | <i>9.18</i>   |

# **LANDOWNER INCENTIVE PROGRAM COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS AND MAMMALS: Species of Greatest Conservation Need

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Bryce Krueger, Prairie Ecologist

## **INTRODUCTION**

Wyoming's private lands provide essential habitat for most of our fish and wildlife species, many of which are Species of Greatest Conservation Need (SGCN). The Wyoming Game and Fish Department (Department) identified 279 SGCN that require additional management attention, more than 80 of which are at some risk of listing under the federal Endangered Species Act (ESA). Though these species and their ecosystems are relatively healthy compared to those in other states, overall population declines continue and many of our SGCN could eventually be listed under the ESA. To help maintain healthy populations of SGCN, the Department started the Wyoming Landowner Incentive Program (LIP) in 2005. The LIP facilitates partnerships between the Department and private landowners to implement habitat improvements and management actions to benefit at-risk species. The program provides technical and financial assistance to promote conservation actions tailored to the needs of both individual landowners and wildlife. The main goal of the program is to improve and conserve vulnerable habitats and prevent ESA listings, while maintaining agricultural vitality. Landowner Incentive Program focus species include the Greater Sage-Grouse, Upland Sandpiper, Sage Sparrow, Brewer's Sparrow, black-tailed prairie dog, swift fox, Woodhouse's toad, common shiner, and plains topminnow. Additional SGCN benefited by LIP projects include the Ferruginous Hawk, Burrowing Owl, Short-eared Owl, Mountain Plover, Lark Bunting, Sage Thrasher, McCown's Longspur, Great Basin pocket mouse, olive-backed pocket mouse, plains pocket gopher, plains pocket mouse, prairie vole, sagebrush vole, western harvest mouse, spotted ground squirrel, and white-tailed prairie dog.

The LIP is a federally-funded program. The U.S. Fish and Wildlife Service (USFWS) awards grants to states on a competitive basis. Wyoming received more than \$1.5 million to improve grasslands, sagebrush steppes, and aquatic systems on private lands. Although the LIP focuses conservation actions on a few representative species in each habitat type, the program tries to implement projects that will benefit as many SGCN as possible. Grassland focus species include the black-tailed prairie dog, swift fox, and Upland Sandpiper, while sagebrush focus species include the Greater Sage-Grouse, Sage Sparrow, and Brewer's Sparrow. The LIP focused on all aquatic SGCN.

Because the LIP is a cost-share program, it requires a non-federal match of at least 50% that may consist of cash or in-kind services provided by the landowner or other partners. The LIP provides cost-share on many management practices, including prescribed burns, inter-seeding native forbs and grasses, weed management, invasive plant removal, fencing, fence removal, fence marking, water developments, planned grazing systems, stream restoration, forage reserves, and fish passage and screening structures.

The LIP can also fund incentives for preventing native habitat conversion, incentives for black-tailed prairie dog colony maintenance, and water purchase. Because they are federally funded, LIP projects must comply with the National Environmental Policy Act, the National Historic Preservation Act, and the ESA. Fortunately, the compliance process has been streamlined for many LIP management practices.

## **ACCOMPLISHMENTS**

During this reporting period, we finished implementing most of the previous 10 LIP funded projects (Krueger 2008); however, the Shirley Basin I project was delayed but will be completed by 1 December 2009. We also initiated some vegetation and species monitoring on all of the projects.

We implemented an additional five LIP projects. Four of the new projects are black-tailed prairie dog incentives that will help conserve 487 acres (197 ha) of ecologically important prairie dog colonies in the Thunder Basin, a Department priority habitat area, and contribute to the Department's objectives of maintaining and increasing population numbers of black-tailed prairie dogs, maintaining and improving natural processes (prairie dog grazing), and improving grassland habitat heterogeneity. These projects will benefit several SGCN, including the Burrowing Owl, Mountain Plover, and Ferruginous Hawk.

The fifth project treated 3,270 acres (1,323 ha) of sagebrush habitats located near active sage grouse leks, and implemented an innovative dormant season grazing program to create quality nesting habitat for Greater Sage-Grouse and underrepresented habitats for sagebrush obligate SGCN.

We initiated an additional 21 projects for the 2010 fiscal year, but many are on hold due to changes made by the USFWS concerning financial encumbrances. We are currently working on meeting the new budgeting requirements and plan to implement many of the proposed projects.

## **LITERATURE CITED**

Krueger, B. 2008. Landowner Incentive Program completion report. Pages 116-122 in A. O. Cerovski, editor. Threatened, Endangered, and Nongame Bird and Mammal Investigations. Wyoming Game and Fish Department Nongame Program, Lander. 273pp.

## **RAPTORS TAKEN FOR FALCONRY**

## **FALCONRY COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Raptors

PERIOD COVERED: 1 January 2008 – 31 December 2008

PREPARED BY: Lee Knox, Nongame Biologist  
Matt Withroder, Permitting Officer

### **SUMMARY**

In 2008, a total of 39 falconry licenses were issued. Of these 39 licenses, 27 raptors were captured in Wyoming for use in falconry (Table 1). The average number of birds captured between 1981-2008 is 24.4, with the capture success rate in 2008 at 69% (Table 2). Compared with 2000-2008, the number of birds captured and the success rate in 2008 has remained relatively stable (Table 2).

Unlike previous years, the Wyoming Game and Fish Department no longer requires falconers to list the species they desire to capture or the area in which they desire to capture raptors when applying for a falcon capture license. However, five falconry licenses were available in 2008 for Peregrine Falcons on a first come basis.

Based on the number of falcons captured, the Golden Eagle and the Northern Goshawk were in greatest demand, followed by a capture of three American Kestrels, three Red-tailed Hawks, one Peregrine Falcon, one Prairie Falcon, and one American Kestrel (Table 1).

Nonresidents had a higher capture success rate than residents. A total of 29 nonresident licenses were issued and 22 birds were captured, for a capture success rate of 76%. A total of 10 resident licenses were issued and 5 birds were captured, for a capture success rate of 50%.

Data are no longer being collected on the number of falconers, species of raptors used for falconry, number of days spent training raptors, number of days spent hunting with raptors, or species of animals taken by raptors in Wyoming.

**Table 1. Wyoming falcons captured by species, 2008.**

| <b>Species Captured</b> | <b>Number Captured<br/>by Residents</b> | <b>Number Captured<br/>by Non-residents</b> | <b>Total<br/>Captures</b> |
|-------------------------|---|---|---------------------------|
| Golden Eagle            | 0                                       | 11  | 11                        |
| Northern Goshawk        | 1                                       | 6   | 7                         |
| American Kestrel        | 1                                       | 0   | 1                         |
| Merlin                  | 0                                       | 3   | 3                         |
| Peregrine Falcon        | 0                                       | 1   | 1                         |
| Red-tailed Hawk         | 3                                       | 0   | 3                         |
| Prairie Falcon          | 0                                       | 1   | 1                         |
| <i>Total Captures</i>   | <i>5</i>                                | <i>22</i>                                   | <i>27</i>                 |

**Table 2. The number of raptors captured and the capture rate (%) in Wyoming, 1981-2008.**

| <b>Year</b> | <b>Number of Raptors Captured</b> | <b>Capture Rate (%)</b> |
|-------------|-----------------------------------|-------------------------|
| 1981        | 27                                | 37                      |
| 1982        | 40                                | 52                      |
| 1983        | 18                                | 18                      |
| 1984        | 25                                | 33                      |
| 1985        | 39                                | 53                      |
| 1986        | 33                                | 35                      |
| 1987        | 19                                | 36                      |
| 1988        | 28                                | 51                      |
| 1989        | 26                                | 55                      |
| 1990        | 32                                | 68                      |
| 1991        | 29                                | 66                      |
| 1992        | 22                                | 53                      |
| 1993        | 13                                | 37                      |
| 1994        | 21                                | 33                      |
| 1995        | 12                                | 30                      |
| 1996        | 25                                | 47                      |
| 1997        | 19                                | 61                      |
| 1998        | 31                                | 63                      |
| 1999        | 27                                | 55                      |
| 2000        | 24                                | 57                      |
| 2001        | 21                                | 45                      |
| 2002        | 29                                | 58                      |
| 2003        | 21                                | 49                      |
| 2004        | 33                                | 48                      |
| 2005        | 13                                | 31                      |
| 2006        | 14                                | 40                      |
| 2007        | 15                                | 45                      |
| 2008        | 27                                | 69                      |

**OTHER NONGAME**

# **BREEDING BIRD SURVEY COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: Other Nongame

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Andrea Orabona, Nongame Bird Biologist  
U.S. Geological Survey – Biological Resources Division

## **INTRODUCTION AND METHODS**

The Breeding Bird Survey (BBS) is sponsored jointly by the U.S. Geological Survey – Biological Resources Division (USGS-BRD) (formerly the U.S. Fish and Wildlife Service) and the Canadian Wildlife Service. Data from the BBS are used to monitor population trends of bird species that nest in North America. These data are especially useful if a species is adequately monitored using this survey method and if routes are conducted annually over the long term, especially by the same observer.

Over 4,400 BBS routes are located throughout the United States and Canada. In Wyoming, there are 108 available BBS routes. The Wyoming Game and Fish Department (Department) Nongame Bird Biologist serves as the State BBS coordinator.

All BBS routes are 24.5 miles (39.4 km) long and consist of 50 stops spaced 0.5 miles (2.1 km) apart. Beginning at sunrise, observers record every bird seen within a 0.25 mile (0.4 km) radius and all birds heard at each stop during a three-minute time period. Data are submitted to the USGS-BRD for analysis. To view these data and additional route information, log onto the BBS Internet web site at [www.pwrc.usgs.gov/bbs](http://www.pwrc.usgs.gov/bbs).

## **RESULTS AND DISCUSSION**

The USGS-BRD conducts a detailed statistical analysis of BBS data from the survey's inception in 1966 in the East and 1968 in the West to the current year. From this analysis, population trends for individual species can be examined on a continental, western region, statewide, and physiographic region scale. The Department uses these BBS data to monitor populations of many bird species, especially terrestrial species whose population trends can be adequately tracked using this survey method, including Species of Greatest Conservation Need (Figures 1 and 2, Table 1).

In 2008, 2,885 of the 4,443 total routes available in the United States and Canada were conducted. In Wyoming, observers agreed to conduct 91 of the 108 available routes in 2008, but only 63 (69%) routes were completed (Table 2).

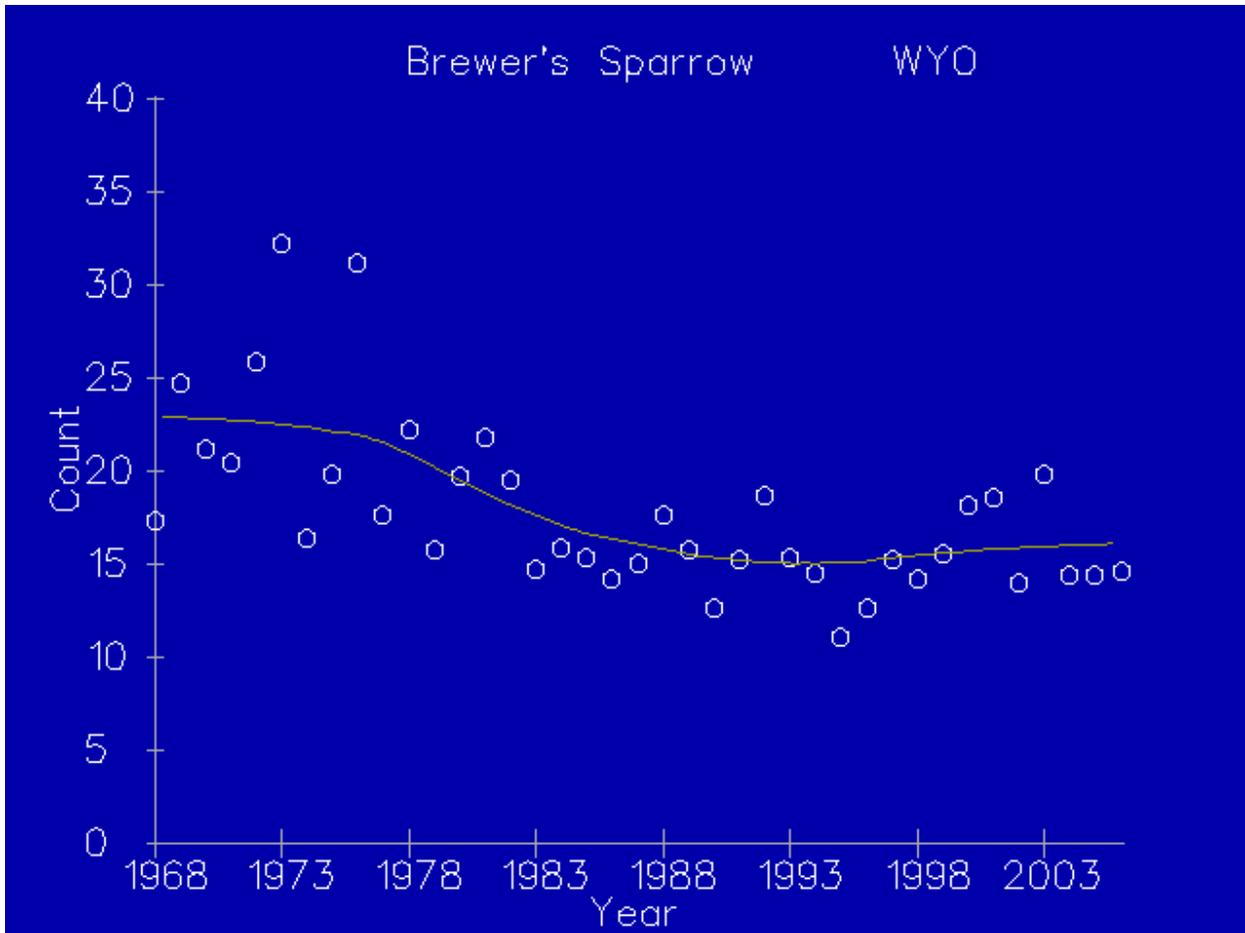
A total of 2,926,863 individual birds were detected on the 63 BBS routes conducted in 2008 in Wyoming. As in 2007, the Western Meadowlark was again the most abundant species detected on BBS routes in Wyoming in 2008, with 3,680 individuals detected on 55 of the 63 (87%) routes completed (Table 3). A summary of the number of routes completed in Wyoming and the species and number of individuals detected on each route from 1968-2008 is presented in Tables 4-7.

Tables 8-11 summarize the history of BBS route observers and years conducted in Wyoming from 1968 through 2008. Fewer than 20 routes have been run continuously, or with only a few scattered years missing, for 10 or more years. A majority of the routes contain gaps of two or more years or have had more than one observer or a succession of observers. The primary purpose of the BBS is to monitor population trends of avian species. Therefore, it is important that each route is conducted annually, and preferably by the same observer, which is a primary goal of BBS coordinators.

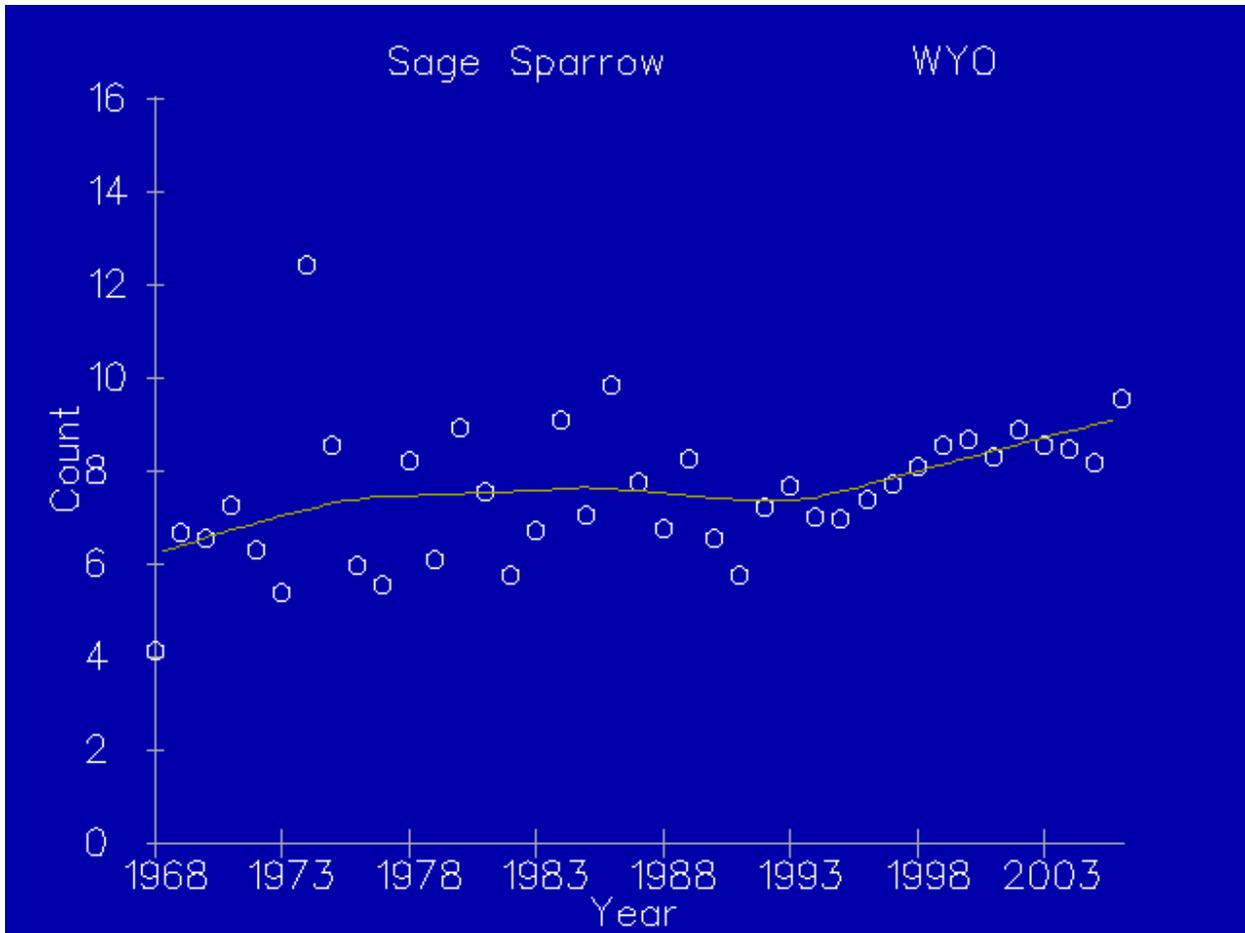
Population trend analysis data are only significant for species occurring on 14 or more separate BBS routes. Therefore, we also employ other survey methods that are necessary to determine population trends for those species that are not adequately monitored by the Breeding Bird Survey.

## **ACKNOWLEDGEMENTS**

The Department would like to thank the volunteers and biologists from this and other natural resources management agencies for their valuable contributions to the 2008 Breeding Bird Survey (see names in Table 2). The continued dedication of these individuals to this survey makes it possible to collect long-term population trend data on numerous avian species in Wyoming.



**Figure 1. Population trend data for the Brewer's Sparrow in Wyoming, 1968-2006.**



**Figure 2. Population trend data for the Sage Sparrow in Wyoming, 1968-2006.**

**Table 1. Species in Wyoming whose population trends are adequately monitored by the Breeding Bird Survey. Species with significant ( $P < 0.05$ ) long-term (1968-2006) trends are denoted in blue for increasing populations, and in red for declining populations.<sup>a</sup>**

| <b>Species</b>       | <b>Trend</b> | <b>P</b> | <b>N</b> | <b>95% CI</b> | <b>R.A.</b> |
|----------------------|--------------|----------|----------|---------------|-------------|
| Mallard              | 2.5          | 0.06     | 92       | 0.1 – 5.1     | 3.48        |
| Red-tailed Hawk      | 1.3          | 0.26     | 95       | -0.9 – 3.5    | 1.11        |
| American Kestrel     | 0.1          | 0.92     | 97       | -2.0 – 2.2    | 1.60        |
| Killdeer             | -0.3         | 0.65     | 104      | -1.7 – 1.1    | 6.13        |
| Common Snipe         | 1.9          | 0.13     | 62       | -0.5 – 4.3    | 2.73        |
| Mourning Dove        | 0.7          | 0.53     | 107      | -1.5 – 3.0    | 17.34       |
| Common Nighthawk     | -0.7         | 0.63     | 94       | -3.5 – 2.1    | 2.44        |
| Northern Flicker     | -0.1         | 0.91     | 86       | -2.2 – 2.0    | 3.04        |
| Say's Phoebe         | 1.7          | 0.36     | 71       | -1.9 – 5.4    | 2.25        |
| Eastern Kingbird     | -0.5         | 0.72     | 58       | -3.3 – 2.3    | 1.46        |
| Loggerhead Shrike    | -0.4         | 0.81     | 65       | -3.3 – 2.6    | 1.14        |
| Clark's Nutcracker   | 2.0          | 0.13     | 28       | -0.5 – 4.5    | 1.34        |
| Black-billed Magpie  | 0.5          | 0.78     | 84       | -2.9 – 3.9    | 7.32        |
| American Crow        | 4.7          | 0.01     | 59       | 1.5 – 7.8     | 2.34        |
| Common Raven         | 4.8          | 0.00     | 57       | 1.6 – 7.9     | 2.89        |
| Horned Lark          | -1.6         | 0.00     | 97       | -2.5 – -0.6   | 50.98       |
| Tree Swallow         | 1.6          | 0.44     | 48       | -2.5 – 5.8    | 3.20        |
| Violet-green Swallow | 6.0          | 0.04     | 47       | 0.4 – 11.7    | 2.74        |
| Cliff Swallow        | 1.3          | 0.31     | 90       | -1.2 – 3.7    | 22.52       |
| Barn Swallow         | -3.4         | 0.01     | 93       | -5.8 – -0.9   | 4.49        |
| Mountain Chickadee   | -0.8         | 0.64     | 19       | -3.9 – 2.3    | 1.63        |
| Rock Wren            | -1.0         | 0.44     | 83       | -3.7 – 1.6    | 4.48        |
| Mountain Bluebird    | -0.6         | 0.74     | 81       | -4.4 – 3.1    | 3.82        |
| American Robin       | -0.2         | 0.72     | 98       | -1.2 – 0.9    | 19.11       |
| European Starling    | 1.4          | 0.31     | 77       | -1.3 – 4.1    | 9.23        |
| Yellow Warbler       | 1.3          | 0.19     | 79       | -0.6 – 3.2    | 5.57        |
| Western Tanager      | 4.3          | 0.06     | 28       | 0.1 – 8.5     | 1.40        |
| Chipping Sparrow     | -3.5         | 0.00     | 62       | -5.3 – -1.8   | 4.27        |
| Brewer's Sparrow     | -0.8         | 0.28     | 100      | -2.3 – 0.7    | 17.15       |
| Lark Sparrow         | -1.2         | 0.26     | 75       | -3.4 – 0.9    | 4.12        |
| Sage Sparrow         | 0.5          | 0.81     | 38       | -3.8 – 4.9    | 7.44        |
| Lark Bunting         | -1.9         | 0.09     | 83       | -4.0 – 0.3    | 51.28       |
| Savannah Sparrow     | 2.2          | 0.40     | 64       | -2.9 – 7.3    | 2.57        |
| Song Sparrow         | 2.7          | 0.12     | 67       | -0.6 – 6.0    | 1.97        |
| Dark-eyed Junco      | -2.1         | 0.12     | 27       | -4.5 – 0.4    | 3.10        |
| Red-winged Blackbird | 1.3          | 0.05     | 100      | 0.0 – 2.6     | 21.45       |
| Western Meadowlark   | 0.2          | 0.75     | 107      | -0.9 – 1.2    | 77.45       |

| <b>Species</b>            | <b>Trend</b> | <b>P</b>    | <b>N</b>  | <b>95% CI</b>      | <b>R.A.</b> |
|---------------------------|--------------|-------------|-----------|--------------------|-------------|
| Yellow-headed Blackbird   | -1.5         | 0.48        | 54        | -5.7 – 2.7         | 2.79        |
| Brewer's Blackbird        | 0.4          | 0.57        | 106       | -0.9 – 1.7         | 21.98       |
| Brown-headed Cowbird      | -0.7         | 0.58        | 87        | -3.2 – 1.8         | 4.15        |
| <b>American Goldfinch</b> | <b>-1.6</b>  | <b>0.05</b> | <b>55</b> | <b>-3.2 – -0.1</b> | <b>1.05</b> |
| House Sparrow             | 1.7          | 0.51        | 47        | -3.3 – 6.7         | 6.43        |

<sup>a</sup> Key to the Statistical Analysis Codes:

|        |  |
|--------|--|
| Trend  | Estimated trend summarized as a percent change per year.   |
| P      | Because the trends are estimates, a statistical test is conducted to determine whether the trend is significantly different from 0, and results of the test are presented as p values, indicating the significance of the trend. P >0.05 indicates that we cannot reject the null hypothesis that the trend is different from 0. |
| N      | Number of survey routes in the analysis.   |
| 95% CI | 95% confidence interval for the trend estimate, given as a multiplicative (constant rate) change in counts over time, with covariables to adjust for differences in observer quality. Regional trends are estimated as a weighted average of the route trends.   |
| R.A.   | Relative abundance for the species, in birds per route. This number is an approximate measure of how many birds are seen on a route in the region.   |

**Table 2. 2008 Breeding Bird Survey (BBS) observers and route information.**

| <b>Observer</b>  | <b>Latilong</b> | <b>Route Number &amp; Name</b> | <b>Number of Species</b> |
|------------------|-----------------|--------------------------------|--------------------------|
| Lisa Baril       | 1               | 1 – NE Entrance, YNP           | 42                       |
| Grace Nutting    | 2               | 2 – Cody                       | 49                       |
| Tim Stephens     | 3               | 3 – Otto                       | 40                       |
| Tom Easterly     | 4               | 4 – Basin                      | 34                       |
| John Berry       | 5               | 5 – Wyarno                     | 42                       |
| <i>n/a</i>       | 6               | 6 – Clarkelen                  | <i>Discontinued</i>      |
| Jennifer Adams   | 7               | 7 – Sundance                   | 57                       |
| <i>n/a</i>       | 8               | 8 – Colter Bay                 | <i>Discontinued</i>      |
| Jazmyn McDonald  | 9               | 9 – Dubois                     | 58                       |
| Jim Downham      | 10              | 10 – Midvale                   | Route not conducted      |
| Donna Walgren    | 11              | 11 – Nowood                    | 43                       |
| <i>n/a</i>       | 12              | 12 – Natrona                   | <i>Discontinued</i>      |
| --               | 13              | 13 – Bill                      | --                       |
| <i>n/a</i>       | 14              | 14 – Redbird                   | <i>Discontinued</i>      |
| Carol Deno       | 15              | 15 – Fontenelle                | 52                       |
| --               | 16              | 16 – Elk Horn                  | --                       |
| Andrea Orabona   | 17              | 17 – Bear Creek                | 17                       |
| --               | 18              | 18 – Ervay                     | --                       |
| Bruce Walgren    | 19              | 19 – Brookhurst                | 57                       |
| <i>n/a</i>       | 20              | 20 – Glenrock                  | <i>Discontinued</i>      |
| Martin Hicks     | 21              | 21 – Dwyer                     | 22                       |
| Carol Deno       | 22              | 22 – Cumberland                | 24                       |
| <i>n/a</i>       | 23              | 23 – McKinnon                  | <i>Discontinued</i>      |
| Laurie Van Fleet | 24              | 24 – Patrick Draw              | 19                       |
| Marie Adams      | 25              | 25 – Savery                    | 41                       |
| Steve Loose      | 26              | 26 – Riverside                 | 47                       |
| --               | 27              | 27 – Buford                    | --                       |
| Jim Lawrence     | 28              | 28 – Yoder                     | 45                       |
| <i>n/a</i>       | --              | 29 – Canyon                    | <i>Discontinued</i>      |
| Lisa Baril       | 1               | 30 – Mammoth, YNP              | 52                       |
| <i>n/a</i>       | --              | 31 – West Thumb                | <i>Discontinued</i>      |
| Kathryn Hicks    | 2               | 32 – Hunter Peak               | 55                       |
| Kathryn Hicks    | 2               | 33 – Clark                     | 52                       |
| <i>n/a</i>       | --              | 34 – no route                  | --                       |
| Bill Anderson    | 3               | 35 – Frannie                   | 20                       |
| Bob South        | 8               | 36 – Moose                     | Route not conducted      |
| Glen Olsen       | 3               | 37 – Lovell                    | Route not conducted      |
| Neil Miller      | 3               | 38 – Meeteetse                 | Route not conducted      |

| <b>Observer</b>  | <b>Latilong</b> | <b>Route Number &amp; Name</b> | <b>Number of Species</b> |
|------------------|-----------------|--------------------------------|--------------------------|
| --               | 4               | 39 – Ten Sleep                 | --                       |
| Tracey Ostheimer | 4               | 40 – Dayton                    | 64                       |
| Neil Miller      | 4               | 41 – Bald Mountain             | 31                       |
| Grace Nutting    | 5               | 42 – Crazy Woman               | 40                       |
| --               | 5               | 43 – Schoonover                | --                       |
| Donald Brewer    | 5               | 44 – Arvada                    | 41                       |
| Rene Schell      | 6               | 45 – Recluse                   | Route not conducted      |
| Rene Schell      | 6               | 46 – Soda Well                 | Route not conducted      |
| <i>n/a</i>       | --              | <i>47 – Piney</i>              | <i>Discontinued</i>      |
| <i>n/a</i>       | --              | <i>48 – Seely</i>              | <i>Discontinued</i>      |
| Laurie Van Fleet | 7               | 49 – Upton                     | 28                       |
| <i>n/a</i>       | --              | <i>50 – Moskee</i>             | <i>Discontinued</i>      |
| Susan Patla      | 8               | 51 – Alpine                    | 57                       |
| --               | 8               | 52 – Wilson                    | --                       |
| Eva Crane        | 9               | 53 – Horse Creek               | 51                       |
| <i>n/a</i>       | --              | <i>54 – no route</i>           | --                       |
| Pat Hnilicka     | 9               | 55 – Crowheart                 | 48                       |
| Jim Downham      | 10              | 56 – Ethete                    | Route not conducted      |
| Pat Hnilicka     | 10              | 57 – Anchor                    | 40                       |
| --               | 10              | 58 – Gebo                      | --                       |
| Justin Binfet    | 11              | 59 – Arminto                   | 25                       |
| Greg Anderson    | 11              | 60 – Lysite                    | 22                       |
| --               | 11              | 61 – Worland                   | --                       |
| --               | 12              | 62 – Teapot Dome               | --                       |
| Deane Bjerke     | 12              | 63 – Mayoworth                 | 37                       |
| Tracey Ostheimer | 12              | 64 – Sussex                    | 44                       |
| --               | 13              | 65 – Harland Flats             | --                       |
| --               | 13              | 66 – Pine Tree                 | --                       |
| Todd Filipi      | 13              | 67 – Highlight                 | Need to modify route     |
| Nate West        | 14              | 68 – Riverview                 | Route not conducted      |
| Laurie Van Fleet | 14              | 69 – Newcastle                 | 23                       |
| Bill Munro       | 14              | 70 – Raven                     | Route not conducted      |
| Gary Fralick     | 15              | 71 – Soda Lake                 | Route not conducted      |
| Gary Fralick     | 15              | 72 – Buckskin Mountain         | Route not conducted      |
| <i>n/a</i>       | --              | <i>73 – Daniel</i>             | <i>Discontinued</i>      |
| Susan Patla      | 16              | 74 – Boulder                   | 55                       |
| Susan Patla      | 16              | 75 – Big Sandy                 | 48                       |
| Grant Frost      | 16              | 76 – Farson                    | 16                       |
| Eva Crane        | 17              | 77 – Fiddler Lake              | 43                       |
| Kelli Jones      | 17              | 78 – Sand Draw                 | Route not conducted      |
| Stan Harter      | 17              | 79 – Sweetwater                | 30                       |

| <b>Observer</b>   | <b>Latilong</b> | <b>Route Number &amp; Name</b> | <b>Number of Species</b> |
|-------------------|-----------------|--------------------------------|--------------------------|
| --                | 18              | 80 – Gas Hills                 | --                       |
| Greg Hiatt        | 18              | 81 – Bairoll                   | 31                       |
| Greg Hiatt        | 18              | 82 – Lamont                    | 30                       |
| Laurie Schwieger  | 19              | 83 – Pathfinder                | 32                       |
| Donna Walgren     | 19              | 84 – Leo                       | 32                       |
| Ann Hines         | 19              | 85 – Shirley                   | 20                       |
| Jim Lawrence      | 20              | 86 – Warbonnet                 | 46                       |
| Gloria Lawrence   | 20              | 87 – Fletcher Peak             | 56                       |
| Justin Binfet     | 20              | 88 – Shawnee                   | Route not conducted      |
| Martin Hicks      | 21              | 89 – Meadowdale                | Route not conducted      |
| Gloria Lawrence   | 21              | 90 – Lusk                      | 29                       |
| Bryce Kreuger     | 21              | 91 – Lingle                    | 34                       |
| <i>n/a</i>        | --              | <i>92 – Diamondville</i>       | <i>Discontinued</i>      |
| Kent Fothergill   | 22              | 93 – Mountain View             | Route not conducted      |
| <i>n/a</i>        | --              | <i>94 – no route</i>           | --                       |
| <i>n/a</i>        | --              | <i>95 – Green River</i>        | <i>Discontinued</i>      |
| --                | 23              | 96 – Reliance                  | --                       |
| Mary Lynn Corbett | 23              | 97 – Rock Springs              | 24                       |
| Andrea Orabona    | 24              | 98 – Black Rock                | Need to modify route     |
| <i>n/a</i>        | --              | <i>99 – no route</i>           | --                       |
| <i>n/a</i>        | --              | <i>100 – no route</i>          | --                       |
| Bill Falvey       | 25              | 101 – Wamsutter                | Route not conducted      |
| Bill Falvey       | 25              | 102 – Rawlins                  | Route not conducted      |
| Tim Woolley       | 25              | 103 – Baggs                    | 23                       |
| Frank Blomquist   | 26              | 104 – Walcott                  | 43                       |
| Scott McConnell   | 26              | 105 – Fox Park                 | Route not conducted      |
| Francis Bergquist | 26              | 106 – Ryan Park                | Route not conducted      |
| Scott McConnell   | 27              | 107 – Sybille Canyon           | Route not conducted      |
| Scott McConnell   | 27              | 108 – Rock River               | Route not conducted      |
| Bryce Krueger     | 27              | 109 – Harmony                  | 42                       |
| Pat Deibert       | 28              | 110 – Cheyenne                 | Route not conducted      |
| --                | 28              | 111 – Chugwater                | --                       |
| Bryce Krueger     | 28              | 112 – Pine Bluff               | 29                       |
| Chris Michelson   | 20              | 120 – Welch                    | 38                       |
| Kathleen Paulin   | 23              | 123 – Flaming Gorge            | 24                       |
| --                | 6               | 147 – Rozet                    | --                       |
| Mary Yemington    | 7               | 148 – Seely 2                  | 49                       |
| Jennifer Adams    | 7               | 150 – Government Valley        | 40                       |
| Rebecca Fogerty   | 15              | 173 – Rye Grass                | 33                       |
| Kent Fothergill   | 23              | 192 – Carter                   | Route not conducted      |
| --                | 23              | 195 – Seedskafee               | --                       |

| <b>Observer</b> | <b>Latilong</b> | <b>Route Number &amp; Name</b> | <b>Number of Species</b> |
|-----------------|-----------------|--------------------------------|--------------------------|
| Sandra Johnson  | 6               | 206 – Caballa Creek            | 30                       |
| Susan Wolff     | 8               | 208 – Moran                    | 49                       |
| Larry Keffer    | 12              | 212 – Bucknum                  | Route not conducted      |
| Bill Munro      | 14              | 214 – Hampshire                | Route not conducted      |
| Jennifer Adams  | 7               | 250 – Moskee 2                 | 55                       |
| <i>n/a</i>      | --              | <i>900 – Hayden Valley</i>     | <i>Discontinued</i>      |
| Lisa Baril      | 1               | 901 – Yellowstone, YNP         | 47                       |
| Bill Falvey     | 1               | 902 – Pryor Flats              | Route not conducted      |

**Table 3. The top 30 species detected on BBS routes in Wyoming in 2008.**

| <b>Species</b>        | <b>Total Detected</b> | <b>Percent Detected</b> | <b>Number of Routes Detected On</b> |
|-----------------------|-----------------------|-------------------------|-------------------------------------|
| Western Meadowlark    | 3680                  | 12.32                   | 55                                  |
| Horned Lark           | 2213                  | 7.41                    | 46                                  |
| Lark Bunting          | 1798                  | 6.02                    | 23                                  |
| Red-winged Blackbird  | 1553                  | 5.20                    | 51                                  |
| Cliff Swallow         | 1314                  | 4.40                    | 36                                  |
| American Robin        | 1252                  | 4.19                    | 54                                  |
| Mourning Dove         | 1155                  | 3.87                    | 50                                  |
| Vesper Sparrow        | 1007                  | 3.37                    | 51                                  |
| Brewer's Blackbird    | 990                   | 3.32                    | 55                                  |
| Brewer's Sparrow      | 858                   | 2.87                    | 44                                  |
| European Starling     | 853                   | 2.86                    | 24                                  |
| Sage Thrasher         | 823                   | 2.76                    | 34                                  |
| Canada Goose          | 653                   | 2.19                    | 15                                  |
| Black-billed Magpie   | 395                   | 1.32                    | 39                                  |
| Warbling Vireo        | 386                   | 1.29                    | 27                                  |
| Yellow Warbler        | 384                   | 1.29                    | 37                                  |
| Common Grackle        | 356                   | 1.19                    | 26                                  |
| House Sparrow         | 328                   | 1.10                    | 19                                  |
| Sage Sparrow          | 301                   | 1.01                    | 16                                  |
| Brown-headed Cowbird  | 300                   | 1.00                    | 36                                  |
| Killdeer              | 287                   | 0.96                    | 45                                  |
| Chipping Sparrow      | 273                   | 0.91                    | 26                                  |
| Ring-necked Pheasant  | 259                   | 0.87                    | 15                                  |
| Lark Sparrow          | 255                   | 0.85                    | 34                                  |
| Yellow-rumped Warbler | 250                   | 0.84                    | 16                                  |
| Western Kingbird      | 246                   | 0.82                    | 20                                  |
| Rock Wren             | 223                   | 0.75                    | 35                                  |
| American Crow         | 219                   | 0.73                    | 26                                  |
| Common Raven          | 217                   | 0.73                    | 38                                  |
| Pine Siskin           | 217                   | 0.73                    | 18                                  |

**Table 4. Wyoming Breeding Bird Survey data, 1968-1979.**

| Species List         | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 |
|----------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Canada Goose         | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 6    | 14   | 16   | 0    | 7    |
| Trumpeter Swan       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Wood Duck            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Gadwall              | 3    | 3    | 0    | 4    | 11   | 0    | 5    | 10   | 1    | 8    | 1    | 5    |
| American Wigeon      | 0    | 8    | 1    | 1    | 2    | 1    | 4    | 15   | 1    | 17   | 2    | 6    |
| Mallard              | 21   | 12   | 46   | 29   | 21   | 11   | 20   | 50   | 19   | 47   | 69   | 82   |
| Blue-winged Teal     | 0    | 4    | 1    | 0    | 2    | 0    | 2    | 4    | 3    | 4    | 17   | 8    |
| Cinnamon Teal        | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 6    | 0    | 0    |
| Northern Shoveler    | 1    | 1    | 0    | 0    | 2    | 0    | 0    | 4    | 1    | 1    | 0    | 2    |
| Northern Pintail     | 3    | 11   | 7    | 0    | 9    | 0    | 2    | 0    | 1    | 0    | 13   | 4    |
| Green-winged Teal    | 1    | 7    | 0    | 1    | 13   | 0    | 2    | 1    | 4    | 4    | 13   | 24   |
| Canvasback           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Redhead              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    | 0    |
| Ring-necked Duck     | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Lesser Scaup         | 1    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 2    | 0    |
| Harlequin Duck       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Bufflehead           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Common Goldeneye     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Barrow's Goldeneye   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 1    | 0    | 2    |
| Hooded Merganser     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Common Merganser     | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 2    | 0    | 13   | 13   | 4    |
| Ruddy Duck           | 0    | 0    | 0    | 0    | 1    | 1    | 0    | 0    | 0    | 4    | 3    | 0    |
| Chukar               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    |
| Gray Partridge       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ring-necked Pheasant | 11   | 17   | 157  | 106  | 61   | 2    | 84   | 134  | 53   | 36   | 24   | 142  |
| Ruffed Grouse        | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    |
| Greater Sage-Grouse  | 6    | 58   | 43   | 12   | 2    | 16   | 89   | 2    | 34   | 94   | 35   | 110  |
| Blue Grouse          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sharp-tailed Grouse  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Wild Turkey          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 5    | 8    | 8    | 7    | 0    |
| Northern Bobwhite    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Common Loon          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |

| Species List                | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Pied-billed Grebe           | 0    | 0    | 0    | 1    | 5    | 2    | 3    | 2    | 0    | 2    | 7    | 2    |
| Horned Grebe                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Red-necked Grebe            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Eared Grebe                 | 0    | 0    | 0    | 4    | 0    | 0    | 0    | 1    | 2    | 0    | 3    | 0    |
| Western Grebe               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Clark's Grebe               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Aechmophorus species        | 0    | 0    | 0    | 0    | 0    | 0    | 4    | 0    | 0    | 0    | 2    | 1    |
| American White Pelican      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Double-crested Cormorant    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 1    | 5    | 12   |
| American Bittern            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 5    | 3    |
| Great Blue Heron            | 1    | 0    | 0    | 0    | 3    | 0    | 3    | 0    | 1    | 80   | 101  | 68   |
| Snowy Egret                 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Black-crowned Night-Heron   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 10   | 2    | 2    |
| White-faced Ibis            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Turkey Vulture              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 8    | 5    | 15   |
| Osprey                      | 1    | 1    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 1    | 0    | 2    |
| Bald Eagle                  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Northern Harrier            | 8    | 2    | 6    | 6    | 7    | 11   | 16   | 5    | 13   | 15   | 21   | 13   |
| Sharp-shinned Hawk          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 1    |
| Cooper's Hawk               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    |
| Northern Goshawk            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 1    | 1    |
| Unidentified Accipiter Hawk | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Broad-winged Hawk           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Swainson's Hawk             | 3    | 1    | 2    | 4    | 1    | 0    | 4    | 6    | 4    | 7    | 9    | 4    |
| Red-tailed Hawk             | 1    | 14   | 11   | 8    | 4    | 1    | 14   | 2    | 12   | 27   | 11   | 25   |
| Ferruginous Hawk            | 4    | 3    | 10   | 1    | 10   | 3    | 6    | 2    | 2    | 2    | 5    | 4    |
| Unidentified Buteo          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 5    | 2    | 0    | 0    |
| Golden Eagle                | 2    | 0    | 1    | 3    | 0    | 3    | 2    | 3    | 5    | 12   | 15   | 14   |
| American Kestrel            | 7    | 11   | 13   | 9    | 14   | 7    | 13   | 12   | 20   | 41   | 49   | 60   |
| Merlin                      | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 1    | 2    | 2    | 3    |
| Peregrine Falcon            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Prairie Falcon              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 4    | 4    | 7    |
| Virginia Rail               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sora                        | 1    | 0    | 0    | 1    | 2    | 0    | 0    | 0    | 0    | 1    | 0    | 2    |
| American Coot               | 6    | 0    | 1    | 0    | 6    | 4    | 3    | 2    | 3    | 4    | 16   | 11   |

| Species List           | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Sandhill Crane         | 2    | 2    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 1    |
| Killdeer               | 40   | 34   | 49   | 30   | 61   | 34   | 89   | 80   | 89   | 87   | 126  | 191  |
| Mountain Plover        | 3    | 2    | 1    | 1    | 2    | 0    | 2    | 1    | 7    | 3    | 1    | 3    |
| Black-necked Stilt     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| American Avocet        | 0    | 0    | 1    | 4    | 1    | 0    | 0    | 0    | 0    | 0    | 3    | 3    |
| Willet                 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 3    | 7    |
| Spotted Sandpiper      | 5    | 7    | 0    | 2    | 4    | 0    | 6    | 3    | 4    | 17   | 18   | 30   |
| Upland Sandpiper       | 2    | 0    | 0    | 0    | 0    | 0    | 3    | 0    | 0    | 0    | 0    | 0    |
| Long-billed Curlew     | 2    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Wilson's Snipe         | 0    | 8    | 12   | 3    | 13   | 0    | 8    | 10   | 14   | 12   | 10   | 48   |
| Wilson's Phalarope     | 0    | 3    | 6    | 1    | 0    | 0    | 1    | 1    | 5    | 13   | 17   | 8    |
| Franklin's Gull        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ring-billed Gull       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 1    | 0    | 5    |
| California Gull        | 4    | 19   | 3    | 0    | 4    | 0    | 10   | 31   | 7    | 4    | 7    | 10   |
| Unidentified Gull      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Caspian Tern           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Common Tern            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Forster's Tern         | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Black Tern             | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 5    | 3    |
| Rock Pigeon            | 5    | 25   | 73   | 4    | 12   | 0    | 2    | 1    | 8    | 0    | 0    | 7    |
| Eurasian Collared-Dove | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Mourning Dove          | 169  | 123  | 249  | 230  | 210  | 99   | 258  | 230  | 401  | 285  | 468  | 490  |
| Black-billed Cuckoo    | 1    | 5    | 1    | 1    | 4    | 0    | 3    | 1    | 1    | 2    | 1    | 0    |
| Yellow-billed Cuckoo   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 4    |
| Western Screech-Owl    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Eastern Screech-Owl    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Great Horned Owl       | 4    | 11   | 7    | 2    | 0    | 0    | 4    | 8    | 2    | 4    | 9    | 7    |
| Northern Pygmy-Owl     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Burrowing Owl          | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 1    | 1    | 1    | 4    | 8    |
| Long-eared Owl         | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Short-eared Owl        | 3    | 0    | 0    | 1    | 1    | 1    | 7    | 0    | 0    | 2    | 0    | 0    |
| Northern Saw-whet Owl  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Common Nighthawk       | 20   | 4    | 44   | 11   | 10   | 49   | 56   | 64   | 22   | 72   | 72   | 68   |
| Common Poorwill        | 0    | 0    | 0    | 0    | 1    | 2    | 0    | 0    | 3    | 2    | 3    | 1    |
| Chimney Swift          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    |

| Species List                      | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 |
|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| White-throated Swift              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 1    | 0    |
| Black-chinned Hummingbird         | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Calliope Hummingbird              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Broad-tailed Hummingbird          | 0    | 2    | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 1    | 4    | 5    |
| Rufous Hummingbird                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Unidentified Hummingbird          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Belted Kingfisher                 | 0    | 1    | 1    | 0    | 0    | 0    | 1    | 3    | 0    | 3    | 5    | 5    |
| Lewis's Woodpecker                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Red-headed Woodpecker             | 1    | 2    | 4    | 1    | 3    | 0    | 0    | 2    | 1    | 1    | 0    | 2    |
| Red-naped Sapsucker               | 0    | 4    | 2    | 0    | 0    | 0    | 0    | 0    | 6    | 18   | 19   | 30   |
| Unidentified Sapsucker            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Williamson's Sapsucker            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Downy Woodpecker                  | 0    | 1    | 0    | 1    | 0    | 0    | 0    | 3    | 7    | 8    | 7    | 13   |
| Hairy Woodpecker                  | 3    | 0    | 0    | 0    | 1    | 0    | 1    | 3    | 3    | 2    | 1    | 3    |
| Unidentified Woodpecker           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| American Three-toed Woodpecker    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Black-backed Woodpecker           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Red-shafted Flicker               | 22   | 30   | 20   | 23   | 14   | 20   | 26   | 33   | 37   | 102  | 94   | 104  |
| Yellow-shafted Flicker            | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 2    | 0    | 0    | 0    |
| Northern Flicker                  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Olive-sided Flycatcher            | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    | 2    | 3    |
| Western Wood-Pewee                | 8    | 8    | 5    | 3    | 5    | 6    | 2    | 11   | 4    | 31   | 11   | 34   |
| Willow Flycatcher                 | 9    | 5    | 5    | 0    | 0    | 0    | 1    | 0    | 0    | 42   | 29   | 16   |
| Least Flycatcher                  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 1    | 2    | 0    | 2    |
| Hammond's Flycatcher              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Gray Flycatcher                   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Dusky Flycatcher                  | 3    | 3    | 1    | 1    | 0    | 0    | 0    | 4    | 14   | 10   | 11   | 22   |
| Cordilleran Flycatcher            | 1    | 0    | 0    | 0    | 0    | 0    | 1    | 6    | 2    | 8    | 2    | 11   |
| Unidentified Empidonax Flycatcher | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 1    |
| Eastern Phoebe                    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Say's Phoebe                      | 4    | 13   | 8    | 6    | 23   | 18   | 24   | 10   | 24   | 113  | 192  | 155  |
| Ash-throated Flycatcher           | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 10   | 15   | 1    |
| Cassin's Kingbird                 | 0    | 1    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    |
| Western Kingbird                  | 13   | 8    | 8    | 8    | 5    | 6    | 6    | 7    | 10   | 7    | 7    | 24   |
| Eastern Kingbird                  | 10   | 13   | 13   | 8    | 7    | 6    | 15   | 17   | 26   | 30   | 51   | 28   |

| Species List                  | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Loggerhead Shrike             | 11   | 11   | 18   | 17   | 21   | 11   | 42   | 21   | 27   | 35   | 44   | 35   |
| Plumbeous Vireo               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 1    | 1    | 4    | 1    |
| Warbling Vireo                | 27   | 38   | 43   | 9    | 11   | 6    | 10   | 19   | 46   | 56   | 50   | 161  |
| Red-eyed Vireo                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 3    | 1    | 2    | 9    |
| Gray Jay                      | 7    | 4    | 5    | 0    | 0    | 0    | 0    | 4    | 2    | 9    | 1    | 8    |
| Steller's Jay                 | 0    | 0    | 0    | 0    | 3    | 0    | 0    | 0    | 0    | 0    | 2    | 4    |
| Blue Jay                      | 0    | 1    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    |
| Pinyon Jay                    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    | 5    | 22   | 6    |
| Clark's Nutcracker            | 5    | 4    | 2    | 1    | 1    | 11   | 7    | 9    | 10   | 3    | 18   | 23   |
| Black-billed Magpie           | 51   | 115  | 197  | 120  | 104  | 44   | 139  | 112  | 87   | 195  | 259  | 383  |
| American Crow                 | 11   | 5    | 11   | 5    | 1    | 2    | 6    | 26   | 17   | 10   | 4    | 19   |
| Common Raven                  | 25   | 44   | 27   | 18   | 0    | 5    | 4    | 6    | 24   | 15   | 28   | 44   |
| Unidentified Raven            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Horned Lark                   | 429  | 597  | 678  | 258  | 704  | 779  | 818  | 753  | 775  | 1101 | 1592 | 1838 |
| Purple Martin                 | 0    | 3    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Tree Swallow                  | 19   | 8    | 22   | 14   | 4    | 11   | 5    | 10   | 7    | 82   | 100  | 167  |
| Violet-green Swallow          | 0    | 0    | 0    | 6    | 8    | 5    | 3    | 5    | 7    | 41   | 61   | 50   |
| Northern Rough-winged Swallow | 4    | 6    | 12   | 3    | 9    | 6    | 10   | 5    | 16   | 28   | 30   | 71   |
| Bank Swallow                  | 5    | 0    | 45   | 5    | 1    | 0    | 3    | 5    | 5    | 6    | 9    | 60   |
| Cliff Swallow                 | 373  | 182  | 294  | 209  | 220  | 101  | 523  | 116  | 183  | 358  | 520  | 373  |
| Barn Swallow                  | 16   | 16   | 24   | 38   | 32   | 10   | 84   | 57   | 113  | 62   | 59   | 110  |
| Black-capped Chickadee        | 6    | 12   | 0    | 1    | 0    | 0    | 2    | 9    | 10   | 23   | 19   | 46   |
| Mountain Chickadee            | 9    | 17   | 19   | 0    | 1    | 1    | 2    | 0    | 2    | 1    | 2    | 21   |
| Unidentified chickadee        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Juniper Titmouse              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 6    | 0    | 0    |
| Bushtit                       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 2    | 7    |
| Red-breasted Nuthatch         | 2    | 8    | 1    | 2    | 0    | 0    | 1    | 3    | 0    | 1    | 3    | 1    |
| White-breasted Nuthatch       | 0    | 0    | 0    | 0    | 0    | 3    | 0    | 5    | 1    | 2    | 0    | 15   |
| Pygmy Nuthatch                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Brown Creeper                 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Rock Wren                     | 30   | 54   | 48   | 38   | 64   | 57   | 57   | 59   | 71   | 152  | 145  | 116  |
| Canyon Wren                   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 12   | 60   | 49   |
| Bewick's Wren                 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| House Wren                    | 9    | 12   | 3    | 9    | 7    | 5    | 13   | 11   | 13   | 34   | 26   | 51   |
| Marsh Wren                    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 6    | 10   | 11   |

| Species List                | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| American Dipper             | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    | 0    | 2    |
| Golden-crowned Kinglet      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 3    |
| Ruby-crowned Kinglet        | 7    | 7    | 10   | 1    | 0    | 0    | 0    | 1    | 5    | 5    | 23   | 62   |
| Blue-gray Gnatcatcher       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Eastern Bluebird            | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Western Bluebird            | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 0    | 0    | 0    | 0    | 0    |
| Mountain Bluebird           | 6    | 12   | 8    | 5    | 6    | 10   | 27   | 31   | 49   | 99   | 119  | 135  |
| Townsend's Solitaire        | 0    | 0    | 0    | 3    | 0    | 0    | 1    | 7    | 2    | 3    | 1    | 3    |
| Veery                       | 1    | 4    | 0    | 0    | 0    | 0    | 4    | 1    | 3    | 4    | 4    | 8    |
| Swainson's Thrush           | 18   | 9    | 16   | 0    | 1    | 1    | 0    | 5    | 6    | 2    | 3    | 10   |
| Hermit Thrush               | 0    | 4    | 0    | 0    | 0    | 0    | 1    | 0    | 2    | 3    | 0    | 34   |
| American Robin              | 94   | 222  | 173  | 111  | 69   | 33   | 146  | 210  | 273  | 311  | 305  | 647  |
| Gray Catbird                | 2    | 3    | 3    | 3    | 1    | 0    | 0    | 7    | 15   | 7    | 4    | 6    |
| Northern Mockingbird        | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 1    | 2    |
| Sage Thrasher               | 35   | 75   | 76   | 13   | 105  | 155  | 217  | 134  | 156  | 556  | 904  | 675  |
| Brown Thrasher              | 2    | 1    | 2    | 2    | 0    | 3    | 1    | 3    | 4    | 1    | 9    | 1    |
| European Starling           | 13   | 58   | 72   | 77   | 160  | 44   | 288  | 38   | 132  | 85   | 69   | 142  |
| American Pipit              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 0    | 0    |
| Sprague's Pipit             | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Cedar Waxwing               | 0    | 0    | 0    | 1    | 1    | 0    | 0    | 4    | 0    | 0    | 0    | 5    |
| Orange-crowned Warbler      | 0    | 0    | 1    | 0    | 1    | 0    | 2    | 1    | 4    | 2    | 10   | 3    |
| Virginia's Warbler          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Yellow Warbler              | 51   | 45   | 39   | 31   | 16   | 20   | 27   | 30   | 47   | 104  | 94   | 196  |
| Chestnut-sided Warbler      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Myrtle Warbler              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Audubon's Warbler           | 58   | 43   | 46   | 1    | 1    | 1    | 0    | 18   | 6    | 25   | 25   | 60   |
| Yellow-rumped Warbler       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Black-throated Gray Warbler | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Townsend's Warbler          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 4    |
| American Redstart           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 4    | 0    | 13   | 9    | 5    |
| Ovenbird                    | 1    | 1    | 0    | 1    | 1    | 0    | 1    | 16   | 19   | 12   | 14   | 17   |
| Northern Waterthrush        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| MacGillivray's Warbler      | 7    | 1    | 4    | 0    | 1    | 2    | 2    | 1    | 10   | 12   | 7    | 15   |
| Common Yellowthroat         | 7    | 4    | 5    | 2    | 1    | 4    | 13   | 14   | 9    | 17   | 9    | 11   |
| Wilson's Warbler            | 6    | 1    | 6    | 0    | 0    | 0    | 0    | 0    | 0    | 7    | 9    | 9    |

| Species List                  | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Yellow-breasted Chat          | 0    | 2    | 5    | 3    | 4    | 0    | 8    | 16   | 5    | 30   | 33   | 44   |
| Western Tanager               | 19   | 24   | 22   | 4    | 6    | 3    | 6    | 11   | 18   | 26   | 23   | 59   |
| Green-tailed Towhee           | 22   | 23   | 14   | 8    | 7    | 2    | 16   | 13   | 52   | 62   | 48   | 77   |
| Spotted Towhee                | 6    | 7    | 5    | 5    | 12   | 4    | 6    | 13   | 17   | 10   | 12   | 12   |
| Eastern Towhee                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Cassin's Sparrow              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Chipping Sparrow              | 45   | 74   | 27   | 2    | 3    | 1    | 26   | 40   | 33   | 49   | 70   | 98   |
| Clay-colored Sparrow          | 1    | 0    | 0    | 0    | 0    | 1    | 2    | 1    | 2    | 0    | 1    | 2    |
| Brewer's Sparrow              | 81   | 182  | 217  | 72   | 168  | 303  | 292  | 110  | 395  | 384  | 590  | 552  |
| Field Sparrow                 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Vesper Sparrow                | 171  | 172  | 114  | 51   | 68   | 105  | 347  | 182  | 234  | 294  | 292  | 325  |
| Lark Sparrow                  | 43   | 40   | 39   | 34   | 49   | 25   | 49   | 82   | 41   | 49   | 76   | 78   |
| Sage Sparrow                  | 3    | 22   | 32   | 1    | 54   | 25   | 62   | 12   | 142  | 410  | 599  | 403  |
| Lark Bunting                  | 1370 | 356  | 1090 | 824  | 927  | 530  | 1785 | 1371 | 722  | 464  | 690  | 1357 |
| Savannah Sparrow              | 4    | 5    | 10   | 0    | 0    | 0    | 13   | 6    | 17   | 24   | 74   | 26   |
| Grasshopper Sparrow           | 26   | 6    | 0    | 4    | 7    | 2    | 5    | 4    | 3    | 0    | 3    | 6    |
| Baird's Sparrow               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Nelson's Sharp-tailed Sparrow | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Fox Sparrow                   | 5    | 4    | 11   | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 4    |
| Song Sparrow                  | 8    | 17   | 8    | 15   | 2    | 2    | 9    | 2    | 3    | 12   | 26   | 41   |
| Lincoln's Sparrow             | 7    | 4    | 9    | 4    | 0    | 1    | 0    | 1    | 0    | 5    | 25   | 42   |
| White-crowned Sparrow         | 32   | 15   | 24   | 1    | 0    | 1    | 1    | 2    | 7    | 7    | 13   | 46   |
| Oregon Junco                  | 45   | 41   | 30   | 0    | 2    | 1    | 2    | 2    | 3    | 1    | 10   | 70   |
| Pink-sided Junco              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| White-winged Junco            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 9    | 25   | 29   | 23   | 31   |
| Gray-headed Junco             | 0    | 0    | 0    | 2    | 0    | 0    | 3    | 0    | 1    | 2    | 0    | 8    |
| Dark-eyed Junco               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| McCown's Longspur             | 3    | 13   | 6    | 6    | 6    | 5    | 6    | 5    | 6    | 9    | 4    | 5    |
| Chestnut-collared Longspur    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 0    |
| Black-headed Grosbeak         | 4    | 1    | 5    | 2    | 3    | 9    | 6    | 7    | 5    | 6    | 11   | 48   |
| Blue Grosbeak                 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Lazuli Bunting                | 8    | 9    | 9    | 6    | 9    | 3    | 3    | 7    | 3    | 7    | 4    | 6    |
| Indigo Bunting                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    |
| Dickcissel                    | 0    | 2    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Bobolink                      | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 4    | 0    | 1    | 0    | 1    |

| Species List                          | 1968        | 1969        | 1970        | 1971        | 1972        | 1973        | 1974        | 1975        | 1976        | 1977        | 1978         | 1979         |
|---------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|
| Red-winged Blackbird                  | 220         | 265         | 465         | 450         | 346         | 103         | 395         | 449         | 268         | 360         | 215          | 290          |
| Western Meadowlark                    | 1057        | 928         | 1031        | 702         | 852         | 625         | 2039        | 2791        | 1678        | 1018        | 1387         | 1657         |
| Yellow-headed Blackbird               | 6           | 7           | 23          | 16          | 18          | 19          | 24          | 16          | 23          | 69          | 52           | 29           |
| Brewer's Blackbird                    | 180         | 379         | 241         | 125         | 147         | 152         | 251         | 285         | 159         | 293         | 395          | 671          |
| Great-tailed Grackle                  | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0            | 0            |
| Common Grackle                        | 57          | 39          | 184         | 103         | 87          | 19          | 56          | 29          | 77          | 69          | 17           | 37           |
| Brown-headed Cowbird                  | 16          | 6           | 0           | 4           | 12          | 9           | 9           | 19          | 26          | 25          | 41           | 61           |
| Orchard Oriole                        | 0           | 2           | 0           | 0           | 0           | 1           | 0           | 1           | 1           | 1           | 1            | 1            |
| Bullock's Oriole                      | 7           | 14          | 16          | 12          | 5           | 4           | 13          | 18          | 21          | 19          | 15           | 15           |
| Baltimore Oriole                      | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0            | 0            |
| Unidentif. Baltimore/Bullock's Oriole | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0            | 0            |
| Gray-crowned Rosy-Finch               | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0            | 0            |
| Black Rosy-Finch                      | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0            | 0            |
| Pine Grosbeak                         | 3           | 0           | 0           | 0           | 0           | 0           | 1           | 0           | 0           | 0           | 0            | 2            |
| Cassin's Finch                        | 3           | 0           | 0           | 0           | 0           | 1           | 4           | 0           | 7           | 0           | 3            | 15           |
| House Finch                           | 0           | 0           | 3           | 1           | 0           | 1           | 2           | 0           | 209         | 97          | 47           | 29           |
| Red Crossbill                         | 4           | 9           | 27          | 0           | 8           | 0           | 4           | 78          | 2           | 5           | 6            | 93           |
| White-winged Crossbill                | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0            | 0            |
| Pine Siskin                           | 21          | 49          | 20          | 14          | 10          | 2           | 0           | 0           | 28          | 11          | 7            | 97           |
| Lesser Goldfinch                      | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0            | 0            |
| American Goldfinch                    | 6           | 11          | 16          | 6           | 16          | 6           | 3           | 8           | 13          | 15          | 17           | 11           |
| Evening Grosbeak                      | 0           | 0           | 1           | 0           | 1           | 0           | 0           | 0           | 0           | 0           | 0            | 0            |
| House Sparrow                         | 30          | 25          | 70          | 99          | 55          | 19          | 131         | 115         | 133         | 22          | 85           | 387          |
| <i>Total Number of Species</i>        | <i>108</i>  | <i>108</i>  | <i>102</i>  | <i>95</i>   | <i>97</i>   | <i>80</i>   | <i>111</i>  | <i>122</i>  | <i>128</i>  | <i>150</i>  | <i>146</i>   | <i>164</i>   |
| <i>Total Number of Individuals</i>    | <i>5276</i> | <i>4867</i> | <i>6502</i> | <i>4112</i> | <i>4998</i> | <i>3618</i> | <i>8850</i> | <i>8280</i> | <i>7462</i> | <i>8788</i> | <i>11273</i> | <i>14476</i> |
| <i>Number of Routes Conducted</i>     | <i>10</i>   | <i>10</i>   | <i>12</i>   | <i>9</i>    | <i>10</i>   | <i>9</i>    | <i>16</i>   | <i>12</i>   | <i>16</i>   | <i>19</i>   | <i>18</i>    | <i>27</i>    |

**Table 5. Wyoming Breeding Bird Survey data, 1980-1991.**

| Species List         | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|----------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Canada Goose         | 13   | 27   | 31   | 90   | 9    | 360  | 345  | 385  | 735  | 505  | 534  | 1020 |
| Trumpeter Swan       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    | 2    | 0    |
| Wood Duck            | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    | 0    | 1    | 1    | 0    |
| Gadwall              | 15   | 37   | 13   | 26   | 14   | 16   | 12   | 132  | 53   | 57   | 27   | 40   |
| American Wigeon      | 15   | 27   | 33   | 44   | 28   | 23   | 27   | 75   | 113  | 108  | 37   | 70   |
| Mallard              | 208  | 144  | 166  | 112  | 131  | 100  | 74   | 199  | 240  | 235  | 237  | 231  |
| Blue-winged Teal     | 17   | 16   | 6    | 10   | 4    | 0    | 14   | 59   | 63   | 17   | 23   | 27   |
| Cinnamon Teal        | 8    | 8    | 9    | 19   | 8    | 8    | 11   | 32   | 41   | 27   | 18   | 25   |
| Northern Shoveler    | 5    | 2    | 7    | 2    | 2    | 0    | 20   | 27   | 42   | 0    | 7    | 27   |
| Northern Pintail     | 26   | 12   | 21   | 22   | 2    | 2    | 13   | 22   | 51   | 53   | 69   | 18   |
| Green-winged Teal    | 34   | 14   | 19   | 14   | 8    | 25   | 9    | 20   | 43   | 35   | 33   | 23   |
| Canvasback           | 0    | 0    | 0    | 5    | 0    | 0    | 0    | 2    | 0    | 4    | 2    | 0    |
| Redhead              | 6    | 8    | 10   | 10   | 1    | 4    | 0    | 24   | 30   | 7    | 16   | 7    |
| Ring-necked Duck     | 0    | 0    | 2    | 0    | 0    | 4    | 0    | 5    | 2    | 4    | 1    | 6    |
| Lesser Scaup         | 2    | 9    | 25   | 4    | 0    | 32   | 34   | 106  | 75   | 65   | 107  | 109  |
| Harlequin Duck       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    |
| Bufflehead           | 0    | 0    | 0    | 0    | 0    | 7    | 0    | 0    | 14   | 13   | 10   | 30   |
| Common Goldeneye     | 9    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    | 0    |
| Barrow's Goldeneye   | 0    | 7    | 18   | 2    | 1    | 24   | 23   | 37   | 56   | 51   | 64   | 125  |
| Hooded Merganser     | 0    | 0    | 2    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    |
| Common Merganser     | 14   | 15   | 56   | 13   | 14   | 25   | 33   | 29   | 48   | 31   | 38   | 31   |
| Ruddy Duck           | 0    | 5    | 4    | 8    | 0    | 2    | 4    | 8    | 13   | 7    | 2    | 17   |
| Chukar               | 1    | 3    | 1    | 4    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    |
| Gray Partridge       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 1    | 0    | 2    |
| Ring-necked Pheasant | 273  | 158  | 181  | 195  | 136  | 111  | 62   | 179  | 206  | 408  | 240  | 316  |
| Ruffed Grouse        | 4    | 0    | 3    | 0    | 1    | 0    | 0    | 0    | 2    | 4    | 0    | 3    |
| Greater Sage-Grouse  | 85   | 125  | 65   | 77   | 54   | 18   | 21   | 76   | 173  | 121  | 54   | 54   |
| Blue Grouse          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 7    | 0    | 1    |
| Sharp-tailed Grouse  | 0    | 0    | 1    | 0    | 2    | 0    | 0    | 0    | 0    | 1    | 1    | 0    |
| Wild Turkey          | 2    | 0    | 0    | 2    | 7    | 7    | 7    | 7    | 5    | 14   | 15   | 13   |
| Northern Bobwhite    | 0    | 1    | 0    | 0    | 0    | 2    | 0    | 5    | 0    | 0    | 1    | 1    |

| Species List                | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Common Loon                 | 0    | 0    | 3    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    |
| Pied-billed Grebe           | 5    | 7    | 5    | 3    | 4    | 1    | 1    | 15   | 3    | 8    | 3    | 7    |
| Horned Grebe                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    |
| Red-necked Grebe            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Eared Grebe                 | 16   | 4    | 20   | 7    | 0    | 0    | 0    | 1    | 2    | 13   | 2    | 18   |
| Western Grebe               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 2    | 45   | 8    | 17   |
| Clark's Grebe               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    |
| Aechmophorus species        | 0    | 2    | 25   | 6    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| American White Pelican      | 0    | 0    | 2    | 15   | 0    | 9    | 13   | 23   | 16   | 51   | 77   | 81   |
| Double-crested Cormorant    | 1    | 24   | 35   | 2    | 2    | 10   | 5    | 11   | 14   | 14   | 11   | 46   |
| American Bittern            | 5    | 3    | 6    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    |
| Great Blue Heron            | 52   | 60   | 123  | 47   | 49   | 15   | 14   | 64   | 38   | 50   | 46   | 56   |
| Snowy Egret                 | 0    | 2    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Black-crowned Night-Heron   | 1    | 2    | 1    | 0    | 0    | 0    | 0    | 0    | 6    | 3    | 0    | 0    |
| White-faced Ibis            | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    |
| Turkey Vulture              | 3    | 1    | 21   | 6    | 6    | 12   | 7    | 15   | 7    | 16   | 30   | 29   |
| Osprey                      | 3    | 5    | 5    | 2    | 2    | 0    | 1    | 1    | 3    | 1    | 3    | 2    |
| Bald Eagle                  | 0    | 0    | 0    | 1    | 3    | 0    | 0    | 1    | 2    | 1    | 0    | 1    |
| Northern Harrier            | 26   | 27   | 26   | 24   | 19   | 1    | 10   | 27   | 43   | 18   | 26   | 30   |
| Sharp-shinned Hawk          | 0    | 2    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 1    | 5    |
| Cooper's Hawk               | 2    | 0    | 1    | 1    | 0    | 1    | 0    | 0    | 0    | 0    | 1    | 0    |
| Northern Goshawk            | 4    | 3    | 4    | 0    | 2    | 2    | 0    | 0    | 1    | 1    | 1    | 0    |
| Unidentified Accipiter Hawk | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Broad-winged Hawk           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Swainson's Hawk             | 22   | 12   | 15   | 15   | 15   | 9    | 16   | 21   | 25   | 30   | 34   | 26   |
| Red-tailed Hawk             | 37   | 25   | 73   | 56   | 50   | 36   | 22   | 47   | 53   | 56   | 69   | 91   |
| Ferruginous Hawk            | 13   | 15   | 10   | 17   | 18   | 6    | 8    | 13   | 26   | 30   | 29   | 27   |
| Unidentified Buteo          | 2    | 3    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 2    | 0    |
| Golden Eagle                | 20   | 20   | 21   | 32   | 13   | 6    | 14   | 18   | 26   | 25   | 37   | 47   |
| American Kestrel            | 66   | 104  | 126  | 55   | 55   | 54   | 64   | 82   | 101  | 134  | 121  | 153  |
| Merlin                      | 1    | 1    | 2    | 2    | 0    | 0    | 0    | 0    | 0    | 1    | 1    | 0    |
| Peregrine Falcon            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Prairie Falcon              | 11   | 11   | 9    | 7    | 5    | 1    | 4    | 6    | 5    | 7    | 11   | 12   |
| Virginia Rail               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 1    | 0    |

| Species List           | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Sora                   | 3    | 1    | 8    | 8    | 1    | 16   | 13   | 15   | 16   | 7    | 12   | 6    |
| American Coot          | 13   | 20   | 24   | 41   | 21   | 25   | 24   | 136  | 87   | 65   | 34   | 33   |
| Sandhill Crane         | 17   | 15   | 54   | 38   | 50   | 50   | 8    | 28   | 40   | 48   | 75   | 36   |
| Killdeer               | 362  | 432  | 469  | 352  | 220  | 167  | 197  | 419  | 440  | 492  | 476  | 428  |
| Mountain Plover        | 15   | 3    | 2    | 1    | 5    | 0    | 1    | 4    | 20   | 6    | 17   | 5    |
| Black-necked Stilt     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| American Avocet        | 14   | 5    | 15   | 3    | 0    | 0    | 14   | 84   | 23   | 10   | 32   | 16   |
| Willet                 | 18   | 25   | 47   | 41   | 47   | 22   | 0    | 9    | 22   | 1    | 5    | 7    |
| Spotted Sandpiper      | 32   | 88   | 54   | 22   | 29   | 37   | 14   | 36   | 45   | 64   | 60   | 46   |
| Upland Sandpiper       | 7    | 15   | 6    | 8    | 34   | 0    | 8    | 15   | 22   | 17   | 33   | 25   |
| Long-billed Curlew     | 12   | 12   | 17   | 16   | 17   | 0    | 2    | 1    | 7    | 14   | 15   | 6    |
| Wilson's Snipe         | 80   | 83   | 208  | 131  | 141  | 111  | 59   | 147  | 213  | 217  | 228  | 196  |
| Wilson's Phalarope     | 34   | 26   | 61   | 59   | 25   | 7    | 17   | 51   | 98   | 76   | 50   | 51   |
| Franklin's Gull        | 41   | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 0    | 0    | 10   | 0    |
| Ring-billed Gull       | 13   | 16   | 19   | 10   | 5    | 0    | 0    | 1    | 0    | 4    | 1    | 10   |
| California Gull        | 22   | 15   | 103  | 22   | 25   | 40   | 42   | 327  | 194  | 304  | 204  | 164  |
| Unidentified Gull      | 0    | 0    | 0    | 4    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    |
| Caspian Tern           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 3    | 1    | 6    |
| Common Tern            | 5    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Forster's Tern         | 0    | 0    | 0    | 4    | 0    | 0    | 0    | 3    | 4    | 3    | 0    | 2    |
| Black Tern             | 1    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Rock Pigeon            | 65   | 59   | 19   | 26   | 40   | 34   | 21   | 34   | 150  | 138  | 220  | 430  |
| Eurasian Collared-Dove | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Mourning Dove          | 929  | 1199 | 1217 | 975  | 962  | 499  | 749  | 756  | 1016 | 1461 | 1157 | 1446 |
| Black-billed Cuckoo    | 30   | 12   | 7    | 2    | 2    | 4    | 8    | 7    | 6    | 5    | 3    | 3    |
| Yellow-billed Cuckoo   | 2    | 2    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Western Screech-Owl    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Eastern Screech-Owl    | 0    | 0    | 2    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Great Horned Owl       | 11   | 3    | 7    | 8    | 6    | 3    | 1    | 8    | 4    | 7    | 4    | 9    |
| Northern Pygmy-Owl     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 1    | 0    |
| Burrowing Owl          | 5    | 14   | 16   | 5    | 3    | 2    | 2    | 6    | 2    | 7    | 3    | 3    |
| Long-eared Owl         | 0    | 0    | 1    | 1    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    |
| Short-eared Owl        | 0    | 2    | 1    | 34   | 0    | 0    | 0    | 2    | 13   | 0    | 3    | 18   |
| Northern Saw-whet Owl  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    |

| Species List                      | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Common Nighthawk                  | 144  | 144  | 179  | 199  | 127  | 52   | 94   | 101  | 198  | 147  | 133  | 140  |
| Common Poorwill                   | 0    | 3    | 11   | 10   | 3    | 0    | 1    | 1    | 1    | 0    | 2    | 2    |
| Chimney Swift                     | 0    | 0    | 4    | 0    | 0    | 4    | 3    | 0    | 0    | 0    | 1    | 0    |
| White-throated Swift              | 4    | 3    | 14   | 5    | 0    | 35   | 27   | 60   | 67   | 56   | 93   | 72   |
| Black-chinned Hummingbird         | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    |
| Calliope Hummingbird              | 5    | 3    | 6    | 2    | 7    | 2    | 5    | 9    | 5    | 1    | 7    | 3    |
| Broad-tailed Hummingbird          | 3    | 9    | 8    | 6    | 7    | 9    | 11   | 7    | 3    | 28   | 23   | 17   |
| Rufous Hummingbird                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 1    | 1    | 2    | 0    |
| Unidentified Hummingbird          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 1    |
| Belted Kingfisher                 | 5    | 11   | 5    | 2    | 1    | 5    | 1    | 4    | 1    | 5    | 3    | 4    |
| Lewis's Woodpecker                | 0    | 0    | 0    | 0    | 0    | 2    | 2    | 0    | 0    | 2    | 1    | 0    |
| Red-headed Woodpecker             | 2    | 6    | 6    | 9    | 4    | 4    | 4    | 8    | 8    | 6    | 7    | 12   |
| Red-naped Sapsucker               | 37   | 53   | 27   | 15   | 10   | 14   | 9    | 6    | 10   | 18   | 12   | 10   |
| Unidentified Sapsucker            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Williamson's Sapsucker            | 0    | 0    | 0    | 0    | 1    | 0    | 2    | 5    | 2    | 1    | 1    | 2    |
| Downy Woodpecker                  | 15   | 20   | 4    | 8    | 2    | 5    | 4    | 7    | 8    | 4    | 10   | 7    |
| Hairy Woodpecker                  | 6    | 1    | 21   | 8    | 8    | 12   | 8    | 9    | 10   | 11   | 10   | 6    |
| Unidentified Woodpecker           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| American Three-toed Woodpecker    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 3    |
| Black-backed Woodpecker           | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Red-shafted Flicker               | 135  | 190  | 211  | 228  | 105  | 85   | 74   | 155  | 149  | 165  | 164  | 138  |
| Yellow-shafted Flicker            | 4    | 2    | 2    | 0    | 0    | 0    | 10   | 0    | 3    | 7    | 2    | 0    |
| Northern Flicker                  | 0    | 3    | 0    | 0    | 0    | 21   | 0    | 0    | 0    | 0    | 0    | 0    |
| Olive-sided Flycatcher            | 5    | 2    | 11   | 10   | 2    | 6    | 6    | 7    | 9    | 13   | 21   | 20   |
| Western Wood-Pewee                | 76   | 42   | 70   | 51   | 48   | 66   | 36   | 73   | 85   | 90   | 88   | 115  |
| Willow Flycatcher                 | 67   | 34   | 29   | 19   | 25   | 14   | 12   | 25   | 14   | 26   | 25   | 30   |
| Least Flycatcher                  | 1    | 9    | 1    | 5    | 3    | 1    | 9    | 10   | 6    | 7    | 17   | 8    |
| Hammond's Flycatcher              | 0    | 2    | 0    | 3    | 1    | 3    | 2    | 2    | 1    | 1    | 10   | 5    |
| Gray Flycatcher                   | 0    | 19   | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 1    | 7    |
| Dusky Flycatcher                  | 21   | 14   | 24   | 41   | 17   | 8    | 27   | 45   | 46   | 81   | 50   | 49   |
| Cordilleran Flycatcher            | 36   | 8    | 23   | 16   | 13   | 21   | 6    | 6    | 10   | 8    | 3    | 7    |
| Unidentified Empidonax Flycatcher | 1    | 1    | 58   | 4    | 5    | 4    | 8    | 2    | 0    | 4    | 1    | 2    |
| Eastern Phoebe                    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Say's Phoebe                      | 219  | 222  | 175  | 101  | 30   | 35   | 28   | 25   | 46   | 100  | 56   | 65   |

| Species List                  | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Ash-throated Flycatcher       | 35   | 0    | 0    | 2    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 1    |
| Cassin's Kingbird             | 1    | 0    | 1    | 4    | 1    | 0    | 1    | 0    | 3    | 1    | 0    | 0    |
| Western Kingbird              | 54   | 97   | 102  | 130  | 70   | 59   | 61   | 82   | 131  | 127  | 164  | 144  |
| Eastern Kingbird              | 81   | 48   | 91   | 77   | 45   | 34   | 62   | 93   | 138  | 164  | 114  | 160  |
| Loggerhead Shrike             | 25   | 50   | 48   | 53   | 31   | 23   | 33   | 46   | 69   | 68   | 42   | 69   |
| Plumbeous Vireo               | 14   | 0    | 6    | 0    | 1    | 5    | 4    | 10   | 2    | 13   | 13   | 12   |
| Warbling Vireo                | 234  | 116  | 263  | 165  | 97   | 186  | 177  | 194  | 216  | 230  | 211  | 153  |
| Red-eyed Vireo                | 6    | 0    | 25   | 18   | 10   | 11   | 39   | 20   | 17   | 13   | 21   | 3    |
| Gray Jay                      | 17   | 5    | 21   | 8    | 2    | 8    | 5    | 9    | 6    | 29   | 37   | 10   |
| Steller's Jay                 | 4    | 4    | 9    | 7    | 3    | 0    | 3    | 2    | 1    | 6    | 0    | 9    |
| Blue Jay                      | 10   | 1    | 2    | 1    | 1    | 1    | 3    | 6    | 2    | 7    | 9    | 14   |
| Pinyon Jay                    | 32   | 29   | 30   | 53   | 3    | 0    | 0    | 0    | 0    | 24   | 8    | 44   |
| Clark's Nutcracker            | 32   | 48   | 109  | 74   | 42   | 106  | 33   | 81   | 97   | 91   | 75   | 73   |
| Black-billed Magpie           | 371  | 509  | 362  | 305  | 149  | 97   | 77   | 184  | 192  | 328  | 316  | 308  |
| American Crow                 | 22   | 12   | 134  | 78   | 69   | 26   | 20   | 33   | 52   | 111  | 80   | 79   |
| Common Raven                  | 68   | 61   | 73   | 111  | 64   | 76   | 60   | 87   | 86   | 95   | 200  | 139  |
| Unidentified Raven            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    |
| Horned Lark                   | 3544 | 3065 | 2353 | 1979 | 1343 | 1118 | 1252 | 1763 | 2576 | 2650 | 3135 | 2912 |
| Purple Martin                 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Tree Swallow                  | 267  | 206  | 212  | 204  | 173  | 143  | 129  | 155  | 303  | 179  | 168  | 195  |
| Violet-green Swallow          | 149  | 102  | 262  | 197  | 74   | 118  | 44   | 166  | 145  | 193  | 176  | 165  |
| Northern Rough-winged Swallow | 83   | 68   | 139  | 114  | 17   | 12   | 24   | 66   | 96   | 78   | 116  | 114  |
| Bank Swallow                  | 29   | 4    | 52   | 16   | 19   | 43   | 70   | 93   | 91   | 112  | 99   | 368  |
| Cliff Swallow                 | 691  | 683  | 978  | 1099 | 1276 | 1032 | 754  | 1376 | 1239 | 2262 | 1823 | 2436 |
| Barn Swallow                  | 190  | 218  | 230  | 191  | 221  | 153  | 172  | 251  | 304  | 418  | 380  | 393  |
| Black-capped Chickadee        | 95   | 37   | 64   | 27   | 41   | 40   | 30   | 55   | 39   | 32   | 65   | 27   |
| Mountain Chickadee            | 22   | 39   | 102  | 62   | 26   | 75   | 61   | 51   | 52   | 107  | 118  | 111  |
| Unidentified chickadee        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Juniper Titmouse              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 1    | 0    | 0    | 0    |
| Bushtit                       | 13   | 6    | 6    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    |
| Red-breasted Nuthatch         | 53   | 2    | 59   | 20   | 13   | 24   | 20   | 21   | 19   | 33   | 68   | 38   |
| White-breasted Nuthatch       | 5    | 4    | 8    | 8    | 10   | 21   | 4    | 8    | 5    | 2    | 7    | 1    |
| Pygmy Nuthatch                | 5    | 2    | 1    | 0    | 5    | 5    | 0    | 0    | 0    | 0    | 0    | 0    |
| Brown Creeper                 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 1    | 2    |

| Species List                | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Rock Wren                   | 176  | 162  | 223  | 157  | 138  | 87   | 113  | 155  | 185  | 197  | 154  | 268  |
| Canyon Wren                 | 34   | 37   | 19   | 17   | 0    | 0    | 0    | 1    | 0    | 2    | 1    | 0    |
| Bewick's Wren               | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 9    | 15   |
| House Wren                  | 91   | 64   | 102  | 120  | 98   | 68   | 54   | 52   | 78   | 136  | 112  | 109  |
| Marsh Wren                  | 12   | 8    | 8    | 8    | 2    | 0    | 0    | 0    | 2    | 0    | 3    | 0    |
| American Dipper             | 3    | 2    | 2    | 4    | 0    | 1    | 0    | 1    | 3    | 2    | 1    | 0    |
| Golden-crowned Kinglet      | 1    | 1    | 16   | 5    | 0    | 0    | 1    | 1    | 9    | 2    | 12   | 1    |
| Ruby-crowned Kinglet        | 149  | 97   | 206  | 78   | 68   | 94   | 114  | 145  | 158  | 253  | 298  | 282  |
| Blue-gray Gnatcatcher       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 0    | 2    | 4    | 2    |
| Eastern Bluebird            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    |
| Western Bluebird            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Mountain Bluebird           | 251  | 195  | 134  | 145  | 100  | 92   | 126  | 145  | 176  | 192  | 208  | 250  |
| Townsend's Solitaire        | 24   | 2    | 14   | 12   | 7    | 38   | 13   | 16   | 19   | 27   | 13   | 40   |
| Veery                       | 9    | 5    | 10   | 7    | 6    | 8    | 16   | 10   | 18   | 3    | 23   | 8    |
| Swainson's Thrush           | 24   | 7    | 29   | 17   | 14   | 13   | 24   | 10   | 15   | 33   | 34   | 26   |
| Hermit Thrush               | 47   | 35   | 107  | 54   | 26   | 67   | 9    | 36   | 41   | 35   | 69   | 66   |
| American Robin              | 904  | 747  | 1217 | 1062 | 587  | 727  | 655  | 828  | 1060 | 1239 | 1307 | 1200 |
| Gray Catbird                | 13   | 11   | 12   | 8    | 11   | 8    | 9    | 13   | 15   | 24   | 20   | 17   |
| Northern Mockingbird        | 2    | 0    | 2    | 3    | 1    | 0    | 1    | 0    | 0    | 0    | 0    | 0    |
| Sage Thrasher               | 995  | 1015 | 783  | 751  | 418  | 225  | 219  | 339  | 694  | 597  | 625  | 444  |
| Brown Thrasher              | 5    | 1    | 4    | 1    | 3    | 4    | 9    | 2    | 7    | 11   | 4    | 3    |
| European Starling           | 430  | 632  | 643  | 490  | 344  | 573  | 605  | 575  | 486  | 330  | 631  | 615  |
| American Pipit              | 0    | 2    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    |
| Sprague's Pipit             | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Cedar Waxwing               | 5    | 5    | 1    | 2    | 17   | 2    | 11   | 11   | 4    | 8    | 0    | 5    |
| Orange-crowned Warbler      | 5    | 14   | 16   | 9    | 6    | 3    | 3    | 1    | 1    | 18   | 10   | 3    |
| Virginia's Warbler          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Yellow Warbler              | 301  | 318  | 370  | 324  | 262  | 187  | 141  | 282  | 323  | 375  | 362  | 290  |
| Chestnut-sided Warbler      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Myrtle Warbler              | 0    | 0    | 0    | 0    | 0    | 3    | 0    | 0    | 0    | 4    | 1    | 0    |
| Audubon's Warbler           | 93   | 17   | 256  | 146  | 60   | 184  | 201  | 220  | 177  | 224  | 258  | 256  |
| Yellow-rumped Warbler       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Black-throated Gray Warbler | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 3    |
| Townsend's Warbler          | 1    | 0    | 0    | 3    | 5    | 5    | 0    | 0    | 0    | 0    | 0    | 0    |

| Species List                  | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| American Redstart             | 21   | 9    | 26   | 16   | 16   | 24   | 28   | 15   | 26   | 17   | 25   | 5    |
| Ovenbird                      | 60   | 1    | 68   | 7    | 16   | 50   | 55   | 52   | 38   | 28   | 66   | 24   |
| Northern Waterthrush          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    |
| MacGillivray's Warbler        | 31   | 39   | 60   | 35   | 26   | 15   | 7    | 13   | 28   | 61   | 55   | 17   |
| Common Yellowthroat           | 58   | 83   | 103  | 61   | 43   | 36   | 37   | 68   | 59   | 42   | 83   | 76   |
| Wilson's Warbler              | 29   | 12   | 31   | 18   | 0    | 13   | 8    | 6    | 12   | 18   | 13   | 9    |
| Yellow-breasted Chat          | 48   | 74   | 38   | 20   | 7    | 2    | 1    | 3    | 5    | 5    | 16   | 14   |
| Western Tanager               | 120  | 85   | 166  | 153  | 84   | 85   | 108  | 66   | 53   | 115  | 57   | 52   |
| Green-tailed Towhee           | 78   | 93   | 117  | 143  | 122  | 98   | 69   | 166  | 183  | 301  | 261  | 222  |
| Spotted Towhee                | 25   | 13   | 46   | 37   | 30   | 39   | 48   | 57   | 49   | 41   | 87   | 82   |
| Eastern Towhee                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Cassin's Sparrow              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 1    | 0    |
| Chipping Sparrow              | 170  | 49   | 242  | 183  | 87   | 161  | 206  | 224  | 222  | 263  | 325  | 292  |
| Clay-colored Sparrow          | 0    | 19   | 1    | 3    | 0    | 3    | 4    | 11   | 7    | 2    | 17   | 19   |
| Brewer's Sparrow              | 894  | 1031 | 1084 | 581  | 435  | 327  | 298  | 538  | 768  | 666  | 566  | 698  |
| Field Sparrow                 | 5    | 0    | 0    | 0    | 1    | 0    | 3    | 11   | 1    | 2    | 18   | 16   |
| Vesper Sparrow                | 507  | 483  | 623  | 527  | 362  | 318  | 355  | 765  | 949  | 1054 | 871  | 976  |
| Lark Sparrow                  | 117  | 151  | 182  | 128  | 124  | 123  | 65   | 106  | 164  | 179  | 235  | 263  |
| Sage Sparrow                  | 664  | 468  | 450  | 336  | 159  | 10   | 175  | 76   | 66   | 87   | 68   | 66   |
| Lark Bunting                  | 2484 | 2503 | 1380 | 2546 | 1432 | 1596 | 1251 | 3288 | 3371 | 2393 | 3079 | 3494 |
| Savannah Sparrow              | 97   | 20   | 132  | 90   | 198  | 84   | 74   | 164  | 214  | 145  | 130  | 147  |
| Grasshopper Sparrow           | 23   | 26   | 16   | 29   | 30   | 12   | 8    | 71   | 38   | 90   | 118  | 176  |
| Baird's Sparrow               | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Nelson's Sharp-tailed Sparrow | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Fox Sparrow                   | 2    | 1    | 1    | 2    | 0    | 3    | 0    | 7    | 4    | 14   | 6    | 7    |
| Song Sparrow                  | 43   | 64   | 57   | 73   | 38   | 35   | 26   | 138  | 136  | 115  | 186  | 70   |
| Lincoln's Sparrow             | 43   | 12   | 78   | 32   | 23   | 11   | 26   | 11   | 21   | 51   | 33   | 52   |
| White-crowned Sparrow         | 94   | 100  | 128  | 72   | 63   | 100  | 45   | 127  | 97   | 89   | 92   | 75   |
| Oregon Junco                  | 104  | 80   | 182  | 152  | 23   | 89   | 95   | 131  | 139  | 58   | 143  | 152  |
| Pink-sided Junco              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| White-winged Junco            | 54   | 0    | 32   | 22   | 27   | 51   | 21   | 49   | 36   | 14   | 29   | 4    |
| Gray-headed Junco             | 0    | 20   | 37   | 19   | 32   | 36   | 21   | 0    | 1    | 13   | 3    | 9    |
| Dark-eyed Junco               | 0    | 0    | 0    | 0    | 0    | 11   | 16   | 0    | 0    | 55   | 0    | 63   |
| McCown's Longspur             | 31   | 122  | 41   | 24   | 28   | 26   | 16   | 11   | 140  | 72   | 230  | 70   |

| Species List                          | 1980         | 1981         | 1982         | 1983         | 1984         | 1985         | 1986         | 1987         | 1988         | 1989         | 1990         | 1991         |
|---------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Chestnut-collared Longspur            | 58           | 91           | 5            | 8            | 18           | 39           | 45           | 38           | 70           | 54           | 80           | 38           |
| Black-headed Grosbeak                 | 55           | 18           | 24           | 16           | 24           | 23           | 27           | 22           | 33           | 46           | 71           | 42           |
| Blue Grosbeak                         | 0            | 0            | 0            | 2            | 0            | 0            | 2            | 4            | 1            | 5            | 15           | 8            |
| Lazuli Bunting                        | 24           | 17           | 30           | 17           | 17           | 10           | 9            | 37           | 17           | 34           | 27           | 18           |
| Indigo Bunting                        | 0            | 0            | 0            | 0            | 0            | 0            | 3            | 0            | 0            | 0            | 0            | 0            |
| Dickcissel                            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 4            | 0            | 2            | 0            |
| Bobolink                              | 6            | 20           | 12           | 91           | 33           | 13           | 16           | 17           | 13           | 29           | 7            | 13           |
| Red-winged Blackbird                  | 1036         | 949          | 1287         | 1090         | 721          | 613          | 780          | 1318         | 1255         | 1739         | 1877         | 1726         |
| Western Meadowlark                    | 2682         | 3366         | 4226         | 3807         | 2448         | 2232         | 2444         | 4601         | 5734         | 6470         | 5658         | 6875         |
| Yellow-headed Blackbird               | 84           | 139          | 118          | 107          | 61           | 33           | 107          | 163          | 188          | 118          | 188          | 189          |
| Brewer's Blackbird                    | 1369         | 1298         | 1128         | 1197         | 1123         | 905          | 501          | 1512         | 1645         | 1699         | 1346         | 1518         |
| Great-tailed Grackle                  | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            |
| Common Grackle                        | 134          | 86           | 272          | 170          | 154          | 133          | 344          | 346          | 255          | 570          | 414          | 477          |
| Brown-headed Cowbird                  | 318          | 76           | 138          | 111          | 162          | 214          | 153          | 275          | 303          | 379          | 309          | 243          |
| Orchard Oriole                        | 7            | 4            | 2            | 0            | 3            | 0            | 0            | 3            | 4            | 2            | 17           | 2            |
| Bullock's Oriole                      | 27           | 48           | 31           | 65           | 32           | 30           | 37           | 38           | 43           | 68           | 74           | 86           |
| Baltimore Oriole                      | 0            | 0            | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            |
| Unidentif. Baltimore/Bullock's Oriole | 0            | 0            | 0            | 0            | 3            | 8            | 0            | 0            | 0            | 0            | 0            | 1            |
| Gray-crowned Rosy-Finch               | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            |
| Black Rosy-Finch                      | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            |
| Pine Grosbeak                         | 1            | 2            | 1            | 1            | 1            | 2            | 0            | 2            | 0            | 1            | 4            | 5            |
| Cassin's Finch                        | 46           | 77           | 56           | 22           | 32           | 30           | 28           | 25           | 59           | 98           | 42           | 117          |
| House Finch                           | 35           | 70           | 26           | 3            | 3            | 2            | 4            | 18           | 3            | 19           | 17           | 7            |
| Red Crossbill                         | 134          | 86           | 119          | 96           | 512          | 275          | 149          | 63           | 64           | 109          | 137          | 82           |
| White-winged Crossbill                | 0            | 0            | 9            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            |
| Pine Siskin                           | 116          | 241          | 338          | 310          | 235          | 199          | 262          | 280          | 180          | 179          | 316          | 187          |
| Lesser Goldfinch                      | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            |
| American Goldfinch                    | 19           | 57           | 33           | 49           | 68           | 49           | 32           | 39           | 58           | 44           | 82           | 66           |
| Evening Grosbeak                      | 10           | 4            | 27           | 12           | 0            | 0            | 0            | 3            | 10           | 2            | 0            | 0            |
| House Sparrow                         | 373          | 789          | 474          | 392          | 203          | 260          | 137          | 419          | 468          | 464          | 354          | 388          |
| <i>Total Number of Species</i>        | <i>179</i>   | <i>175</i>   | <i>184</i>   | <i>179</i>   | <i>162</i>   | <i>158</i>   | <i>162</i>   | <i>180</i>   | <i>183</i>   | <i>191</i>   | <i>198</i>   | <i>191</i>   |
| <i>Total Number of Individuals</i>    | <i>25610</i> | <i>25588</i> | <i>28047</i> | <i>24815</i> | <i>17957</i> | <i>16591</i> | <i>16068</i> | <i>27539</i> | <i>32080</i> | <i>35227</i> | <i>34906</i> | <i>37646</i> |
| <i>Number of Routes Conducted</i>     | <i>44</i>    | <i>39</i>    | <i>53</i>    | <i>47</i>    | <i>33</i>    | <i>29</i>    | <i>28</i>    | <i>44</i>    | <i>55</i>    | <i>61</i>    | <i>68</i>    | <i>63</i>    |

**Table 6. Wyoming Breeding Bird Survey data, 1992-2003.**

| Species List         | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|----------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Canada Goose         | 1020 | 540  | 971  | 818  | 729  | 623  | 496  | 1093 | 984  | 933  | 880  | 799  |
| Trumpeter Swan       | 3    | 1    | 1    | 1    | 2    | 2    | 8    | 0    | 3    | 2    | 4    | 0    |
| Wood Duck            | 3    | 0    | 0    | 2    | 1    | 2    | 0    | 0    | 3    | 1    | 0    | 0    |
| Gadwall              | 20   | 71   | 52   | 52   | 100  | 36   | 58   | 70   | 49   | 81   | 26   | 42   |
| American Wigeon      | 48   | 118  | 60   | 51   | 77   | 85   | 78   | 73   | 47   | 52   | 22   | 53   |
| Mallard              | 250  | 323  | 249  | 273  | 257  | 204  | 406  | 293  | 332  | 229  | 188  | 237  |
| Blue-winged Teal     | 21   | 47   | 26   | 11   | 20   | 11   | 37   | 15   | 39   | 3    | 11   | 6    |
| Cinnamon Teal        | 6    | 27   | 10   | 10   | 12   | 25   | 18   | 34   | 14   | 9    | 10   | 13   |
| Northern Shoveler    | 11   | 53   | 11   | 32   | 55   | 5    | 18   | 24   | 11   | 7    | 1    | 7    |
| Northern Pintail     | 25   | 62   | 20   | 64   | 25   | 6    | 19   | 15   | 34   | 28   | 6    | 4    |
| Green-winged Teal    | 48   | 71   | 36   | 17   | 23   | 27   | 42   | 37   | 18   | 21   | 1    | 12   |
| Canvasback           | 1    | 4    | 0    | 0    | 3    | 1    | 0    | 0    | 29   | 10   | 15   | 4    |
| Redhead              | 6    | 6    | 2    | 0    | 8    | 19   | 20   | 14   | 11   | 37   | 26   | 0    |
| Ring-necked Duck     | 4    | 14   | 3    | 2    | 5    | 13   | 7    | 17   | 7    | 16   | 7    | 17   |
| Lesser Scaup         | 126  | 198  | 203  | 143  | 73   | 67   | 88   | 154  | 243  | 124  | 76   | 67   |
| Harlequin Duck       | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 4    | 2    | 0    | 0    | 0    |
| Bufflehead           | 27   | 36   | 50   | 10   | 18   | 9    | 23   | 20   | 14   | 21   | 24   | 13   |
| Common Goldeneye     | 3    | 3    | 0    | 0    | 0    | 0    | 0    | 11   | 0    | 0    | 0    | 0    |
| Barrow's Goldeneye   | 63   | 123  | 67   | 105  | 80   | 236  | 99   | 50   | 97   | 39   | 34   | 46   |
| Hooded Merganser     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Common Merganser     | 54   | 45   | 54   | 44   | 36   | 40   | 49   | 29   | 66   | 35   | 16   | 32   |
| Ruddy Duck           | 15   | 10   | 13   | 4    | 6    | 9    | 26   | 14   | 17   | 20   | 10   | 12   |
| Chukar               | 7    | 1    | 10   | 0    | 12   | 6    | 0    | 1    | 0    | 0    | 2    | 4    |
| Gray Partridge       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 5    | 0    | 0    | 0    |
| Ring-necked Pheasant | 342  | 286  | 204  | 233  | 216  | 308  | 251  | 329  | 247  | 237  | 246  | 233  |
| Ruffed Grouse        | 2    | 9    | 0    | 7    | 0    | 5    | 4    | 3    | 0    | 1    | 0    | 1    |
| Greater Sage-Grouse  | 70   | 51   | 60   | 17   | 69   | 44   | 34   | 79   | 144  | 104  | 38   | 40   |
| Blue Grouse          | 0    | 3    | 0    | 0    | 0    | 0    | 1    | 1    | 0    | 1    | 2    | 0    |
| Sharp-tailed Grouse  | 1    | 0    | 1    | 0    | 0    | 0    | 3    | 1    | 16   | 3    | 12   | 0    |
| Wild Turkey          | 11   | 11   | 14   | 25   | 8    | 7    | 4    | 9    | 58   | 26   | 29   | 33   |
| Northern Bobwhite    | 0    | 0    | 1    | 0    | 1    | 0    | 1    | 0    | 1    | 0    | 0    | 0    |

| Species List                | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Common Loon                 | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 3    | 1    | 1    | 1    |
| Pied-billed Grebe           | 11   | 7    | 15   | 10   | 4    | 7    | 14   | 15   | 11   | 8    | 7    | 7    |
| Horned Grebe                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    |
| Red-necked Grebe            | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Eared Grebe                 | 2    | 5    | 0    | 13   | 1    | 6    | 1    | 15   | 23   | 5    | 10   | 13   |
| Western Grebe               | 8    | 5    | 8    | 16   | 12   | 20   | 27   | 23   | 37   | 16   | 32   | 16   |
| Clark's Grebe               | 0    | 0    | 0    | 0    | 2    | 1    | 2    | 5    | 0    | 6    | 1    | 0    |
| Aechmophorus species        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| American White Pelican      | 71   | 321  | 179  | 579  | 294  | 191  | 187  | 243  | 316  | 464  | 304  | 226  |
| Double-crested Cormorant    | 47   | 25   | 15   | 16   | 13   | 21   | 6    | 47   | 51   | 29   | 35   | 13   |
| American Bittern            | 0    | 2    | 3    | 4    | 0    | 1    | 0    | 1    | 0    | 1    | 0    | 0    |
| Great Blue Heron            | 38   | 72   | 46   | 75   | 51   | 45   | 40   | 46   | 46   | 32   | 34   | 17   |
| Snowy Egret                 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Black-crowned Night-Heron   | 4    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 1    |
| White-faced Ibis            | 0    | 0    | 3    | 0    | 0    | 0    | 0    | 0    | 0    | 7    | 3    | 0    |
| Turkey Vulture              | 32   | 16   | 23   | 29   | 27   | 36   | 38   | 59   | 71   | 59   | 71   | 50   |
| Osprey                      | 5    | 6    | 16   | 7    | 6    | 6    | 12   | 10   | 8    | 11   | 15   | 13   |
| Bald Eagle                  | 0    | 0    | 2    | 1    | 4    | 4    | 3    | 7    | 5    | 3    | 5    | 9    |
| Northern Harrier            | 51   | 31   | 34   | 35   | 49   | 28   | 30   | 43   | 36   | 32   | 12   | 22   |
| Sharp-shinned Hawk          | 1    | 1    | 0    | 2    | 2    | 0    | 0    | 3    | 1    | 3    | 1    | 1    |
| Cooper's Hawk               | 2    | 2    | 1    | 1    | 0    | 1    | 1    | 6    | 0    | 1    | 1    | 0    |
| Northern Goshawk            | 0    | 3    | 1    | 0    | 0    | 0    | 5    | 2    | 4    | 3    | 2    | 3    |
| Unidentified Accipiter Hawk | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Broad-winged Hawk           | 1    | 0    | 0    | 0    | 2    | 0    | 0    | 0    | 0    | 1    | 0    | 0    |
| Swainson's Hawk             | 26   | 39   | 45   | 27   | 26   | 28   | 30   | 25   | 26   | 18   | 15   | 25   |
| Red-tailed Hawk             | 121  | 124  | 118  | 90   | 92   | 77   | 82   | 83   | 77   | 85   | 65   | 62   |
| Ferruginous Hawk            | 27   | 39   | 30   | 24   | 20   | 32   | 32   | 32   | 25   | 22   | 16   | 17   |
| Unidentified Buteo          | 0    | 0    | 0    | 0    | 0    | 2    | 0    | 1    | 1    | 3    | 1    | 0    |
| Golden Eagle                | 41   | 35   | 27   | 30   | 34   | 27   | 28   | 40   | 40   | 45   | 26   | 30   |
| American Kestrel            | 184  | 138  | 120  | 110  | 95   | 99   | 97   | 134  | 120  | 84   | 74   | 65   |
| Merlin                      | 2    | 1    | 0    | 0    | 1    | 1    | 0    | 2    | 1    | 0    | 0    | 2    |
| Peregrine Falcon            | 0    | 0    | 0    | 1    | 1    | 3    | 0    | 1    | 1    | 0    | 2    | 1    |
| Prairie Falcon              | 9    | 15   | 8    | 9    | 6    | 12   | 12   | 13   | 14   | 8    | 7    | 8    |
| Virginia Rail               | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 1    | 1    | 0    | 0    | 1    |

| Species List           | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Sora                   | 16   | 28   | 12   | 10   | 5    | 9    | 14   | 15   | 14   | 19   | 17   | 11   |
| American Coot          | 85   | 75   | 59   | 51   | 38   | 53   | 115  | 112  | 123  | 55   | 76   | 41   |
| Sandhill Crane         | 63   | 83   | 148  | 149  | 83   | 76   | 49   | 64   | 74   | 102  | 73   | 91   |
| Killdeer               | 390  | 487  | 410  | 474  | 461  | 309  | 360  | 397  | 275  | 321  | 229  | 290  |
| Mountain Plover        | 3    | 10   | 1    | 0    | 7    | 2    | 5    | 15   | 1    | 4    | 5    | 3    |
| Black-necked Stilt     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    |
| American Avocet        | 15   | 45   | 30   | 11   | 32   | 24   | 33   | 17   | 34   | 21   | 7    | 8    |
| Willet                 | 4    | 23   | 50   | 10   | 25   | 26   | 28   | 49   | 26   | 20   | 14   | 14   |
| Spotted Sandpiper      | 93   | 89   | 72   | 100  | 61   | 96   | 69   | 129  | 90   | 90   | 84   | 71   |
| Upland Sandpiper       | 35   | 29   | 29   | 27   | 11   | 34   | 38   | 26   | 46   | 55   | 31   | 45   |
| Long-billed Curlew     | 19   | 2    | 8    | 2    | 13   | 7    | 3    | 19   | 9    | 11   | 6    | 6    |
| Wilson's Snipe         | 154  | 200  | 221  | 207  | 184  | 292  | 255  | 327  | 222  | 290  | 238  | 161  |
| Wilson's Phalarope     | 26   | 43   | 6    | 35   | 45   | 17   | 49   | 55   | 29   | 53   | 20   | 19   |
| Franklin's Gull        | 0    | 0    | 42   | 0    | 37   | 14   | 136  | 1    | 1    | 1    | 0    | 0    |
| Ring-billed Gull       | 8    | 3    | 7    | 44   | 0    | 20   | 36   | 14   | 0    | 24   | 16   | 0    |
| California Gull        | 74   | 301  | 281  | 180  | 235  | 358  | 364  | 358  | 197  | 140  | 37   | 48   |
| Unidentified Gull      | 0    | 0    | 0    | 0    | 0    | 5    | 3    | 15   | 3    | 4    | 2    | 0    |
| Caspian Tern           | 0    | 0    | 3    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Common Tern            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Forster's Tern         | 0    | 1    | 0    | 2    | 6    | 0    | 0    | 3    | 1    | 0    | 4    | 2    |
| Black Tern             | 0    | 6    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Rock Pigeon            | 214  | 283  | 414  | 261  | 94   | 130  | 159  | 354  | 143  | 131  | 170  | 121  |
| Eurasian Collared-Dove | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Mourning Dove          | 1337 | 1277 | 1301 | 1244 | 1252 | 839  | 1112 | 1075 | 822  | 604  | 906  | 692  |
| Black-billed Cuckoo    | 0    | 1    | 1    | 0    | 1    | 4    | 7    | 2    | 5    | 0    | 1    | 0    |
| Yellow-billed Cuckoo   | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Western Screech-Owl    | 2    | 0    | 0    | 2    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Eastern Screech-Owl    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Great Horned Owl       | 14   | 13   | 4    | 6    | 7    | 3    | 8    | 4    | 10   | 11   | 5    | 3    |
| Northern Pygmy-Owl     | 0    | 0    | 0    | 1    | 0    | 1    | 0    | 0    | 2    | 0    | 0    | 0    |
| Burrowing Owl          | 1    | 6    | 2    | 2    | 2    | 2    | 2    | 6    | 13   | 3    | 2    | 2    |
| Long-eared Owl         | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Short-eared Owl        | 9    | 0    | 3    | 1    | 13   | 1    | 4    | 8    | 10   | 1    | 0    | 0    |
| Northern Saw-whet Owl  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |

| Species List                      | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Common Nighthawk                  | 179  | 216  | 190  | 131  | 122  | 151  | 161  | 158  | 133  | 104  | 112  | 106  |
| Common Poorwill                   | 0    | 6    | 2    | 0    | 1    | 3    | 3    | 1    | 2    | 2    | 1    | 3    |
| Chimney Swift                     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    |
| White-throated Swift              | 57   | 79   | 59   | 55   | 30   | 100  | 43   | 48   | 51   | 48   | 25   | 51   |
| Black-chinned Hummingbird         | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 2    |
| Calliope Hummingbird              | 3    | 11   | 10   | 11   | 13   | 8    | 2    | 3    | 1    | 0    | 0    | 4    |
| Broad-tailed Hummingbird          | 38   | 44   | 48   | 33   | 21   | 27   | 23   | 44   | 37   | 33   | 22   | 26   |
| Rufous Hummingbird                | 0    | 0    | 3    | 1    | 0    | 0    | 1    | 1    | 1    | 0    | 0    | 0    |
| Unidentified Hummingbird          | 0    | 1    | 2    | 3    | 0    | 5    | 0    | 1    | 0    | 1    | 0    | 0    |
| Belted Kingfisher                 | 9    | 1    | 7    | 2    | 4    | 1    | 3    | 5    | 3    | 1    | 6    | 7    |
| Lewis's Woodpecker                | 0    | 2    | 11   | 1    | 6    | 9    | 0    | 4    | 2    | 13   | 4    | 0    |
| Red-headed Woodpecker             | 13   | 11   | 7    | 3    | 3    | 5    | 2    | 8    | 3    | 2    | 2    | 1    |
| Red-naped Sapsucker               | 33   | 31   | 8    | 15   | 16   | 9    | 14   | 20   | 12   | 15   | 21   | 25   |
| Unidentified Sapsucker            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    |
| Williamson's Sapsucker            | 4    | 1    | 1    | 2    | 1    | 2    | 1    | 1    | 3    | 5    | 0    | 2    |
| Downy Woodpecker                  | 11   | 15   | 9    | 7    | 4    | 9    | 3    | 6    | 10   | 9    | 1    | 10   |
| Hairy Woodpecker                  | 17   | 38   | 15   | 18   | 7    | 10   | 8    | 6    | 11   | 2    | 15   | 27   |
| Unidentified Woodpecker           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| American Three-toed Woodpecker    | 1    | 1    | 1    | 3    | 4    | 0    | 2    | 2    | 5    | 5    | 6    | 4    |
| Black-backed Woodpecker           | 0    | 0    | 0    | 1    | 1    | 0    | 0    | 0    | 1    | 0    | 1    | 1    |
| Red-shafted Flicker               | 186  | 221  | 239  | 223  | 124  | 122  | 187  | 165  | 200  | 126  | 111  | 92   |
| Yellow-shafted Flicker            | 1    | 0    | 2    | 2    | 8    | 15   | 2    | 2    | 22   | 11   | 2    | 5    |
| Northern Flicker                  | 0    | 0    | 0    | 0    | 1    | 17   | 1    | 7    | 8    | 6    | 5    | 0    |
| Olive-sided Flycatcher            | 16   | 16   | 19   | 9    | 11   | 7    | 9    | 14   | 14   | 6    | 7    | 8    |
| Western Wood-Pewee                | 140  | 117  | 127  | 108  | 78   | 105  | 98   | 124  | 96   | 85   | 111  | 87   |
| Willow Flycatcher                 | 22   | 30   | 25   | 15   | 22   | 23   | 21   | 19   | 33   | 24   | 15   | 28   |
| Least Flycatcher                  | 18   | 15   | 15   | 17   | 23   | 9    | 11   | 15   | 25   | 13   | 8    | 7    |
| Hammond's Flycatcher              | 8    | 4    | 11   | 8    | 8    | 16   | 12   | 13   | 11   | 24   | 21   | 16   |
| Gray Flycatcher                   | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    |
| Dusky Flycatcher                  | 62   | 49   | 64   | 51   | 62   | 58   | 45   | 78   | 61   | 64   | 125  | 96   |
| Cordilleran Flycatcher            | 13   | 7    | 11   | 7    | 12   | 9    | 16   | 44   | 15   | 30   | 9    | 7    |
| Unidentified Empidonax Flycatcher | 0    | 1    | 0    | 3    | 1    | 3    | 2    | 2    | 0    | 0    | 7    | 0    |
| Eastern Phoebe                    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Say's Phoebe                      | 84   | 112  | 101  | 112  | 66   | 79   | 78   | 79   | 60   | 61   | 71   | 69   |

| Species List                  | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Ash-throated Flycatcher       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Cassin's Kingbird             | 5    | 0    | 0    | 7    | 0    | 0    | 2    | 12   | 4    | 6    | 1    | 1    |
| Western Kingbird              | 158  | 208  | 249  | 257  | 176  | 159  | 184  | 226  | 183  | 135  | 157  | 138  |
| Eastern Kingbird              | 162  | 204  | 152  | 226  | 109  | 153  | 126  | 161  | 139  | 156  | 122  | 134  |
| Loggerhead Shrike             | 101  | 83   | 85   | 71   | 41   | 43   | 81   | 64   | 53   | 36   | 22   | 37   |
| Plumbeous Vireo               | 14   | 10   | 21   | 46   | 16   | 30   | 6    | 19   | 14   | 17   | 14   | 12   |
| Warbling Vireo                | 213  | 171  | 205  | 324  | 220  | 278  | 229  | 257  | 284  | 361  | 380  | 351  |
| Red-eyed Vireo                | 4    | 3    | 6    | 18   | 9    | 17   | 36   | 7    | 26   | 13   | 28   | 20   |
| Gray Jay                      | 34   | 71   | 6    | 16   | 26   | 21   | 8    | 5    | 13   | 17   | 16   | 15   |
| Steller's Jay                 | 13   | 10   | 3    | 1    | 1    | 3    | 6    | 5    | 7    | 4    | 2    | 1    |
| Blue Jay                      | 19   | 10   | 10   | 18   | 10   | 11   | 15   | 24   | 16   | 7    | 11   | 11   |
| Pinyon Jay                    | 53   | 54   | 36   | 20   | 9    | 20   | 16   | 32   | 37   | 42   | 12   | 45   |
| Clark's Nutcracker            | 133  | 118  | 136  | 88   | 71   | 72   | 80   | 60   | 119  | 80   | 84   | 96   |
| Black-billed Magpie           | 524  | 309  | 320  | 291  | 227  | 238  | 229  | 279  | 229  | 228  | 284  | 282  |
| American Crow                 | 155  | 214  | 93   | 152  | 90   | 199  | 155  | 228  | 253  | 284  | 162  | 182  |
| Common Raven                  | 213  | 243  | 286  | 308  | 199  | 214  | 206  | 281  | 287  | 183  | 162  | 292  |
| Unidentified Raven            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Horned Lark                   | 3491 | 3330 | 3594 | 3019 | 2356 | 2280 | 3093 | 3202 | 2393 | 2696 | 1758 | 2581 |
| Purple Martin                 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Tree Swallow                  | 148  | 147  | 185  | 236  | 116  | 141  | 176  | 91   | 71   | 148  | 124  | 160  |
| Violet-green Swallow          | 274  | 312  | 181  | 173  | 186  | 212  | 131  | 161  | 142  | 259  | 253  | 185  |
| Northern Rough-winged Swallow | 122  | 70   | 142  | 18   | 36   | 48   | 53   | 84   | 69   | 93   | 130  | 66   |
| Bank Swallow                  | 166  | 340  | 175  | 198  | 344  | 451  | 109  | 415  | 327  | 178  | 129  | 174  |
| Cliff Swallow                 | 2712 | 2574 | 2196 | 2976 | 1333 | 2259 | 2244 | 2213 | 1910 | 1649 | 2027 | 1053 |
| Barn Swallow                  | 492  | 418  | 386  | 459  | 283  | 319  | 282  | 251  | 206  | 87   | 134  | 105  |
| Black-capped Chickadee        | 25   | 99   | 48   | 66   | 62   | 51   | 32   | 38   | 48   | 33   | 49   | 40   |
| Mountain Chickadee            | 204  | 141  | 177  | 142  | 98   | 114  | 119  | 173  | 124  | 158  | 164  | 146  |
| Unidentified chickadee        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Juniper Titmouse              | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Bushtit                       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Red-breasted Nuthatch         | 86   | 102  | 73   | 71   | 61   | 64   | 42   | 39   | 48   | 79   | 87   | 68   |
| White-breasted Nuthatch       | 21   | 20   | 12   | 21   | 29   | 19   | 5    | 4    | 13   | 11   | 8    | 3    |
| Pygmy Nuthatch                | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    |
| Brown Creeper                 | 0    | 5    | 0    | 1    | 6    | 0    | 1    | 1    | 1    | 0    | 3    | 2    |

| Species List                | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Rock Wren                   | 296  | 251  | 276  | 237  | 325  | 294  | 268  | 245  | 232  | 186  | 256  | 259  |
| Canyon Wren                 | 0    | 1    | 0    | 3    | 0    | 0    | 2    | 1    | 1    | 0    | 1    | 1    |
| Bewick's Wren               | 6    | 0    | 2    | 2    | 0    | 0    | 0    | 2    | 4    | 0    | 0    | 2    |
| House Wren                  | 184  | 242  | 198  | 218  | 205  | 204  | 175  | 177  | 171  | 210  | 228  | 234  |
| Marsh Wren                  | 4    | 16   | 11   | 5    | 2    | 2    | 10   | 1    | 3    | 11   | 7    | 6    |
| American Dipper             | 1    | 3    | 4    | 3    | 4    | 3    | 7    | 4    | 3    | 4    | 2    | 0    |
| Golden-crowned Kinglet      | 26   | 8    | 11   | 8    | 1    | 5    | 20   | 10   | 4    | 3    | 5    | 1    |
| Ruby-crowned Kinglet        | 279  | 309  | 333  | 335  | 290  | 209  | 127  | 209  | 250  | 269  | 276  | 280  |
| Blue-gray Gnatcatcher       | 3    | 4    | 1    | 2    | 0    | 0    | 0    | 0    | 3    | 3    | 0    | 0    |
| Eastern Bluebird            | 1    | 0    | 0    | 0    | 2    | 1    | 0    | 4    | 4    | 1    | 0    | 0    |
| Western Bluebird            | 1    | 5    | 4    | 1    | 0    | 6    | 0    | 0    | 0    | 0    | 0    | 0    |
| Mountain Bluebird           | 306  | 369  | 325  | 237  | 237  | 137  | 222  | 197  | 203  | 132  | 135  | 192  |
| Townsend's Solitaire        | 50   | 60   | 38   | 22   | 40   | 36   | 30   | 39   | 22   | 26   | 19   | 30   |
| Veery                       | 19   | 22   | 32   | 11   | 13   | 15   | 22   | 23   | 37   | 22   | 25   | 22   |
| Swainson's Thrush           | 43   | 35   | 53   | 39   | 27   | 22   | 12   | 30   | 18   | 28   | 50   | 39   |
| Hermit Thrush               | 140  | 66   | 78   | 115  | 93   | 65   | 84   | 110  | 107  | 79   | 77   | 80   |
| American Robin              | 1477 | 1778 | 1654 | 1727 | 1309 | 1431 | 1570 | 1467 | 1368 | 1323 | 1325 | 1440 |
| Gray Catbird                | 12   | 17   | 20   | 17   | 22   | 21   | 14   | 25   | 31   | 28   | 32   | 51   |
| Northern Mockingbird        | 0    | 1    | 1    | 4    | 4    | 1    | 4    | 5    | 1    | 0    | 4    | 1    |
| Sage Thrasher               | 745  | 817  | 583  | 632  | 591  | 600  | 711  | 705  | 535  | 583  | 467  | 571  |
| Brown Thrasher              | 6    | 8    | 11   | 15   | 4    | 6    | 5    | 3    | 2    | 8    | 7    | 0    |
| European Starling           | 571  | 786  | 743  | 1263 | 1086 | 909  | 898  | 794  | 781  | 680  | 532  | 454  |
| American Pipit              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sprague's Pipit             | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Cedar Waxwing               | 17   | 20   | 20   | 8    | 7    | 15   | 13   | 9    | 16   | 6    | 6    | 10   |
| Orange-crowned Warbler      | 26   | 10   | 3    | 7    | 8    | 0    | 3    | 3    | 9    | 4    | 2    | 4    |
| Virginia's Warbler          | 3    | 0    | 0    | 0    | 0    | 6    | 5    | 0    | 2    | 0    | 0    | 0    |
| Yellow Warbler              | 358  | 427  | 457  | 400  | 370  | 477  | 434  | 454  | 339  | 425  | 400  | 371  |
| Chestnut-sided Warbler      | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Myrtle Warbler              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    |
| Audubon's Warbler           | 389  | 271  | 271  | 333  | 277  | 293  | 246  | 288  | 247  | 270  | 278  | 284  |
| Yellow-rumped Warbler       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Black-throated Gray Warbler | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 0    | 0    | 0    |
| Townsend's Warbler          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |

| Species List                  | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| American Redstart             | 21   | 24   | 14   | 32   | 32   | 32   | 31   | 21   | 12   | 21   | 28   | 32   |
| Ovenbird                      | 26   | 36   | 46   | 53   | 69   | 53   | 53   | 44   | 63   | 51   | 63   | 64   |
| Northern Waterthrush          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| MacGillivray's Warbler        | 64   | 35   | 99   | 31   | 33   | 61   | 51   | 44   | 44   | 36   | 33   | 65   |
| Common Yellowthroat           | 51   | 70   | 51   | 60   | 49   | 67   | 53   | 62   | 46   | 73   | 57   | 70   |
| Wilson's Warbler              | 32   | 19   | 38   | 23   | 21   | 18   | 14   | 12   | 14   | 20   | 25   | 23   |
| Yellow-breasted Chat          | 15   | 9    | 9    | 11   | 6    | 13   | 10   | 15   | 27   | 19   | 27   | 32   |
| Western Tanager               | 124  | 84   | 62   | 80   | 55   | 72   | 60   | 71   | 64   | 58   | 82   | 95   |
| Green-tailed Towhee           | 383  | 250  | 201  | 243  | 197  | 206  | 248  | 233  | 308  | 168  | 207  | 205  |
| Spotted Towhee                | 71   | 93   | 118  | 89   | 97   | 76   | 74   | 119  | 91   | 108  | 116  | 105  |
| Eastern Towhee                | 0    | 0    | 0    | 0    | 0    | 1    | 1    | 1    | 0    | 0    | 0    | 0    |
| Cassin's Sparrow              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    | 0    | 0    |
| Chipping Sparrow              | 476  | 307  | 427  | 381  | 421  | 414  | 436  | 323  | 337  | 294  | 288  | 274  |
| Clay-colored Sparrow          | 22   | 17   | 15   | 9    | 12   | 54   | 16   | 16   | 79   | 48   | 38   | 20   |
| Brewer's Sparrow              | 1147 | 825  | 777  | 707  | 722  | 1030 | 1089 | 1084 | 1069 | 1050 | 748  | 940  |
| Field Sparrow                 | 10   | 11   | 43   | 24   | 18   | 68   | 26   | 49   | 37   | 3    | 0    | 2    |
| Vesper Sparrow                | 1195 | 1273 | 1368 | 1108 | 1070 | 1348 | 1645 | 1401 | 1332 | 1307 | 1336 | 1250 |
| Lark Sparrow                  | 341  | 230  | 315  | 587  | 276  | 340  | 383  | 347  | 283  | 305  | 153  | 234  |
| Sage Sparrow                  | 253  | 205  | 183  | 345  | 129  | 300  | 384  | 411  | 301  | 279  | 205  | 260  |
| Lark Bunting                  | 2767 | 5341 | 3361 | 4647 | 2899 | 3257 | 4328 | 2776 | 3601 | 1752 | 2105 | 1437 |
| Savannah Sparrow              | 264  | 402  | 356  | 318  | 182  | 292  | 287  | 325  | 334  | 227  | 212  | 210  |
| Grasshopper Sparrow           | 159  | 212  | 193  | 185  | 156  | 189  | 372  | 406  | 247  | 146  | 100  | 80   |
| Baird's Sparrow               | 0    | 0    | 1    | 3    | 0    | 0    | 0    | 7    | 6    | 4    | 4    | 1    |
| Nelson's Sharp-tailed Sparrow | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Fox Sparrow                   | 1    | 4    | 3    | 2    | 7    | 7    | 7    | 9    | 2    | 4    | 14   | 11   |
| Song Sparrow                  | 136  | 131  | 249  | 191  | 175  | 184  | 156  | 220  | 163  | 199  | 131  | 185  |
| Lincoln's Sparrow             | 85   | 94   | 93   | 98   | 55   | 83   | 89   | 52   | 93   | 74   | 78   | 68   |
| White-crowned Sparrow         | 228  | 151  | 185  | 194  | 95   | 203  | 224  | 225  | 164  | 188  | 103  | 113  |
| Oregon Junco                  | 252  | 191  | 259  | 173  | 205  | 174  | 63   | 44   | 129  | 45   | 81   | 77   |
| Pink-sided Junco              | 0    | 0    | 0    | 0    | 0    | 0    | 80   | 70   | 0    | 78   | 46   | 70   |
| White-winged Junco            | 12   | 31   | 15   | 20   | 47   | 40   | 35   | 53   | 17   | 22   | 22   | 38   |
| Gray-headed Junco             | 17   | 107  | 25   | 38   | 29   | 42   | 41   | 80   | 71   | 58   | 6    | 3    |
| Dark-eyed Junco               | 7    | 17   | 0    | 6    | 0    | 0    | 92   | 88   | 56   | 21   | 20   | 18   |
| McCown's Longspur             | 81   | 101  | 122  | 38   | 79   | 97   | 181  | 201  | 72   | 95   | 79   | 47   |

| Species List                          | 1992         | 1993         | 1994         | 1995         | 1996         | 1997         | 1998         | 1999         | 2000         | 2001         | 2002         | 2003         |
|---------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Chestnut-collared Longspur            | 58           | 56           | 85           | 72           | 5            | 0            | 62           | 77           | 55           | 82           | 45           | 55           |
| Black-headed Grosbeak                 | 44           | 26           | 29           | 36           | 49           | 51           | 30           | 31           | 38           | 44           | 58           | 44           |
| Blue Grosbeak                         | 1            | 4            | 7            | 8            | 4            | 10           | 5            | 6            | 11           | 8            | 4            | 0            |
| Lazuli Bunting                        | 67           | 38           | 38           | 23           | 30           | 46           | 18           | 37           | 17           | 32           | 41           | 46           |
| Indigo Bunting                        | 1            | 1            | 0            | 0            | 1            | 1            | 0            | 0            | 0            | 0            | 0            | 0            |
| Dickcissel                            | 0            | 1            | 0            | 0            | 3            | 3            | 7            | 3            | 7            | 0            | 11           | 3            |
| Bobolink                              | 3            | 10           | 18           | 15           | 0            | 9            | 29           | 45           | 0            | 8            | 12           | 7            |
| Red-winged Blackbird                  | 1500         | 1643         | 1747         | 2203         | 1674         | 2069         | 2010         | 2206         | 1577         | 1804         | 1529         | 1625         |
| Western Meadowlark                    | 7136         | 5483         | 6368         | 8594         | 5422         | 6221         | 7134         | 7046         | 5661         | 5394         | 3736         | 4088         |
| Yellow-headed Blackbird               | 245          | 207          | 305          | 229          | 177          | 272          | 234          | 210          | 196          | 157          | 161          | 110          |
| Brewer's Blackbird                    | 2079         | 1755         | 1589         | 1621         | 1311         | 1800         | 1461         | 1663         | 1384         | 1108         | 869          | 1191         |
| Great-tailed Grackle                  | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 1            | 0            | 0            |
| Common Grackle                        | 304          | 646          | 612          | 1025         | 596          | 430          | 561          | 552          | 466          | 200          | 193          | 349          |
| Brown-headed Cowbird                  | 311          | 356          | 531          | 328          | 275          | 354          | 379          | 386          | 273          | 346          | 240          | 327          |
| Orchard Oriole                        | 11           | 1            | 4            | 11           | 4            | 3            | 1            | 2            | 3            | 4            | 4            | 4            |
| Bullock's Oriole                      | 68           | 94           | 95           | 115          | 120          | 114          | 93           | 114          | 114          | 111          | 81           | 55           |
| Baltimore Oriole                      | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            |
| Unidentif. Baltimore/Bullock's Oriole | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            |
| Gray-crowned Rosy-Finch               | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            |
| Black Rosy-Finch                      | 0            | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            |
| Pine Grosbeak                         | 2            | 5            | 7            | 1            | 3            | 6            | 0            | 1            | 4            | 3            | 0            | 2            |
| Cassin's Finch                        | 127          | 161          | 103          | 102          | 89           | 39           | 49           | 53           | 81           | 46           | 36           | 28           |
| House Finch                           | 12           | 56           | 15           | 52           | 71           | 13           | 30           | 40           | 17           | 18           | 15           | 42           |
| Red Crossbill                         | 220          | 138          | 111          | 60           | 227          | 45           | 56           | 52           | 111          | 264          | 106          | 128          |
| White-winged Crossbill                | 0            | 0            | 0            | 3            | 0            | 0            | 1            | 0            | 1            | 0            | 0            | 3            |
| Pine Siskin                           | 506          | 536          | 326          | 409          | 588          | 210          | 443          | 388          | 500          | 367          | 257          | 184          |
| Lesser Goldfinch                      | 0            | 0            | 0            | 0            | 0            | 0            | 3            | 0            | 0            | 0            | 0            | 0            |
| American Goldfinch                    | 72           | 90           | 87           | 98           | 156          | 98           | 88           | 114          | 95           | 95           | 75           | 85           |
| Evening Grosbeak                      | 0            | 6            | 1            | 2            | 0            | 0            | 2            | 6            | 0            | 0            | 0            | 0            |
| House Sparrow                         | 389          | 565          | 427          | 369          | 262          | 331          | 406          | 381          | 329          | 102          | 159          | 190          |
| <i>Total Number of Species</i>        | <i>190</i>   | <i>192</i>   | <i>188</i>   | <i>194</i>   | <i>191</i>   | <i>194</i>   | <i>193</i>   | <i>210</i>   | <i>206</i>   | <i>194</i>   | <i>194</i>   | <i>188</i>   |
| <i>Total Number of Individuals</i>    | <i>42251</i> | <i>43975</i> | <i>41943</i> | <i>46602</i> | <i>35076</i> | <i>38585</i> | <i>42213</i> | <i>42549</i> | <i>37798</i> | <i>33845</i> | <i>29578</i> | <i>29720</i> |
| <i>Number of Routes Conducted</i>     | <i>74</i>    | <i>77</i>    | <i>77</i>    | <i>79</i>    | <i>65</i>    | <i>68</i>    | <i>76</i>    | <i>73</i>    | <i>66</i>    | <i>67</i>    | <i>59</i>    | <i>58</i>    |

**Table 7. Wyoming Breeding Bird Survey data, 2004-2008.**

| <b>Species List</b>  | <b>2004</b> | <b>2005</b> | <b>2006</b> | <b>2007</b> | <b>2008</b> |
|----------------------|-------------|-------------|-------------|-------------|-------------|
| Canada Goose         | 117         | 753         | 1584        | 1042        | 653         |
| Trumpeter Swan       | 2           | 2           | 0           | 1           | 8           |
| Wood Duck            | 4           | 7           | 4           | 0           | 12          |
| Gadwall              | 36          | 23          | 53          | 18          | 28          |
| American Wigeon      | 19          | 39          | 62          | 33          | 50          |
| Mallard              | 131         | 213         | 443         | 152         | 138         |
| Blue-winged Teal     | 17          | 39          | 10          | 7           | 44          |
| Cinnamon Teal        | 11          | 17          | 5           | 13          | 6           |
| Northern Shoveler    | 6           | 18          | 4           | 7           | 34          |
| Northern Pintail     | 13          | 26          | 27          | 11          | 11          |
| Green-winged Teal    | 6           | 9           | 7           | 15          | 10          |
| Canvasback           | 0           | 0           | 5           | 0           | 3           |
| Redhead              | 1           | 0           | 12          | 5           | 10          |
| Ring-necked Duck     | 16          | 14          | 3           | 0           | 11          |
| Lesser Scaup         | 53          | 65          | 136         | 63          | 39          |
| Harlequin Duck       | 0           | 0           | 6           | 3           | 0           |
| Bufflehead           | 0           | 8           | 14          | 10          | 9           |
| Common Goldeneye     | 0           | 0           | 0           | 0           | 0           |
| Barrow's Goldeneye   | 5           | 24          | 20          | 52          | 2           |
| Hooded Merganser     | 0           | 0           | 0           | 0           | 0           |
| Common Merganser     | 15          | 7           | 37          | 14          | 29          |
| Ruddy Duck           | 12          | 2           | 15          | 4           | 17          |
| Chukar               | 4           | 2           | 0           | 2           | 7           |
| Gray Partridge       | 0           | 0           | 0           | 0           | 0           |
| Ring-necked Pheasant | 195         | 299         | 295         | 325         | 259         |
| Ruffed Grouse        | 4           | 7           | 3           | 0           | 1           |
| Greater Sage-Grouse  | 71          | 66          | 65          | 74          | 65          |
| Blue Grouse          | 0           | 1           | 1           | 2           | 1           |
| Sharp-tailed Grouse  | 4           | 0           | 0           | 0           | 2           |
| Wild Turkey          | 27          | 41          | 10          | 64          | 66          |
| Northern Bobwhite    | 1           | 0           | 0           | 4           | 0           |

| Species List                | 2004 | 2005 | 2006 | 2007 | 2008 |
|-----------------------------|------|------|------|------|------|
| Common Loon                 | 0    | 0    | 0    | 0    | 0    |
| Pied-billed Grebe           | 4    | 5    | 6    | 1    | 2    |
| Horned Grebe                | 0    | 0    | 0    | 0    | 0    |
| Red-necked Grebe            | 0    | 0    | 0    | 0    | 0    |
| Eared Grebe                 | 34   | 15   | 11   | 17   | 27   |
| Western Grebe               | 13   | 9    | 6    | 11   | 18   |
| Clark's Grebe               | 5    | 2    | 0    | 0    | 0    |
| Aechmophorus species        | 0    | 0    | 0    | 0    | 0    |
| American White Pelican      | 72   | 128  | 194  | 107  | 122  |
| Double-crested Cormorant    | 15   | 11   | 15   | 18   | 2    |
| American Bittern            | 1    | 0    | 0    | 0    | 0    |
| Great Blue Heron            | 24   | 32   | 56   | 32   | 46   |
| Snowy Egret                 | 0    | 0    | 0    | 0    | 0    |
| Black-crowned Night-Heron   | 0    | 0    | 0    | 1    | 0    |
| White-faced Ibis            | 0    | 0    | 0    | 2    | 0    |
| Turkey Vulture              | 49   | 65   | 44   | 32   | 65   |
| Osprey                      | 10   | 6    | 10   | 4    | 12   |
| Bald Eagle                  | 2    | 1    | 8    | 5    | 3    |
| Northern Harrier            | 16   | 22   | 37   | 42   | 44   |
| Sharp-shinned Hawk          | 1    | 2    | 1    | 0    | 1    |
| Cooper's Hawk               | 1    | 2    | 2    | 0    | 1    |
| Northern Goshawk            | 7    | 3    | 2    | 1    | 1    |
| Unidentified Accipiter Hawk | 0    | 1    | 0    | 0    | 0    |
| Broad-winged Hawk           | 0    | 0    | 0    | 1    | 1    |
| Swainson's Hawk             | 11   | 31   | 31   | 33   | 34   |
| Red-tailed Hawk             | 63   | 77   | 92   | 91   | 109  |
| Ferruginous Hawk            | 15   | 38   | 23   | 25   | 24   |
| Unidentified Buteo          | 1    | 0    | 0    | 3    | 0    |
| Golden Eagle                | 28   | 24   | 23   | 32   | 26   |
| American Kestrel            | 63   | 84   | 70   | 63   | 83   |
| Merlin                      | 1    | 0    | 0    | 1    | 0    |
| Peregrine Falcon            | 0    | 2    | 0    | 1    | 0    |
| Prairie Falcon              | 5    | 16   | 5    | 9    | 11   |
| Virginia Rail               | 1    | 0    | 0    | 0    | 1    |

| Species List           | 2004 | 2005 | 2006 | 2007 | 2008 |
|------------------------|------|------|------|------|------|
| Sora                   | 8    | 11   | 9    | 10   | 3    |
| American Coot          | 48   | 12   | 26   | 13   | 35   |
| Sandhill Crane         | 92   | 110  | 100  | 168  | 119  |
| Killdeer               | 249  | 374  | 319  | 323  | 289  |
| Mountain Plover        | 10   | 2    | 15   | 9    | 0    |
| Black-necked Stilt     | 0    | 0    | 0    | 0    | 0    |
| American Avocet        | 5    | 35   | 27   | 32   | 46   |
| Willet                 | 4    | 16   | 95   | 52   | 34   |
| Spotted Sandpiper      | 45   | 67   | 68   | 65   | 56   |
| Upland Sandpiper       | 34   | 34   | 47   | 47   | 27   |
| Long-billed Curlew     | 13   | 13   | 12   | 37   | 17   |
| Wilson's Snipe         | 201  | 257  | 242  | 214  | 193  |
| Wilson's Phalarope     | 24   | 67   | 48   | 38   | 39   |
| Franklin's Gull        | 0    | 0    | 0    | 0    | 0    |
| Ring-billed Gull       | 21   | 2    | 0    | 0    | 0    |
| California Gull        | 36   | 60   | 159  | 242  | 19   |
| Unidentified Gull      | 0    | 0    | 0    | 0    | 0    |
| Caspian Tern           | 0    | 0    | 0    | 1    | 0    |
| Common Tern            | 0    | 0    | 0    | 0    | 0    |
| Forster's Tern         | 0    | 0    | 1    | 0    | 0    |
| Black Tern             | 0    | 0    | 0    | 0    | 0    |
| Rock Pigeon            | 105  | 84   | 106  | 176  | 147  |
| Eurasian Collared-Dove | 0    | 0    | 10   | 16   | 31   |
| Mourning Dove          | 665  | 730  | 1212 | 1101 | 1199 |
| Black-billed Cuckoo    | 0    | 1    | 0    | 1    | 3    |
| Yellow-billed Cuckoo   | 1    | 10   | 0    | 0    | 0    |
| Western Screech-Owl    | 0    | 0    | 0    | 0    | 0    |
| Eastern Screech-Owl    | 0    | 0    | 0    | 0    | 0    |
| Great Horned Owl       | 4    | 2    | 9    | 8    | 3    |
| Northern Pygmy-Owl     | 0    | 0    | 0    | 1    | 0    |
| Burrowing Owl          | 0    | 2    | 13   | 3    | 4    |
| Long-eared Owl         | 0    | 0    | 0    | 0    | 0    |
| Short-eared Owl        | 3    | 1    | 8    | 2    | 1    |
| Northern Saw-whet Owl  | 0    | 0    | 0    | 0    | 0    |

| Species List                      | 2004 | 2005 | 2006 | 2007 | 2008 |
|-----------------------------------|------|------|------|------|------|
| Common Nighthawk                  | 164  | 120  | 133  | 178  | 194  |
| Common Poorwill                   | 5    | 4    | 4    | 4    | 1    |
| Chimney Swift                     | 0    | 0    | 0    | 0    | 0    |
| White-throated Swift              | 29   | 49   | 0    | 46   | 92   |
| Black-chinned Hummingbird         | 0    | 0    | 0    | 0    | 0    |
| Calliope Hummingbird              | 8    | 2    | 6    | 8    | 3    |
| Broad-tailed Hummingbird          | 23   | 21   | 18   | 17   | 14   |
| Rufous Hummingbird                | 0    | 0    | 0    | 0    | 2    |
| Unidentified Hummingbird          | 0    | 2    | 0    | 0    | 0    |
| Belted Kingfisher                 | 3    | 10   | 11   | 5    | 2    |
| Lewis's Woodpecker                | 1    | 3    | 0    | 0    | 0    |
| Red-headed Woodpecker             | 3    | 3    | 0    | 1    | 1    |
| Red-naped Sapsucker               | 42   | 19   | 17   | 27   | 20   |
| Unidentified Sapsucker            | 0    | 0    | 0    | 0    | 0    |
| Williamson's Sapsucker            | 2    | 1    | 2    | 2    | 1    |
| Downy Woodpecker                  | 11   | 6    | 2    | 5    | 4    |
| Hairy Woodpecker                  | 16   | 18   | 2    | 25   | 16   |
| Unidentified Woodpecker           | 0    | 1    | 0    | 0    | 0    |
| American Three-toed Woodpecker    | 6    | 4    | 2    | 1    | 0    |
| Black-backed Woodpecker           | 1    | 0    | 0    | 3    | 3    |
| Red-shafted Flicker               | 178  | 176  | 214  | 140  | 101  |
| Yellow-shafted Flicker            | 8    | 2    | 0    | 3    | 6    |
| Northern Flicker                  | 0    | 0    | 0    | 3    | 2    |
| Olive-sided Flycatcher            | 11   | 3    | 12   | 15   | 8    |
| Western Wood-Pewee                | 92   | 111  | 118  | 91   | 144  |
| Willow Flycatcher                 | 21   | 28   | 34   | 28   | 21   |
| Least Flycatcher                  | 12   | 12   | 9    | 18   | 7    |
| Hammond's Flycatcher              | 25   | 21   | 12   | 7    | 18   |
| Gray Flycatcher                   | 0    | 0    | 3    | 0    | 1    |
| Dusky Flycatcher                  | 81   | 77   | 50   | 98   | 102  |
| Cordilleran Flycatcher            | 25   | 11   | 6    | 13   | 12   |
| Unidentified Empidonax Flycatcher | 0    | 0    | 1    | 0    | 0    |
| Eastern Phoebe                    | 0    | 0    | 0    | 0    | 0    |
| Say's Phoebe                      | 80   | 58   | 59   | 53   | 63   |

| Species List                  | 2004 | 2005 | 2006 | 2007 | 2008 |
|-------------------------------|------|------|------|------|------|
| Ash-throated Flycatcher       | 0    | 0    | 1    | 0    | 0    |
| Cassin's Kingbird             | 0    | 0    | 0    | 0    | 15   |
| Western Kingbird              | 127  | 82   | 218  | 240  | 281  |
| Eastern Kingbird              | 139  | 89   | 102  | 116  | 108  |
| Loggerhead Shrike             | 40   | 52   | 48   | 36   | 28   |
| Plumbeous Vireo               | 9    | 10   | 7    | 14   | 11   |
| Warbling Vireo                | 307  | 294  | 233  | 290  | 394  |
| Red-eyed Vireo                | 9    | 12   | 0    | 5    | 17   |
| Gray Jay                      | 20   | 18   | 9    | 14   | 5    |
| Steller's Jay                 | 5    | 10   | 0    | 10   | 3    |
| Blue Jay                      | 7    | 3    | 9    | 11   | 17   |
| Pinyon Jay                    | 56   | 26   | 30   | 0    | 1    |
| Clark's Nutcracker            | 133  | 119  | 143  | 51   | 53   |
| Black-billed Magpie           | 331  | 328  | 433  | 358  | 399  |
| American Crow                 | 248  | 213  | 237  | 211  | 219  |
| Common Raven                  | 211  | 283  | 310  | 242  | 220  |
| Unidentified Raven            | 0    | 0    | 0    | 0    | 0    |
| Horned Lark                   | 2097 | 2740 | 2875 | 2187 | 2214 |
| Purple Martin                 | 0    | 0    | 0    | 0    | 0    |
| Tree Swallow                  | 107  | 149  | 113  | 161  | 139  |
| Violet-green Swallow          | 184  | 183  | 142  | 131  | 164  |
| Northern Rough-winged Swallow | 79   | 67   | 88   | 150  | 108  |
| Bank Swallow                  | 64   | 53   | 257  | 212  | 183  |
| Cliff Swallow                 | 784  | 941  | 1177 | 1091 | 1376 |
| Barn Swallow                  | 141  | 168  | 233  | 241  | 213  |
| Black-capped Chickadee        | 39   | 60   | 11   | 79   | 50   |
| Mountain Chickadee            | 124  | 138  | 115  | 83   | 144  |
| Unidentified chickadee        | 0    | 0    | 0    | 0    | 0    |
| Juniper Titmouse              | 0    | 0    | 0    | 0    | 0    |
| Bushtit                       | 0    | 0    | 0    | 0    | 0    |
| Red-breasted Nuthatch         | 84   | 81   | 34   | 42   | 91   |
| White-breasted Nuthatch       | 13   | 3    | 4    | 12   | 9    |
| Pygmy Nuthatch                | 3    | 0    | 0    | 3    | 0    |
| Brown Creeper                 | 1    | 7    | 0    | 3    | 1    |

| Species List                | 2004 | 2005 | 2006 | 2007 | 2008 |
|-----------------------------|------|------|------|------|------|
| Rock Wren                   | 306  | 327  | 320  | 190  | 229  |
| Canyon Wren                 | 1    | 0    | 0    | 3    | 3    |
| Bewick's Wren               | 2    | 6    | 5    | 0    | 5    |
| House Wren                  | 189  | 207  | 154  | 181  | 196  |
| Marsh Wren                  | 5    | 6    | 3    | 7    | 2    |
| American Dipper             | 4    | 3    | 2    | 2    | 2    |
| Golden-crowned Kinglet      | 4    | 0    | 3    | 2    | 12   |
| Ruby-crowned Kinglet        | 273  | 308  | 332  | 212  | 247  |
| Blue-gray Gnatcatcher       | 1    | 4    | 3    | 1    | 0    |
| Eastern Bluebird            | 2    | 0    | 0    | 0    | 2    |
| Western Bluebird            | 0    | 2    | 1    | 0    | 1    |
| Mountain Bluebird           | 301  | 222  | 269  | 221  | 171  |
| Townsend's Solitaire        | 36   | 32   | 10   | 26   | 27   |
| Veery                       | 24   | 20   | 1    | 25   | 28   |
| Swainson's Thrush           | 38   | 22   | 28   | 23   | 31   |
| Hermit Thrush               | 122  | 107  | 101  | 80   | 73   |
| American Robin              | 1263 | 1342 | 1211 | 1222 | 1313 |
| Gray Catbird                | 52   | 58   | 43   | 63   | 71   |
| Northern Mockingbird        | 0    | 0    | 5    | 2    | 1    |
| Sage Thrasher               | 561  | 700  | 669  | 520  | 825  |
| Brown Thrasher              | 3    | 1    | 2    | 4    | 6    |
| European Starling           | 820  | 522  | 828  | 787  | 881  |
| American Pipit              | 0    | 4    | 5    | 0    | 0    |
| Sprague's Pipit             | 0    | 2    | 0    | 0    | 0    |
| Cedar Waxwing               | 12   | 3    | 8    | 18   | 7    |
| Orange-crowned Warbler      | 6    | 9    | 3    | 4    | 5    |
| Virginia's Warbler          | 0    | 0    | 0    | 0    | 0    |
| Yellow Warbler              | 341  | 366  | 356  | 388  | 399  |
| Chestnut-sided Warbler      | 0    | 0    | 0    | 0    | 1    |
| Myrtle Warbler              | 0    | 0    | 0    | 0    | 0    |
| Audubon's Warbler           | 248  | 277  | 272  | 233  | 280  |
| Yellow-rumped Warbler       | 0    | 0    | 0    | 0    | 0    |
| Black-throated Gray Warbler | 0    | 0    | 0    | 0    | 0    |
| Townsend's Warbler          | 0    | 0    | 0    | 0    | 0    |

| Species List                  | 2004 | 2005 | 2006 | 2007 | 2008 |
|-------------------------------|------|------|------|------|------|
| American Redstart             | 32   | 35   | 3    | 31   | 52   |
| Ovenbird                      | 57   | 67   | 2    | 67   | 84   |
| Northern Waterthrush          | 0    | 0    | 0    | 0    | 0    |
| MacGillivray's Warbler        | 48   | 32   | 30   | 39   | 30   |
| Common Yellowthroat           | 51   | 51   | 30   | 60   | 69   |
| Wilson's Warbler              | 14   | 23   | 9    | 4    | 9    |
| Yellow-breasted Chat          | 14   | 25   | 31   | 36   | 12   |
| Western Tanager               | 92   | 59   | 65   | 117  | 70   |
| Green-tailed Towhee           | 186  | 251  | 205  | 121  | 186  |
| Spotted Towhee                | 122  | 100  | 76   | 83   | 111  |
| Eastern Towhee                | 0    | 2    | 0    | 0    | 0    |
| Cassin's Sparrow              | 0    | 0    | 1    | 0    | 3    |
| Chipping Sparrow              | 282  | 306  | 226  | 308  | 292  |
| Clay-colored Sparrow          | 45   | 20   | 23   | 35   | 21   |
| Brewer's Sparrow              | 818  | 916  | 870  | 842  | 864  |
| Field Sparrow                 | 5    | 4    | 5    | 17   | 0    |
| Vesper Sparrow                | 1231 | 1108 | 1163 | 1045 | 1040 |
| Lark Sparrow                  | 219  | 382  | 210  | 227  | 283  |
| Sage Sparrow                  | 222  | 225  | 260  | 123  | 301  |
| Lark Bunting                  | 1640 | 1297 | 1458 | 1250 | 1814 |
| Savannah Sparrow              | 143  | 237  | 276  | 215  | 211  |
| Grasshopper Sparrow           | 36   | 43   | 114  | 88   | 103  |
| Baird's Sparrow               | 0    | 0    | 6    | 6    | 0    |
| Nelson's Sharp-tailed Sparrow | 0    | 0    | 0    | 1    | 0    |
| Fox Sparrow                   | 8    | 8    | 11   | 15   | 6    |
| Song Sparrow                  | 145  | 173  | 135  | 124  | 121  |
| Lincoln's Sparrow             | 45   | 107  | 73   | 96   | 86   |
| White-crowned Sparrow         | 66   | 117  | 62   | 72   | 84   |
| Oregon Junco                  | 92   | 102  | 53   | 117  | 72   |
| Pink-sided Junco              | 40   | 49   | 86   | 75   | 37   |
| White-winged Junco            | 74   | 28   | 0    | 49   | 49   |
| Gray-headed Junco             | 7    | 16   | 3    | 16   | 23   |
| Dark-eyed Junco               | 87   | 90   | 107  | 10   | 51   |
| McCown's Longspur             | 34   | 76   | 99   | 38   | 48   |

| <b>Species List</b>                   | <b>2004</b>  | <b>2005</b>  | <b>2006</b>  | <b>2007</b>  | <b>2008</b>  |
|---------------------------------------|--------------|--------------|--------------|--------------|--------------|
| Chestnut-collared Longspur            | 28           | 51           | 7            | 9            | 5            |
| Black-headed Grosbeak                 | 40           | 32           | 34           | 44           | 34           |
| Blue Grosbeak                         | 5            | 4            | 9            | 15           | 8            |
| Lazuli Bunting                        | 22           | 9            | 14           | 7            | 17           |
| Indigo Bunting                        | 0            | 0            | 0            | 0            | 1            |
| Dickcissel                            | 2            | 0            | 41           | 0            | 0            |
| Bobolink                              | 0            | 11           | 26           | 21           | 26           |
| Red-winged Blackbird                  | 1199         | 1363         | 1780         | 1639         | 1557         |
| Western Meadowlark                    | 3320         | 4138         | 3784         | 4159         | 3864         |
| Yellow-headed Blackbird               | 94           | 53           | 161          | 117          | 63           |
| Brewer's Blackbird                    | 1138         | 854          | 1137         | 940          | 1018         |
| Great-tailed Grackle                  | 0            | 0            | 0            | 5            | 0            |
| Common Grackle                        | 251          | 310          | 555          | 345          | 365          |
| Brown-headed Cowbird                  | 287          | 373          | 581          | 326          | 337          |
| Orchard Oriole                        | 2            | 2            | 1            | 0            | 6            |
| Bullock's Oriole                      | 78           | 90           | 87           | 71           | 129          |
| Baltimore Oriole                      | 0            | 0            | 0            | 0            | 0            |
| Unidentif. Baltimore/Bullock's Oriole | 0            | 0            | 0            | 0            | 0            |
| Gray-crowned Rosy-Finch               | 0            | 0            | 0            | 0            | 0            |
| Black Rosy-Finch                      | 3            | 0            | 5            | 0            | 0            |
| Pine Grosbeak                         | 5            | 1            | 5            | 4            | 3            |
| Cassin's Finch                        | 29           | 53           | 40           | 38           | 21           |
| House Finch                           | 12           | 22           | 23           | 25           | 12           |
| Red Crossbill                         | 134          | 159          | 63           | 89           | 49           |
| White-winged Crossbill                | 0            | 0            | 2            | 0            | 0            |
| Pine Siskin                           | 273          | 335          | 155          | 243          | 234          |
| Lesser Goldfinch                      | 3            | 0            | 0            | 0            | 0            |
| American Goldfinch                    | 96           | 115          | 86           | 119          | 106          |
| Evening Grosbeak                      | 0            | 0            | 0            | 0            | 0            |
| House Sparrow                         | 167          | 174          | 365          | 359          | 328          |
| <i>Total Number of Species</i>        | <i>193</i>   | <i>191</i>   | <i>186</i>   | <i>192</i>   | <i>195</i>   |
| <i>Total Number of Individuals</i>    | <i>26646</i> | <i>29687</i> | <i>32814</i> | <i>29912</i> | <i>30847</i> |
| <i>Number of Routes Conducted</i>     | <i>56</i>    | <i>62</i>    | <i>61</i>    | <i>55</i>    | <i>63</i>    |

**Table 8. Breeding Bird Survey time line, 1968-1980. Names under the years are the observers who conducted the routes. Years that routes were not conducted are left blank.**

| Route Number | Route Name        | 1968   | 1969   | 1970      | 1971      | 1972      | 1973      | 1974     | 1975     | 1976     | 1977    | 1978    | 1979    | 1980                    |
|--------------|-------------------|--------|--------|-----------|-----------|-----------|-----------|----------|----------|----------|---------|---------|---------|-------------------------|
| 1            | NE Entrance (VNP) |        |        |           |           |           |           |          |          |          |         |         |         |                         |
| 2            | Cody              |        |        |           |           |           |           |          |          |          |         |         |         | McGough                 |
| 3            | Otto              |        |        | Kessinger | Kessinger | Kessinger | Kessinger | Dominick | Dominick | Dominick |         |         |         |                         |
| 4            | Basin             |        |        | Kessinger | Kessinger | Kessinger | Kessinger | Dominick |          |          |         |         |         |                         |
| 5            | Wyarno            |        |        |           |           |           |           | Hall     | Hall     | Downing  | Downing | Downing | Downing | Downing                 |
| 6            | Clarkelken        | Hall   |        | Kessinger | Kessinger | Spring    |           | Downing  | Downing  | Downing  | Downing | Downing | Downing | CHANGED TO #206 IN 1979 |
| 7            | Sundance          |        |        |           |           |           |           |          | Downing  | Downing  | Downing | Downing | Downing | Downing                 |
| 8            | Collier Bay       | Scott  | Scott  | Scott     | Scott     | Scott     | Scott     | Scott    | Scott    | Scott    | Scott   | Scott   | Scott   | Scott                   |
| 9            | Dubois            | Back   | Back   | Back      | Back      | Back      | Back      | Back     | Back     | Back     | Back    | Back    | Back    | Back                    |
| 10           | Midvale           |        |        |           |           |           |           | Back     | Back     | Back     |         |         |         |                         |
| 11           | Nowood            |        |        |           |           |           |           |          |          |          |         |         |         |                         |
| 12           | Natrona           | Scott  | Scott  | Scott     | Scott     | Scott     | Scott     | Scott    | Scott    | Scott    | Scott   | Scott   | Scott   | Scott                   |
| 13           | Bill              |        |        |           |           |           |           | Tate     |          |          |         |         |         |                         |
| 14           | Redbird           | Scott  | Scott  | Scott     | Scott     | Scott     | Scott     | Scott    | Scott    | Scott    | Scott   | Scott   | Scott   | Scott                   |
| 15           | Fontenelle        |        |        |           |           |           |           |          |          |          |         |         |         |                         |
| 16           | Elk Horn          |        |        |           |           |           |           |          |          |          |         |         |         |                         |
| 17           | Bear Creek        | Layton | Layton | Layton    | Layton    | Layton    | Layton    | Layton   | Layton   | Layton   | Layton  | Layton  | Layton  | Layton                  |
| 18           | Ervay             |        |        |           |           |           |           | Layton   | Layton   | Layton   | Layton  | Layton  | Layton  | Layton                  |
| 19           | Brookhurst        | Scott  | Scott  | Scott     | Scott     | Scott     | Scott     | Scott    | Scott    | Scott    | Scott   | Scott   | Scott   | Scott                   |
| 20           | Glenrock          | Layton | Layton | Layton    | Layton    | Layton    | Layton    | Layton   | Layton   | Layton   | Layton  | Layton  | Layton  | CHANGED TO #120 IN 1978 |
| 21           | Dwyer             |        |        |           |           |           |           |          |          |          |         |         |         |                         |
| 22           | Cumberland        |        |        |           |           |           |           |          |          |          |         | June    | June    | June                    |
| 23           | McKinnon          |        | Layton | Layton    | Layton    | Layton    | Layton    | Layton   | Layton   | June     | June    | June    | June    | June                    |
| 24           | Patrick Draw      |        |        |           |           |           |           | Layton   | Layton   | June     | June    | June    | June    | June                    |
| 25           | Savery            |        |        |           |           |           |           |          |          |          |         |         |         |                         |

| Route Number | Route Name       | 1968                | 1969        | 1970        | 1971        | 1972        | 1973 | 1974   | 1975 | 1976   | 1977   | 1978  | 1979    | 1980      |
|--------------|------------------|---------------------|-------------|-------------|-------------|-------------|------|--------|------|--------|--------|-------|---------|-----------|
| 26           | Riverside        | J & W Green         | J & W Green | J & W Green | J & W Green | J & W Green |      |        |      |        |        |       |         |           |
| 27           | Buford           |                     |             |             |             |             |      | Spring |      | Spring | Spring | Dom   | Dom     | Dom       |
| 28           | Yoder            | W. Green            | W. Green    | W. Green    | W. Green    | W. Green    |      |        |      |        |        |       | Luce    | Luce      |
| 29           | Canyon (YNP)     |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 30           | Mammoth (YNP)    |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 31           | West Thumb (YNP) | ROUTE NO LONGER RUN |             |             |             |             |      |        |      |        |        |       |         |           |
| 32           | Hunter Peak      |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 33           | Clark            |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 35           | Frannie          |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 36           | Moose            |                     |             |             |             |             |      |        |      | Scott  | Scott  | Scott | Scott   | Scott     |
| 37           | Lovell           |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 38           | Meeteetse        |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 39           | Ten Sleep        |                     |             |             |             |             |      |        |      |        |        |       |         | Hanebury  |
| 40           | Dayton           |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 41           | Bald Mountain    |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 42           | Crazy Woman      |                     |             |             |             |             |      |        |      |        |        |       | Daly    | Daly      |
| 43           | Schoonover       |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 44           | Arvada           |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 45           | Recluse          |                     |             |             |             |             |      |        |      |        |        |       |         | Pallister |
| 46           | Soda Well        |                     |             |             |             |             |      |        |      |        |        |       | Daly    | Daly      |
| 47           | Piney            |                     |             |             |             |             |      |        |      |        |        |       |         | Pallister |
| 48           | Seely            |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 49           | Upton            |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 50           | Moskee           |                     |             |             |             |             |      |        |      |        |        |       |         | Faanes    |
| 51           | Alpine           |                     |             |             |             |             |      |        |      |        |        |       | Oakleaf | Oakleaf   |
| 52           | Wilson           |                     |             |             |             |             |      |        |      |        |        |       | Raynes  | Raynes    |
| 53           | Horse Creek      |                     |             |             |             |             |      |        |      |        |        |       |         | Mikol     |
| 55           | Crowheart        |                     |             |             |             |             |      |        |      |        |        |       |         |           |
| 56           | Ethete           |                     |             |             |             |             |      |        |      |        |        |       |         |           |

| Route Number | Route Name    | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978    | 1979    | 1980     |
|--------------|---------------|------|------|------|------|------|------|------|------|------|------|---------|---------|----------|
| 57           | Anchor        |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 58           | Gabo          |      |      |      |      |      |      |      |      |      |      |         |         | Baggs    |
| 59           | Arminto       |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 60           | Lysite        |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 61           | Worland       |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 62           | Teapot Dome   |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 63           | Mayoworth     |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 64           | Sussex        |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 65           | Harland Flats |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 66           | Pine Tree     |      |      |      |      |      |      |      |      |      |      |         |         | Gasson   |
| 67           | Highlight     |      |      |      |      |      |      |      |      |      |      |         |         | Gasson   |
| 68           | Riverview     |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 69           | Newcastle     |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 70           | Raven         |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 71           | Soda Lake     |      |      |      |      |      |      |      |      |      |      |         |         | Johnson  |
| 72           | Buckskin Mtn. |      |      |      |      |      |      |      |      |      |      |         |         | Johnson  |
| 73           | Daniel        |      |      |      |      |      |      |      |      |      |      |         |         | Johnson  |
| 74           | Boulder       |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 75           | Big Sandy     |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 76           | Fairson       |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 77           | Fiddler Lake  |      |      |      |      |      |      |      |      |      |      | Oakleaf | Oakleaf |          |
| 78           | Sand Draw     |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 79           | Sweetwater    |      |      |      |      |      |      |      |      |      |      |         |         | Emmerich |
| 80           | Gas Hills     |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 81           | Bairoil       |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 82           | Lamont        |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 83           | Pathfinder    |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 84           | Leo           |      |      |      |      |      |      |      |      |      |      |         |         |          |
| 85           | Shirley       |      |      |      |      |      |      |      |      |      |      |         | Bohne   | Bohne    |
| 86           | Warbonnet     |      |      |      |      |      |      |      |      |      |      |         |         |          |

| Route Number | Route Name     | 1968                | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978   | 1979     | 1980       |
|--------------|----------------|---------------------|------|------|------|------|------|------|------|------|------|--------|----------|------------|
| 87           | Fletcher Park  |                     |      |      |      |      |      |      |      |      |      |        | Rothwell |            |
| 88           | Shawnee        |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 89           | Meadowdale     |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 90           | Lusk           |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 91           | Lingje         |                     |      |      |      |      |      |      |      |      |      |        |          | Rothwell   |
| 92           | Diamondville   | ROUTE NO LONGER RUN |      |      |      |      | June |      |      |      | June | June   | June     | June       |
| 93           | Mountain View  |                     |      |      |      |      |      |      |      |      |      |        |          | June       |
| 95           | Green River    |                     |      |      |      |      | June |      |      |      | June | June   | June     | June       |
| 96           | Reliance       |                     |      |      |      |      | June |      |      |      | June | June   | June     | June       |
| 97           | Rock Springs   |                     |      |      |      |      | June |      |      |      | June | June   | June     | June       |
| 98           | Black Rock     |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 101          | Wamsutter      |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 102          | Rawlins        |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 103          | Baggs          |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 104          | Walcott        |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 105          | Fox Park       |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 106          | Ryan Park      |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 107          | Sybilie Canyon |                     |      |      |      |      |      |      |      |      |      |        |          | McAdams    |
| 108          | Rock River     |                     |      |      |      |      |      |      |      |      |      |        |          | Bohne      |
| 109          | Harmony        |                     |      |      |      |      |      |      |      |      |      |        |          | Floyd      |
| 110          | Cheyenne       |                     |      |      |      |      |      |      |      |      |      |        | Rothwell | Rothwell   |
| 111          | Chugwater      |                     |      |      |      |      |      |      |      |      |      |        |          | Strickland |
| 112          | Pine Bluff     |                     |      |      |      |      |      |      |      |      |      | Layton | Layton   | Layton     |
| 120          | Welch          |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 123          | Flaming Gorge  |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 147          | Rozet          |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 173          | Ryegrass       |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 195          | Seedskaadee    |                     |      |      |      |      |      |      |      |      |      |        |          |            |
| 206          | Caballa Creek  |                     |      |      |      |      |      |      |      |      |      |        |          |            |

| Route Number | Route Name          | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|--------------|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 900          | Hayden Valley (YNP) |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 901          | Yellowstone (YNP)   |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 902          | Prior Flats         |      |      |      |      |      |      |      |      |      |      |      |      |      |

**Table 9. Breeding Bird Survey time line, 1981-1990. Names under the years are the observers who conducted the routes. Year 1981 routes conducted by the same observer as in 1980 have two dashes before the observer's name. Years that routes were not conducted are left blank.**

| Route Number | Route Name        | 1981                    | 1982       | 1983       | 1984     | 1985     | 1986       | 1987     | 1988                    | 1989        | 1990     |  |
|--------------|-------------------|-------------------------|------------|------------|----------|----------|------------|----------|-------------------------|-------------|----------|--|
| 1            | NE Entrance (YNP) |                         | Bystrak    |            |          |          |            |          |                         |             |          |  |
| 2            | Cody              |                         |            |            |          |          |            |          |                         |             |          |  |
| 3            | Otto              | --McGough               |            | Steller    | Steller  | Steller  | Steller    | Steller  | Steller                 | Steller     | Steller  |  |
| 4            | Basin             | --Raper                 | Raper      | Steller    | Steller  | Steller  | Steller    | Steller  | Steller                 | Steller     | Steller  |  |
| 5            | Wyarno            | --Downing               | Eads       | Jackson    | Jackson  | Jackson  | Downing    | Downing  | Berry                   | Berry       | Berry    |  |
| 6            | Clarkelen         | CHANGED TO #206 IN 1979 |            |            |          |          |            |          |                         |             |          |  |
| 7            | Sundance          |                         | J. Adams   | J. Adams   | J. Adams | J. Adams | J. Adams   | J. Adams | J. Adams                | J. Adams    | J. Adams |  |
| 8            | Colter Bay        |                         |            |            |          |          |            |          |                         | Wallen      | Wallen   |  |
| 9            | Dubois            | Merrifield              | Merrifield | Merrifield | Abbott   | Abbott   | Abbott     | Abbott   | Abbott                  | Wimpfheimer | Abbott   |  |
| 10           | Midvale           |                         |            |            |          |          |            | Ritter   | Ritter                  | Ryder       | Ryder    |  |
| 11           | Nowood            |                         |            |            |          |          |            |          | Means                   |             | Means    |  |
| 12           | Natrona           | Herold                  | Herold     | Herold     | Herold   | Herold   | Herold     | Herold   | Herold                  | Herold      | Herold   |  |
| 13           | Bill              |                         |            |            |          |          |            |          |                         |             |          |  |
| 14           | Redbird           | --Scott                 | Scott      | Scott      | Scott    | Scott    | Scott      | Scott    | Scott                   | Scott       | Scott    |  |
| 15           | Fontenelle        |                         | Row        | Row        | Row      | Row      | Luce       | Luce     | Luce                    | Baker       |          |  |
| 16           | Elk Horn          |                         |            |            |          |          |            |          | Kinter                  |             | Kinter   |  |
| 17           | Bear Creek        | --Layton                | Layton     | Layton     | Layton   | Layton   | Layton     | Layton   | Layton                  | Layton      | Layton   |  |
| 18           | Ervey             | --Layton                | Layton     | Layton     | Layton   | Layton   | Layton     | Layton   | Layton                  | Layton      | Layton   |  |
| 19           | Brookhurst        | --Scott                 | Scott      | Scott      | Scott    | Scott    | Scott      | Scott    | Scott                   | South       |          |  |
| 20           | Glenrock          | CHANGED TO #120 IN 1978 |            |            |          |          |            |          |                         |             |          |  |
| 21           | Dwyer             |                         |            |            |          |          |            |          |                         |             |          |  |
| 22           | Cumberland        | --June                  | June       |            |          |          |            |          | Luce                    |             |          |  |
| 23           | McKinnon          | --June                  | June       | June       |          |          | Kesselheim |          | CHANGED TO #123 IN 1988 |             |          |  |
| 24           | Patrick Draw      | --June                  | Hays       | June       | June     | June     | Jahnke     | Jahnke   | Jahnke                  | Raper       |          |  |

| Route Number | Route Name       | 1981        | 1982       | 1983                | 1984    | 1985                    | 1986        | 1987        | 1988        | 1989        | 1990        |
|--------------|------------------|-------------|------------|---------------------|---------|-------------------------|-------------|-------------|-------------|-------------|-------------|
| 25           | Savery           |             |            |                     |         |                         |             |             | Jahnke      | Filton      |             |
| 26           | Riverside        |             |            |                     |         |                         |             |             |             | Straw       | Straw       |
| 27           | Buford           |             |            |                     |         |                         |             |             |             |             |             |
| 28           | Yoder            | --Luce      | Luce       |                     |         |                         | J. Lawrence |
| 29           | Canyon (YNP)     |             | Bystrak    | ROUTE NO LONGER RUN |         |                         |             |             |             |             |             |
| 30           | Mammoth (YNP)    |             | Gniadek    | Gniadek             |         | Zarki                   | Zarki       | Zarki       | Zarki       | Zarki       | Zarki       |
| 31           | West Thumb (YNP) |             | Bystrak    | ROUTE NO LONGER RUN |         |                         |             |             |             |             |             |
| 32           | Hunter Peak      |             | Bystrak    | Holmes              |         |                         | K. Hicks    |             | K. Hicks    | K. Hicks    | K. Hicks    |
| 33           | Clark            |             |            |                     |         |                         |             |             |             |             | K. Hicks    |
| 35           | Frannie          |             |            |                     |         |                         |             |             |             | Bryant      |             |
| 36           | Moose            | --Scott     | Scott      | Scott               | Scott   | Herold                  | South       | South       | South       | South       | South       |
| 37           | Lovell           |             |            |                     |         |                         |             |             |             | Peters      | Peters      |
| 38           | Meeteetse        |             |            |                     |         |                         |             |             |             |             |             |
| 39           | Ten Sleep        |             |            |                     |         |                         |             |             |             |             |             |
| 40           | Dayton           | --Hanebury  | Hanebury   | Hanebury            | Downing | Downing                 | Downing     | Downing     | Johnson     | Johnson     | Daly        |
| 41           | Bald Mountain    |             |            |                     |         |                         |             |             |             |             | Roney       |
| 42           | Crazy Woman      | --Daly      | Daly       | Daly                | Daly    | Daly                    | Daly        | Daly        | Daly        | Daly        | Posner      |
| 43           | Schoonover       |             | Pallister  |                     |         |                         | Pallister   | Pallister   | Pallister   | Pallister   | Pallister   |
| 44           | Arvada           |             | Segerstrom | Segerstrom          |         |                         | Segerstrom  | Daly        | Daly        | Daly        | Daly        |
| 45           | Recluse          |             | Segerstrom | Segerstrom          |         |                         | Segerstrom  | Burton      | Burton      |             | Oedekoven   |
| 46           | Soda Well        | --Daly      | Daly       | Daly                |         |                         | Ernst       | Ernst       | Ernst       | Ernst       | Ernst       |
| 47           | Piney            | --Pallister | Gasson     | Segerstrom          |         |                         | Winland     | Winland     | Winland     | Winland     | Winland     |
| 48           | Seely            |             |            |                     |         |                         |             |             |             |             | Droege      |
| 49           | Upton            |             |            |                     |         |                         |             | Ryder       | Ryder       | Lanka       |             |
| 50           | Moskee           |             | Bystrak    |                     |         |                         | J. Adams    |
| 51           | Alpine           |             |            |                     |         |                         |             |             |             | Luce        | Luce        |
| 52           | Wilson           | --Raynes    | Glen       | Raynes              | Raynes  | Raynes                  | Duffy       | Duffy       | Duffy       | Duffy       | Duffy       |
| 53           | Horse Creek      |             | Mikol      | Mikol               | Mikol   | Ritter (formerly Mikol) | Ritter      | Ritter      | Ritter      | Ritter      | Ritter      |

| Route Number | Route Name    | 1981       | 1982     | 1983       | 1984     | 1985     | 1986     | 1987      | 1988      | 1989                    | 1990     |
|--------------|---------------|------------|----------|------------|----------|----------|----------|-----------|-----------|-------------------------|----------|
| 55           | Crowheart     |            |          |            |          |          |          | Reid      |           |                         |          |
| 56           | Ethete        |            |          |            |          |          |          |           |           |                         |          |
| 57           | Anchor        |            |          |            |          |          |          |           |           |                         |          |
| 58           | Gabo          | --Baggs    |          | Lawson     |          |          |          |           | Fuchs     |                         |          |
| 59           | Arminto       |            | Pate     | Pate       |          | Pate     |          | Guenzel   | Guenzel   | Guenzel                 | Guenzel  |
| 60           | Lysite        |            |          |            |          |          |          |           |           | Ryder                   | Ryder    |
| 61           | Worland       |            |          |            |          |          |          |           |           |                         |          |
| 62           | Teapot Dome   | Pate       | Pate     | Pate       |          |          |          | Guenzel   | Guenzel   | Guenzel                 | Guenzel  |
| 63           | Mayoworth     |            | Talbot   | Luce       | Luce     | Luce     |          | Bjerke    | Bjerke    | Johnson                 | Bjerke   |
| 64           | Sussex        |            |          |            |          |          |          |           |           |                         |          |
| 65           | Harland Flats |            |          |            |          |          |          |           |           |                         | Cerovski |
| 66           | Pine Tree     | --Gasson   |          | Segerstrom |          |          |          | Hurley    | Johnson   |                         | Leggett  |
| 67           | Highlight     | --Gasson   | Gasson   | Segerstrom |          |          |          | Hurley    |           | Oelklaus                | Oelklaus |
| 68           | Riverview     |            | Fuchs    | Fuchs      | Fuchs    |          |          | Helms     | Helms     | Helms                   | Helms    |
| 69           | Newcastle     |            |          |            |          |          |          |           | Ryder     | Lanka                   | J. Adams |
| 70           | Raven         |            |          |            |          |          |          |           |           |                         |          |
| 71           | Soda Lake     | --Johnson  | Johnson  | Johnson    | Johnson  |          |          |           | Wollrab   |                         | Smith    |
| 72           | Buckskin Mtn. | --Johnson  | Johnson  |            |          |          |          |           |           |                         |          |
| 73           | Daniel        | --Johnson  | Johnson  | Johnson    | Johnson  |          |          |           | Wollrab   | CHANGED TO #173 IN 1988 |          |
| 74           | Boulder       |            | Row      | Row        | Row      |          |          |           |           |                         |          |
| 75           | Big Sandy     |            |          | Straley    |          |          |          | Straley   | Straley   | Fralick                 | Fralick  |
| 76           | Farson        |            |          | June       |          |          |          |           |           |                         |          |
| 77           | Fiddler Lake  |            | Oakleaf  |            |          |          |          | Bellitsky | Bellitsky |                         | Nelson   |
| 78           | Sand Draw     |            |          |            |          |          |          |           |           |                         |          |
| 79           | Sweetwater    | --Emmerich | Emmerich | Emmerich   | Emmerich | Emmerich | Emmerich | Emmerich  | Emmerich  | Emmerich                | Emmerich |
| 80           | Gas Hills     |            |          |            |          |          |          |           |           |                         |          |
| 81           | Bairoil       |            |          |            |          |          |          |           | Bredehoft |                         | Hiatt    |
| 82           | Lamont        |            |          |            |          |          |          | Hiatt     | Hiatt     | Hiatt                   | Hiatt    |

| Route Number | Route Name     | 1981       | 1982       | 1983                | 1984     | 1985     | 1986                    | 1987    | 1988     | 1989        | 1990         |
|--------------|----------------|------------|------------|---------------------|----------|----------|-------------------------|---------|----------|-------------|--------------|
| 83           | Pathfinder     |            | Pate       | Pate                | Pate     |          |                         | Guenzel | Guenzel  | Guenzel     | Guenzel      |
| 84           | Leo            |            | Gilbert    |                     |          |          |                         |         |          |             |              |
| 85           | Shirley        | Hays       |            |                     |          |          |                         |         |          | Luce        | Rudd         |
| 86           | Warbonnet      |            |            |                     |          |          |                         |         |          |             | Droege       |
| 87           | Fletcher Park  | Rothwell   | Rothwell   | Rothwell            | Rothwell | Rothwell | Rothwell                |         | Helms    | G. Lawrence | G. Lawrence  |
| 88           | Shawnee        |            |            |                     |          |          |                         |         | Helms    | Helms       | Helms        |
| 89           | Meadowdale     |            |            | Hymas               | Hymas    | Hymas    |                         |         |          | Filton      | Ritter       |
| 90           | Lusk           |            | Fuchs      | Fuchs               | Fuchs    |          |                         | Helms   | Helms    | Helms       | Helms        |
| 91           | Lingle         | --Rothwell | Rothwell   | Rothwell            | Rothwell | Rothwell | Stroud                  | Straw   | Lockwood | Lockwood    | Howe         |
| 92           | Diamondville   | --June     | Hays       | ROUTE NO LONGER RUN |          |          |                         |         |          |             |              |
| 93           | Mountain View  | --June     | June       | June                |          |          |                         | Luce    |          | Deen        |              |
| 95           | Green River    | --June     | June       | Luke                | Luke     |          | CHANGED TO #195 IN 1986 |         |          |             |              |
| 96           | Reliance       | --June     | Hays       | Luke                | Luke     |          |                         |         |          |             |              |
| 97           | Rock Springs   | --June     | June       | June                |          |          |                         | Raper   | Raper    | Raper       | Luke         |
| 98           | Black Rock     |            |            |                     |          |          |                         |         |          |             | Christiansen |
| 101          | Wamsutter      |            |            |                     |          |          |                         |         |          |             | Jahnke       |
| 102          | Rawlins        |            |            |                     |          |          |                         |         | Rinkes   | Rinkes      | Rinkes       |
| 103          | Baggs          |            |            |                     |          |          | Moody                   |         | Jahnke   | Longobardi  | Longobardi   |
| 104          | Walcott        |            | Long       |                     |          | Long     |                         |         |          | Parks       | Long         |
| 105          | Fox Park       |            |            |                     |          |          |                         |         |          |             |              |
| 106          | Ryan Park      |            |            |                     |          |          |                         |         |          |             |              |
| 107          | Sybilie Canyon |            |            |                     |          |          |                         |         |          | Ritter      | Mobley       |
| 108          | Rock River     |            |            |                     |          |          |                         |         |          |             | Oneale       |
| 109          | Harmony        | Hays       | Bystrak    |                     |          |          |                         | Bohne   | Bohne    | Bohne       | Bohne        |
| 110          | Cheyenne       | --Floyd    |            | Hill                | Hill     | Hill     | Hill                    | Hill    | Hill     | Hill        | Hill         |
| 111          | Chugwater      | --Rothwell | Rothwell   | Rothwell            | Rothwell | Rothwell | Bohne                   |         |          | Rothwell    |              |
| 112          | Pine Bluff     | Strickland | Strickland | Strickland          | Wollrab  |          |                         |         |          | Samuelson   | Samuelson    |
| 120          | Welch          | --Layton   | Layton     | Layton              | Layton   | Layton   | Layton                  | Layton  | Layton   | Layton      | Layton       |

| Route Number | Route Name          | 1981 | 1982 | 1983 | 1984 | 1985  | 1986     | 1987  | 1988                | 1989  | 1990         |
|--------------|---------------------|------|------|------|------|-------|----------|-------|---------------------|-------|--------------|
| 123          | Flaming Gorge       |      |      |      |      |       |          |       | Christiansen        |       | Christiansen |
| 147          | Rozet               |      |      |      |      |       |          |       |                     |       |              |
| 173          | Ryegrass            |      |      |      |      |       |          |       |                     |       | Wollrab      |
| 195          | Seedskadee          |      |      |      |      |       | M. Adams |       |                     |       |              |
| 206          | Caballa Creek       |      |      |      |      |       |          |       |                     |       |              |
| 900          | Hayden Valley (YNP) |      |      |      |      | Zarki | Zarki    | Zarki | ROUTE NO LONGER RUN |       |              |
| 901          | Yellowstone (YNP)   |      |      |      |      |       |          |       | Zarki               | Zarki | Zarki        |
| 902          | Prior Flats         |      |      |      |      |       |          |       |                     |       |              |

**Table 10. Breeding Bird Survey time line, 1991-2000. Names under the years are the observers who conducted the routes. Year 1991 routes conducted by the same observer as in 1990 have two dashes before the observer's name. Years that routes were not conducted are left blank.**

| Route Number | Route Name        | 1991                    | 1992                    | 1993                    | 1994     | 1995     | 1996      | 1997       | 1998       | 1999       | 2000                    |  |  |
|--------------|-------------------|-------------------------|-------------------------|-------------------------|----------|----------|-----------|------------|------------|------------|-------------------------|--|--|
| 1            | NE Entrance (YNP) | --Nutting               | Nutting                 | Nutting                 |          | Nutting  |           | McEneaney  | McEneaney  | McEneaney  | McEneaney               |  |  |
| 2            | Cody              | --Greenquist            |                         | Nutting                 | Nutting  | Nutting  | Nutting   | Nutting    | Nutting    | Nutting    | Nutting                 |  |  |
| 3            | Otto              | --Steller               | Stephens                | Stephens                | Stephens | Stephens | Stephens  | Stephens   |            |            |                         |  |  |
| 4            | Basin             | --Steller               | Easterly                | Easterly                | Easterly | Easterly | Easterly  | Easterly   | Easterly   |            |                         |  |  |
| 5            | Wyarno            | --Berry                 | Berry                   | Berry                   | Berry    | Berry    | Berry     | Berry      | Berry      | Berry      | Berry                   |  |  |
| 6            | Clarkelien        | CHANGED TO #206 IN 1979 |                         |                         |          |          |           |            |            |            |                         |  |  |
| 7            | Sundance          | Yemington               | J. Adams                | J. Adams                | J. Adams | J. Adams | J. Adams  | J.J. Adams | J.J. Adams | J.J. Adams | J.J. Adams              |  |  |
| 8            | Colter Bay        | --Wallen                | Wallen                  | Wallen                  | Wallen   | Wallen   | Duffy     | Duffy      | Duffy      | S. Patta   | CHANGED TO #208 IN 2000 |  |  |
| 9            | Dubois            | --Abbott                | Abbott                  | Abbott                  | Abbott   |          | Vernon    | Vernon     |            |            |                         |  |  |
| 10           | Midvale           | --Ryder                 |                         | Ryder                   | Ryder    | Ryder    | Hnilicka  | Hnilicka   | Hnilicka   | Hnilicka   | Hnilicka                |  |  |
| 11           | Nowood            |                         |                         | Walgren                 | Walgren  | Walgren  | Walgren   | Walgren    | Walgren    | Walgren    | Walgren                 |  |  |
| 12           | Natrona           | --Herold                | Herold                  | CHANGED TO #212 IN 1993 |          |          |           |            |            |            |                         |  |  |
| 13           | Bill              |                         | Picken                  | Picken                  |          |          | Bartosiak | Bartosiak  | Bartosiak  | Buckman    | Buckman                 |  |  |
| 14           | Redbird           |                         | CHANGED TO #214 IN 1994 |                         |          |          |           |            |            |            |                         |  |  |
| 15           | Fontenelle        | Leabt                   | Deno                    | Deno                    | Deno     | Deno     | Deno      | Deno       | Deno       | Deno       | Deno                    |  |  |
| 16           | Elk Horn          |                         |                         | Gunyan                  |          |          |           |            |            |            |                         |  |  |
| 17           | Bear Creek        | --Layton                | Layton                  |                         |          |          | Cerovski  | Cerovski   | Cerovski   | Cerovski   | Cerovski                |  |  |
| 18           | Ervey             |                         |                         |                         |          |          |           |            |            |            |                         |  |  |
| 19           | Brookhurst        | Scott                   |                         | Patterson               |          | Walgren  | Walgren   | Walgren    | Walgren    | Walgren    | Walgren                 |  |  |
| 20           | Glenrock          | CHANGED TO #120 IN 1978 |                         |                         |          |          |           |            |            |            |                         |  |  |
| 21           | Dwyer             |                         | Lutz                    |                         | Roberts  | Roberts  | Felley    |            |            |            |                         |  |  |
| 22           | Cumberland        |                         | Deno                    | Deno                    | Deno     | Deno     | Deno      | Deno       | Deno       | Deno       | Deno                    |  |  |
| 23           | MckInnon          | CHANGED TO #123 IN 1988 |                         |                         |          |          |           |            |            |            |                         |  |  |
| 24           | Patrick Draw      | --Raper                 | Raper                   |                         | Cerovski | Cerovski | Cerovski  | Cerovski   | Cerovski   | Cerovski   | Van Fleet               |  |  |

| Route Number | Route Name       | 1991                    | 1992        | 1993        | 1994        | 1995        | 1996        | 1997        | 1998        | 1999        | 2000        |
|--------------|------------------|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 25           | Savery           |                         | Michelson   | Michelson   |             | Michelson   |             |             |             |             |             |
| 26           | Riverside        | --Straw                 |             | Straw       | Straw       | Straw       |             | Loose       | Loose       | Loose       | Loose       |
| 27           | Buford           |                         |             | Johnson     | Johnson     | Johnson     | Johnson     | Johnson     | Johnson     |             | Johnson     |
| 28           | Yoder            | --J. Lawrence           | J. Lawrence | J. Lawrence | J. Lawrence | J. Lawrence | J. Lawrence | J. Lawrence | J. Lawrence | J. Lawrence | J. Lawrence |
| 29           | Canyon (YNP)     | ROUTE NO LONGER RUN     |             |             |             |             |             |             |             |             |             |
| 30           | Mammoth (YNP)    | McEneaney               | McEneaney   | McEneaney   | McEneaney   | McEneaney   | McEneaney   | McEneaney   | McEneaney   | McEneaney   | McEneaney   |
| 31           | West Thumb (YNP) | ROUTE NO LONGER RUN     |             |             |             |             |             |             |             |             |             |
| 32           | Hunter Peak      |                         | K. Hicks    |             | K. Hicks    |
| 33           | Clark            | Roop                    | Roop        |             | Roop        |             |             |             |             |             | K. Hicks    |
| 35           | Frannie          | Bryant                  |             |             |             | Wehrfritz   |             |             |             | B. Anderson | B. Anderson |
| 36           | Moose            | --South                 | South       |
| 37           | Lovell           | --Peters                | Peters      |
| 38           | Meeteetse        | Miller                  | Miller      | Miller      | Miller      | Miller      | Miller      | Miller      | Miller      | Miller      | Miller      |
| 39           | Ten Sleep        |                         |             |             |             | Ward        | Ward        | Ward        | Ward        |             |             |
| 40           | Dayton           | --Daly                  |             | H. Corbett  | H. Corbett  | H. Corbett  |             | H. Corbett  | H. Corbett  | H. Corbett  | H. Corbett  |
| 41           | Bald Mountain    | --Roney                 | Roney       | Roney       | Roney       | Roney       |             |             |             | Peters      | Peters      |
| 42           | Crazy Woman      | --Posner                | Posner      | Posner      | Posner      | Posner      |             |             | Nutting     | Nutting     | Nutting     |
| 43           | Schoonover       | --Pallister             | Pallister   | Pallister   | Pallister   | Pallister   |             |             | Ward        | Ward        | Ward        |
| 44           | Arvada           | --Daly                  |             | Daly        | Daly        | Ward        | Ward        | Ward        | Ward        | Ward        | Ward        |
| 45           | Recluse          | --Oedekoven             | Oedekoven   |
| 46           | Soda Well        | --Ernst                 | Ernst       |             |             |
| 47           | Piney            | CHANGED TO #147 IN 1991 |             |             |             |             |             |             |             |             |             |
| 48           | Seely            | Cerovski                | Yemington   |
| 49           | Upton            | Lanka                   | Talbot      | Brimeyer    | Dyksira     | Brimeyer    | Brimeyer    | G. Anderson | G. Anderson | G. Anderson | G. Anderson |
| 50           | Moskee           | Yemington               | J. Adams    |
| 51           | Alpine           |                         | Luce        | Wife        |
| 52           | Wilson           | --Duffy                 | Duffy       |             |             |
| 53           | Horse Creek      | --Ritter                | Ritter      | Crane       |
| 55           | Crowheart        |                         |             |             |             |             |             |             |             |             |             |

| Route Number | Route Name    | 1991       | 1992                    | 1993      | 1994      | 1995      | 1996      | 1997      | 1998      | 1999      | 2000      |
|--------------|---------------|------------|-------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 56           | Ethete        | Firchow    | Firchow                 | Firchow   | Firchow   | Firchow   |           |           |           |           |           |
| 57           | Anchor        |            | Firchow                 | Firchow   |           |           |           |           |           |           |           |
| 58           | Gebo          |            | Stephens                | Stephens  | Stephens  | Stephens  | Stephens  | Alkins    | Alkins    |           |           |
| 59           | Arminto       |            | Thiele                  |           | Patterson | Patterson |           |           |           |           |           |
| 60           | Lysite        | --Ryder    | Ryder                   | Ryder     | Ryder     | Ryder     | Hnilicka  | Hnilicka  | Hnilicka  | Hnilicka  | Hnilicka  |
| 61           | Worland       |            | Serrano                 | Serrano   | Serrano   | Serrano   | Serrano   | Serrano   | Serrano   |           |           |
| 62           | Teapot Dome   |            |                         |           |           |           |           |           |           |           |           |
| 63           | Mayoworth     | --Bjerke   | Bjerke                  | Bjerke    | Bjerke    | Bjerke    | Bjerke    | Bjerke    | Bjerke    | Bjerke    | Bjerke    |
| 64           | Sussex        | Fralick    | Fralick                 |           | Thiele    | Thiele    | Thiele    | Thiele    | Thiele    |           |           |
| 65           | Harland Flats | --Cerovski | Cerovski                | Hunter    |           | Hunter    |           |           |           |           |           |
| 66           | Pine Tree     |            | James                   | James     | James     | James     |           |           |           |           |           |
| 67           | Highlight     | --Oelklaus | Oelklaus                |           | Oelklaus  |           |           |           |           |           |           |
| 68           | Riverview     | --Helms    | Helms                   | Robertson | Robertson | Robertson | Anderson  | Anderson  | Anderson  | Anderson  | Anderson  |
| 69           | Newcastle     |            | Talbot                  | Brimeyer  | Brimeyer  | Brimeyer  | Anderson  | Anderson  | Anderson  | Anderson  | Anderson  |
| 70           | Raven         |            | Bartosiak               | Picken    | Bartosiak | Domsalla  | Bartosiak | Bartosiak | Bartosiak | Bartosiak | Snell     |
| 71           | Soda Lake     | Bohne      | Bohne                   | Fralick   | Fralick   | Fralick   |           | Fralick   |           |           |           |
| 72           | Buckskin Mtn. |            | Stone                   |           | Fralick   |           |           |           |           |           | Fralick   |
| 73           | Daniel        |            | CHANGED TO #173 IN 1988 |           |           |           |           |           |           |           |           |
| 74           | Boulder       | Rawlins    |                         |           | Rawlins   |
| 75           | Big Sandy     |            | Ritter                  |           | Smith     |
| 76           | Farson        |            |                         |           |           | Hunter    |           |           |           |           |           |
| 77           | Fiddler Lake  | --Nelson   | Nelson                  | Nelson    | Nelson    | Crane     | Crane     | Crane     | Crane     | Crane     | Crane     |
| 78           | Sand Draw     |            |                         | Jones     | Jones     | Jones     | Jones     |           |           |           |           |
| 79           | Sweetwater    | Emmerich   | Emmerich                | Ryder     |
| 80           | Gas Hills     | Laurion    | Laurion                 | Laurion   |           |           |           |           |           |           |           |
| 81           | Bairroll      | --Hiatt    | Hiatt                   | Hiatt     | Hiatt     | Hiatt     | Hiatt     | Hiatt     | Hiatt     | Hiatt     | Hiatt     |
| 82           | Lamont        | --Hiatt    | Hiatt                   | Hiatt     | Hiatt     | Hiatt     | Hiatt     | Hiatt     | Hiatt     | Hiatt     | Hiatt     |
| 83           | Pathfinder    | Hines      | Schwieger               | Schwieger | Schwieger | Schwieger | Schwieger | Schwieger | Schwieger | Schwieger | Schwieger |
| 84           | Leo           |            |                         |           | Walgren   |

| Route Number | Route Name     | 1991                    | 1992        | 1993        | 1994        | 1995        | 1996        | 1997        | 1998        | 1999        | 2000        |  |
|--------------|----------------|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--|
| 85           | Shirley        |                         | Easterly    | Hines       |  |
| 86           | Warbonnet      |                         | Schwieger   | Schwieger   | Schwieger   | Schwieger   | Schwieger   | Schwieger   | J. Lawrence | J. Lawrence | J. Lawrence |  |
| 87           | Fletcher Park  | --G. Lawrence           | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence |  |
| 88           | Shawnee        | --Helms                 | Helms       | Robertson   | Helms       | Helms       |             | Kroger      | Kroger      | Kroger      | Kroger      |  |
| 89           | Meadowdale     | --Ritter                | Lutz        |             | Hnilicka    | Zomes       |             |             |             |             |             |  |
| 90           | Lusk           | --Helms                 | Helms       | Robertson   | Helms       | Helms       |             |             | G. Lawrence | G. Lawrence | G. Lawrence |  |
| 91           | Lingle         | Ritter                  | Lutz        | Lutz        |             | Lutz        | Felley      | Felley      | Felley      | Felley      | Felley      |  |
| 92           | Diamondville   | CHANGED TO #192 IN 1983 |             |             |             |             |             |             |             |             |             |  |
| 93           | Mountain View  | --Deen                  |             |             | M. Adams    |             |             |             |             | Paulin      |             |  |
| 95           | Green River    | CHANGED TO #195 IN 1986 |             |             |             |             |             |             |             |             |             |  |
| 96           | Reliance       |                         |             |             |             |             |             |             |             |             |             |  |
| 97           | Rock Springs   | --Luke                  | Luke        |             | Gunyan      | Gunyan      |             |             |             |             |             |  |
| 98           | Black Rock     |                         |             | Gunyan      | Gunyan      | Gunyan      |             |             |             |             |             |  |
| 101          | Wamsutter      | --Jahnke                |             | Jahnke      |             | Cerovski    |             | Woolley     | Woolley     | Woolley     | Woolley     |  |
| 102          | Rawlins        | --Rinkes                | Rinkes      | Rinkes      |             |             | Apple       | Apple       | Apple       | Apple       | Apple       |  |
| 103          | Baggs          | Iversen                 |             |             |             | Hnilicka    |             | Woolley     | Woolley     | Woolley     | Woolley     |  |
| 104          | Walcott        | Blomquist               | Blomquist   | Blomquist   | Blomquist   | Blomquist   | Blomquist   | Blomquist   | Blomquist   | Blomquist   | Blomquist   |  |
| 105          | Fox Park       |                         | Bohle       |  |
| 106          | Ryan Park      |                         |             |             |             |             |             |             |             |             |             |  |
| 107          | Sybilie Canyon | --Mobley                |             | Pauley      |             |             |             | Felley      | Felley      | Felley      | Felley      |  |
| 108          | Rock River     | --Oneale                | Oneale      | Young       |  |
| 109          | Harmony        | Guenzel                 |             |             |             |             |             |             |             |             |             |  |
| 110          | Cheyenne       |                         | Brockman    | Brockman    | Brockman    | Zomes       | Delbert     | Delbert     | Delbert     | Delbert     | Delbert     |  |
| 111          | Chugwater      | Rothwell                |             |             | Rothwell    | Rothwell    |             |             |             |             |             |  |
| 112          | Pine Bluff     |                         | Samuelson   | Young       |  |
| 120          | Welch          | Michelson               | Michelson   | Michelson   | Michelson   | Michelson   | Michelson   | Michelson   | Michelson   | Michelson   | Michelson   |  |
| 123          | Flaming Gorge  |                         | Reinmuth    | Reinmuth    | Norvell     | Lewis       |             | Paulin      | Paulin      | Paulin      | Paulin      |  |
| 147          | Rozet          | Winland                 |             | Hayes       |             |             |             |             |             |             |             |  |
| 150          | Gov't. Valley  | NEW IN 1992             | J. Adams    |  |

| Route Number | Route Name        | 1991      | 1992      | 1993      | 1994      | 1995      | 1996       | 1997      | 1998      | 1999      | 2000      |
|--------------|-------------------|-----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|
| 173          | Ryegrass          |           |           |           | Smith     |           | Smith      | Smith     | Smith     | Smith     | Smith     |
| 192          | Carter            |           |           |           |           |           |            |           |           |           |           |
| 195          | Seedskaadee       |           | Luke      | Bryant    | Bryant    | Pedersen  | Halvorson  | Halvorson | Halvorson | Halvorson |           |
| 206          | Caballa Creek     |           | Plato     | Plato     | Plato     | Plato     | Plato      | Plato     | Plato     | Plato     | Plato     |
| 212          | Bucknum           |           |           | Herold    | Herold    | Herold    | Herold     | Herold    | Herold    | Herold    | Herold    |
| 214          | Hampshire         |           |           |           | Bartosiak | Bartosiak | Beauchaine | Bartosiak | Bartosiak | Snell     | Snell     |
| 901          | Yellowstone (YNP) | McEneaney | McEneaney | McEneaney | McEneaney | McEneaney | McEneaney  | McEneaney | McEneaney | McEneaney | McEneaney |
| 902          | Prior Flats       | Scott     |           |           |           |           |            |           |           |           |           |

**Table 11. Breeding Bird Survey time line, 2001-2008. Names under the years are the observers who conducted the routes. Year 2001 routes conducted by the same observer as in 2000 have two dashes before the observer's name. Years that routes were not conducted are left blank.**

| Route Number | Route Name        | 2001                    | 2002       | 2003       | 2004       | 2005       | 2006       | 2007       | 2008       |  |
|--------------|-------------------|-------------------------|------------|------------|------------|------------|------------|------------|------------|--|
| 1            | NE Entrance (YNP) | --McEneaney             | McEneaney  | McEneaney  | McEneaney  | McEneaney  | McEneaney  | McEneaney  | Baril      |  |
| 2            | Cody              | --Nutting               | Nutting    |  |
| 3            | Otto              | --Stephens              | Stephens   |  |
| 4            | Basin             |                         | Easterly   |  |
| 5            | Wyarno            | --Berry                 | Berry      |  |
| 6            | Clarkelien        | CHANGED TO #206 IN 1979 |            |            |            |            |            |            |            |  |
| 7            | Sundance          | J.J. Adams              | J.J. Adams | J.J. Adams | J.J. Adams | J.J. Adams | J.J. Adams | J.J. Adams | J.J. Adams |  |
| 8            | Colter Bay        | CHANGED TO #208 IN 2000 |            |            |            |            |            |            |            |  |
| 9            | Dubois            | McDonald                |            |            |            |            |            |            |            |  |
| 10           | Midvale           |                         |            |            |            |            |            |            |            |  |
| 11           | Nowood            | --Walgren               | Walgren    |  |
| 12           | Natrona           | CHANGED TO #212 IN 1993 |            |            |            |            |            |            |            |  |
| 13           | Bill              | --Buckman               |            |            |            |            |            |            |            |  |
| 14           | Redbird           | CHANGED TO #214 IN 1994 |            |            |            |            |            |            |            |  |
| 15           | Fontenelle        | --Deno                  | Deno       |  |
| 16           | Elk Horn          | --Meyer                 | Meyer      | Meyer      |            |            |            |            |            |  |
| 17           | Bear Creek        | --Cerovski              | Cerovski   | Cerovski   | Cerovski   | Cerovski   | Cerovski   | Cerovski   | Orabona    |  |
| 18           | Ervay             | Binfét                  |            |            |            |            |            |            |            |  |
| 19           | Brookhurst        | --Walgren               | Walgren    |  |
| 20           | Glenrock          | CHANGED TO #120 IN 1978 |            |            |            |            |            |            |            |  |
| 21           | Dwyer             | M. Hicks                |            |            |            |            |            |            |            |  |
| 22           | Cumberland        | --Deno                  | Deno       |  |
| 23           | McKinnon          | CHANGED TO #123 IN 1988 |            |            |            |            |            |            |            |  |
| 24           | Patrick Draw      | --VanFleet              | VanFleet   |  |

| Route Number | Route Name       | 2001                    | 2002                    | 2003        | 2004        | 2005        | 2006          | 2007          | 2008          |
|--------------|------------------|-------------------------|-------------------------|-------------|-------------|-------------|---------------|---------------|---------------|
| 25           | Savery           |                         |                         |             |             |             |               | M. Adams      | M. Adams      |
| 26           | Riverside        | --Loose                 | Loose                   | Loose       | Loose       | Loose       | Loose         | Loose         | Loose         |
| 27           | Buford           | --Johnson               |                         | Johnson     | Johnson     |             |               |               |               |
| 28           | Yoder            | --J. Lawrence           | J. Lawrence             | J. Lawrence | J. Lawrence | J. Lawrence | J. Lawrence   | J. Lawrence   | J. Lawrence   |
| 29           | Canyon (YNP)     | ROUTE NO LONGER RUN     |                         |             |             |             |               |               |               |
| 30           | Mammoth (YNP)    | --McEneaney             | McEneaney               | McEneaney   | McEneaney   | McEneaney   | McEneaney     | McEneaney     | Baril         |
| 31           | West Thumb (YNP) | ROUTE NO LONGER RUN     |                         |             |             |             |               |               |               |
| 32           | Hunter Peak      | --K. Hicks              | K. Hicks                | K. Hicks    | K. Hicks    | K. Hicks    | K. Hicks      | K. Hicks      | K. Hicks      |
| 33           | Clark            | -- K. Hicks             | K. Hicks                | K. Hicks    | K. Hicks    | K. Hicks    | K. Hicks      | K. Hicks      | K. Hicks      |
| 35           | Frannie          | --B. Anderson           | B. Anderson             | B. Anderson | B. Anderson | B. Anderson | B. Anderson   | B. Anderson   | B. Anderson   |
| 36           | Moose            |                         | South                   | South       |             |             |               |               |               |
| 37           | Lovell           | --Peters                | Peters                  | Peters      | Peters      | Peters      | Peters        | Olsen         |               |
| 38           | Meeteetse        | --Miller                |                         | Miller      | Miller      | Miller      | Miller        | Miller        |               |
| 39           | Ten Sleep        |                         |                         |             |             |             |               |               |               |
| 40           | Dayton           |                         |                         |             |             |             |               | B. Ostheimer  | T. Ostheimer  |
| 41           | Bald Mountain    | --Peters                | Olsen                   | Olsen       | Olsen       | Olsen       | Olsen         | Miller        | Miller        |
| 42           | Crazy Woman      | --Nutting               | Nutting                 | Nutting     | Nutting     | Nutting     | Nutting       | Nutting       | Nutting       |
| 43           | Schoonover       | --Ward                  |                         |             |             |             |               |               |               |
| 44           | Arvada           | --Ward                  | Ward                    |             |             |             |               |               |               |
| 45           | Recluse          | --Oedekoven             | Oedekoven               | Oedekoven   | Oedekoven   | Oedekoven   | Loomis-Schell | Loomis-Schell | Loomis-Schell |
| 46           | Soda Well        |                         |                         |             |             |             | Loomis-Schell | Loomis-Schell |               |
| 47           | Piney            | CHANGED TO #147 IN 1991 |                         |             |             |             |               |               |               |
| 48           | Seely            | --Yemington             | CHANGED TO #148 IN 2002 |             |             |             |               |               |               |
| 49           | Upton            | G. Anderson             |                         |             |             |             | VanFleet      | VanFleet      | VanFleet      |
| 50           | Moskee           | J. Adams                | CHANGED TO #250 IN 2002 |             |             |             |               |               |               |
| 51           | Alpine           | --Wife                  | Patla                   | Patla       | Patla       | Patla       | Patla         | Patla         | Patla         |
| 52           | Wilson           |                         |                         |             |             |             |               |               |               |
| 53           | Horse Creek      | --Crane                 | Crane                   | Crane       | Crane       | Crane       | Crane         | Crane         | Crane         |
| 55           | Crowheart        |                         | Hnilicka                | Hnilicka    | Hnilicka    | Hnilicka    | Hnilicka      | Hnilicka      | Hnilicka      |

| Route Number | Route Name    | 2001                    | 2002        | 2003        | 2004        | 2005        | 2006         | 2007        | 2008         |  |
|--------------|---------------|-------------------------|-------------|-------------|-------------|-------------|--------------|-------------|--------------|--|
| 56           | Ethete        |                         | Firchow     |             |             |             |              |             |              |  |
| 57           | Anchor        | Hnilicka                | Hnilicka    | Hnilicka    | Hnilicka    | Hnilicka    | Hnilicka     | Hnilicka    | Hnilicka     |  |
| 58           | Gebo          |                         |             |             |             |             |              |             |              |  |
| 59           | Arminto       | Harter                  | Harter      | Harter      | Harter      | Harter      | Harter       | Binfet      | Binfet       |  |
| 60           | Lysite        |                         | G. Anderson  | G. Anderson | G. Anderson  |  |
| 61           | Worland       |                         |             |             |             |             |              |             |              |  |
| 62           | Teapot Dome   |                         |             |             |             |             |              |             |              |  |
| 63           | Mayoworth     | --Bjerke                | Bjerke      | Bjerke      | Bjerke      | Bjerke      | Bjerke       | Bjerke      | Bjerke       |  |
| 64           | Sussex        |                         |             |             |             |             | T. Ostheimer |             | B. Ostheimer |  |
| 65           | Harland Flats |                         |             |             |             |             |              |             |              |  |
| 66           | Pine Tree     |                         |             |             |             |             |              |             |              |  |
| 67           | Highlight     |                         |             |             |             |             |              | Filipi      |              |  |
| 68           | Riverview     |                         |             |             |             |             |              |             |              |  |
| 69           | Newcastle     | --G. Anderson           |             |             |             |             | VanFleet     | VanFleet    | VanFleet     |  |
| 70           | Raven         |                         |             |             |             |             |              |             |              |  |
| 71           | Soda Lake     | Fralick                 | Fralick     | Fralick     | Fralick     | Fralick     | Fralick      | Fralick     | Fralick      |  |
| 72           | Buckskin Mtn. | --Fralick               | Fralick     | Fralick     | Fralick     | Fralick     | Fralick      | Fralick     | Fralick      |  |
| 73           | Daniel        | CHANGED TO #173 IN 1988 |             |             |             |             |              |             |              |  |
| 74           | Boulder       |                         |             |             |             |             | Patla        | Patla       | Patla        |  |
| 75           | Big Sandy     | --Smith                 | Stroud      |             |             |             | Patla        | Patla       | Patla        |  |
| 76           | Farson        | Cornell                 |             |             |             | Cornell     | Frost        | Frost       | Frost        |  |
| 77           | Fiddler Lake  | --Crane                 | Crane       | Crane       | Crane       | Crane       | Crane        | Crane       | Crane        |  |
| 78           | Sand Draw     |                         |             |             |             | Jones       |              |             |              |  |
| 79           | Sweetwater    | --Ryder                 | Ryder       | Ryder       | Ryder       | Harter      | Harter       | Harter      | Harter       |  |
| 80           | Gas Hills     |                         |             |             |             |             |              |             |              |  |
| 81           | Bairroll      |                         | Hiatt       | Hiatt       | Hiatt       | Hiatt       | Hiatt        | Hiatt       | Hiatt        |  |
| 82           | Lamont        | --Hiatt                 | Hiatt       | Hiatt       | Hiatt       | Hiatt       | Hiatt        | Hiatt       | Hiatt        |  |
| 83           | Pathfinder    | --Schwieger             | Schwieger   | Schwieger   | Schwieger   | Schwieger   | Schwieger    | Schwieger   | Schwieger    |  |
| 84           | Leo           | --Walgren               | Walgren     | Walgren     | Walgren     | Walgren     | Walgren      | Walgren     | Walgren      |  |

| Route Number | Route Name     | 2001                    | 2002        | 2003        | 2004        | 2005        | 2006        | 2007        | 2008        |  |
|--------------|----------------|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--|
| 85           | Shirley        | --Hines                 | Hines       |  |
| 86           | Warbonnet      | --J. Lawrence           | J. Lawrence | J. Lawrence | J. Lawrence | J. Lawrence | J. Lawrence | J. Lawrence | J. Lawrence |  |
| 87           | Fletcher Park  | --G. Lawrence           | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence |  |
| 88           | Shawnee        | --Kroger                | Kroger      | Kroger      | Binfet      | Binfet      | Binfet      | Binfet      | Binfet      |  |
| 89           | Meadowdale     |                         |             |             |             |             |             |             |             |  |
| 90           | Lusk           | --G. Lawrence           | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence | G. Lawrence |  |
| 91           | Lingle         |                         |             |             | Krueger     | Krueger     | Krueger     | Krueger     | Krueger     |  |
| 92           | Diamondville   | CHANGED TO #192 IN 1983 |             |             |             |             |             |             |             |  |
| 93           | Mountain View  | Paulin                  | Paulin      |             |             |             | Fothergill  |             |             |  |
| 95           | Green River    | CHANGED TO #195 IN 1986 |             |             |             |             |             |             |             |  |
| 96           | Reliance       | Luce                    |             |             |             |             |             |             |             |  |
| 97           | Rock Springs   |                         |             |             | Linton      | Linton      | M. Corbett  |             | Linton      |  |
| 98           | Black Rock     | Cornell                 |             |             |             |             |             |             |             |  |
| 101          | Wamsutter      | --Woolley               | Woolley     | Woolley     | Falvey      | Falvey      | Falvey      | Falvey      | Falvey      |  |
| 102          | Rawlins        |                         |             |             | Falvey      | Falvey      | Falvey      |             |             |  |
| 103          | Baggs          | --Woolley               | Woolley     | Woolley     | Woolley     | Woolley     |             |             |             |  |
| 104          | Walcott        | --Blomquist             | Blomquist   |  |
| 105          | Fox Park       | --Bohle                 |             |             |             |             |             |             |             |  |
| 106          | Ryan Park      |                         |             |             |             |             |             | Bergquist   |             |  |
| 107          | Sybilie Canyon |                         |             |             | Falvey      | Falvey      | Falvey      |             |             |  |
| 108          | Rock River     |                         |             |             | Falvey      | Falvey      | Falvey      |             |             |  |
| 109          | Harmony        |                         |             |             | Krueger     | Krueger     | Krueger     | Krueger     | Krueger     |  |
| 110          | Cheyenne       | Delbert                 | Delbert     | Delbert     |             | Delbert     |             |             |             |  |
| 111          | Chugwater      |                         |             |             |             |             |             |             |             |  |
| 112          | Pine Bluff     |                         |             |             | Krueger     | Krueger     | Krueger     | Krueger     | Krueger     |  |
| 120          | Welch          | --Michelson             | Michelson   |  |
| 123          | Flaming Gorge  | --Paulin                | Paulin      |  |
| 147          | Rozet          |                         |             |             |             |             |             |             |             |  |
| 148          | Seely 2        |                         | Yemington   |  |

| Route Number | Route Name        | 2001        | 2002       | 2003       | 2004       | 2005       | 2006        | 2007       | 2008       |
|--------------|-------------------|-------------|------------|------------|------------|------------|-------------|------------|------------|
| 150          | Gov't. Valley     | J.J. Adams  | J.J. Adams | J.J. Adams | J.J. Adams | J.J. Adams | Kondratieff | J.J. Adams | J.J. Adams |
| 173          | Ryegrass          | --Smith     |            | Smith      | Smith      |            | Kondratieff | Fogerty    |            |
| 192          | Carter            |             |            |            |            |            | Fothergill  |            |            |
| 195          | Seedskaadee       | Halvorson   | Glass      | Danberg    |            |            |             |            |            |
| 206          | Caballa Creek     | --Plato     | Plato      |            |            | Johnson    | Johnson     |            | Johnson    |
| 208          | Moran             |             | Wolf       |            | Wolf       | Wolf       | Wolf        | Wolf       |            |
| 212          | Bucknum           | --Herold    |            |            |            | Keffer     |             | Keffer     |            |
| 214          | Hampshire         | --Snell     |            |            |            |            |             |            |            |
| 250          | Moskee 2          |             | J.J. Adams | J.J. Adams | J.J. Adams | J.J. Adams |             | J.J. Adams | J.J. Adams |
| 901          | Yellowstone (YMP) | --McEneaney | McEneaney  | McEneaney  | McEneaney  | McEneaney  | McEneaney   | McEneaney  | Baril      |
| 902          | Prior Flats       |             |            |            | Falvey     | Falvey     | Falvey      | Falvey     |            |

# WYOMING PARTNERS IN FLIGHT COMPLETION REPORT

STATE OF WYOMING

NONGAME BIRDS: Partners In Flight and Monitoring Wyoming's Birds

PERIOD COVERED: 15 April 2008 – 14 April 2009

PREPARED BY: Andrea Orabona, Nongame Bird Biologist

## INTRODUCTION

Analysis of long-term data indicates that population trends of many landbirds are declining due to changes in land use; habitat loss, fragmentation, and deterioration; pesticide use; and human disturbance. The international Partners In Flight program, of which Wyoming is an active participant, was initiated in 1990 to address and reverse these declines. State, regional, national, and international Bird Conservation Plans comprehensively address the issues of avian and habitat conservation on a landscape scale.

Wyoming Partners In Flight (WY-PIF) is comprised of participants from the Wyoming Game and Fish Department (Department), Bureau of Land Management (BLM), U.S. Forest Service, U.S. Fish and Wildlife Service, Bureau of Reclamation, National Park Service, Rocky Mountain Bird Observatory, Audubon Wyoming and affiliate chapters, Wyoming Natural Diversity Database, University of Wyoming, and The Nature Conservancy. The Department's Nongame Bird Biologist has served as the State's WY-PIF chairperson since its inception in 1991.

## BIRD CONSERVATION PLANNING

The Wyoming Bird Conservation Plan, Version 2.0 (Nicholoff 2003) is available on the Partners In Flight web site at [www.blm.gov/wildlife/plan/WY/menu.htm](http://www.blm.gov/wildlife/plan/WY/menu.htm). The Plan presents population objectives for birds, habitat objectives for the major habitat groups in the state, Best Management Practices (BMPs) to benefit birds, and recommendations to ensure that landbirds and the habitats they require remain intact and viable into the future through proactive and restorative management techniques.

In addition, various funding sources have been used to design and print BMPs as separate publications for distribution to the public. Currently, BMPs are available for sagebrush-steppe, riparian, grassland, forest, and wetland habitats, and will soon be available for juniper, mountain-foothills shrub, aquatic, meadow, and alpine tundra grassland habitats.

## MONITORING WYOMING'S BIRDS

One of the highest priority population objectives throughout the Plan is to implement *Monitoring Wyoming's Birds: The Plan for Count-based Monitoring* (Leukering et al. 2001). For the eighth consecutive year, the BLM developed a cooperative assistance agreement with the Department that provides for collaborative efforts between the two agencies to establish a statewide monitoring protocol for birds, determine the distribution and abundance of selected avian species, and develop educational and outreach materials on birds in Wyoming.

Through this agreement, the Department continued contract agreements with the Rocky Mountain Bird Observatory (RMBO) and Audubon Wyoming. The RMBO implements the Monitoring Wyoming's Birds program in six habitats in Wyoming (aspen, grassland, juniper woodland, mid-elevation conifer, montane riparian, and shrub-steppe) (Hanni et al. 2009). Audubon Wyoming assists with inventory and monitoring efforts for those species that require techniques other than point-counts, produces and distributes educational materials on birds and their habitats, and implements the Citizen Science program in cooperation with the Department's Nongame Bird Biologist. The Department also received some of the funds and contributed in-kind services to conduct surveys and provide data for Common Loons, American Bitterns, songbirds, and raptors and to compile, print, and distribute Partners In Flight educational materials.

Between 23 May and 21 July 2008, RMBO conducted 2,334 point counts along 168 transects. A total of 19,545 birds of 165 species were detected on statewide point-count transects. Of all habitats sampled, the most birds detected per transect occurred in montane riparian habitat and the fewest birds per transect were recorded in shrubsteppe habitat. The greatest number of species detected per transect occurred in aspen habitat and the fewest species per transect were detected in grassland and shrubsteppe habitats. RMBO used point count data and distance analysis software (Distance 5.0) to produce density estimates for species in a sampled habitat. We combined data from 2002-2008 to calculate our densities estimates for species by habitat. The pooled data yielded robust density estimates (CV < 50%) for 65 species and moderately robust estimates (CV = 50-75%) for four additional species.

In 2008, RMBO recorded 84 bird species with conservation and management designations in Wyoming, and recorded 35 species in sufficient numbers to calculate density estimates in at least one habitat.

All avian Species of Greatest Conservation Need (SGCN) detected during point-count transects from 2002-2008 are presented in Table 1. Annual and multi-year reports and density data from this monitoring program are available on the Department's website at <http://gf.state.wy.us/wildlife/nongame/MonitoringWyomingsBirds/index.asp>.

## **PUBLIC CONTACTS**

The WY-PIF Chair continues to receive inquiries from and provide information to agency biologists, private consultants, and members of the public regarding the Wyoming Bird Conservation Plan and the Best Management Practices to benefit birds in various habitat types. The Wyoming Bird Conservation Plan is available on the Partners In Flight website at <http://www.blm.gov/wildlife/plan/WY/menu.htm>. Best Management Practices to benefit birds for five additional habitats (alpine tundra grasslands, aquatic, meadows, mountain-foothills shrublands, and juniper woodlands) are being prepared for printing and distribution. This will complete the goal of providing Best Management Practices to benefit birds in all habitats from the Wyoming Bird Conservation Plan as stand-alone publications for distribution to the public.

## **NORTH AMERICAN MIGRATION COUNT**

International Migratory Bird Day is an annual Partners In Flight event that celebrates migratory birds and supports efforts to conserve them. The North American Migration Count (NAMC) is part of this celebration, and takes place on the second Saturday each May. The goals of the NAMC are to: 1) obtain a snapshot in time of the progress of spring migration, 2) obtain information on species abundance and distribution, 3) initiate more participation among birders within and between states, and 4) aid in the organization and centralization of data collected. Participants are asked to record and submit all birds detected, as well as the number of participants, total hours spent counting, and total miles covered during the count day on the official count form (below) for inclusion in the annual report (Tables 2 and 3).

## **LITERATURE CITED**

- American Ornithologists' Union. 2003. Forty-fourth Supplement to the American Ornithologists' Union Check-list of North American Birds. *The Auk* 120(3):923-931.
- Hanni, D. J., J. Birek, C. White, R. Sparks, and J. Blakesley. 2008. Monitoring Wyoming's Birds: 2008 Field Season Report. Technical Report M-MWB08-01. Rocky Mountain Bird Observatory, Brighton, CO. 91pp.
- Leukering, T., M. F. Carter, A. Panjabi, D. Faulkner, and R. Leivad. 2001. Monitoring Wyoming's Birds: The Plan for Count-based Monitoring. Rocky Mountain Bird Observatory, Brighton, CO.
- Nicholoff, S. H., compiler. 2003. Wyoming Bird Conservation Plan, Version 2.0. Wyoming Partners In Flight. Wyoming Game and Fish Department, Lander, WY.

**NORTH AMERICAN MIGRATION COUNT  
10 May 2008**

Name(s) \_\_\_\_\_

Address \_\_\_\_\_

Location(s) counted \_\_\_\_\_

Start time \_\_\_\_\_ Stop time \_\_\_\_\_ # of Observers \_\_\_\_\_

# Hours - car \_\_\_\_\_ # Miles - car \_\_\_\_\_

# Hours - foot \_\_\_\_\_ # Miles - foot \_\_\_\_\_

# Hours - other \_\_\_\_\_ # Miles - other \_\_\_\_\_

**Bird Species Seen and Number of Individuals (List feeder species separately)**

**OWLING**

If you spent any time owling, please indicate the following: # Hours \_\_\_\_\_  
# Miles \_\_\_\_\_  
# Observers \_\_\_\_\_

**Owl Species Seen and Number of Individuals**

**FEEDER COUNTS ONLY**

# Hours watching \_\_\_\_\_ # Feeding stations \_\_\_\_\_

**Bird Species and Number of Individuals at Your Feeder**

*Please send the completed form by June 15<sup>th</sup> to:  
Andrea Orabona, Wyoming Game and Fish Department,  
260 Buena Vista, Lander, Wyoming 82520*

**Table 1. List of all avian Species of Greatest Conservation Need (SGCN) observed during point-count transects in Wyoming from 2002-2008, with management designation and species totals.**

| Species <sup>a</sup>      | Species Management Designation <sup>b</sup> |       |      |        |    |    |    | Total # Individuals Observed per Habitat <sup>c</sup> , 2008 |    |    |      |      | Total # Individuals Observed (in all habitats surveyed <sup>d</sup> ) |      |      |      |      |
|---------------------------|---|-------|------|--------|----|----|----|--|----|----|------|------|---|------|------|------|------|
|                           | USFS  | USFWS | WGFD | WY-PIF | AS | GR | JW | MC   | MR | SS | 2002 | 2003 | 2004  | 2005 | 2006 | 2007 | 2008 |
| Trumpeter Swan            | R2SS  |       | SGCN | WY-I   |    |    |    |  |    |    | 0    | 0    | 0   | 0    | 0    | 6    | 0    |
| Northern Pintail          |   |       | SGCN |        |    | 2  |    |  |    |    | 2    | 0    | 6   | 4    | 3    | 0    | 2    |
| Canvasback                |   |       | SGCN |        |    |    |    |  |    |    | 0    | 0    | 0   | 3    | 4    | 0    | 0    |
| Redhead                   |   |       | SGCN |        |    |    |    |  |    |    | 0    | 0    | 0   | 5    | 0    | 0    | 0    |
| Lesser Scaup              |   |       | SGCN |        |    |    |    |  |    |    | 1    | 0    | 14  | 13   | 8    | 1    | 0    |
| Harlequin Duck            | R2SS  |       | SGCN | WY-II  |    |    |    |  |    |    | 0    | 0    | 0   | 1    | 0    | 0    | 0    |
| Barrow's Goldeneye        |   |       | SGCN |        |    |    | 1  | 2  |    |    | 0    | 1    | 9   | 2    | 2    | 4    | 3    |
| Greater Sage-Grouse       | R2SS  |       | SGCN | WY-I   | 1  |    |    |  | 6  |    | 3    | 0    | 3   | 24   | 77   | 53   | 7    |
| Sharp-tailed Grouse       | R2SS  |       | SGCN | WY-I   |    |    |    |  |    |    | 0    | 0    | 0   | 6    | 0    | 3    | 0    |
| Common Loon               |   |       | SGCN | WY-II  |    |    |    |  |    |    | 0    | 0    | 0   | 0    | 1    | 1    | 0    |
| Western Grebe             |   |       | SGCN |        |    |    |    |  | 2  |    | 0    | 0    | 0   | 1    | 3    | 0    | 2    |
| Clark's Grebe             |   |       | SGCN | WY-III |    |    |    |  |    |    | 0    | 0    | 0   | 2    | 0    | 0    | 0    |
| American White Pelican    |   |       | SGCN | WY-II  |    | 19 |    | 4  | 2  |    | 0    | 0    | 2   | 2    | 16   | 8    | 25   |
| Great Blue Heron          |   |       | SGCN |        |    | 1  | 1  | 6  | 1  |    | 5    | 3    | 10  | 9    | 11   | 3    | 9    |
| Black-crowned Night-Heron |   |       | SGCN |        |    |    |    |  |    |    | 0    | 0    | 0   | 0    | 0    | 3    | 0    |
| Bald Eagle                |   |       | SGCN | WY-I   | 1  |    |    | 1  |    |    | 0    | 1    | 1   | 4    | 1    | 1    | 2    |
| Northern Goshawk          | R2SS  |       | SGCN | WY-I   |    |    | 2  |  |    |    | 1    | 0    | 5   | 8    | 5    | 4    | 2    |
| Swainson's Hawk           |   | BCC   | SGCN | WY-I   | 1  |    |    |  |    |    | 2    | 2    | 8   | 4    | 13   | 8    | 1    |
| Ferruginous Hawk          | R2SS  | BCC   | SGCN | WY-I   | 1  |    |    |  | 3  |    | 2    | 5    | 9   | 8    | 11   | 6    | 4    |
| Merlin                    |   |       | SGCN | WY-II  |    |    |    | 1  |    |    | 2    | 0    | 1   | 0    | 0    | 0    | 1    |
| Peregrine Falcon          | R2SS  | BCC   | SGCN | WY-I   |    |    |    |  |    |    | 0    | 0    | 0   | 0    | 1    | 1    | 0    |
| Sandhill Crane            |   |       | SGCN |        | 9  | 1  | 3  | 5  | 16 |    | 11   | 6    | 20  | 34   | 45   | 45   | 34   |
| Mountain Plover           | R2SS  | BCC   | SGCN | WY-I   |    | 2  |    |  |    |    | 2    | 16   | 1   | 10   | 4    | 2    | 2    |
| Upland Sandpiper          |   | BCC   | SGCN | WY-I   | 4  | 1  |    |  |    |    | 0    | 2    | 10  | 7    | 6    | 0    | 5    |
| Long-billed Curlew        |   | BCC   | SGCN | WY-I   |    | 3  |    |  |    |    | 0    | 0    | 1   | 1    | 4    | 4    | 3    |
| Franklin's Gull           |   |       | SGCN | WY-I   |    |    |    |  |    |    | 0    | 0    | 0   | 1    | 2    | 0    | 0    |
| Forster's Tern            |   |       | SGCN | WY-I   |    |    |    |  |    |    | 0    | 0    | 0   | 0    | 2    | 0    | 0    |

| Species <sup>a</sup>           | Species Management Designation <sup>b</sup> |       |      |        |    |      | Total # Individuals Observed per Habitat <sup>c</sup> , 2008 |    |    |     |      |      | Total # Individuals Observed (in all habitats surveyed <sup>d</sup> ) |      |      |      |      |   |
|--------------------------------|---|-------|------|--------|----|------|--|----|----|-----|------|------|---|------|------|------|------|---|
|                                | USFS  | USFWS | WGFD | WY-PIF | AS | GR   | JW   | MC | MR | SS  | 2002 | 2003 | 2004  | 2005 | 2006 | 2007 | 2008 |   |
|                                | Northern Pygmy-Owl                          |       |      | SGCN   |    |      |  |    |    |     |      | 0    | 1   | 0    | 1    | 1    | 0    | 0 |
| Burrowing Owl                  | R2SS  | BCC   | SGCN | WY-I   |    |      |  |    |    |     | 0    | 0    | 3   | 0    | 1    | 0    | 0    |   |
| Great Gray Owl                 |   |       | SGCN | WY-II  |    |      |  |    |    |     | 0    | 0    | 0   | 1    | 1    | 1    | 0    |   |
| Short-eared Owl                | R2SS  | BCC   | SGCN | WY-I   |    |      |  |    |    |     | 0    | 0    | 9   | 0    | 2    | 0    | 0    |   |
| Lewis's Woodpecker             | R2SS  | BCC   | SGCN | WY-II  |    |      |  |    |    |     | 0    | 0    | 0   | 1    | 0    | 0    | 0    |   |
| American Three-toed Woodpecker | R2SS  |       | SGCN | WY-II  | 1  |      |  |    |    |     | 2    | 6    | 13  | 18   | 12   | 3    | 1    |   |
| Black-backed Woodpecker        | R2SS  |       | SGCN | WY-II  |    |      |  |    |    |     | 1    | 0    | 0   | 0    | 0    | 1    | 0    |   |
| Willow Flycatcher              |   |       | SGCN | WY-II  |    |      |  | 13 |    |     | 13   | 15   | 25  | 29   | 34   | 31   | 13   |   |
| Ash-throated Flycatcher        |   |       | SGCN | WY-II  |    | 7    |  |    |    |     | 10   | 8    | 7   | 16   | 14   | 0    | 7    |   |
| Western Scrub-Jay              |   |       | SGCN | WY-II  |    |      |  |    |    |     | 9    | 5    | 5   | 10   | 2    | 0    | 0    |   |
| Juniper Titmouse               |   |       | SGCN | WY-II  |    | 9    |  |    |    |     | 11   | 25   | 10  | 7    | 57   | 0    | 9    |   |
| Bush-tit                       |   |       | SGCN | WY-II  |    | 5    |  |    |    |     | 0    | 5    | 18  | 18   | 10   | 0    | 5    |   |
| Pygmy Nuthatch                 |   |       | SGCN | WY-II  |    |      |  |    |    |     | 9    | 0    | 0   | 2    | 6    | 3    | 0    |   |
| Sage Thrasher                  |   |       | SGCN | WY-II  | 3  | 6    | 18   |    | 3  | 292 | 79   | 232  | 258   | 326  | 490  | 208  | 322  |   |
| Brewer's Sparrow               | R2SS  | BCC   | SGCN | WY-I   | 62 | 122  | 164  | 6  | 58 | 480 | 478  | 770  | 1262  | 1179 | 1527 | 967  | 892  |   |
| Sage Sparrow                   | R2SS  |       | SGCN | WY-I   |    | 3    | 49   |    |    | 161 | 86   | 107  | 110   | 128  | 232  | 127  | 213  |   |
| Lark Bunting                   |   |       | SGCN | WY-II  | 1  | 1170 |  |    |    | 142 | 477  | 603  | 1592  | 743  | 1312 | 769  | 1313 |   |
| Grasshopper Sparrow            | R2SS  | BCC   | SGCN | WY-II  |    | 74   |  |    |    |     | 20   | 42   | 35  | 37   | 87   | 57   | 74   |   |
| McCown's Longspur              | R2SS  | BCC   | SGCN | WY-I   |    | 112  |  |    |    |     | 71   | 81   | 138   | 236  | 270  | 125  | 112  |   |
| Chestnut-collared Longspur     | R2SS  | BCC   | SGCN | WY-II  |    | 25   | 2  |    |    |     | 74   | 132  | 48  | 97   | 112  | 17   | 27   |   |
| Scott's Oriole                 |   |       | SGCN | WY-II  |    |      |  |    |    |     | 0    | 5    | 3   | 5    | 1    | 0    | 0    |   |

<sup>a</sup> Common Names are from the AOU Check-list of North American Birds, Seventh Edition (2003).

<sup>b</sup> Special management designations: USFS=United States Forest Service, R2SS=USFS Region 2 Sensitive Species; USFWS=U.S.

Fish and Wildlife Service, BCC=USFWS Bird of Conservation Concern for Region 6 (Mountain-Prairie Region);

WGFD=Wyoing Game and Fish Department, T=Threatened Species, E=Endangered Species, SGCN=Species of Greatest

Conservation Need (Wyoming Comprehensive Wildlife Conservation Strategy 2005); WY-PIF=Wyoing Partners in Flight, WY-

I=Wyoing Partners In Flight Level I Priority (Conservation Action), WY-II=Wyoing Partners In Flight Level II Priority

(Monitoring); WY-III=Wyoing Partners in Flight Level III Priority (Local Interest).

<sup>c</sup> Habitats: AS=aspen; GR=grassland; JW=juniper woodland; MC=mid-elevation conifer; MR=montane riparian; SS=shrubsteppe.

<sup>d</sup> The number and types of habitats surveyed each year may vary.

**Table 2. Summary of the species detected during the North American Migration Count conducted annually on the second Saturday in May.**

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Canada Goose                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 273  | 154  | 119  | 149  | 238  | 161  | 255  | 227  | 189  | 181  |
| Lincoln                                | 40   |      |      |      |      |      |      |      |      |      |
| Platte                                 |      |      |      |      |      | 20   |      |      |      |      |
| Sheridan                               | 93   | 115  | 129  | 50   | 160  | 74   | 220  | 218  |      | 81   |
| Sweetwater                             |      |      |      |      |      |      | 31   |      |      |      |
| Teton                                  | 75   | 86   | 149  | 42   |      | 130  | 165  | 40   | 47   | 58   |
| Yellowstone National Park              | 31   |      | 52   |      |      | 30   |      |      |      |      |
| Trumpeter Swan                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      | 2    |      |      |      |
| Teton                                  | 8    | 3    | 11   |      |      | 1    | 6    | 1    |      | 11   |
| Yellowstone National Park              | 3    |      |      |      |      |      |      |      |      |      |
| Wood Duck                              |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 11   | 4    | 14   | 2    | 13   | 15   | 4    |
| Platte                                 |      |      |      |      |      | 11   |      |      |      |      |
| Sheridan                               | 4    |      |      | 4    | 2    |      |      | 6    |      |      |
| Gadwall                                |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 55   | 104  | 50   | 101  | 95   | 68   | 90   | 76   | 251  | 105  |
| Lincoln                                | 5    |      |      |      |      |      |      |      |      |      |
| Sheridan                               | 31   | 7    | 10   | 5    | 12   | 8    | 54   | 19   |      |      |
| Teton                                  | 19   | 21   | 7    | 38   |      | 77   | 47   | 4    | 3    | 91   |
| Yellowstone National Park              | 4    |      | 14   |      |      | 58   |      |      |      |      |
| Eurasian Wigeon                        |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      | 1    |      |      |      |      |      |      |
| American Wigeon                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 15   | 9    | 9    | 32   | 38   | 19   | 17   | 8    | 58   | 10   |
| Platte                                 |      |      |      |      |      | 30   |      |      |      |      |
| Sheridan                               | 12   |      | 28   | 14   | 19   | 6    | 12   | 11   |      |      |
| Teton                                  | 84   | 40   | 9    | 20   |      | 37   | 11   | 4    | 13   | 29   |
| Yellowstone National Park              | 41   |      | 33   |      |      | 92   |      |      |      |      |
| Mallard                                |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 85   | 34   | 69   | 91   | 179  | 51   | 72   | 96   | 183  | 83   |
| Lincoln                                | 7    |      |      |      |      |      |      |      |      |      |
| Platte                                 |      |      |      |      |      | 50   |      |      |      |      |
| Sheridan                               | 126  | 126  | 98   | 67   | 129  | 63   | 107  | 97   |      | 23   |
| Sweetwater                             |      |      |      |      |      |      | 3    |      |      |      |
| Teton                                  | 89   | 47   | 43   | 23   |      | 80   | 51   | 11   | 17   | 54   |
| Yellowstone National Park              | 55   |      | 49   |      |      | 93   |      |      |      |      |
| Blue-winged Teal                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 12   | 6    | 4    | 35   | 31   | 16   | 33   | 11   | 27   | 5    |
| Lincoln                                | 1    |      |      |      |      |      |      |      |      |      |
| Platte                                 |      |      |      |      |      | 63   |      |      |      |      |
| Sheridan                               | 17   | 6    | 4    | 5    | 21   | 17   | 21   | 9    |      | 2    |
| Sweetwater                             |      |      |      |      |      |      | 4    |      |      |      |
| Teton                                  | 2    |      |      | 4    |      | 5    | 4    | 1    |      |      |
| Yellowstone National Park              | 2    |      | 1    |      |      |      |      |      |      |      |
| Cinnamon Teal                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 33   | 6    | 24   | 70   | 11   | 30   | 17   | 24   | 37   | 3    |
| Lincoln                                | 3    |      |      |      |      |      |      |      |      |      |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Platte                                 |      |      |      |      |      | 2    |      |      |      |      |
| Sheridan                               | 2    | 2    | 4    |      | 6    | 2    | 6    |      |      | 2    |
| Sweetwater                             |      |      |      |      |      |      | 4    |      |      |      |
| Teton                                  | 2    | 9    | 20   | 12   |      | 12   | 15   | 11   | 14   | 22   |
| Yellowstone National Park              | 20   |      | 8    |      |      | 9    |      |      |      |      |
| Northern Shoveler                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 48   | 45   | 44   | 139  | 92   | 44   | 25   | 45   | 95   | 47   |
| Lincoln                                | 20   |      |      |      |      |      |      |      |      |      |
| Platte                                 |      |      |      |      |      | 2    |      |      |      |      |
| Sheridan                               | 46   | 6    | 2    | 2    | 10   | 10   | 1    | 6    |      |      |
| Sweetwater                             |      |      |      |      |      |      | 4    |      |      |      |
| Teton                                  | 2    | 3    | 4    |      |      | 14   | 4    |      | 1    | 10   |
| Yellowstone National Park              | 6    |      |      |      |      | 36   |      |      |      |      |
| Northern Pintail                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 8    | 6    | 7    | 22   | 7    | 2    | 9    | 1    | 16   | 9    |
| Lincoln                                | 1    |      |      |      |      |      |      |      |      |      |
| Platte                                 |      |      |      |      |      | 25   |      |      |      |      |
| Sheridan                               | 3    |      |      |      |      |      |      |      |      |      |
| Sweetwater                             |      |      |      |      |      |      | 6    |      |      |      |
| Teton                                  | 3    | 4    | 1    | 40   |      |      |      |      |      |      |
| Yellowstone National Park              | 6    |      | 9    |      |      | 1    |      |      |      |      |
| Green-winged Teal                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 37   | 2    | 11   | 59   | 135  | 10   | 23   | 17   | 46   | 31   |
| Lincoln                                | 1    |      |      |      |      |      |      |      |      |      |
| Platte                                 |      |      |      |      |      | 35   |      |      |      |      |
| Sheridan                               | 11   | 6    | 2    | 2    | 2    |      | 1    | 6    |      |      |
| Sweetwater                             |      |      |      |      |      |      | 1    |      |      |      |
| Teton                                  | 13   | 8    |      | 27   |      | 25   | 4    | 1    | 18   | 24   |
| Yellowstone National Park              | 44   |      | 79   |      |      | 13   |      |      |      |      |
| Canvasback                             |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 2    | 17   |      |      | 4    |      |      | 4    | 2    | 6    |
| Sheridan                               |      | 1    |      |      |      |      |      |      |      |      |
| Redhead                                |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 55   | 13   | 13   | 47   | 23   | 41   | 46   | 26   | 59   | 12   |
| Sheridan                               |      |      |      |      |      |      | 2    |      |      |      |
| Sweetwater                             | 2    |      |      |      |      |      | 5    |      |      |      |
| Teton                                  | 7    | 4    | 9    | 10   |      | 8    | 6    | 4    | 19   | 6    |
| Yellowstone National Park              | 11   |      | 3    |      |      | 1    |      |      |      |      |
| Ring-necked Duck                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 32   |      | 10   | 166  | 35   | 18   | 46   | 12   | 29   | 19   |
| Sheridan                               |      |      |      | 1    | 9    |      |      | 4    |      | 2    |
| Sweetwater                             | 7    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 36   | 7    | 7    | 12   |      | 17   | 7    |      |      | 16   |
| Yellowstone National Park              | 36   |      |      |      |      |      |      |      |      |      |
| Greater Scaup                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 4    |      |      | 10   |      |      |      |      |      |
| Teton                                  |      |      |      | 12   |      |      |      |      |      |      |
| Lesser Scaup                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 54   |      | 10   | 101  | 32   | 3    | 53   | 99   | 108  | 13   |
| Platte                                 |      |      |      |      |      | 5    |      |      |      |      |
| Sheridan                               | 8    | 1    |      | 6    | 2    |      |      | 1    |      |      |
| Sweetwater                             | 18   |      |      |      |      |      |      |      |      |      |
| Teton                                  | 1    | 4    | 4    | 12   |      | 8    | 11   |      |      | 37   |
| Yellowstone National Park              | 61   |      | 82   |      |      | 51   |      |      |      |      |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Harlequin Duck                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    |      |      |      |      |      |      |      |      |      |
| Sheridan                               | 2    |      |      |      |      |      |      |      |      |      |
| Yellowstone National Park              |      |      | 7    |      |      | 12   |      |      |      |      |
| Bufflehead                             |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 34   | 5    | 3    | 4    | 12   | 7    | 23   |
| Sheridan                               |      |      |      |      | 2    |      |      |      |      |      |
| Sweetwater                             | 2    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 11   | 4    | 6    | 8    |      | 9    | 2    | 6    | 2    | 23   |
| Yellowstone National Park              | 45   |      | 31   |      |      | 32   |      |      |      |      |
| Common Goldeneye                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 4    |      |      | 2    |      | 1    | 3    | 13   | 3    |      |
| Sheridan                               |      |      |      | 2    | 4    |      | 1    |      |      |      |
| Sweetwater                             |      |      |      |      |      |      | 6    |      |      |      |
| Teton                                  | 11   | 25   | 4    | 4    |      | 2    |      |      |      | 1    |
| Yellowstone National Park              | 21   |      | 28   |      |      | 10   |      |      |      |      |
| Barrow's Goldeneye                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 18   |      | 3    | 1    | 23   |      | 17   |      | 2    |      |
| Sheridan                               |      |      |      | 2    |      |      |      |      |      |      |
| Sweetwater                             | 6    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 7    | 23   | 4    | 12   |      | 26   | 15   | 43   | 2    | 107  |
| Yellowstone National Park              | 34   |      | 81   |      |      | 22   |      |      |      |      |
| Common Merganser                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 15   |      | 10   | 17   | 12   | 7    | 14   | 12   | 3    | 17   |
| Platte                                 |      |      |      |      |      | 6    |      |      |      |      |
| Sheridan                               | 1    | 9    | 4    | 4    | 4    | 5    | 8    | 5    |      | 2    |
| Sweetwater                             | 2    |      |      |      |      |      | 3    |      |      |      |
| Teton                                  | 34   | 89   | 10   | 6    |      | 16   | 18   | 38   | 9    | 29   |
| Yellowstone National Park              | 5    |      | 10   |      |      | 27   |      |      |      |      |
| Red-breasted Merganser                 |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      |      |      |      | 1    |
| Yellowstone National Park              | 1    |      |      |      |      |      |      |      |      |      |
| Ruddy Duck                             |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 8    | 6    | 8    | 17   | 6    | 15   | 45   | 25   | 32   | 17   |
| Platte                                 |      |      |      |      |      | 1    |      |      |      |      |
| Sheridan                               | 1    |      |      |      | 1    |      |      |      |      |      |
| Sweetwater                             |      |      |      |      |      |      | 5    |      |      |      |
| Teton                                  |      | 6    | 5    | 12   |      | 10   | 12   | 6    | 9    | 15   |
| Chukar                                 |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      |      | 4    | 1    |      |      |      | 2    |
| Gray Partridge                         |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               | 6    | 32   | 11   | 6    |      |      |      |      |      |      |
| Ring-necked Pheasant                   |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 5    | 4    | 3    | 12   | 10   | 27   | 12   | 18   | 10   | 10   |
| Sheridan                               | 46   | 68   | 60   | 30   | 51   | 48   | 122  | 69   |      | 24   |
| Ruffed Grouse                          |      |      |      |      |      |      |      |      |      |      |
| Teton                                  |      | 1    |      |      |      |      |      |      |      |      |
| Yellowstone National Park              |      |      | 1    |      |      |      |      |      |      |      |
| Greater Sage-Grouse                    |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 45   |      | 2    |      | 30   |      |      |      |      |      |
| Teton                                  |      |      |      |      |      |      |      |      | 2    |      |
| Dusky Grouse                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      |      |      |      | 1    |
| Teton                                  |      |      | 6    |      |      |      | 2    |      |      | 1    |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Sharp-tailed Grouse                    |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      | 3    | 2    | 5    |      | 2    | 3    |      |      |      |
| Wild Turkey                            |      |      |      |      |      |      |      |      |      |      |
| Platte                                 |      |      |      |      |      | 2    |      |      |      |      |
| Sheridan                               | 75   | 48   | 22   | 8    | 40   | 12   | 35   | 13   |      | 15   |
| Common Loon                            |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 2    | 3    | 3    | 4    | 6    |      | 7    | 4    |      | 1    |
| Sheridan                               | 1    | 1    |      |      |      |      |      |      |      |      |
| Sweetwater                             | 2    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 8    | 4    | 15   | 2    |      |      | 3    | 2    | 1    | 2    |
| Yellowstone National Park              | 2    |      | 11   |      |      | 6    |      |      |      |      |
| Pied-billed Grebe                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    |      | 3    | 5    | 4    | 2    | 9    | 5    | 12   | 1    |
| Platte                                 |      |      |      |      |      | 10   |      |      |      |      |
| Sheridan                               | 3    | 3    | 2    |      | 2    | 2    | 2    | 2    |      |      |
| Sweetwater                             | 1    |      |      |      |      |      |      |      |      |      |
| Teton                                  |      |      | 1    | 4    |      | 1    |      | 3    | 1    | 3    |
| Eared Grebe                            |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 180  |      | 127  | 53   | 458  |      | 904  | 270  | 30   | 34   |
| Platte                                 |      |      |      |      |      | 4    |      |      |      |      |
| Sheridan                               |      |      |      | 2    |      |      |      |      |      |      |
| Sweetwater                             | 7    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 2    | 1    |      |      |      |      |      |      |      | 5    |
| Yellowstone National Park              | 85   |      | 1    |      |      |      |      |      |      |      |
| Western Grebe                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 78   | 59   | 18   | 36   | 68   | 32   | 227  | 43   | 78   | 13   |
| Platte                                 |      |      |      |      |      | 85   |      |      |      |      |
| Sheridan                               | 3    | 5    |      |      |      |      |      |      |      |      |
| Sweetwater                             | 4    |      |      |      |      |      | 1    |      |      |      |
| Teton                                  |      |      |      | 2    |      | 1    | 5    | 1    |      | 4    |
| Clark's Grebe                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    |      |      | 5    | 22   | 27   | 24   |      | 5    | 15   |
| American White Pelican                 |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 31   |      |      |      | 12   | 18   | 27   | 59   | 43   | 94   |
| Platte                                 |      |      |      |      |      | 140  |      |      |      |      |
| Sheridan                               |      |      |      |      |      | 2    | 63   |      |      |      |
| Sweetwater                             | 6    |      |      |      |      |      | 9    |      |      |      |
| Teton                                  | 39   | 4    |      | 26   |      | 94   | 106  | 24   | 30   | 37   |
| Yellowstone National Park              | 13   |      | 6    |      |      | 9    |      |      |      |      |
| Double-crested Cormorant               |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 7    | 6    | 3    | 3    | 8    | 12   | 79   | 31   | 16   | 7    |
| Platte                                 |      |      |      |      |      | 55   |      |      |      |      |
| Sheridan                               | 1    |      |      |      | 4    | 4    | 11   |      |      |      |
| Teton                                  | 2    | 4    |      | 2    |      | 8    | 10   | 12   |      | 2    |
| Yellowstone National Park              | 1    |      |      |      |      |      |      |      |      |      |
| American Bittern                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 1    |      |      |      |      |      |
| Great Blue Heron                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 23   | 14   | 9    | 9    | 11   | 7    | 10   | 5    | 6    | 5    |
| Platte                                 |      |      |      |      |      | 10   |      |      |      |      |
| Sheridan                               | 5    | 29   | 11   | 11   | 15   | 10   | 23   | 25   |      | 12   |
| Sweetwater                             | 28   |      |      |      |      |      | 13   |      |      |      |
| Teton                                  | 9    | 1    | 2    | 2    |      | 7    | 8    |      | 5    | 13   |
| Yellowstone National Park              | 4    |      | 8    |      |      | 3    |      |      |      |      |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Snowy Egret                            |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 1    |      |      |      |      |      |      |
| Cattle Egret                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      | 2    |      |      |      |
| Black-crowned Night-Heron              |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      | 1    |      |      |      |      |      |      |
| White-faced Ibis                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 35   | 18   | 2    | 128  | 166  | 1    | 75   | 144  | 12   | 30   |
| Sweetwater                             | 20   |      |      |      |      |      | 26   |      |      |      |
| Teton                                  |      |      |      |      |      | 7    |      | 1    |      | 2    |
| Turkey Vulture                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 9    | 13   | 3    | 10   | 2    | 5    | 5    | 4    | 16   | 16   |
| Platte                                 |      |      |      |      |      | 8    |      |      |      |      |
| Sheridan                               | 8    | 10   | 11   | 10   | 16   | 8    | 3    | 20   |      |      |
| Sweetwater                             | 1    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 3    | 1    | 3    |      |      | 2    |      | 3    | 1    | 1    |
| Osprey                                 |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 6    | 2    | 2    | 3    | 4    | 3    | 9    | 3    | 5    | 3    |
| Sheridan                               | 1    | 4    | 3    | 3    | 4    |      | 1    | 4    |      |      |
| Sweetwater                             | 1    |      |      |      |      |      | 3    |      |      |      |
| Teton                                  | 9    | 11   | 17   | 4    |      | 18   | 15   | 4    | 3    | 6    |
| Yellowstone National Park              | 2    |      | 4    |      |      | 5    |      |      |      |      |
| Bald Eagle                             |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 2    | 1    |      |      | 2    |      | 3    |      | 1    | 1    |
| Sheridan                               |      |      | 1    |      |      | 1    |      |      |      |      |
| Sweetwater                             |      |      |      |      |      |      | 6    |      |      |      |
| Teton                                  | 5    | 5    | 8    | 2    |      | 9    | 5    | 1    | 2    | 11   |
| Yellowstone National Park              | 4    |      | 3    |      |      | 1    |      |      |      |      |
| Northern Harrier                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 6    | 11   | 6    | 9    | 12   | 10   | 5    | 6    | 3    | 6    |
| Sheridan                               | 4    | 18   | 4    | 3    | 17   | 7    | 5    | 8    |      | 1    |
| Sweetwater                             | 4    |      |      |      |      |      | 8    |      |      |      |
| Teton                                  | 9    | 2    | 3    | 1    |      | 3    | 2    | 5    | 1    | 7    |
| Yellowstone National Park              | 1    |      |      |      |      | 1    |      |      |      |      |
| Sharp-shinned Hawk                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    |      |      |      |      | 2    |      |      |      |      |
| Sheridan                               |      |      |      | 2    | 1    | 1    |      |      |      | 1    |
| Teton                                  | 2    | 2    | 1    |      |      |      | 1    |      |      |      |
| Cooper's Hawk                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    |      |      |      |      |      | 1    |      |      |      |
| Sheridan                               |      |      |      |      | 1    |      |      |      |      |      |
| Teton                                  |      | 2    |      |      |      |      | 2    |      | 1    | 1    |
| Northern Goshawk                       |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      | 3    |      | 2    | 1    |      |      |      |      |      |
| Teton                                  |      | 1    |      |      |      |      |      |      |      |      |
| Yellowstone National Park              |      |      | 1    |      |      |      |      |      |      |      |
| Broad-winged Hawk                      |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      | 2    |      |      |      |      |      |      |
| Swainson's Hawk                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    | 2    | 5    | 2    | 1    | 2    | 3    | 11   | 4    | 2    |
| Sheridan                               |      | 1    |      | 2    |      | 2    | 1    | 1    |      |      |
| Sweetwater                             | 3    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 3    | 4    | 2    | 2    |      | 3    | 4    | 4    | 3    | 1    |
| Yellowstone National Park              | 3    |      | 4    |      |      | 1    |      |      |      |      |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Red-tailed Hawk                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 12   | 12   | 1    | 11   | 22   | 5    | 14   | 15   | 6    | 17   |
| Sheridan                               | 12   | 20   | 7    | 9    | 16   | 5    | 16   | 16   |      |      |
| Sweetwater                             | 8    |      |      |      |      |      | 1    |      |      |      |
| Teton                                  | 16   | 21   | 12   | 2    |      | 11   | 8    | 4    | 3    | 5    |
| Yellowstone National Park              | 3    |      | 3    |      |      | 2    |      |      |      |      |
| Ferruginous Hawk                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 2    |      | 3    | 2    |      | 2    | 1    | 1    |      |
| Sheridan                               |      | 1    |      |      | 1    |      |      | 1    |      |      |
| Teton                                  | 1    |      |      |      |      |      |      |      |      |      |
| Rough-legged Hawk                      |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      |      |      |      |      |      |      | 1    |
| Teton                                  |      |      |      |      |      |      | 1    |      |      |      |
| Golden Eagle                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 12   | 1    | 4    |      | 7    | 2    | 5    | 1    | 1    | 3    |
| Sheridan                               | 6    | 9    | 6    | 4    | 4    | 5    | 5    | 7    |      |      |
| Sweetwater                             | 2    |      |      |      |      |      |      |      |      |      |
| Teton                                  |      | 2    |      |      | 4    |      |      |      |      |      |
| American Kestrel                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 32   | 15   | 9    | 16   | 46   | 8    | 27   | 12   | 19   | 12   |
| Sheridan                               | 20   | 29   | 15   | 17   | 22   | 5    | 20   | 29   |      | 1    |
| Sweetwater                             | 5    |      |      |      |      |      | 1    |      |      |      |
| Teton                                  | 19   | 34   | 6    | 8    |      | 7    | 9    | 6    | 5    | 10   |
| Yellowstone National Park              | 2    |      |      |      |      | 1    |      |      |      |      |
| Merlin                                 |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 1    |      |      |      |      |      |      |
| Sheridan                               |      |      |      | 1    |      |      |      |      |      |      |
| Peregrine Falcon                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 1    | 1    |      |      |      |      |      |
| Teton                                  | 1    |      |      |      |      |      |      |      |      | 1    |
| Prairie Falcon                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    |      | 1    |      | 2    |      | 1    |      |      |      |
| Sheridan                               |      | 1    | 1    |      | 1    |      |      | 1    |      |      |
| Teton                                  |      |      | 1    |      |      |      | 1    |      | 1    |      |
| Virginia Rail                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 3    |      |      | 1    |      |      |
| Sheridan                               |      | 1    |      | 1    |      |      |      |      |      |      |
| Sora                                   |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 1    |      | 3    |      | 3    | 1    | 2    | 2    | 1    |
| Sheridan                               |      | 2    |      | 1    |      |      |      |      |      |      |
| Teton                                  |      | 1    | 1    |      |      |      | 4    |      | 1    | 1    |
| American Coot                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 430  | 59   | 46   | 165  | 116  | 73   | 128  | 259  | 222  | 801  |
| Platte                                 |      |      |      |      |      | 16   |      |      |      |      |
| Sheridan                               | 3    | 16   | 1    | 16   | 7    | 2    | 5    | 3    |      | 1    |
| Sweetwater                             | 20   |      |      |      |      |      | 3    |      |      |      |
| Teton                                  | 17   | 50   | 71   | 20   |      | 107  | 71   | 122  | 19   | 41   |
| Yellowstone National Park              | 6    |      |      |      |      | 6    |      |      |      |      |
| Sandhill Crane                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 44   | 11   | 9    | 19   | 36   | 23   | 30   | 9    | 28   | 26   |
| Platte                                 |      |      |      |      |      | 5    |      |      |      |      |
| Sheridan                               | 2    | 7    | 6    | 2    | 3    | 6    | 12   | 12   |      | 6    |
| Sweetwater                             | 41   |      |      |      |      |      | 2    |      |      |      |
| Teton                                  | 9    | 14   | 13   | 2    |      | 11   | 12   | 10   | 8    | 11   |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Yellowstone National Park              | 15   |      | 11   |      |      | 3    |      |      |      |      |
| Black-bellied Plover                   |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 6    |      | 5    | 28   |      |      | 14   | 1    |      |
| Semipalmated Plover                    |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 10   | 12   |      |      |      |      |      |
| Sheridan                               | 1    |      |      |      |      |      |      |      |      |      |
| Killdeer                               |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 23   | 9    | 35   | 17   | 34   | 23   | 18   | 19   | 35   | 18   |
| Platte                                 |      |      |      |      |      | 10   |      |      |      |      |
| Sheridan                               | 29   | 32   | 18   | 13   | 31   | 19   | 47   | 27   |      | 7    |
| Sweetwater                             | 5    |      |      |      |      |      | 1    |      |      |      |
| Teton                                  | 6    | 1    |      | 2    |      | 6    | 4    | 1    | 2    | 3    |
| Yellowstone National Park              | 4    |      | 16   |      |      | 2    |      |      |      |      |
| Mountain Plover                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      | 1    |      |      |      |      |      |      |      |
| Black-necked Stilt                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 4    |      |      |      |      |      |      |
| Sweetwater                             | 2    |      |      |      |      |      |      |      |      |      |
| American Avocet                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 98   | 13   | 32   | 49   | 31   | 7    | 9    | 35   | 53   | 28   |
| Sweetwater                             | 2    |      |      |      |      |      |      |      |      |      |
| Teton                                  |      |      |      |      |      | 1    |      |      |      |      |
| Greater Yellowlegs                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 1    |      |      |      |      | 1    |
| Teton                                  |      | 2    |      |      |      |      |      |      |      |      |
| Yellowstone National Park              | 2    |      |      |      |      |      |      |      |      |      |
| Lesser Yellowlegs                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 3    | 3    |      |      | 2    |      | 1    |
| Sheridan                               | 3    |      |      |      | 2    |      |      | 2    |      |      |
| Teton                                  |      |      |      | 10   |      |      |      |      |      |      |
| Solitary Sandpiper                     |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               | 3    |      |      | 2    |      |      | 2    | 1    |      |      |
| Teton                                  | 1    |      |      | 1    |      |      |      |      |      |      |
| Willet                                 |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 15   | 6    | 12   | 6    | 23   | 2    | 1    | 6    | 7    | 5    |
| Sheridan                               |      |      |      |      | 17   |      |      |      |      |      |
| Sweetwater                             | 2    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 1    |      |      |      |      | 4    |      |      |      | 1    |
| Yellowstone National Park              | 11   |      |      |      |      |      |      |      |      |      |
| Spotted Sandpiper                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    | 5    | 29   | 33   | 28   | 6    | 33   | 7    | 19   | 10   |
| Platte                                 |      |      |      |      |      | 5    |      |      |      |      |
| Sheridan                               | 8    | 2    | 1    | 1    | 3    | 1    | 2    | 2    |      | 1    |
| Sweetwater                             | 2    |      |      |      |      |      | 1    |      |      |      |
| Teton                                  |      | 2    | 1    | 1    |      | 1    | 3    |      | 2    | 2    |
| Yellowstone National Park              |      |      | 3    |      |      |      |      |      |      |      |
| Upland Sandpiper                       |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               | 2    | 1    |      |      |      |      |      |      |      |      |
| Whimbrel                               |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 4    |      |      |      | 32   |      |
| Long-billed Curlew                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 2    |      |      | 3    |      |      |      |      |      |
| Sheridan                               |      |      |      | 2    |      |      |      |      |      |      |
| Teton                                  | 6    | 1    |      |      |      | 1    |      |      |      | 6    |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Marbled Godwit                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 2    |      | 15   | 17   |      |      |      |      |      |
| Semipalmated Sandpiper                 |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 1    |      | 2    | 16   |      |      |      |      |      |
| Western Sandpiper                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      |      | 1    | 7    |      |
| Yellowstone National Park              | 1    |      |      |      |      |      |      |      |      |      |
| Least Sandpiper                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 10   |      |      |      | 1    | 2    |      |
| Sheridan                               | 5    | 1    | 1    |      |      |      | 1    |      |      |      |
| Baird's Sandpiper                      |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               | 3    |      |      |      |      |      | 1    |      |      |      |
| Pectoral Sandpiper                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 2    |      |      |      |      |      |      |
| Dunlin                                 |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 1    |      |      |      |      |      |
| Long-billed Dowitcher                  |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      | 26   | 141  | 24   | 6    | 18   | 20   | 11   | 6    |
| Platte                                 |      |      |      |      |      | 1    |      |      |      |      |
| Sheridan                               |      |      |      |      | 22   |      |      |      |      |      |
| Sweetwater                             | 1    |      |      |      |      |      |      |      |      |      |
| Wilson's Snipe                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 19   | 2    | 2    | 9    | 24   | 34   | 7    | 8    | 12   | 12   |
| Sheridan                               | 14   | 8    | 9    | 15   | 8    | 10   | 16   | 10   |      | 2    |
| Sweetwater                             | 2    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 15   | 5    | 2    |      |      | 3    | 3    | 2    |      | 1    |
| Yellowstone National Park              | 1    |      | 10   |      |      | 1    |      |      |      |      |
| Wilson's Phalarope                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 73   | 68   | 337  | 755  | 108  | 119  | 130  | 340  | 365  | 223  |
| Platte                                 |      |      |      |      |      | 5    |      |      |      |      |
| Sheridan                               | 14   | 15   | 16   | 3    |      | 10   | 7    | 34   |      |      |
| Sweetwater                             | 11   |      |      |      |      |      |      |      |      |      |
| Teton                                  |      |      | 18   |      |      | 15   | 4    |      | 2    | 21   |
| Red-necked Phalarope                   |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 160  | 7    |      | 182  |      | 7    |      |
| Teton                                  |      |      |      |      |      |      | 9    |      |      |      |
| Franklin's Gull                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 6    | 15   | 25   | 35   | 1    |      | 104  | 26   | 31   | 5    |
| Sweetwater                             | 14   |      |      |      |      |      | 6    |      |      |      |
| Teton                                  | 8    |      |      |      |      |      |      |      |      | 2    |
| Ring-billed Gull                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      | 2    | 3    | 18   |      | 10   | 18   | 3    | 2    |
| Sheridan                               | 11   | 1    |      |      | 20   |      | 1    |      |      |      |
| Teton                                  |      | 1    | 1    |      |      |      |      |      |      |      |
| California Gull                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 12   | 165  | 162  | 32   | 478  | 768  | 1107 | 368  | 1229 | 71   |
| Platte                                 |      |      |      |      |      | 10   |      |      |      |      |
| Teton                                  |      |      |      | 12   |      | 3    | 22   |      | 5    | 2    |
| Yellowstone National Park              | 1    |      | 1    |      |      | 19   |      |      |      |      |
| Caspian Tern                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      | 2    | 2    | 2    |      |      | 1    |      | 6    |
| Platte                                 |      |      |      |      |      | 5    |      |      |      |      |
| Black Tern                             |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    |      |      |      |      |      | 3    |      |      |      |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Teton                                  |      |      |      |      |      |      | 3    |      |      |      |
| Common Tern                            |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 2    | 121  | 5    |      | 10   | 1    |      |      |      |      |
| Forster's Tern                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 12   |      | 3    | 2    | 40   | 17   | 47   | 17   | 1    |
| Sheridan                               | 3    |      |      | 1    |      |      |      |      |      |      |
| Teton                                  |      |      |      |      |      | 1    |      |      |      |      |
| Rock Pigeon                            |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 19   | 95   | 108  | 26   | 137  | 43   | 37   | 24   | 122  | 73   |
| Sheridan                               | 140  | 174  | 90   | 90   | 24   | 38   | 92   | 169  |      | 25   |
| Eurasian Collared-Dove                 |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 1    | 2    | 19   | 37   | 36   | 78   | 49   |
| Sheridan                               |      |      |      |      |      |      |      | 4    |      | 3    |
| White-winged Dove                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      | 1    |      |      |      |
| Mourning Dove                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 53   | 74   | 68   | 154  | 136  | 144  | 108  | 184  | 161  | 89   |
| Platte                                 |      |      |      |      |      | 20   |      |      |      |      |
| Sheridan                               | 174  | 183  | 105  | 158  | 42   | 96   | 113  | 171  |      | 18   |
| Sweetwater                             | 5    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 5    | 2    | 8    | 6    |      | 9    | 3    | 2    | 5    | 4    |
| Great Horned Owl                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 7    | 7    | 1    | 1    | 7    | 10   | 8    | 11   | 9    | 10   |
| Sheridan                               | 2    | 1    | 1    | 2    | 2    | 4    | 7    |      |      | 3    |
| Sweetwater                             | 2    |      |      |      |      |      | 1    |      |      |      |
| Teton                                  |      |      |      |      |      |      | 3    |      |      |      |
| Long-eared Owl                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      |      | 1    |      |      |
| Burrowing Owl                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      |      |      | 2    |      |
| Sweetwater                             |      |      |      |      |      |      | 2    |      |      |      |
| Short-eared Owl                        |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      |      |      | 1    |      |      |      |      |
| Common Nighthawk                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      | 6    |      |      |      |      |
| Sheridan                               |      | 3    |      |      |      |      |      |      |      |      |
| Common Poorwill                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      | 2    |      |      |      |      |
| White-throated Swift                   |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 17   |      |      |      | 7    |      | 22   |
| Sheridan                               |      |      |      | 2    |      |      |      | 1    |      |      |
| Sweetwater                             | 8    |      |      |      |      |      |      |      |      |      |
| Calliope Hummingbird                   |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      | 5    | 2    |      |      | 2    | 2    | 3    |      |      |
| Teton                                  |      |      | 1    |      |      | 7    | 1    |      |      |      |
| Yellowstone National Park              |      |      | 1    |      |      |      |      |      |      |      |
| Broad-tailed Hummingbird               |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      |      | 1    |      |      |
| Sheridan                               |      |      | 2    |      |      | 3    |      | 2    |      |      |
| Teton                                  |      | 2    | 1    |      |      | 6    | 1    |      |      | 1    |
| Rufous Hummingbird                     |      |      |      |      |      |      |      |      |      |      |
| Yellowstone National Park              |      |      | 1    |      |      |      |      |      |      |      |
| Belted Kingfisher                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 6    | 1    | 2    | 6    | 5    | 5    | 10   | 3    | 4    | 7    |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Sheridan                               | 2    | 4    | 1    | 1    | 2    | 4    | 2    | 4    |      | 3    |
| Teton                                  | 2    | 2    |      | 1    |      | 1    | 4    |      |      | 1    |
| Yellowstone National Park              |      |      | 1    |      |      |      |      |      |      |      |
| Lewis's Woodpecker                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 1    |      |      |      |      |      | 4    |
| Williamson's Sapsucker                 |      |      |      |      |      |      |      |      |      |      |
| Teton                                  |      |      |      |      |      |      | 1    | 1    | 1    |      |
| Yellowstone National Park              |      |      | 1    |      |      |      |      |      |      |      |
| Yellow-bellied Sapsucker               |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    |      |      |      |      |      |      |      |      |      |
| Teton                                  |      |      | 1    |      |      |      |      |      |      |      |
| Red-naped Sapsucker                    |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 2    | 2    |      | 1    | 2    |      | 15   |      |      | 4    |
| Sheridan                               | 1    |      |      | 2    | 3    | 1    |      | 3    |      |      |
| Teton                                  | 1    | 9    | 8    | 2    |      | 2    | 11   | 1    | 1    | 1    |
| Yellowstone National Park              | 4    |      |      |      |      | 3    |      |      |      |      |
| Downy Woodpecker                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 2    | 1    |      | 4    | 3    | 4    | 2    | 3    | 3    | 4    |
| Sheridan                               | 11   | 7    | 6    | 7    | 2    | 8    | 3    | 9    |      | 3    |
| Sweetwater                             | 2    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 2    | 1    | 1    |      |      | 5    | 2    | 1    | 1    |      |
| Hairy Woodpecker                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 2    |      |      | 2    | 1    | 1    | 2    |      |      |      |
| Sheridan                               | 10   | 3    |      | 1    |      | 3    | 1    | 2    |      |      |
| Teton                                  | 1    | 4    | 3    |      |      | 3    | 1    |      |      |      |
| American Three-toed Woodpecker         |      |      |      |      |      |      |      |      |      |      |
| Yellowstone National Park              | 1    |      |      |      |      | 2    |      |      |      |      |
| Black-backed Woodpecker                |      |      |      |      |      |      |      |      |      |      |
| Teton                                  |      |      |      |      |      | 1    |      |      |      |      |
| Northern Flicker                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 23   | 1    | 9    | 14   | 24   | 16   | 36   | 20   | 15   | 8    |
| Platte                                 |      |      |      |      |      | 8    |      |      |      |      |
| Sheridan                               | 35   | 41   | 22   | 18   | 7    | 18   | 25   | 22   |      | 9    |
| Sweetwater                             | 10   |      |      |      |      |      |      |      |      |      |
| Teton                                  | 22   | 14   | 4    | 8    |      | 14   | 26   | 5    | 5    | 14   |
| Yellowstone National Park              | 10   |      | 4    |      |      | 13   |      |      |      |      |
| Western Wood-Pewee                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 2    |      |      |      |      | 1    | 1    | 1    |      |
| Sheridan                               |      |      | 1    | 1    |      |      | 1    |      |      |      |
| Sweetwater                             |      |      |      |      |      |      | 1    |      |      |      |
| Willow Flycatcher                      |      |      |      |      |      |      |      |      |      |      |
| Teton                                  |      |      |      | 1    |      |      |      |      |      |      |
| Least Flycatcher                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      | 1    |      | 1    |      |
| Sheridan                               |      | 1    | 4    | 1    |      | 2    | 3    | 2    |      |      |
| Gray Flycatcher                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 1    |      | 2    |      | 1    | 1    |
| Dusky Flycatcher                       |      |      |      |      |      |      |      |      |      |      |
| Teton                                  |      |      |      |      |      |      |      |      |      | 1    |
| Cordilleran Flycatcher                 |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      | 1    |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      | 1    |      |      |      |      |      |      |
| Say's Phoebe                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 10   | 7    | 10   | 7    | 14   | 11   | 11   | 11   | 9    | 4    |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Sheridan                               | 4    | 16   | 17   | 9    | 3    | 9    | 3    | 10   |      | 2    |
| Sweetwater                             |      |      |      |      |      |      | 1    |      |      |      |
| Western Kingbird                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 9    | 12   | 10   | 6    | 18   | 57   | 52   | 56   | 16   |
| Platte                                 |      |      |      |      |      | 2    |      |      |      |      |
| Sheridan                               |      | 18   | 16   | 25   | 4    | 19   | 15   | 51   |      |      |
| Sweetwater                             |      |      |      |      |      |      | 8    |      |      |      |
| Eastern Kingbird                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 2    | 13   | 6    | 8    | 3    | 8    | 2    | 13   | 1    |
| Platte                                 |      |      |      |      |      | 5    |      |      |      |      |
| Sheridan                               | 2    | 4    | 27   | 7    | 3    | 3    | 7    | 9    |      |      |
| Sweetwater                             |      |      |      |      |      |      | 1    |      |      |      |
| Teton                                  |      |      |      |      |      |      |      |      |      | 3    |
| Loggerhead Shrike                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 7    | 21   | 6    | 8    | 15   | 8    | 9    | 14   | 6    | 5    |
| Sheridan                               | 8    | 11   | 5    | 3    | 1    | 7    | 12   | 5    |      |      |
| Sweetwater                             | 3    |      |      |      |      |      |      |      |      |      |
| Warbling Vireo                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      | 2    |      |      |      |      |      | 4    |      |
| Sheridan                               |      |      | 1    |      |      |      |      |      |      |      |
| Red-eyed Vireo                         |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      |      |      |      | 1    |      |      |      |
| Plumbeous Vireo                        |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      |      |      |      |      | 1    |      |      |
| Gray Jay                               |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 4    |      |      |      |      |      |      |      |      |      |
| Teton                                  |      |      |      | 3    |      | 4    | 2    | 2    |      |      |
| Yellowstone National Park              |      |      | 3    |      |      |      |      |      |      |      |
| Steller's Jay                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 2    |      | 1    |      |      |      |
| Blue Jay                               |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      | 1    |      |      |      |
| Sheridan                               | 3    |      | 2    | 9    | 2    |      | 1    | 1    |      |      |
| Pinyon Jay                             |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      | 1    |      |      |      | 7    |      | 52   |      |
| Clark's Nutcracker                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 5    |      | 4    |      | 1    | 5    | 3    |      | 4    | 1    |
| Sheridan                               |      | 3    |      |      | 4    |      |      |      |      |      |
| Teton                                  | 5    | 4    | 6    |      |      | 2    |      | 2    | 2    |      |
| Yellowstone National Park              | 1    |      | 2    |      |      | 2    |      |      |      |      |
| Black-billed Magpie                    |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 66   | 28   | 24   | 45   | 108  | 15   | 92   | 38   | 25   | 19   |
| Sheridan                               | 106  | 74   | 48   | 42   | 37   | 32   | 25   | 89   |      | 25   |
| Sweetwater                             | 4    |      |      |      |      |      | 4    |      |      |      |
| Teton                                  | 39   | 19   | 32   | 12   |      | 67   | 30   | 10   | 12   | 5    |
| Yellowstone National Park              | 6    |      | 6    |      |      | 2    |      |      |      |      |
| American Crow                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 8    | 6    |      | 2    | 13   | 8    | 9    |      | 5    |      |
| Sheridan                               | 38   | 45   | 22   | 11   | 19   | 8    | 16   | 25   |      | 1    |
| Sweetwater                             | 3    |      |      |      |      |      | 2    |      |      |      |
| Teton                                  | 12   | 4    | 4    |      |      | 8    | 12   | 2    | 12   |      |
| Yellowstone National Park              |      |      | 12   |      |      | 2    |      |      |      |      |
| Common Raven                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 37   | 6    | 15   | 16   | 47   | 22   | 53   | 25   | 27   | 21   |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Sheridan                               | 15   | 3    |      | 3    | 3    | 1    | 7    | 3    |      |      |
| Sweetwater                             | 3    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 42   | 85   | 70   | 12   |      | 56   | 22   | 29   | 38   | 23   |
| Yellowstone National Park              | 20   |      | 37   |      |      | 13   |      |      |      |      |
| Horned Lark                            |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 64   | 43   | 44   | 670  | 63   | 75   | 29   | 81   | 46   | 44   |
| Sheridan                               |      |      | 6    |      |      | 1    |      | 2    |      |      |
| Sweetwater                             | 20   |      |      |      |      |      | 2    |      |      |      |
| Teton                                  |      |      |      |      |      |      |      |      |      | 4    |
| Yellowstone National Park              | 1    |      |      |      |      |      |      |      |      |      |
| Tree Swallow                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 34   | 3    | 6    | 24   | 7    | 19   | 31   | 12   | 28   | 99   |
| Platte                                 |      |      |      |      |      | 1    |      |      |      |      |
| Sheridan                               | 45   | 94   | 19   | 41   | 105  | 34   | 128  | 79   |      | 20   |
| Sweetwater                             | 10   |      |      |      |      |      | 9    |      |      |      |
| Teton                                  | 58   | 81   | 36   | 10   |      | 150  | 119  | 38   | 21   | 349  |
| Yellowstone National Park              | 31   |      | 14   |      |      | 13   |      |      |      |      |
| Violet-green Swallow                   |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 3    | 81   |      | 5    | 3    |      | 2    | 1    | 3    | 60   |
| Sheridan                               | 7    | 2    | 2    | 15   |      |      | 1    | 1    |      |      |
| Sweetwater                             | 101  |      |      |      |      |      |      |      |      |      |
| Teton                                  | 16   | 7    | 16   | 4    |      | 18   | 10   | 25   | 7    | 172  |
| Yellowstone National Park              |      |      | 17   |      |      |      |      |      |      |      |
| Northern Rough-winged Swallow          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 24   |      | 10   | 40   | 142  | 15   | 32   | 33   | 67   | 86   |
| Sheridan                               | 6    | 14   | 2    | 1    | 28   | 8    |      | 55   |      | 4    |
| Teton                                  |      | 2    | 2    | 3    |      | 10   | 22   | 1    | 2    | 8    |
| Bank Swallow                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 4    | 101  |      | 10   | 15   | 8    | 84   |      | 56   | 54   |
| Sheridan                               |      | 3    | 2    |      | 1    |      |      | 2    |      |      |
| Teton                                  |      |      |      |      |      |      |      |      |      | 2    |
| Yellowstone National Park              |      |      |      |      |      | 12   |      |      |      |      |
| Cliff Swallow                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 4    |      | 6    | 255  | 63   | 6    | 4    | 120  | 178  | 20   |
| Sheridan                               | 2    | 18   | 242  | 10   | 328  | 111  | 4    | 62   |      |      |
| Teton                                  |      | 1    |      |      |      | 12   | 17   | 10   | 58   | 25   |
| Yellowstone National Park              |      |      |      |      |      | 70   |      |      |      |      |
| Barn Swallow                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 22   | 38   | 20   | 81   | 55   | 87   | 123  | 106  | 128  | 123  |
| Platte                                 |      |      |      |      |      | 1    |      |      |      |      |
| Sheridan                               | 38   | 54   | 17   | 18   | 27   | 30   | 40   | 55   |      |      |
| Sweetwater                             | 1    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 1    | 11   | 6    | 1    |      | 28   | 7    | 21   | 15   | 19   |
| Yellowstone National Park              | 1    |      |      |      |      |      |      |      |      |      |
| Black-capped Chickadee                 |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 6    | 4    | 5    | 17   | 10   | 9    | 6    | 7    | 3    | 4    |
| Sheridan                               | 75   | 38   | 37   | 25   | 22   | 21   | 22   | 79   |      | 8    |
| Teton                                  | 16   | 16   | 19   | 4    |      | 35   | 28   | 2    |      | 9    |
| Mountain Chickadee                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 35   |      | 4    |      | 3    |      | 11   |      |      |      |
| Sheridan                               | 5    | 3    |      |      |      |      | 1    |      |      |      |
| Sweetwater                             | 1    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 12   | 2    | 12   | 2    |      | 32   | 17   | 5    | 9    |      |
| Yellowstone National Park              | 9    |      | 16   |      |      | 8    |      |      |      |      |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Red-breasted Nuthatch                  |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 6    |      |      |      | 4    | 2    | 9    | 2    | 2    |      |
| Sheridan                               | 5    | 4    | 1    | 5    |      | 2    | 2    | 2    |      |      |
| Teton                                  | 1    | 2    | 3    |      |      | 3    | 1    |      | 3    | 1    |
| Yellowstone National Park              | 1    |      | 6    |      |      |      |      |      |      |      |
| White-breasted Nuthatch                |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 1    | 1    | 3    | 1    |      | 1    |
| Sheridan                               | 3    | 2    |      |      | 1    | 2    |      | 3    |      |      |
| Teton                                  |      |      |      |      |      | 1    |      |      | 1    |      |
| Yellowstone National Park              |      |      |      |      |      | 1    |      |      |      |      |
| Rock Wren                              |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    | 1    | 1    | 1    | 2    | 8    | 8    |      |      |      |
| Sheridan                               |      | 2    | 2    | 1    |      | 2    |      |      |      |      |
| Sweetwater                             | 2    |      |      |      |      |      |      |      |      |      |
| Yellowstone National Park              |      |      |      |      |      | 1    |      |      |      |      |
| Canyon Wren                            |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      | 1    |      |      |      |      | 1    |      |      |
| House Wren                             |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 2    | 3    | 5    |      |      | 9    | 4    | 6    | 20   | 1    |
| Sheridan                               | 5    | 43   | 27   | 10   | 1    | 23   | 13   | 30   |      |      |
| Teton                                  |      | 3    | 4    | 1    |      |      |      |      |      |      |
| Sweetwater                             | 4    |      |      |      |      |      | 4    |      |      |      |
| Marsh Wren                             |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 11   | 3    | 52   | 43   | 97   | 46   | 122  | 39   | 42   |
| Sweetwater                             |      |      |      |      |      |      | 4    |      |      |      |
| Teton                                  |      |      |      |      | 39   | 5    | 31   |      |      | 1    |
| Yellowstone National Park              |      |      |      |      |      | 1    |      |      |      |      |
| American Dipper                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    |      |      |      | 2    |      | 2    |      |      |      |
| Sheridan                               | 5    | 3    | 1    |      | 2    | 2    | 1    |      |      |      |
| Teton                                  |      | 2    |      |      |      | 2    | 1    | 1    |      |      |
| Yellowstone National Park              | 1    |      |      |      |      |      |      |      |      |      |
| Golden-crowned Kinglet                 |      |      |      |      |      |      |      |      |      |      |
| Teton                                  |      |      |      |      |      |      | 2    |      |      |      |
| Ruby-crowned Kinglet                   |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 2    |      |      | 4    | 5    | 29   | 43   | 5    | 17   | 7    |
| Sheridan                               |      |      |      | 4    | 3    | 2    | 1    | 5    |      |      |
| Sweetwater                             | 2    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 6    | 11   | 10   | 4    |      | 39   | 37   | 8    | 25   | 10   |
| Yellowstone National Park              | 3    |      | 34   |      |      | 18   |      |      |      |      |
| Eastern Bluebird                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 1    |      |      |      |      |      |      |      |      |
| Mountain Bluebird                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 20   | 1    | 3    | 23   | 8    | 9    | 38   |      | 6    | 4    |
| Sheridan                               | 3    | 1    | 4    | 18   | 12   | 7    | 4    | 7    |      |      |
| Sweetwater                             | 2    |      |      |      |      |      | 17   |      |      |      |
| Teton                                  | 78   | 11   | 3    |      |      | 7    | 10   | 10   | 6    | 5    |
| Yellowstone National Park              | 3    |      | 3    |      |      | 7    |      |      |      |      |
| Townsend's Solitaire                   |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 3    | 1    |      |      | 1    |      | 10   |      |      |      |
| Sheridan                               |      | 3    |      |      |      |      | 1    |      |      |      |
| Sweetwater                             | 1    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 4    | 2    |      |      |      |      |      | 2    |      | 3    |
| Yellowstone National Park              | 2    |      | 7    |      |      |      |      |      |      |      |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Veery                                  |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      | 3    |      |      | 1    |      | 1    |      |      |      |
| Swainson's Thrush                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 1    | 1    |      |      |      |      |
| Sheridan                               | 1    |      | 1    | 2    | 3    |      |      | 5    |      |      |
| Hermit Thrush                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 5    | 2    |      |      |      |      |
| Sheridan                               |      |      |      |      |      |      |      | 4    |      |      |
| Sweetwater                             | 1    |      |      |      |      |      |      |      |      |      |
| American Robin                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1076 | 64   | 56   | 118  | 257  | 87   | 198  | 89   | 115  | 107  |
| Platte                                 |      |      |      |      |      | 25   |      |      |      |      |
| Sheridan                               | 349  | 500  | 213  | 262  | 201  | 231  | 353  | 317  |      | 27   |
| Sweetwater                             | 12   |      |      |      |      |      | 1    |      |      |      |
| Teton                                  | 113  | 103  | 7    | 22   |      | 111  | 79   | 16   | 35   | 82   |
| Yellowstone National Park              | 92   |      | 64   |      |      | 29   |      |      |      |      |
| Gray Catbird                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 1    |      |      |      |      |      |
| Sheridan                               | 1    | 1    | 8    | 1    | 1    | 2    | 8    | 1    |      |      |
| Teton                                  |      |      |      |      |      |      |      |      |      | 1    |
| Sage Thrasher                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 3    | 2    | 5    | 6    | 6    | 15   | 18   | 23   | 19   | 2    |
| Sweetwater                             |      |      |      |      |      |      | 3    |      |      |      |
| Brown Thrasher                         |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               | 1    | 5    | 9    | 4    |      | 7    | 4    | 15   |      |      |
| European Starling                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 76   | 31   | 24   | 79   | 334  | 245  | 115  | 162  | 93   | 69   |
| Platte                                 |      |      |      |      |      | 33   |      |      |      |      |
| Sheridan                               | 228  | 88   | 84   | 103  | 150  | 45   | 137  | 163  |      | 214  |
| Sweetwater                             | 10   |      |      |      |      |      | 1    |      |      |      |
| Teton                                  | 10   | 41   | 17   | 12   |      | 13   | 13   | 7    | 7    | 2    |
| Yellowstone National Park              | 4    |      | 4    |      |      |      |      |      |      |      |
| American Pipit                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 12   |      |      | 1    |      |      |
| Teton                                  |      |      |      |      |      |      |      |      |      | 1    |
| Cedar Waxwing                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 20   |      |      | 7    | 3    | 2    | 2    |
| Sheridan                               |      |      |      | 4    |      |      | 4    | 15   |      |      |
| Orange-crowned Warbler                 |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 1    | 1    | 2    | 2    | 1    |      |
| Sheridan                               | 2    |      |      | 7    | 5    |      | 2    | 1    |      |      |
| Yellow Warbler                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    | 1    | 1    | 7    |      | 9    | 11   | 9    | 20   | 9    |
| Platte                                 |      |      |      |      |      | 15   |      |      |      |      |
| Sheridan                               | 1    | 37   | 58   | 48   | 3    | 49   | 23   | 41   |      | 2    |
| Teton                                  |      | 5    | 5    |      |      | 28   | 18   | 4    | 8    | 5    |
| Sweetwater                             | 6    |      |      |      |      |      | 1    |      |      |      |
| Black-throated Gray Warbler            |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      |      |      | 2    |      |
| Yellow-rumped Warbler                  |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 25   | 4    | 16   | 139  | 47   | 49   | 75   | 34   | 7    | 26   |
| Sheridan                               | 51   | 8    | 1    | 113  | 40   |      | 16   | 19   |      |      |
| Sweetwater                             |      |      |      |      |      |      | 2    |      |      |      |
| Teton                                  |      | 24   | 8    | 4    |      | 13   | 36   | 5    | 8    | 29   |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Yellowstone National Park              |      |      | 30   |      |      | 31   |      |      |      |      |
| Blackpoll Warbler                      |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      |      | 2    |      |      |      |      |      |
| Ovenbird                               |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      |      |      |      |      | 1    |      |      |
| Northern Waterthrush                   |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      | 1    | 1    |      | 1    | 1    |      |      |
| Common Yellowthroat                    |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 3    | 13   | 7    | 1    | 15   | 6    | 15   | 10   | 6    |
| Sheridan                               |      | 3    | 1    | 12   |      | 2    | 1    | 4    |      |      |
| Teton                                  |      |      |      |      |      |      | 3    |      |      | 2    |
| Wilson's Warbler                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 1    |      | 2    |      | 6    |      |      |
| Sheridan                               |      |      | 1    |      |      |      |      |      |      |      |
| Teton                                  |      |      | 3    |      |      |      |      |      |      |      |
| Western Tanager                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      |      |      |      | 2    |
| Sheridan                               |      |      |      | 2    |      |      |      |      |      |      |
| Teton                                  |      |      |      |      |      |      |      |      | 1    |      |
| Yellow-breasted Chat                   |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      | 2    |      |      |      |
| Sheridan                               |      |      |      |      |      |      | 1    | 2    |      |      |
| Green-tailed Towhee                    |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 1    |      |      | 1    |      |      |      |
| Teton                                  |      |      |      |      |      |      | 1    |      |      |      |
| Spotted Towhee                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 2    |      | 7    | 3    | 8    | 4    | 7    | 3    | 5    | 7    |
| Platte                                 |      |      |      |      |      | 2    |      |      |      |      |
| Sheridan                               | 5    | 51   | 26   | 10   | 2    | 36   | 13   | 16   |      |      |
| American Tree Sparrow                  |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 1    |      |      |      | 1    |      |      |
| Chipping Sparrow                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      | 1    | 52   | 1    | 9    | 34   | 2    | 37   | 5    |
| Sheridan                               | 13   | 34   | 12   | 110  | 4    | 11   | 68   | 63   |      | 5    |
| Teton                                  | 2    | 4    | 1    | 2    |      | 3    | 19   | 4    | 10   | 204  |
| Yellowstone National Park              |      |      | 4    |      |      | 2    |      |      |      |      |
| Clay-colored Sparrow                   |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               | 2    | 2    |      | 9    |      |      | 1    | 4    |      |      |
| Brewer's Sparrow                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      | 8    | 1    | 11   | 12   | 10   | 7    | 12   |      |
| Sheridan                               | 1    |      | 2    |      |      |      | 1    | 19   |      |      |
| Sweetwater                             | 2    |      |      |      |      |      |      |      |      |      |
| Teton                                  |      | 3    |      |      |      | 1    | 6    | 4    | 1    |      |
| Vesper Sparrow                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 8    |      | 9    | 2780 | 123  | 7    | 15   | 4    | 6    | 5    |
| Sheridan                               | 147  | 8    | 26   | 23   | 61   | 12   | 47   | 37   |      | 16   |
| Sweetwater                             | 1    |      |      |      |      |      | 1    |      |      |      |
| Teton                                  | 6    | 7    | 2    | 26   |      | 7    | 14   | 1    | 2    | 8    |
| Yellowstone National Park              |      |      |      |      |      | 4    |      |      |      |      |
| Lark Sparrow                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 11   | 22   | 14   | 37   | 10   | 7    | 11   | 22   | 14   |
| Platte                                 |      |      |      |      |      | 4    |      |      |      |      |
| Sheridan                               | 2    | 42   | 35   | 35   | 3    | 3    | 46   | 85   |      |      |
| Teton                                  |      |      |      |      |      |      |      | 1    |      | 1    |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Sage Sparrow                           |      |      |      |      |      |      |      |      |      |      |
| Sweetwater                             |      |      |      |      |      |      | 3    |      |      |      |
| Lark Bunting                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 16   | 8    | 2    | 1    | 27   | 1    | 12   | 2    |      |
| Sheridan                               |      | 4    | 4    | 16   |      | 2    |      | 33   |      |      |
| Savannah Sparrow                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    | 3    | 32   | 6    | 13   | 14   | 5    | 7    |      | 7    |
| Sheridan                               | 18   | 4    | 12   | 10   | 12   | 2    | 8    | 8    |      |      |
| Teton                                  |      | 1    | 2    |      |      | 4    | 23   | 7    | 3    | 5    |
| Yellowstone National Park              | 1    |      | 64   |      |      | 3    |      |      |      |      |
| Grasshopper Sparrow                    |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      |      |      |      | 1    |      |
| Baird's Sparrow                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    |      |      |      |      |      |      |      | 1    |      |
| Sheridan                               | 5    |      |      |      |      |      |      |      |      |      |
| Fox Sparrow                            |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      | 1    |      |      |      |      |      |      |      |      |
| Teton                                  | 10   | 4    |      | 2    |      |      |      |      | 1    |      |
| Song Sparrow                           |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 14   | 8    | 8    | 19   | 23   | 16   | 10   | 14   | 7    | 12   |
| Platte                                 |      |      |      |      |      | 6    |      |      |      |      |
| Sheridan                               | 15   | 6    | 2    | 8    | 3    | 6    | 5    | 15   |      |      |
| Sweetwater                             |      |      |      |      |      |      | 2    |      |      |      |
| Teton                                  | 19   | 12   | 5    | 2    |      | 30   | 16   | 8    | 9    | 9    |
| Lincoln's Sparrow                      |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      | 2    | 2    |      | 1    |      |      |      |
| Sheridan                               |      | 4    |      | 2    | 7    |      | 2    | 1    |      | 1    |
| Sweetwater                             |      |      |      |      |      |      | 1    |      |      |      |
| Teton                                  |      |      |      |      |      |      | 2    |      |      | 2    |
| White-throated Sparrow                 |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      | 1    |      |      |      | 3    |
| Harris's Sparrow                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 1    | 1    |      |      |      |      |
| Sheridan                               |      |      |      |      |      |      | 1    |      |      |      |
| White-crowned Sparrow                  |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 6    | 4    | 3    | 31   | 21   | 6    | 16   | 4    | 8    |      |
| Sheridan                               | 46   | 5    | 3    | 20   | 12   | 1    | 13   | 5    |      |      |
| Sweetwater                             | 8    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 6    | 6    | 4    | 3    |      | 5    | 3    | 2    | 4    | 9    |
| Yellowstone National Park              |      |      | 9    |      |      | 12   |      |      |      |      |
| Golden-crowned Sparrow                 |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      |      |      | 1    |      |      |      |      |      |
| Dark-eyed Junco                        |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 402  | 2    | 1    | 38   | 9    | 7    | 27   | 2    |      | 27   |
| Sheridan                               | 26   | 71   |      | 2    | 206  |      | 12   | 7    |      |      |
| Sublette                               |      |      |      |      | 4    |      |      |      |      |      |
| Sweetwater                             | 1    |      |      |      |      |      |      |      |      |      |
| Teton                                  | 21   | 5    | 7    | 10   |      | 28   | 25   | 8    | 3    | 36   |
| Yellowstone National Park              | 16   |      | 14   |      |      | 13   |      |      |      |      |
| Black-headed Grosbeak                  |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 1    |      | 1    | 1    |      | 3    | 5    |      | 1    |      |
| Sheridan                               |      | 7    | 1    | 3    |      |      | 7    | 3    |      |      |
| Teton                                  |      |      | 1    |      |      | 2    | 1    |      |      |      |
| Rose-breasted Grosbeak                 |      |      |      |      |      |      |      |      |      |      |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Teton                                  |      |      |      |      |      |      |      | 1    |      |      |
| Lazuli Bunting                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 2    |      | 2    | 1    |      | 10   | 3    |      | 4    | 1    |
| Sheridan                               | 3    | 4    |      | 4    |      | 2    | 16   | 6    |      |      |
| Teton                                  |      |      | 1    |      |      | 2    |      |      |      |      |
| Indigo Bunting                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      |      | 1    |      |      |      |      |
| Teton                                  |      |      |      |      |      |      | 1    |      |      |      |
| Bobolink                               |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      |      |      | 1    |      | 1    |      |      |      |
| Sheridan                               |      | 1    | 8    | 1    |      |      | 3    | 1    |      |      |
| Red-winged Blackbird                   |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 322  | 200  | 135  | 350  | 438  | 370  | 164  | 422  | 337  | 249  |
| Platte                                 |      |      |      |      |      | 330  |      |      |      |      |
| Sheridan                               | 996  | 902  | 797  | 647  | 565  | 361  | 765  | 590  |      | 66   |
| Sweetwater                             | 2    |      |      |      |      |      | 1    |      |      |      |
| Teton                                  | 17   | 12   | 51   | 2    |      | 31   | 47   |      | 5    | 19   |
| Yellowstone National Park              | 2    |      | 5    |      |      | 7    |      |      |      |      |
| Western Meadowlark                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 85   | 72   | 74   | 110  | 139  | 148  | 108  | 134  | 136  | 50   |
| Platte                                 |      |      |      |      |      | 15   |      |      |      |      |
| Sheridan                               | 375  | 565  | 373  | 297  | 98   | 200  | 313  | 439  |      | 8    |
| Sweetwater                             | 1    |      |      |      |      |      | 2    |      |      |      |
| Teton                                  | 8    | 4    | 4    | 9    |      | 9    | 9    | 6    | 5    | 3    |
| Yellowstone National Park              | 5    |      | 1    |      |      | 7    |      |      |      |      |
| Yellow-headed Blackbird                |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 360  | 128  | 80   | 295  | 316  | 201  | 153  | 463  | 285  | 57   |
| Platte                                 |      |      |      |      |      | 20   |      |      |      |      |
| Sheridan                               | 119  | 42   | 63   | 15   | 17   | 4    | 52   | 18   |      |      |
| Sweetwater                             | 1    |      |      |      |      |      | 1    |      |      |      |
| Teton                                  | 13   | 8    | 15   | 8    |      | 31   | 22   | 9    | 4    | 51   |
| Brewer's Blackbird                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 276  | 86   | 275  | 427  | 417  | 67   | 172  | 10   | 32   | 70   |
| Sheridan                               | 775  | 139  | 84   | 287  | 35   | 15   | 80   | 39   |      |      |
| Sweetwater                             | 24   |      |      |      |      |      | 1    |      |      |      |
| Teton                                  | 94   | 54   | 37   | 28   |      | 42   | 59   | 19   | 9    | 30   |
| Yellowstone National Park              | 6    |      | 4    |      |      | 7    |      |      |      |      |
| Common Grackle                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 134  | 34   | 118  | 154  | 304  | 229  | 118  | 224  | 136  | 111  |
| Platte                                 |      |      |      |      |      | 100  |      |      |      |      |
| Sheridan                               | 298  | 356  | 213  | 199  | 178  | 138  | 187  | 252  |      | 47   |
| Teton                                  | 5    |      | 1    | 2    |      |      |      |      |      |      |
| Yellowstone National Park              |      |      |      |      |      | 1    |      |      |      |      |
| Brown-headed Cowbird                   |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 33   | 2    | 34   | 221  | 236  | 132  | 151  | 167  | 65   | 48   |
| Sheridan                               | 258  | 139  | 168  | 151  | 65   | 84   | 81   | 438  |      |      |
| Sweetwater                             | 1    |      |      |      |      |      | 1    |      |      |      |
| Teton                                  | 6    | 17   | 28   | 7    |      | 14   | 102  | 2    | 7    | 7    |
| Yellowstone National Park              | 6    |      | 10   |      |      | 1    |      |      |      |      |
| Bullock's Oriole                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      | 2    | 12   | 1    |      | 18   | 25   | 9    | 33   | 11   |
| Platte                                 |      |      |      |      |      | 2    |      |      |      |      |
| Sheridan                               |      | 11   | 28   |      | 1    | 15   | 17   | 12   |      |      |
| Sweetwater                             | 1    |      |      |      |      |      | 3    |      |      |      |

| Species <sup>a</sup><br>County or Area | Year |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|------|
|  | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Teton                                  |      |      |      |      |      | 2    | 2    |      |      | 1    |
| Gray-crowned Rosy-Finch                |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 11   |      |      |      | 50   |      |      |      |      |      |
| Sheridan                               | 4    |      |      |      |      |      |      |      |      |      |
| Sublette                               |      |      |      |      | 3    |      |      |      |      |      |
| Black Rosy-Finch                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 16   |      |      |      | 500  |      |      |      |      |      |
| Pine Grosbeak                          |      |      |      |      |      |      |      |      |      |      |
| Teton                                  |      |      |      |      |      |      | 1    |      |      |      |
| Cassin's Finch                         |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 76   | 2    |      | 1    | 92   | 30   | 80   | 2    |      | 4    |
| Sheridan                               | 10   | 7    | 7    |      | 12   |      | 1    | 2    |      |      |
| Teton                                  | 17   | 8    | 46   | 2    |      | 22   | 32   | 4    | 3    | 1    |
| Yellowstone National Park              | 1    |      | 18   |      |      | 6    |      |      |      |      |
| House Finch                            |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 5    |      | 6    | 55   | 38   | 32   | 78   | 60   | 66   | 41   |
| Sheridan                               | 33   | 29   | 11   | 46   | 37   | 30   | 35   | 21   |      | 2    |
| Teton                                  |      |      | 8    |      |      | 1    |      | 1    |      | 9    |
| Red Crossbill                          |      |      |      |      |      |      |      |      |      |      |
| Sheridan                               |      |      | 7    |      | 48   |      |      |      |      |      |
| Teton                                  |      | 2    |      |      |      |      |      |      |      |      |
| Yellowstone National Park              | 4    |      | 4    |      |      |      |      |      | 3    |      |
| Hoary Redpoll                          |      |      |      |      |      |      |      |      |      |      |
| Sublette                               |      |      |      |      | 3    |      |      |      |      |      |
| Pine Siskin                            |      |      |      |      |      |      |      |      |      |      |
| Fremont                                |      |      | 17   | 88   | 59   | 8    | 75   | 17   | 15   | 30   |
| Sheridan                               | 10   | 18   | 14   | 114  | 134  |      | 17   | 34   |      |      |
| Teton                                  | 2    | 100  | 59   | 3    |      | 23   | 8    | 2    | 35   |      |
| Yellowstone National Park              |      |      | 2    |      |      | 1    |      |      |      |      |
| American Goldfinch                     |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 3    | 3    | 39   | 30   | 99   | 37   | 3    | 4    | 21   | 11   |
| Platte                                 |      |      |      |      |      | 3    |      |      |      |      |
| Sheridan                               | 15   | 19   | 2    | 27   | 1    | 3    | 3    | 12   |      |      |
| Teton                                  | 6    | 6    | 2    |      |      | 22   |      |      | 6    | 2    |
| Evening Grosbeak                       |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 8    |      |      |      |      |      | 8    |      |      |      |
| Sheridan                               | 5    | 5    |      | 5    |      |      | 12   | 2    |      |      |
| Teton                                  | 6    | 2    | 7    |      |      | 9    | 50   |      |      |      |
| House Sparrow                          |      |      |      |      |      |      |      |      |      |      |
| Fremont                                | 109  | 25   | 74   | 97   | 53   | 206  | 61   | 51   | 81   | 58   |
| Sheridan                               | 33   | 49   | 16   | 25   | 10   | 62   | 57   | 59   |      | 6    |
| Teton                                  | 1    |      |      |      |      | 51   | 1    |      | 4    |      |

<sup>a</sup> May include sightings of species that are not accepted by the Wyoming Bird Records Committee at a later date.

**Table 3. Summary of volunteer efforts during the 2008 North American Migration Count.**

| <b>County</b> | <b>Total Number of Observers</b> | <b>Total Count Hours</b> | <b>Total Count Miles</b> | <b>Total Species Detected</b> | <b>Total Individuals Detected</b> |
|---------------|----------------------------------|--------------------------|--------------------------|-------------------------------|-----------------------------------|
| Fremont       | 9                                | 29.25                    | 316.5                    | 114                           | 3997                              |
| Sheridan      | 3                                | 9.5                      | 73                       | 45                            | 708                               |
| Teton         | 20                               | 8.5                      | Not recorded             | 90                            | 1913                              |
| <i>Totals</i> | <i>32</i>                        | <i>47.25</i>             | <i>389.5+</i>            | <i>133</i>                    | <i>6618</i>                       |

# **NONGAME BIRD DISTRIBUTION AND ABUNDANCE SURVEYS COMPLETION REPORT**

STATE OF WYOMING

NONGAME BIRDS: General Inventories

PERIOD COVERED: 1 January 2008 – 31 December 2008

PREPARED BY: Laurie Van Fleet, Nongame Biologist  
Andrea Orabona, Nongame Bird Biologist

## **INTRODUCTION**

The distribution, relative abundance, and population trends of nongame birds are being monitored through several different approaches. This report discusses the Avian Atlas, riparian transects, and the Wyoming Bird Checklist. The Breeding Bird Survey is discussed elsewhere in this publication. A summary of the accomplishments of the Wyoming Bird Records Committee is also provided here.

## **WYOMING AVIAN ATLAS**

The Wyoming Avian Atlas (Oakleaf et al. 1982) was designed to summarize available information on distribution, relative abundance, seasonal status, and habitat associations of birds in Wyoming. Data were summarized by latilong. Periodic updates and changes to the Atlas are typical as new and additional information becomes available. In 1991, the format was revised, and the mammal and bird atlases were combined into a new publication, Draft Distribution and Status of Birds and Mammals in Wyoming. This publication was reviewed by wildlife observers throughout the state and was published as the Wyoming Bird and Mammal Atlas in 1992 (Oakleaf et al. 1992). In 1997, the Atlas was updated and reptile and amphibian sections were included; this was published as the Atlas of Birds, Mammals, Reptiles, and Amphibians in Wyoming (Luce et al. 1997), and was reprinted with additional updates in 1999 (Luce et al. 1999). Updates and additions were again made in 2004 and in April of 2009. The 2009 version is published as the Atlas of Birds, Mammals, Amphibians, and Reptiles in Wyoming (Orabona et al. 2009) and is available on the Wyoming Game and Fish Department's (Department) web site at under the Wildlife, Nongame Home link at <http://gf.state.wy.us/wildlife/nongame/index.asp>.

## **RIPARIAN TRANSECTS**

Volunteers conduct point-count transects along three riparian areas in Wyoming. In Casper, Bruce and Donna Walgren conduct the Garden Creek and North Platte River Parkway transects. In northeastern Wyoming, the Sand Creek transect near Beulah is conducted by Mary Yemington with assistance from Jean Adams. Currently, three previously conducted riparian transects are in need of new observers: Ash Creek and Tongue River transects in the Sheridan area, and the Belle Fourche River transect near Devils Tower.

The Sheridan area transects were first conducted in 1976. The Ash Creek transect was run one day in each of three or four seasons every year, with the exception of 1994-1997 and 1999. Surveys have not been conducted since 2002. The Tongue River transect was run one day in each of three or four seasons every year, with the exception of 1997-1999; however, surveys have not been conducted since 1999. The Belle Fourche transect was conducted from 1989 – 1999 and is in need of an observer. Results from the Belle Fourche transect were not included in riparian survey analysis until 1993 because not enough data were available to evaluate trends. The Casper area transects were started in 1982 and have been run one day in each of three or four seasons every year, with the exception of 1999, 2001, and 2002 when the Garden Creek survey was not conducted, and 2000 when the North Platte River survey was not conducted. The Sand Creek transect was started in 1983, and has been run one day in each of two or three seasons every year, with the exception of 1988 and 1997 during which time the survey was not conducted.

The long-term data from these transects are valuable for evaluating changes in bird populations, not only along each riparian area but also combined. Detailed data from these transects are available from the Nongame Bird Biologist, Wyoming Game and Fish Department, 260 Buena Vista, Lander, WY 82520.

The frequency that species were recorded on spring transects for all years that transects were conducted is presented in Table 1. Spring data were chosen because survey dates were more consistent than during other seasons.

## **SPECIES CHECKLISTS**

In 2008, 16 of 60 avian Species of Greatest Conservation Need with a Native Species Status of 1 – 4 were detected by the Birds of Jackson Hole checklist participants, compared to 23 in 2006, 10 in 2005, and 17 in 2004. In 2007, additional species distribution and status information had been obtained and a new checklist was published, however it was not available in 2007 due to printing problems. Interpreting trends from these checklists is difficult. Trends are influenced by the quality of the observations and the locations that observers visit, both of which vary annually. Also, since 1993, checklists have been on display at the Moose Visitor Center in Grand Teton National Park but were only available to visitors upon request. As a result, it is likely that fewer casual birders submitted checklists in the most recent years. Weather also affects species lists by influencing the amount of time visitors spend in the field. Still, the checklist remains valuable because it provides a way of tracking populations and distribution through incidental observations, in addition to the Breeding Bird Survey and riparian transects.

In 1991, the Wyoming Bird Checklist was published and made available to the public; in 1995 it was updated and improved. Additional species distribution and status information has been obtained since 1995, so a new checklist was published in the fall of 2008. The checklist divides the state into six regions based on latilongs, and can be stapled closed, stamped, and mailed to the Nongame Bird Biologist. In 2008, Wyoming Bird Checklist participants detected 39 of the 60 avian Species of Greatest Conservation Need compared to 35 in 2007, 31 in 2006, and 37 in 2005.

## WYOMING BIRD RECORDS COMMITTEE

The Wyoming Bird Records Committee (WBRC) was established in 1989 to accomplish the following goals.

- 1) To solicit, organize, and maintain records, documentation, photographs, tape 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 Wyoming's Birds.
- 3) To disseminate useful and pertinent material concerning the field identification of Wyoming birds in order to assist Wyoming birders in increasing their knowledge and skill.

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 Wyoming Bird Records Committee operates under a set of bylaws approved in 1991 and updated in 1992 and 1998.

As of 2008, the WBRC has reviewed 1,078 documentations. Of these, 856 observations have been accepted, 217 have not been accepted, and 5 records are in recirculation.

The Wyoming Bird Records Committee Database is a dynamic document, updated once or twice a year following the WBRC meetings. The 2009 Wyoming Bird Records Committee report is available on the Department's web site under the Wildlife, Nongame Home link at <http://gf.state.wy.us/wildlife/nongame/index.asp>. All reports of rare and unusual birds submitted to the WBRC are presented in this report.

A record of the Official Wyoming State Bird List and the avian species for which documentation is requested is presented in Appendix I. How to document rare and unusual birds and a WBRC Rare Bird Form appear below.

To improve the accuracy and breadth of Wyoming's ornithological record, the following suggestions are given to assist with documentation of sightings.

- 1) Read "How to Document Rare Birds", by Donna L. Dittman and Greg W. Lasley (pages 145-159 in the 1992 issue of Birding, Vol. 24, No. 3).
- 2) Acceptable documentation must eliminate all similar species. Remember that immatures or juveniles of one species can be very similar to adults of another species. Examples that might

cause confusion are gulls, jaegers, sparrows, and longspurs. Species that exhibit multiple color morphs can also be problematic.

- 3) Study and learn bird topography. Most field guides provide a schematic of avian body parts and feather groups. Specialized identification guides also provide specific structural and anatomical detail. A thorough grasp of this subject will heighten your general birding skill and facilitate accurate, detailed documentation.
- 4) Take meticulous and thorough field notes during or immediately after the observation. Alternatively, you can also use a tape recorder or digital camera to capture identification details. If the bird is cooperative, write your notes during the observation period. Try not to consult your field guide while you are writing to avoid predisposing your identification. Do not rely on memory to document a rare or unusual bird.
- 5) A good physical description of the bird is most crucial and you should include everything you observe. Include all details concerning plumage, shape, relative size, eyes, legs, and bill. Note the colors, including color distribution, color density, and color contrast between different feather groups. It is helpful to consider proportional details, i.e., bill length compared to head width, tail length as a proportion of body length, and length of primary projection compared to tail length. Record plumage characteristics such as degree of wear or signs of molt. When describing size, try to compare nearby known species or some other object of known dimensions. Avoid trying to estimate size in actual units (inches, feet) since this is very subjective.
- 6) Observe and record the subject bird's behavior. While behavior is seldom diagnostic by itself, in combination with other details, it is often conclusive. One of the few documented observations of the Connecticut Warbler in Wyoming was accepted by the WBRC, in part, because it was observed walking, not hopping.
- 7) If possible, take photographs. Take a number of shots to capture a complete portrait. The advent of digital photography has greatly increased the number of records the WBRC receives with photographs, which greatly helps our work. However, a photograph should always be accompanied by a written description, as one photograph will likely not display all the diagnostic features.
- 8) If you do not have a camera, consider making a sketch. You do not need the talent of Rembrandt or Audubon to draw a convincing and diagnostic sketch. Utilize your knowledge of bird topography and you will be surprised how well you do. Draw this sketch in the field during the observation. Do not rely on memory.
- 9) Vocalizations can be extremely important for identification, especially for some groups such as flycatchers. Describe what you hear while you are listening. Better yet, record the bird, even if you do not have professional recording equipment. A hand-held recorder or cellular phone with a built-in microphone or a digital camera with a video recording feature can provide reliable results. There are many excellent collections of bird songs and calls that can prepare birders for the unexpected find by ear alone.

- 10) Specimens that can be identified and repositied at the University of Wyoming Zoological Museum are still the most convincing evidence of an occurrence. If you encounter a dead rare or unusual bird in the field, please deliver the specimen to an appropriate authority, e.g. Wyoming Game and Fish Department, National Park Service, or U.S. Fish and Wildlife Service personnel. Note the exact date and location of the discovery. Freeze the specimen if delivery is to be delayed. Always use gloves or a plastic bag to pick up dead birds and double-bag with a note inside with date and location and your contact information.

## **LITERATURE CITED**

- Dittman, D. L., and G. W. Lasley. 1992. How to document rare birds. Pages 145-159 in *Birding* 24(3).
- Luce, B., B. Oakleaf, A. Cerovski, L. Hunter, and J. Priday. 1997. Atlas of Birds, Mammals, Reptiles, and Amphibians in Wyoming. Wyoming Game and Fish Department Nongame Program, Lander. 192pp.
- Luce, B., A. Cerovski, B. Oakleaf, J. Priday, and L. Van Fleet. 1999. Atlas of Birds, Mammals, Reptiles, and Amphibians in Wyoming. Wyoming Game and Fish Department Nongame Program, Lander. 194pp.
- Oakleaf, B., H. Downing, B. Raynes, M. Raynes, and O. K. Scott. 1982. Wyoming Avian Atlas. Wyoming Game and Fish Department and Bighorn Audubon Society. 87pp.
- Oakleaf, B. Luce, S. Ritter, and A. Cerovski. 1992. Wyoming Bird and Mammal Atlas. Wyoming Game and Fish Department, Cheyenne. 170pp.
- Orabona, A., S. Patla, L. Van Fleet, M. Grenier, B. Oakleaf, and Z. Walker. 2009. Atlas of Birds, Mammals, Amphibians, and Reptiles in Wyoming. Wyoming Game and Fish Department Nongame Program, Lander. 227pp.

***Rare and Unusual Bird Sighting Form***  
**WYOMING BIRD RECORDS COMMITTEE**  
**260 BUENA VISTA, LANDER, WY 82520**

***The Wyoming Bird Records Committee sincerely thanks all observers for submitting this form to help keep Wyoming's bird records up-to-date and accurate. It is not necessary to complete every block if some details are lacking, but please provide all the details you can and attach photographs, if available.***

|  |  |
|--|--|
| Common Name:   | Specific location of observation:  |
| Scientific Name:                                       |  |
| Observation Date:                                      |  |
| Observation Time:                                      | UTM E                      UTM N                      Datum                      Zone                      T             |
| Length of Observation:                                 | Latitude    °    '                      "N/Longitude    °    '                      "W                                   |
| Distance from Bird:                                    | T                      N / R                      W / Sec.                      / ¼ Sec.                      / ¼ ¼ Sec. |
| Light Conditions:                                      | Weather at time of observation:  |
| Optical Equipment:                                     |  |
| Notes made: _____ During sighting    _____ From memory | Prior weather and number of days since last change:  |
| Date report prepared:                                  |  |

Give a general description of the bird seen and any other details of interest relating to the observation.

| GENDER        | AGE                | PLUMAGE   |              | PHOTO/TAPE/DRAWING                           |
|---------------|--------------------|-----------|--------------|--|
| Male:         | Adult:             | Breeding: | Juvenal:     | Enclosed:                                    |
| Female:       | Juvenile/Immature: | Winter:   | Dark Morph:  | Available:                                   |
| Unknown:      | 2-3 year bird:     | Eclipse:  | Light Morph: | Please submit a copy of your field drawings. |
| Total Number: | Unknown:           | Other:    |              |  |

*If possible, please include in the sections below details of the specific body parts actually observed during the sighting.*

|             |
|-------------|
| BILL:       |
| HEAD:       |
| NECK:       |
| UPPERPARTS: |
| UNDERPARTS: |

*Please do not write below here; for WBRC use only.*

*Form updated January 2008*

|                      |                 |                 |                      |
|----------------------|-----------------|-----------------|----------------------|
| <b>Record Number</b> | <b>Category</b> | <b>Latilong</b> | <b>Date Received</b> |
|----------------------|-----------------|-----------------|----------------------|

|   |   |
|---|---|
| WINGS:  |   |
| TAIL:   |   |
| LEGS & FEET:  |   |
| List similar species and describe how or why you eliminated them.   |   |
| Describe the behavior of this bird and the interaction with others. |   |
| What is the habitat at this location?                               |   |
| If heard, describe the bird's song or vocalizations.                | Reporter's name, address, phone number, and e-mail address. |
| How many years have you birded?                                     | Corroborating observers who are not reporting separately.   |
| Have you observed this species before?                              |   |

*Please do not write below here; for WBRC use only.*

*Form updated January 2008*

|                      |
|----------------------|
| <b>Record Number</b> |
|----------------------|

|                 |
|-----------------|
| <b>Latilong</b> |
|-----------------|

|                     |
|---------------------|
| <b>Atlas Update</b> |
|---------------------|

|  |
|--|
| <b>Sighting Entered in WGFD WOS Database</b> |
|--|

**THANK YOU FOR SUBMITTING YOUR SIGHTING TO THE WYOMING BIRD RECORDS COMMITTEE!**

**Table 1. The number of years species were recorded on spring riparian transects, through 2008. Years equals number of years transects were actually surveyed.**

| <b>Species</b>            | <b>Ash<br/>Creek<br/>Years=22</b> | <b>Belle<br/>Fourche<br/>Years=10</b> | <b>Garden<br/>Creek<br/>Years=25</b> | <b>N. Platte<br/>River<br/>Years=27</b> | <b>Sand<br/>Creek<br/>Years=26</b> | <b>Tongue<br/>River<br/>Years=24</b> |
|---------------------------|-----------------------------------|---------------------------------------|--------------------------------------|---|------------------------------------|--------------------------------------|
| Western Grebe             |                                   |                                       |                                      | 1                                       |                                    |                                      |
| American White Pelican    |                                   |                                       |                                      | 1                                       |                                    |                                      |
| Double-crested Cormorant  | 1                                 |                                       | 2                                    | 23                                      |                                    |                                      |
| Great Blue Heron          | 14                                | 7                                     | 1                                    | 4                                       | 24                                 | 4                                    |
| Great Egret               |                                   |                                       |                                      | 1                                       |                                    |                                      |
| Green-backed Heron        |                                   | 1                                     |                                      |   |                                    |                                      |
| Black-crowned Night-Heron |                                   |                                       |                                      | 3                                       |                                    |                                      |
| Canada Goose              | 1                                 | 3                                     | 1                                    | 7                                       |                                    |                                      |
| Wood Duck                 |                                   | 3                                     |                                      | 3                                       | 6                                  |                                      |
| Mallard                   | 16                                | 4                                     | 13                                   | 20                                      | 20                                 | 11                                   |
| Blue-winged Teal          |                                   | 1                                     |                                      | 3                                       | 4                                  |                                      |
| Gadwall                   |                                   |                                       |                                      | 2                                       |                                    |                                      |
| Common Merganser          |                                   | 1                                     |                                      | 2                                       | 11                                 | 23                                   |
| Turkey Vulture            | 2                                 | 5                                     |                                      | 1                                       | 7                                  | 6                                    |
| Osprey                    | 1                                 |                                       |                                      | 2                                       | 1                                  |                                      |
| Northern Harrier          | 3                                 |                                       |                                      |   |                                    |                                      |
| Sharp-shinned Hawk        | 1                                 |                                       | 1                                    |   |                                    | 3                                    |
| Cooper's Hawk             | 1                                 |                                       |                                      | 1                                       |                                    |                                      |
| Northern Goshawk          | 1                                 |                                       |                                      |   |                                    |                                      |
| Broad-winged Hawk         | 2                                 |                                       |                                      | 1                                       |                                    |                                      |
| Swainson's Hawk           |                                   |                                       | 1                                    | 1                                       |                                    |                                      |
| Red-tailed Hawk           | 3                                 | 2                                     | 2                                    | 7                                       | 9                                  | 3                                    |
| Ferruginous Hawk          |                                   |                                       | 1                                    |   |                                    |                                      |
| Golden Eagle              | 5                                 |                                       |                                      |   | 4                                  | 6                                    |
| American Kestrel          | 16                                | 6                                     | 1                                    | 9                                       | 7                                  | 8                                    |
| Merlin                    | 1                                 |                                       |                                      | 1                                       |                                    |                                      |
| Prairie Falcon            | 1                                 | 2                                     |                                      |   |                                    | 2                                    |
| Chukar                    |                                   |                                       | 1                                    |   |                                    |                                      |
| Ring-necked Pheasant      | 4                                 | 1                                     |                                      |   |                                    | 2                                    |
| Wild Turkey               | 14                                | 2                                     |                                      |   |                                    |                                      |
| Killdeer                  | 5                                 | 3                                     | 1                                    | 20                                      | 4                                  |                                      |
| American Avocet           |                                   |                                       |                                      | 5                                       |                                    |                                      |
| Spotted Sandpiper         |                                   | 1                                     |                                      | 12                                      | 1                                  | 2                                    |
| Common Snipe              | 2                                 |                                       |                                      |   |                                    | 1                                    |
| Ring-billed Gull          |                                   |                                       | 1                                    | 3                                       |                                    |                                      |
| California Gull           |                                   |                                       | 20                                   | 22                                      |                                    |                                      |
| Caspian Tern              |                                   |                                       |                                      | 8                                       |                                    |                                      |
| Rock Pigeon               |                                   | 4                                     | 6                                    | 9                                       | 13                                 | 13                                   |
| Mourning Dove             | 21                                | 10                                    | 23                                   | 24                                      | 23                                 | 9                                    |
| Eurasian Collared-Dove    |                                   |                                       | 1                                    |   |                                    |                                      |
| Western Screech-Owl       | 2                                 |                                       |                                      |   |                                    |                                      |
| Great Horned Owl          | 1                                 |                                       |                                      | 2                                       |                                    | 1                                    |
| Common Nighthawk          |                                   |                                       |                                      | 1                                       |                                    |                                      |
| White-throated Swift      |                                   | 1                                     |                                      |   | 7                                  | 23                                   |
| Calliope Hummingbird      |                                   |                                       |                                      |   |                                    | 2                                    |
| Broad-tailed Hummingbird  |                                   |                                       |                                      |   |                                    | 2                                    |
| Belted Kingfisher         | 9                                 | 1                                     | 3                                    | 2                                       | 21                                 | 3                                    |
| Lewis' Woodpecker         |                                   | 3                                     |                                      |   | 1                                  |                                      |
| Red-headed Woodpecker     | 1                                 | 9                                     |                                      | 1                                       | 1                                  |                                      |
| Yellow-bellied Sapsucker  |                                   |                                       |                                      |   | 1                                  |                                      |
| Red-naped Sapsucker       | 1                                 |                                       |                                      |   | 1                                  |                                      |
| Downy Woodpecker          | 7                                 | 2                                     | 7                                    | 14                                      | 10                                 | 1                                    |
| Hairy Woodpecker          | 3                                 | 7                                     |                                      |   | 9                                  | 2                                    |
| Northern Flicker          | 20                                | 10                                    | 14                                   | 22                                      | 19                                 | 9                                    |

| <b>Species</b>          | <b>Ash<br/>Creek<br/>Years=22</b> | <b>Belle<br/>Fourche<br/>Years=10</b> | <b>Garden<br/>Creek<br/>Years=25</b> | <b>N. Platte<br/>River<br/>Years=27</b> | <b>Sand<br/>Creek<br/>Years=26</b> | <b>Tongue<br/>River<br/>Years=24</b> |
|-------------------------|-----------------------------------|---------------------------------------|--------------------------------------|---|------------------------------------|--------------------------------------|
| Olive-sided Flycatcher  |                                   |                                       | 1                                    | 1                                       |                                    |                                      |
| Western Wood-Pewee      | 7                                 | 8                                     | 10                                   | 3                                       | 20                                 | 13                                   |
| Willow Flycatcher       | 2                                 |                                       |                                      |   | 1                                  | 8                                    |
| Least Flycatcher        | 6                                 |                                       | 3                                    | 1                                       |                                    | 17                                   |
| Dusky Flycatcher        | 1                                 |                                       |                                      |   | 1                                  | 2                                    |
| Cordilleran Flycatcher  | 2                                 |                                       | 1                                    | 4                                       | 10                                 | 2                                    |
| Say's Phoebe            |                                   |                                       |                                      |   | 1                                  |                                      |
| Western Kingbird        |                                   |                                       | 1                                    | 8                                       |                                    |                                      |
| Eastern Kingbird        | 13                                | 10                                    |                                      | 11                                      | 26                                 |                                      |
| Tree Swallow            | 5                                 |                                       | 3                                    | 2                                       | 5                                  | 6                                    |
| Violet-green Swallow    | 1                                 | 5                                     |                                      |   | 22                                 | 15                                   |
| N. Rough-winged Swallow | 7                                 |                                       | 14                                   | 5                                       | 18                                 |                                      |
| Cliff Swallow           |                                   | 8                                     |                                      | 11                                      | 5                                  |                                      |
| Barn Swallow            | 2                                 | 4                                     | 6                                    | 9                                       | 1                                  | 2                                    |
| Gray Jay                |                                   | 1                                     |                                      |   |                                    |                                      |
| Blue Jay                |                                   | 5                                     | 9                                    | 6                                       | 17                                 |                                      |
| Pinyon Jay              | 7                                 | 3                                     |                                      |   |                                    |                                      |
| Clark's Nutcracker      | 6                                 |                                       |                                      |   |                                    | 5                                    |
| Black-billed Magpie     | 15                                | 1                                     |                                      | 23                                      | 13                                 | 4                                    |
| American Crow           | 1                                 | 6                                     | 2                                    | 6                                       | 19                                 | 1                                    |
| Common Raven            |                                   |                                       |                                      |   |                                    | 4                                    |
| Black-capped Chickadee  | 21                                | 10                                    | 15                                   | 18                                      | 26                                 | 19                                   |
| Mountain Chickadee      |                                   |                                       | 1                                    |   |                                    | 2                                    |
| Red-breasted Nuthatch   | 5                                 | 2                                     |                                      | 2                                       | 7                                  | 1                                    |
| White-breasted Nuthatch | 6                                 | 4                                     |                                      |   | 5                                  | 1                                    |
| Rock Wren               | 14                                |                                       |                                      |   | 3                                  | 4                                    |
| Canyon Wren             |                                   |                                       |                                      |   | 3                                  | 1                                    |
| House Wren              | 20                                | 10                                    | 15                                   | 21                                      | 19                                 | 18                                   |
| American Dipper         |                                   |                                       |                                      |   |                                    | 10                                   |
| Ruby-crowned Kinglet    | 1                                 |                                       | 3                                    | 4                                       | 1                                  | 4                                    |
| Blue-gray Gnatcatcher   |                                   |                                       |                                      | 2                                       |                                    |                                      |
| Mountain Bluebird       | 13                                | 5                                     |                                      |   | 5                                  |                                      |
| Townsend's Solitaire    | 4                                 |                                       |                                      |   | 7                                  | 2                                    |
| Veery                   | 1                                 |                                       | 2                                    | 2                                       |                                    | 3                                    |
| Swainson's Thrush       | 4                                 |                                       | 7                                    | 16                                      | 4                                  | 8                                    |
| Hermit Thrush           |                                   |                                       | 1                                    |   |                                    |                                      |
| American Robin          | 21                                | 10                                    | 24                                   | 23                                      | 26                                 | 23                                   |
| Gray Catbird            | 9                                 | 1                                     | 23                                   | 9                                       | 10                                 | 7                                    |
| Brown Thrasher          | 2                                 |                                       | 6                                    | 12                                      | 1                                  |                                      |
| Cedar Waxwing           | 2                                 | 4                                     | 14                                   | 2                                       | 9                                  | 1                                    |
| European Starling       | 14                                | 10                                    | 22                                   | 22                                      | 6                                  | 7                                    |
| Plumbeous Vireo         | 2                                 | 2                                     |                                      | 1                                       | 3                                  | 5                                    |
| Warbling Vireo          |                                   | 1                                     | 6                                    | 3                                       | 3                                  | 22                                   |
| Red-eyed Vireo          | 3                                 | 1                                     |                                      | 1                                       | 18                                 | 3                                    |
| Tennessee Warbler       | 1                                 |                                       |                                      | 2                                       |                                    | 4                                    |
| Orange-crowned Warbler  | 2                                 |                                       | 5                                    | 8                                       |                                    | 2                                    |
| Nashville Warbler       |                                   |                                       |                                      |   |                                    | 1                                    |
| Northern Parula         |                                   |                                       | 1                                    |   |                                    |                                      |
| Yellow Warbler          | 20                                | 10                                    | 24                                   | 21                                      | 24                                 | 22                                   |
| Chestnut-sided Warbler  |                                   |                                       |                                      |   |                                    | 2                                    |
| Magnolia Warbler        |                                   |                                       |                                      | 1                                       |                                    |                                      |
| Yellow-rumped Warbler   | 7                                 | 2                                     | 4                                    | 16                                      | 6                                  | 5                                    |
| Blackpoll Warbler       |                                   |                                       |                                      |   | 1                                  |                                      |
| American Redstart       |                                   |                                       |                                      |   | 3                                  |                                      |
| Ovenbird                | 1                                 |                                       |                                      |   | 1                                  | 2                                    |
| Northern Waterthrush    |                                   |                                       | 3                                    | 1                                       |                                    |                                      |
| MacGillivray's Warbler  | 3                                 |                                       | 2                                    | 3                                       | 1                                  | 15                                   |
| Common Yellowthroat     | 8                                 | 2                                     | 3                                    | 15                                      | 22                                 | 19                                   |
| Wilson's Warbler        | 1                                 |                                       | 1                                    | 3                                       | 1                                  | 1                                    |
| Yellow-breasted Chat    | 18                                | 1                                     | 1                                    | 1                                       | 16                                 | 1                                    |

| <b>Species</b>                         | <b>Ash<br/>Creek<br/>Years=22</b> | <b>Belle<br/>Fourche<br/>Years=10</b> | <b>Garden<br/>Creek<br/>Years=25</b> | <b>N. Platte<br/>River<br/>Years=27</b> | <b>Sand<br/>Creek<br/>Years=26</b> | <b>Tongue<br/>River<br/>Years=24</b> |
|--|-----------------------------------|---------------------------------------|--------------------------------------|---|------------------------------------|--------------------------------------|
| Western Tanager                        |                                   | 3                                     | 7                                    | 1                                       | 9                                  | 7                                    |
| Rose-breasted Grosbeak                 |                                   |                                       | 1                                    |   |                                    |                                      |
| Black-headed Grosbeak                  | 1                                 | 4                                     | 24                                   | 6                                       | 22                                 |                                      |
| Lazuli Bunting                         | 15                                |                                       | 5                                    | 1                                       | 21                                 | 22                                   |
| Indigo Bunting                         |                                   |                                       |                                      |   | 10                                 |                                      |
| Lazuli-Indigo cross                    |                                   |                                       |                                      |   | 12                                 |                                      |
| Green-tailed Towhee                    | 1                                 |                                       | 2                                    | 2                                       |                                    | 1                                    |
| Spotted Towhee                         | 21                                | 8                                     | 5                                    | 6                                       | 26                                 | 23                                   |
| American Tree Sparrow                  |                                   | 1                                     |                                      |   |                                    |                                      |
| Chipping Sparrow                       | 19                                | 9                                     | 2                                    | 6                                       | 18                                 | 4                                    |
| Clay-colored Sparrow                   |                                   |                                       |                                      |   | 1                                  |                                      |
| Brewer's Sparrow                       | 1                                 |                                       |                                      |   |                                    |                                      |
| Vesper Sparrow                         | 2                                 |                                       |                                      | 2                                       |                                    |                                      |
| Lark Sparrow                           | 17                                | 9                                     |                                      |   | 22                                 |                                      |
| Lark Bunting                           | 1                                 |                                       |                                      | 2                                       |                                    |                                      |
| Fox Sparrow                            |                                   |                                       |                                      |   | 1                                  |                                      |
| Song Sparrow                           | 4                                 | 1                                     | 17                                   | 5                                       | 16                                 | 11                                   |
| Lincoln's Sparrow                      | 2                                 |                                       |                                      | 5                                       |                                    | 1                                    |
| White-crowned Sparrow                  | 1                                 |                                       | 2                                    | 7                                       | 1                                  |                                      |
| Harris' Sparrow                        |                                   |                                       |                                      | 1                                       |                                    |                                      |
| Dark-eyed Junco                        |                                   |                                       |                                      |   | 3                                  | 1                                    |
| Bobolink                               |                                   |                                       |                                      | 1                                       | 1                                  |                                      |
| Red-winged Blackbird                   | 17                                | 10                                    | 1                                    | 23                                      | 14                                 | 2                                    |
| Western Meadowlark                     | 19                                | 10                                    | 2                                    | 20                                      | 25                                 | 7                                    |
| Yellow-headed Blackbird                | 1                                 |                                       |                                      |   |                                    |                                      |
| Brewer's Blackbird                     | 11                                |                                       | 6                                    | 7                                       | 13                                 | 7                                    |
| Common Grackle                         | 15                                | 10                                    | 25                                   | 22                                      | 15                                 | 8                                    |
| Brown-headed Cowbird                   | 19                                | 6                                     | 7                                    | 16                                      | 25                                 | 9                                    |
| Orchard Oriole                         |                                   |                                       |                                      |   | 5                                  |                                      |
| Bullock's Oriole                       | 11                                | 10                                    | 22                                   | 20                                      | 25                                 | 2                                    |
| Cassin's Finch                         |                                   |                                       | 7                                    |   |                                    | 2                                    |
| House Finch                            | 4                                 |                                       | 24                                   | 14                                      |                                    |                                      |
| Red Crossbill                          | 9                                 | 3                                     |                                      |   | 6                                  |                                      |
| Pine Siskin                            | 2                                 | 2                                     | 12                                   |   | 3                                  | 11                                   |
| American Goldfinch                     | 12                                | 8                                     | 15                                   | 7                                       | 15                                 | 6                                    |
| Evening Grosbeak                       |                                   |                                       | 12                                   |   | 1                                  | 1                                    |
| House Sparrow                          |                                   |                                       | 24                                   | 18                                      |                                    |                                      |
| <i>Total Number of Species</i>         | <i>92</i>                         | <i>65</i>                             | <i>71</i>                            | <i>93</i>                               | <i>89</i>                          | <i>82</i>                            |
| <i>Avg. Number of Species/Year</i>     | <i>31</i>                         | <i>31</i>                             | <i>23</i>                            | <i>32</i>                               | <i>33</i>                          | <i>25</i>                            |
| <i>Avg. Number of Individuals/Year</i> | <i>253</i>                        | <i>384</i>                            | <i>244</i>                           | <i>183</i>                              | <i>190</i>                         | <i>225</i>                           |

## **APPENDICES**

**THE OFFICIAL STATE LIST OF THE COMMON AND SCIENTIFIC NAMES OF THE  
BIRDS, MAMMALS, AMPHIBIANS, AND REPTILES IN WYOMING**

| Spp. Code                    | Common Name                   | Scientific Name                  | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|------------------------------|-------------------------------|----------------------------------|-----------|--|
| <b>BIRDS</b> <sup>c, d</sup> |                               |                                  |           |  |
| <b>Waterfowl</b>             |                               |                                  |           |  |
| <b>Order: Anseriformes</b>   |                               |                                  |           |  |
| <b>Family: Anatidae</b>      |                               |                                  |           |  |
| 171.0                        | Greater White-fronted Goose * | <i>Anser albifrons</i>           | (FL)      | M  |
| 169.0                        | Snow Goose *                  | <i>Chen caerulescens</i>         |           | M  |
| 170.0                        | Ross's Goose *                | <i>Chen rossii</i>               | (FL)      | M  |
| 173.0                        | Brant                         | <i>Branta bernicla</i>           | (AS)      | A, Includes Black Brant (174.0)                            |
| 172.2                        | Cackling Goose                | <i>Branta hutchinsii</i>         | (FL)      | A  |
| 172.0                        | Canada Goose *                | <i>Branta canadensis</i>         |           | R  |
| 181.0                        | Trumpeter Swan *              | <i>Cygnus buccinator</i>         | (FL)      | R, No season, NSS2   |
| 180.0                        | Tundra Swan *                 | <i>Cygnus columbianus</i>        |           | W, No season   |
| 179.0                        | Whooper Swan                  | <i>Cygnus cygnus</i>             | (AS)      | A  |
| 144.0                        | Wood Duck *                   | <i>Aix sponsa</i>                |           | S  |
| 135.0                        | Gadwall *                     | <i>Anas strepera</i>             |           | R  |
| 136.0                        | Eurasian Wigeon               | <i>Anas penelope</i>             | (AS)      | A  |
| 137.0                        | American Wigeon *             | <i>Anas americana</i>            |           | R  |
| 133.0                        | American Black Duck           | <i>Anas rubripes</i>             | (AS)      | A  |
| 132.0                        | Mallard *                     | <i>Anas platyrhynchos</i>        |           | R  |
| 140.0                        | Blue-winged Teal *            | <i>Anas discors</i>              |           | S  |
| 141.0                        | Cinnamon Teal *               | <i>Anas cyanoptera</i>           |           | S  |
| 142.0                        | Northern Shoveler *           | <i>Anas clypeata</i>             |           | S  |
| 143.0                        | Northern Pintail *            | <i>Anas acuta</i>                |           | R, NSS3  |
| 139.2                        | Garganey                      | <i>Anas querquedula</i>          | (AS)      | A  |
| 139.0                        | Green-winged Teal *           | <i>Anas crecca</i>               |           | R  |
| 147.0                        | Canvasback *                  | <i>Aythya valisineria</i>        |           | S, NSS3  |
| 146.0                        | Redhead *                     | <i>Aythya americana</i>          |           | S, NSS3  |
| 150.0                        | Ring-necked Duck *            | <i>Aythya collaris</i>           |           | S  |
| 149.1                        | Tufted Duck                   | <i>Aythya fuligula</i>           | (AS)      | A  |
| 148.0                        | Greater Scaup *               | <i>Aythya marila</i>             | (FL)      | M  |
| 149.0                        | Lesser Scaup *                | <i>Aythya affinis</i>            |           | S, NSS3  |
| 155.0                        | Harlequin Duck *              | <i>Histrionicus histrionicus</i> |           | S, NSS3  |
| 166.0                        | Surf Scoter *                 | <i>Melanitta perspicillata</i>   | (FL)      | M  |
| 165.0                        | White-winged Scoter *         | <i>Melanitta fusca</i>           | (FL)      | M  |
| 163.0                        | Black Scoter                  | <i>Melanitta nigra</i>           | (AS)      | A  |
| 154.0                        | Long-tailed Duck *            | <i>Clangula hyemalis</i>         | (FL)      | M  |
| 153.0                        | Bufflehead *                  | <i>Bucephala albeola</i>         |           | R  |
| 151.0                        | Common Goldeneye *            | <i>Bucephala clangula</i>        |           | R  |
| 152.0                        | Barrow's Goldeneye *          | <i>Bucephala islandica</i>       |           | R, NSS3  |
| 131.0                        | Hooded Merganser *            | <i>Lophodytes cucullatus</i>     |           | R  |
| 129.0                        | Common Merganser *            | <i>Mergus merganser</i>          |           | R  |
| 130.0                        | Red-breasted Merganser *      | <i>Mergus serrator</i>           |           | S  |
| 167.0                        | Ruddy Duck *                  | <i>Oxyura jamaicensis</i>        |           | S  |

| Spp. Code                                     | Common Name              | Scientific Name                  | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|---|--------------------------|----------------------------------|-----------|--|
| <b>Gallinaceous Birds</b>                     |                          |                                  |           |  |
| <b>Order: Galliformes</b>                     |                          |                                  |           |  |
| <b>Family: Phasianidae</b>                    |                          |                                  |           |  |
| 288.2   | Chukar *                 | <i>Alectoris chukar</i>          |           | R  |
| 288.1   | Gray Partridge *         | <i>Perdix perdix</i>             |           | R  |
| 309.1   | Ring-necked Pheasant *   | <i>Phasianus colchicus</i>       |           | R  |
| 300.0   | Ruffed Grouse *          | <i>Bonasa umbellus</i>           |           | R  |
| 309.0   | Greater Sage-Grouse *    | <i>Centrocercus urophasianus</i> |           | R, NSS2  |
| 304.0   | White-tailed Ptarmigan * | <i>Lagopus leucura</i>           | (AS)      | R, No season   |
| 297.0   | Dusky Grouse *           | <i>Dendragapus obscurus</i>      |           | R  |
| 308.0   | Sharp-tailed Grouse *    | <i>Tympanuchus phasianellus</i>  |           | R, NSS3, Includes Columbian subspecies                     |
| 305.0   | Greater Prairie-Chicken  | <i>Tympanuchus cupido</i>        | (AS)      | A  |
| 310.0   | Wild Turkey *            | <i>Meleagris gallopavo</i>       |           | R  |
| <b>Family: Odontophoridae</b>                 |                          |                                  |           |  |
| 289.0   | Northern Bobwhite *      | <i>Colinus virginianus</i>       | (AS)      | R  |
| <b>Loons</b>                                  |                          |                                  |           |  |
| <b>Order: Gaviiformes</b>                     |                          |                                  |           |  |
| <b>Family: Gaviidae</b>                       |                          |                                  |           |  |
| 011.0   | Red-throated Loon        | <i>Gavia stellata</i>            | (AS)      | M  |
| 010.0   | Pacific Loon             | <i>Gavia pacifica</i>            | (FL)      | M  |
| 007.0   | Common Loon              | <i>Gavia immer</i>               |           | S, NSS1  |
| 008.0   | Yellow-billed Loon       | <i>Gavia adamsii</i>             | (AS)      | A  |
| <b>Grebes</b>                                 |                          |                                  |           |  |
| <b>Order: Podicipediformes</b>                |                          |                                  |           |  |
| <b>Family: Podicipedidae</b>                  |                          |                                  |           |  |
| 006.0   | Pied-billed Grebe        | <i>Podilymbus podiceps</i>       |           | S  |
| 003.0   | Horned Grebe             | <i>Podiceps auritus</i>          |           | S  |
| 002.0   | Red-necked Grebe         | <i>Podiceps grisegena</i>        | (AS)      | S  |
| 004.0   | Eared Grebe              | <i>Podiceps nigricollis</i>      |           | S  |
| 001.0   | Western Grebe            | <i>Aechmophorus occidentalis</i> |           | S, NSS4  |
| 001.1   | Clark's Grebe            | <i>Aechmophorus clarkii</i>      |           | S, NSS4  |
| <b>Shearwaters</b>                            |                          |                                  |           |  |
| <b>Order: Procellariiformes</b>               |                          |                                  |           |  |
| <b>Family: Procellariidae</b>                 |                          |                                  |           |  |
| 088.1   | Streaked Shearwater      | <i>Calonectris leucomelas</i>    | (AS)      | A  |
| <b>Pelicans, Cormorants, and Frigatebirds</b> |                          |                                  |           |  |
| <b>Order: Pelecaniformes</b>                  |                          |                                  |           |  |
| <b>Family: Pelecanidae</b>                    |                          |                                  |           |  |
| 125.0   | American White Pelican   | <i>Pelecanus erythrorhynchos</i> |           | S, NSS3  |
| 126.0   | Brown Pelican            | <i>Pelecanus occidentalis</i>    | (AS)      | A, Endangered  |
| <b>Family: Phalacrocoracidae</b>              |                          |                                  |           |  |
| 120.0   | Double-crested Cormorant | <i>Phalacrocorax auritus</i>     |           | S  |
| <b>Family: Fregatidae</b>                     |                          |                                  |           |  |
| 128.2   | Lesser Frigatebird       | <i>Fregata ariel</i>             | (AS)      | A  |
| <b>Wading Birds</b>                           |                          |                                  |           |  |
| <b>Order: Ciconiiformes</b>                   |                          |                                  |           |  |
| <b>Family: Ardeidae</b>                       |                          |                                  |           |  |
| 190.0   | American Bittern         | <i>Botaurus lentiginosus</i>     | (FL)      | S, NSS3  |

| Spp. Code                        | Common Name                | Scientific Name                 | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|----------------------------------|----------------------------|---------------------------------|-----------|--|
| 191.0                            | Least Bittern              | <i>Ixobrychus exilis</i>        | (AS)      | A  |
| 194.0                            | Great Blue Heron           | <i>Ardea herodias</i>           |           | S, NSS4  |
| 196.0                            | Great Egret                | <i>Ardea alba</i>               | (AS)      | A  |
| 197.0                            | Snowy Egret                | <i>Egretta thula</i>            |           | S, NSS3  |
| 200.0                            | Little Blue Heron          | <i>Egretta caerulea</i>         | (AS)      | A  |
| 199.0                            | Tricolored Heron           | <i>Egretta tricolor</i>         | (AS)      | A  |
| 200.1                            | Cattle Egret               | <i>Bubulcus ibis</i>            | (FL)      | S  |
| 201.0                            | Green Heron                | <i>Butorides virescens</i>      | (AS)      | M  |
| 202.0                            | Black-crowned Night-Heron  | <i>Nycticorax nycticorax</i>    |           | S, NSS3  |
| 203.0                            | Yellow-crowned Night-Heron | <i>Nyctanassa violacea</i>      | (AS)      | A  |
| <b>Family: Threskiornithidae</b> |                            |                                 |           |  |
| 184.0                            | White Ibis                 | <i>Eudocimus albus</i>          | (AS)      | A  |
| 186.0                            | Glossy Ibis                | <i>Plegadis falcinellus</i>     | (AS)      | A  |
| 187.0                            | White-faced Ibis           | <i>Plegadis chihi</i>           |           | S  |
| <b>Family: Ciconiidae</b>        |                            |                                 |           |  |
| 188.0                            | Wood Stork                 | <i>Mycteria americana</i>       | (AS)      | A, Endangered  |
| <b>Diurnal Birds of Prey</b>     |                            |                                 |           |  |
| <b>Order: Ciconiiformes</b>      |                            |                                 |           |  |
| <b>Family: Cathartidae</b>       |                            |                                 |           |  |
| 325.0                            | Turkey Vulture             | <i>Cathartes aura</i>           |           | S  |
| <b>Order: Falconiformes</b>      |                            |                                 |           |  |
| <b>Family: Accipitridae</b>      |                            |                                 |           |  |
| 364.0                            | Osprey                     | <i>Pandion haliaetus</i>        |           | S  |
| 328.0                            | White-tailed Kite          | <i>Elanus leucurus</i>          | (AS)      | A  |
| 329.0                            | Mississippi Kite           | <i>Ictinia mississippiensis</i> | (AS)      | A  |
| 352.0                            | Bald Eagle                 | <i>Haliaeetus leucocephalus</i> |           | R, NSS2  |
| 331.0                            | Northern Harrier           | <i>Circus cyaneus</i>           |           | S  |
| 332.0                            | Sharp-shinned Hawk         | <i>Accipiter striatus</i>       |           | S  |
| 333.0                            | Cooper's Hawk              | <i>Accipiter cooperii</i>       |           | S  |
| 334.0                            | Northern Goshawk           | <i>Accipiter gentilis</i>       |           | R, NSS4  |
| 335.0                            | Harris's Hawk              | <i>Parabuteo unicinctus</i>     | (AS)      | A  |
| 339.0                            | Red-shouldered Hawk        | <i>Buteo lineatus</i>           | (AS)      | A  |
| 343.0                            | Broad-winged Hawk          | <i>Buteo platypterus</i>        | (FL)      | S  |
| 342.0                            | Swainson's Hawk            | <i>Buteo swainsoni</i>          |           | S, NSS4  |
| 337.0                            | Red-tailed Hawk            | <i>Buteo jamaicensis</i>        |           | R, Includes Harlan's Hawk (338.0)                          |
| 348.0                            | Ferruginous Hawk           | <i>Buteo regalis</i>            |           | R, NSS3  |
| 347.0                            | Rough-legged Hawk          | <i>Buteo lagopus</i>            |           | W  |
| 349.0                            | Golden Eagle               | <i>Aquila chrysaetos</i>        |           | R  |
| <b>Family: Falconidae</b>        |                            |                                 |           |  |
| 362.0                            | Crested Caracara           | <i>Caracara cheriway</i>        | (AS)      | A  |
| 360.0                            | American Kestrel           | <i>Falco sparverius</i>         |           | S  |
| 357.0                            | Merlin                     | <i>Falco columbarius</i>        |           | R, NSS3  |
| 354.0                            | Gyrfalcon                  | <i>Falco rusticolus</i>         | (AS)      | W  |
| 356.0                            | Peregrine Falcon           | <i>Falco peregrinus</i>         | (FL)      | R, NSS3  |
| 355.0                            | Prairie Falcon             | <i>Falco mexicanus</i>          |           | R  |

| Spp. Code                       | Common Name             | Scientific Name                   | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|---------------------------------|-------------------------|-----------------------------------|-----------|--|
| <b>Marshbirds</b>               |                         |                                   |           |  |
| <b>Order: Gruiformes</b>        |                         |                                   |           |  |
| <b>Family: Rallidae</b>         |                         |                                   |           |  |
| 215.0                           | Yellow Rail             | <i>Coturnicops noveboracensis</i> | (AS)      | A  |
| 212.0                           | Virginia Rail *         | <i>Rallus limicola</i>            |           | S, NSS3  |
| 214.0                           | Sora *                  | <i>Porzana carolina</i>           |           | S  |
| 218.0                           | Purple Gallinule        | <i>Porphyrio martinica</i>        | (AS)      | A  |
| 219.0                           | Common Moorhen          | <i>Gallinula chloropus</i>        | (AS)      | A  |
| 221.0                           | American Coot *         | <i>Fulica americana</i>           |           | S  |
| <b>Family: Gruidae</b>          |                         |                                   |           |  |
| 206.0                           | Sandhill Crane *        | <i>Grus canadensis</i>            |           | S, NSS3, Includes Greater Sandhill Crane subspecies        |
| 204.0                           | Whooping Crane          | <i>Grus americana</i>             | (AS)      | S, Endangered  |
| <b>Shorebirds</b>               |                         |                                   |           |  |
| <b>Order: Charadriiformes</b>   |                         |                                   |           |  |
| <b>Family: Charadriidae</b>     |                         |                                   |           |  |
| 270.0                           | Black-bellied Plover    | <i>Pluvialis squatarola</i>       |           | M  |
| 272.0                           | American Golden-Plover  | <i>Pluvialis dominica</i>         | (FL)      | M  |
| 278.0                           | Snowy Plover            | <i>Charadrius alexandrinus</i>    | (AS)      | S  |
| 274.0                           | Semipalmated Plover     | <i>Charadrius semipalmatus</i>    |           | M  |
| 277.0                           | Piping Plover           | <i>Charadrius melodus</i>         | (AS)      | M, Endangered  |
| 273.0                           | Killdeer                | <i>Charadrius vociferus</i>       |           | S  |
| 281.0                           | Mountain Plover         | <i>Charadrius montanus</i>        |           | S, NSS4  |
| <b>Family: Recurvirostridae</b> |                         |                                   |           |  |
| 226.0                           | Black-necked Stilt      | <i>Himantopus mexicanus</i>       |           | S  |
| 225.0                           | American Avocet         | <i>Recurvirostra americana</i>    |           | S  |
| <b>Family: Scolopacidae</b>     |                         |                                   |           |  |
| 263.0                           | Spotted Sandpiper       | <i>Actitis macularius</i>         |           | S  |
| 256.0                           | Solitary Sandpiper      | <i>Tringa solitaria</i>           |           | M  |
| 254.0                           | Greater Yellowlegs      | <i>Tringa melanoleuca</i>         |           | M  |
| 258.0                           | Willet                  | <i>Tringa semipalmata</i>         |           | S  |
| 255.0                           | Lesser Yellowlegs       | <i>Tringa flavipes</i>            |           | M  |
| 261.0                           | Upland Sandpiper        | <i>Bartramia longicauda</i>       | (FL)      | S, NSS4  |
| 265.0                           | Whimbrel                | <i>Numenius phaeopus</i>          | (FL)      | M  |
| 264.0                           | Long-billed Curlew      | <i>Numenius americanus</i>        |           | S, NSS3  |
| 251.0                           | Hudsonian Godwit        | <i>Limosa haemastica</i>          | (AS)      | M  |
| 249.0                           | Marbled Godwit          | <i>Limosa fedoa</i>               |           | M  |
| 283.0                           | Ruddy Turnstone         | <i>Arenaria interpres</i>         | (FL)      | M  |
| 234.0                           | Red Knot                | <i>Calidris canutus</i>           | (AS)      | M  |
| 248.0                           | Sanderling              | <i>Calidris alba</i>              |           | M  |
| 246.0                           | Semipalmated Sandpiper  | <i>Calidris pusilla</i>           |           | M  |
| 247.0                           | Western Sandpiper       | <i>Calidris mauri</i>             |           | M  |
| 242.0                           | Least Sandpiper         | <i>Calidris minutilla</i>         |           | M  |
| 240.0                           | White-rumped Sandpiper  | <i>Calidris fuscicollis</i>       | (FL)      | M  |
| 241.0                           | Baird's Sandpiper       | <i>Calidris bairdii</i>           |           | M  |
| 239.0                           | Pectoral Sandpiper      | <i>Calidris melanotos</i>         |           | M  |
| 243.0                           | Dunlin                  | <i>Calidris alpina</i>            | (FL)      | M  |
| 233.0                           | Stilt Sandpiper         | <i>Calidris himantopus</i>        |           | M  |
| 262.0                           | Buff-breasted Sandpiper | <i>Tryngites subruficollis</i>    | (AS)      | M  |

| Spp. Code                     | Common Name              | Scientific Name                     | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|-------------------------------|--------------------------|-------------------------------------|-----------|--|
| 231.0                         | Short-billed Dowitcher   | <i>Limnodromus griseus</i>          | (AS)      | M  |
| 232.0                         | Long-billed Dowitcher    | <i>Limnodromus scolopaceus</i>      |           | M  |
| 230.0                         | Wilson's Snipe           | <i>Gallinago delicata</i>           |           | S  |
| 228.0                         | American Woodcock        | <i>Scolopax minor</i>               | (AS)      | A  |
| 224.0                         | Wilson's Phalarope       | <i>Phalaropus tricolor</i>          |           | S  |
| 223.0                         | Red-necked Phalarope     | <i>Phalaropus lobatus</i>           |           | M  |
| 222.0                         | Red Phalarope            | <i>Phalaropus fulicarius</i>        | (AS)      | A  |
| <b>Gulls and Terns</b>        |                          |                                     |           |  |
| <b>Order: Charadriiformes</b> |                          |                                     |           |  |
| <b>Family: Laridae</b>        |                          |                                     |           |  |
| 040.0                         | Black-legged Kittiwake   | <i>Rissa tridactyla</i>             | (AS)      | A  |
| 062.0                         | Sabine's Gull            | <i>Xema sabini</i>                  | (FL)      | M  |
| 060.0                         | Bonaparte's Gull         | <i>Chroicocephalus philadelphia</i> |           | M  |
| 055.1                         | Black-headed Gull        | <i>Chroicocephalus ridibundus</i>   | (AS)      | A  |
| 060.1                         | Little Gull              | <i>Hydrocoloeus minutus</i>         | (AS)      | A  |
| 061.0                         | Ross's Gull              | <i>Rhodostethia rosea</i>           | (AS)      | A  |
| 058.0                         | Laughing Gull            | <i>Larus atricilla</i>              | (AS)      | A  |
| 059.0                         | Franklin's Gull          | <i>Larus pipixcan</i>               |           | S, NSS3  |
| 057.0                         | Heermann's Gull          | <i>Larus heermanni</i>              | (AS)      | A  |
| 055.0                         | Mew Gull                 | <i>Larus canus</i>                  | (AS)      | A  |
| 054.0                         | Ring-billed Gull         | <i>Larus delawarensis</i>           |           | S  |
| 053.0                         | California Gull          | <i>Larus californicus</i>           |           | S  |
| 051.0                         | Herring Gull             | <i>Larus argentatus</i>             |           | M  |
| 043.1                         | Thayer's Gull            | <i>Larus thayeri</i>                | (AS)      | A  |
| 050.0                         | Lesser Black-backed Gull | <i>Larus fuscus</i>                 | (AS)      | A  |
| 044.0                         | Glaucous-winged Gull     | <i>Larus glaucescens</i>            | (AS)      | A  |
| 042.0                         | Glaucous Gull            | <i>Larus hyperboreus</i>            | (AS)      | A  |
| 047.0                         | Great Black-backed Gull  | <i>Larus marinus</i>                | (AS)      | A  |
| 074.0                         | Least Tern               | <i>Sternula antillarum</i>          | (AS)      | A, Endangered  |
| 064.0                         | Caspian Tern             | <i>Hydroprogne caspia</i>           |           | S, NSS3  |
| 077.0                         | Black Tern               | <i>Chlidonias niger</i>             |           | S, NSS3  |
| 070.0                         | Common Tern              | <i>Sterna hirundo</i>               | (FL)      | M  |
| 071.0                         | Arctic Tern              | <i>Sterna paradisaea</i>            | (AS)      | A  |
| 069.0                         | Forster's Tern           | <i>Sterna forsteri</i>              |           | S, NSS3  |
| <b>Family: Stercorariidae</b> |                          |                                     |           |  |
| 036.0                         | Pomarine Jaeger          | <i>Stercorarius pomarinus</i>       | (AS)      | A  |
| 037.0                         | Parasitic Jaeger         | <i>Stercorarius parasiticus</i>     | (AS)      | A  |
| <b>Seabirds</b>               |                          |                                     |           |  |
| <b>Order: Charadriiformes</b> |                          |                                     |           |  |
| <b>Family: Alcidae</b>        |                          |                                     |           |  |
| 023.0                         | Long-billed Murrelet     | <i>Brachyramphus perdix</i>         | (AS)      | A  |
| 021.0                         | Ancient Murrelet         | <i>Synthliboramphus antiquus</i>    | (AS)      | A  |
| <b>Doves and Pigeons</b>      |                          |                                     |           |  |
| <b>Order: Columbiformes</b>   |                          |                                     |           |  |
| <b>Family: Columbidae</b>     |                          |                                     |           |  |
| 313.1                         | Rock Pigeon              | <i>Columba livia</i>                |           | R  |
| 312.0                         | Band-tailed Pigeon       | <i>Patagioenas fasciata</i>         | (AS)      | M  |
| 315.4                         | Eurasian Collared-Dove   | <i>Streptopelia decaocto</i>        | (FL)      | R  |
| 319.0                         | White-winged Dove        | <i>Zenaida asiatica</i>             | (AS)      | A  |
| 316.0                         | Mourning Dove *          | <i>Zenaida macroura</i>             |           | S  |

| Spp. Code                      | Common Name               | Scientific Name                  | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|--------------------------------|---------------------------|----------------------------------|-----------|--|
| 315.0                          | Passenger Pigeon          | <i>Ectopistes migratorius</i>    |           | Extinct  |
| <b>Cuckoos</b>                 |                           |                                  |           |  |
| <b>Order: Cuculiformes</b>     |                           |                                  |           |  |
| <b>Family: Cuculidae</b>       |                           |                                  |           |  |
| 387.0                          | Yellow-billed Cuckoo      | <i>Coccyzus americanus</i>       | (FL)      | S, NSS2  |
| 388.0                          | Black-billed Cuckoo       | <i>Coccyzus erythrophthalmus</i> | (FL)      | S  |
| <b>Owls</b>                    |                           |                                  |           |  |
| <b>Order: Strigiformes</b>     |                           |                                  |           |  |
| <b>Family: Tytonidae</b>       |                           |                                  |           |  |
| 365.0                          | Barn Owl                  | <i>Tyto alba</i>                 | (AS)      | S, (AS) except L21   |
| <b>Family: Strigidae</b>       |                           |                                  |           |  |
| 374.0                          | Flammulated Owl           | <i>Otus flammeolus</i>           | (AS)      | S  |
| 373.2                          | Western Screech-Owl       | <i>Megascops kennicottii</i>     | (AS)      | R, (AS) except L8  |
| 373.0                          | Eastern Screech-Owl       | <i>Megascops asio</i>            | (FL)      | R  |
| 375.0                          | Great Horned Owl          | <i>Bubo virginianus</i>          |           | R  |
| 376.0                          | Snowy Owl                 | <i>Bubo scandiacus</i>           | (AS)      | W  |
| 377.0                          | Northern Hawk Owl         | <i>Surnia ulula</i>              | (AS)      | A  |
| 379.0                          | Northern Pygmy-Owl        | <i>Glaucidium gnoma</i>          | (FL)      | R, NSS4  |
| 378.0                          | Burrowing Owl             | <i>Athene cunicularia</i>        |           | S, NSS4  |
| 368.0                          | Barred Owl                | <i>Strix varia</i>               | (AS)      | A  |
| 370.0                          | Great Gray Owl            | <i>Strix nebulosa</i>            |           | R, NSS4  |
| 366.0                          | Long-eared Owl            | <i>Asio otus</i>                 |           | R  |
| 367.0                          | Short-eared Owl           | <i>Asio flammeus</i>             |           | R, NSS4  |
| 371.0                          | Boreal Owl                | <i>Aegolius funereus</i>         | (FL)      | R, NSS4  |
| 372.0                          | Northern Saw-whet Owl     | <i>Aegolius acadicus</i>         | (FL)      | R  |
| <b>Goatsuckers</b>             |                           |                                  |           |  |
| <b>Order: Caprimulgiformes</b> |                           |                                  |           |  |
| <b>Family: Caprimulgidae</b>   |                           |                                  |           |  |
| 420.0                          | Common Nighthawk          | <i>Chordeiles minor</i>          |           | S  |
| 418.0                          | Common Poorwill           | <i>Phalaenoptilus nuttallii</i>  |           | S  |
| <b>Swifts</b>                  |                           |                                  |           |  |
| <b>Order: Apodiformes</b>      |                           |                                  |           |  |
| <b>Family: Apodidae</b>        |                           |                                  |           |  |
| 423.0                          | Chimney Swift             | <i>Chaetura pelagica</i>         | (FL)      | S  |
| 425.0                          | White-throated Swift      | <i>Aeronautes saxatalis</i>      |           | S  |
| <b>Hummingbirds</b>            |                           |                                  |           |  |
| <b>Order: Apodiformes</b>      |                           |                                  |           |  |
| <b>Family: Trochilidae</b>     |                           |                                  |           |  |
| 426.0                          | Magnificent Hummingbird   | <i>Eugenes fulgens</i>           | (AS)      | A  |
| 428.0                          | Ruby-throated Hummingbird | <i>Archilochus colubris</i>      | (AS)      | A  |
| 429.0                          | Black-chinned Hummingbird | <i>Archilochus alexandri</i>     | (FL)      | S  |
| 431.0                          | Anna's Hummingbird        | <i>Calypte anna</i>              | (AS)      | A  |
| 436.0                          | Calliope Hummingbird      | <i>Stellula calliope</i>         |           | S  |
| 432.0                          | Broad-tailed Hummingbird  | <i>Selasphorus platycercus</i>   |           | S  |
| 433.0                          | Rufous Hummingbird        | <i>Selasphorus rufus</i>         |           | S  |

| Spp. Code                   | Common Name                    | Scientific Name                   | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|-----------------------------|--------------------------------|-----------------------------------|-----------|--|
| <b>Kingfishers</b>          |                                |                                   |           |  |
| <b>Order: Coraciiformes</b> |                                |                                   |           |  |
| <b>Family: Alcedinidae</b>  |                                |                                   |           |  |
| 390.0                       | Belted Kingfisher              | <i>Megaceryle alcyon</i>          |           | R  |
| <b>Woodpeckers</b>          |                                |                                   |           |  |
| <b>Order: Piciformes</b>    |                                |                                   |           |  |
| <b>Family: Picidae</b>      |                                |                                   |           |  |
| 408.0                       | Lewis's Woodpecker             | <i>Melanerpes lewis</i>           |           | S, NSS3  |
| 406.0                       | Red-headed Woodpecker          | <i>Melanerpes erythrocephalus</i> | (FL)      | S  |
| 407.0                       | Acorn Woodpecker               | <i>Melanerpes formicivorus</i>    | (AS)      | A  |
| 409.0                       | Red-bellied Woodpecker         | <i>Melanerpes carolinus</i>       | (AS)      | A  |
| 404.0                       | Williamson's Sapsucker         | <i>Sphyrapicus thyroideus</i>     |           | S  |
| 402.0                       | Yellow-bellied Sapsucker       | <i>Sphyrapicus varius</i>         | (AS)      | A  |
| 402.1                       | Red-naped Sapsucker            | <i>Sphyrapicus nuchalis</i>       |           | S  |
| 394.0                       | Downy Woodpecker               | <i>Picoides pubescens</i>         |           | R  |
| 393.0                       | Hairy Woodpecker               | <i>Picoides villosus</i>          |           | R  |
| 399.0                       | White-headed Woodpecker        | <i>Picoides albolarvatus</i>      | (AS)      | A  |
| 401.0                       | American Three-toed Woodpecker | <i>Picoides dorsalis</i>          |           | R, NSS4  |
| 400.0                       | Black-backed Woodpecker        | <i>Picoides arcticus</i>          | (FL)      | R, NSS4  |
| 412.0                       | Northern Flicker               | <i>Colaptes auratus</i>           |           | R, includes Red-shafted and Yellow-shafted                 |
| 405.0                       | Pileated Woodpecker            | <i>Dryocopus pileatus</i>         | (AS)      | A  |
| <b>Passerines</b>           |                                |                                   |           |  |
| <b>Order: Passeriformes</b> |                                |                                   |           |  |
| <b>Family: Tyrannidae</b>   |                                |                                   |           |  |
| 459.0                       | Olive-sided Flycatcher         | <i>Contopus cooperi</i>           |           | S  |
| 462.0                       | Western Wood-Pewee             | <i>Contopus sordidulus</i>        |           | S  |
| 461.0                       | Eastern Wood-Pewee             | <i>Contopus virens</i>            | (AS)      | A  |
| 466.0                       | Willow Flycatcher              | <i>Empidonax traillii</i>         |           | S, NSS3  |
| 467.0                       | Least Flycatcher               | <i>Empidonax minimus</i>          | (FL)      | S  |
| 468.0                       | Hammond's Flycatcher           | <i>Empidonax hammondii</i>        | (FL)      | S  |
| 469.1                       | Gray Flycatcher                | <i>Empidonax wrightii</i>         | (FL)      | S  |
| 469.0                       | Dusky Flycatcher               | <i>Empidonax oberholseri</i>      |           | S  |
| 464.0                       | Cordilleran Flycatcher         | <i>Empidonax occidentalis</i>     |           | S  |
| 456.0                       | Eastern Phoebe                 | <i>Sayornis phoebe</i>            | (AS)      | S  |
| 457.0                       | Say's Phoebe                   | <i>Sayornis saya</i>              |           | S  |
| 471.0                       | Vermilion Flycatcher           | <i>Pyrocephalus rubinus</i>       | (AS)      | A  |
| 454.0                       | Ash-throated Flycatcher        | <i>Myiarchus cinerascens</i>      | (FL)      | S, NSS3  |
| 452.0                       | Great Crested Flycatcher       | <i>Myiarchus crinitus</i>         | (AS)      | A  |
| 448.0                       | Cassin's Kingbird              | <i>Tyrannus vociferans</i>        | (FL)      | S  |
| 447.0                       | Western Kingbird               | <i>Tyrannus verticalis</i>        |           | S  |
| 444.0                       | Eastern Kingbird               | <i>Tyrannus tyrannus</i>          |           | S  |
| 443.0                       | Scissor-tailed Flycatcher      | <i>Tyrannus forficatus</i>        | (AS)      | A  |
| <b>Family: Laniidae</b>     |                                |                                   |           |  |
| 622.0                       | Loggerhead Shrike              | <i>Lanius ludovicianus</i>        |           | S  |
| 621.0                       | Northern Shrike                | <i>Lanius excubitor</i>           |           | W  |

| Spp. Code                    | Common Name                   | Scientific Name                   | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|------------------------------|-------------------------------|-----------------------------------|-----------|--|
| <b>Family: Vireonidae</b>    |                               |                                   |           |  |
| 631.0                        | White-eyed Vireo              | <i>Vireo griseus</i>              | (AS)      | A  |
| 634.0                        | Gray Vireo                    | <i>Vireo vicinior</i>             | (AS)      | S  |
| 628.0                        | Yellow-throated Vireo         | <i>Vireo flavifrons</i>           | (AS)      | A  |
| 629.1                        | Plumbeous Vireo               | <i>Vireo plumbeus</i>             |           | S  |
| 629.2                        | Cassin's Vireo                | <i>Vireo cassinii</i>             | (AS)      | M  |
| 629.3                        | Blue-headed Vireo             | <i>Vireo solitarius</i>           | (AS)      | M  |
| 627.0                        | Warbling Vireo                | <i>Vireo gilvus</i>               |           | S  |
| 626.0                        | Philadelphia Vireo            | <i>Vireo philadelphicus</i>       | (AS)      | M  |
| 624.0                        | Red-eyed Vireo                | <i>Vireo olivaceus</i>            |           | S  |
| <b>Family: Corvidae</b>      |                               |                                   |           |  |
| 484.0                        | Gray Jay                      | <i>Perisoreus canadensis</i>      |           | R  |
| 478.0                        | Steller's Jay                 | <i>Cyanocitta stelleri</i>        |           | R  |
| 477.0                        | Blue Jay                      | <i>Cyanocitta cristata</i>        |           | R  |
| 481.0                        | Western Scrub-Jay             | <i>Aphelocoma californica</i>     | (FL)      | R, NSS3  |
| 492.0                        | Pinyon Jay                    | <i>Gymnorhinus cyanocephalus</i>  |           | R  |
| 491.0                        | Clark's Nutcracker            | <i>Nucifraga columbiana</i>       |           | R  |
| 475.0                        | Black-billed Magpie           | <i>Pica hudsonia</i>              |           | R  |
| 488.0                        | American Crow                 | <i>Corvus brachyrhynchos</i>      |           | R  |
| 486.0                        | Common Raven                  | <i>Corvus corax</i>               |           | R  |
| <b>Family: Alaudidae</b>     |                               |                                   |           |  |
| 474.0                        | Horned Lark                   | <i>Eremophila alpestris</i>       |           | R  |
| <b>Family: Hirundinidae</b>  |                               |                                   |           |  |
| 611.0                        | Purple Martin                 | <i>Progne subis</i>               | (AS)      | S  |
| 614.0                        | Tree Swallow                  | <i>Tachycineta bicolor</i>        |           | S  |
| 615.0                        | Violet-green Swallow          | <i>Tachycineta thalassina</i>     |           | S  |
| 617.0                        | Northern Rough-winged Swallow | <i>Stelgidopteryx serripennis</i> |           | S  |
| 616.0                        | Bank Swallow                  | <i>Riparia riparia</i>            |           | S  |
| 612.0                        | Cliff Swallow                 | <i>Petrochelidon pyrrhonota</i>   |           | S  |
| 613.0                        | Barn Swallow                  | <i>Hirundo rustica</i>            |           | S  |
| <b>Family: Paridae</b>       |                               |                                   |           |  |
| 735.0                        | Black-capped Chickadee        | <i>Poecile atricapillus</i>       |           | R  |
| 738.0                        | Mountain Chickadee            | <i>Poecile gambeli</i>            |           | R  |
| 733.0                        | Juniper Titmouse              | <i>Baeolophus ridgwayi</i>        | (FL)      | R, NSS3  |
| <b>Family: Aegithalidae</b>  |                               |                                   |           |  |
| 743.0                        | Bushtit                       | <i>Psaltriparus minimus</i>       | (FL)      | S, NSS3  |
| <b>Family: Sittidae</b>      |                               |                                   |           |  |
| 728.0                        | Red-breasted Nuthatch         | <i>Sitta canadensis</i>           |           | R  |
| 727.0                        | White-breasted Nuthatch       | <i>Sitta carolinensis</i>         |           | R  |
| 730.0                        | Pygmy Nuthatch                | <i>Sitta pygmaea</i>              |           | R, NSS4  |
| <b>Family: Certhiidae</b>    |                               |                                   |           |  |
| 726.0                        | Brown Creeper                 | <i>Certhia americana</i>          |           | R  |
| <b>Family: Troglodytidae</b> |                               |                                   |           |  |
| 715.0                        | Rock Wren                     | <i>Salpinctes obsoletus</i>       |           | S  |
| 717.0                        | Canyon Wren                   | <i>Catherpes mexicanus</i>        |           | R  |
| 718.0                        | Carolina Wren                 | <i>Thryothorus ludovicianus</i>   | (AS)      | A  |
| 719.0                        | Bewick's Wren                 | <i>Thryomanes bewickii</i>        | (FL)      | S  |
| 721.0                        | House Wren                    | <i>Troglodytes aedon</i>          |           | S  |
| 722.0                        | Winter Wren                   | <i>Troglodytes troglodytes</i>    | (FL)      | M  |

| Spp. Code                    | Common Name                 | Scientific Name               | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|------------------------------|-----------------------------|-------------------------------|-----------|--|
| 724.0                        | Sedge Wren                  | <i>Cistothorus platensis</i>  | (AS)      | A  |
| 725.0                        | Marsh Wren                  | <i>Cistothorus palustris</i>  |           | S  |
| <b>Family: Cinclidae</b>     |                             |                               |           |  |
| 701.0                        | American Dipper             | <i>Cinclus mexicanus</i>      |           | R  |
| <b>Family: Regulidae</b>     |                             |                               |           |  |
| 748.0                        | Golden-crowned Kinglet      | <i>Regulus satrapa</i>        |           | R  |
| 749.0                        | Ruby-crowned Kinglet        | <i>Regulus calendula</i>      |           | S  |
| <b>Family: Sylviidae</b>     |                             |                               |           |  |
| 751.0                        | Blue-gray Gnatcatcher       | <i>Poliotilta caerulea</i>    |           | S  |
| <b>Family: Turdidae</b>      |                             |                               |           |  |
| 766.0                        | Eastern Bluebird            | <i>Sialia sialis</i>          | (FL)      | S  |
| 767.0                        | Western Bluebird            | <i>Sialia mexicana</i>        | (AS)      | S  |
| 768.0                        | Mountain Bluebird           | <i>Sialia currucoides</i>     |           | S  |
| 754.0                        | Townsend's Solitaire        | <i>Myadestes townsendi</i>    |           | R  |
| 756.0                        | Veery                       | <i>Catharus fuscescens</i>    |           | S  |
| 757.0                        | Gray-cheeked Thrush         | <i>Catharus minimus</i>       | (AS)      | M  |
| 758.0                        | Swainson's Thrush           | <i>Catharus ustulatus</i>     |           | S  |
| 759.0                        | Hermit Thrush               | <i>Catharus guttatus</i>      |           | S  |
| 755.0                        | Wood Thrush                 | <i>Hylocichla mustelina</i>   | (AS)      | M  |
| 761.0                        | American Robin              | <i>Turdus migratorius</i>     |           | R  |
| 763.0                        | Varied Thrush               | <i>Ixoreus naevius</i>        | (AS)      | M  |
| <b>Family: Mimidae</b>       |                             |                               |           |  |
| 704.0                        | Gray Catbird                | <i>Dumetella carolinensis</i> |           | S  |
| 703.0                        | Northern Mockingbird        | <i>Mimus polyglottos</i>      |           | S  |
| 702.0                        | Sage Thrasher               | <i>Oreoscoptes montanus</i>   |           | S, NSS4  |
| 705.0                        | Brown Thrasher              | <i>Toxostoma rufum</i>        |           | S  |
| <b>Family: Sturnidae</b>     |                             |                               |           |  |
| 493.0                        | European Starling           | <i>Sturnus vulgaris</i>       |           | R  |
| <b>Family: Motacillidae</b>  |                             |                               |           |  |
| 697.0                        | American Pipit              | <i>Anthus rubescens</i>       |           | S  |
| 700.0                        | Sprague's Pipit             | <i>Anthus spragueii</i>       | (AS)      | M  |
| <b>Family: Bombycillidae</b> |                             |                               |           |  |
| 618.0                        | Bohemian Waxwing            | <i>Bombycilla garrulus</i>    |           | W  |
| 619.0                        | Cedar Waxwing               | <i>Bombycilla cedrorum</i>    |           | R  |
| <b>Family: Parulidae</b>     |                             |                               |           |  |
| 641.0                        | Blue-winged Warbler         | <i>Vermivora pinus</i>        | (AS)      | A  |
| 642.0                        | Golden-winged Warbler       | <i>Vermivora chrysoptera</i>  | (AS)      | A  |
| 647.0                        | Tennessee Warbler           | <i>Vermivora peregrina</i>    | (FL)      | M  |
| 646.0                        | Orange-crowned Warbler      | <i>Vermivora celata</i>       |           | S  |
| 645.0                        | Nashville Warbler           | <i>Vermivora ruficapilla</i>  | (FL)      | M  |
| 644.0                        | Virginia's Warbler          | <i>Vermivora virginiae</i>    | (FL)      | S  |
| 648.0                        | Northern Parula             | <i>Parula americana</i>       | (FL)      | M  |
| 652.0                        | Yellow Warbler              | <i>Dendroica petechia</i>     |           | S  |
| 659.0                        | Chestnut-sided Warbler      | <i>Dendroica pensylvanica</i> | (FL)      | M  |
| 657.0                        | Magnolia Warbler            | <i>Dendroica magnolia</i>     | (FL)      | M  |
| 650.0                        | Cape May Warbler            | <i>Dendroica tigrina</i>      | (AS)      | A  |
| 654.0                        | Black-throated Blue Warbler | <i>Dendroica caerulescens</i> | (FL)      | M  |
| 655.0                        | Yellow-rumped Warbler       | <i>Dendroica coronata</i>     |           | S  |
| 665.0                        | Black-throated Gray Warbler | <i>Dendroica nigrescens</i>   | (FL)      | S  |

| Spp. Code                  | Common Name                  | Scientific Name                  | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|----------------------------|------------------------------|----------------------------------|-----------|--|
| 667.0                      | Black-throated Green Warbler | <i>Dendroica virens</i>          | (AS)      | A  |
| 668.0                      | Townsend's Warbler           | <i>Dendroica townsendi</i>       |           | S  |
| 669.0                      | Hermit Warbler               | <i>Dendroica occidentalis</i>    | (AS)      | A  |
| 662.0                      | Blackburnian Warbler         | <i>Dendroica fusca</i>           | (AS)      | M  |
| 663.0                      | Yellow-throated Warbler      | <i>Dendroica dominica</i>        | (AS)      | A  |
| 671.0                      | Pine Warbler                 | <i>Dendroica pinus</i>           | (AS)      | A  |
| 673.0                      | Prairie Warbler              | <i>Dendroica discolor</i>        | (AS)      | A  |
| 672.0                      | Palm Warbler                 | <i>Dendroica palmarum</i>        | (AS)      | M  |
| 660.0                      | Bay-breasted Warbler         | <i>Dendroica castanea</i>        | (AS)      | M  |
| 661.0                      | Blackpoll Warbler            | <i>Dendroica striata</i>         | (FL)      | M  |
| 636.0                      | Black-and-white Warbler      | <i>Mniotilta varia</i>           | (FL)      | M  |
| 687.0                      | American Redstart            | <i>Setophaga ruticilla</i>       |           | S  |
| 637.0                      | Prothonotary Warbler         | <i>Protonotaria citrea</i>       | (AS)      | A  |
| 639.0                      | Worm-eating Warbler          | <i>Helmitheros vermivorum</i>    | (AS)      | A  |
| 674.0                      | Ovenbird                     | <i>Seiurus aurocapilla</i>       |           | S  |
| 675.0                      | Northern Waterthrush         | <i>Seiurus noveboracensis</i>    |           | M  |
| 677.0                      | Kentucky Warbler             | <i>Oporornis formosus</i>        | (AS)      | A  |
| 678.0                      | Connecticut Warbler          | <i>Oporornis agilis</i>          | (AS)      | A  |
| 679.0                      | Mourning Warbler             | <i>Oporornis philadelphia</i>    | (AS)      | A  |
| 680.0                      | MacGillivray's Warbler       | <i>Oporornis tolmiei</i>         |           | S  |
| 681.0                      | Common Yellowthroat          | <i>Geothlypis trichas</i>        |           | S  |
| 684.0                      | Hooded Warbler               | <i>Wilsonia citrina</i>          | (AS)      | A  |
| 685.0                      | Wilson's Warbler             | <i>Wilsonia pusilla</i>          |           | S  |
| 686.0                      | Canada Warbler               | <i>Wilsonia canadensis</i>       | (AS)      | A  |
| 690.0                      | Red-faced Warbler            | <i>Cardellina rubrifrons</i>     | (AS)      | A  |
| 683.0                      | Yellow-breasted Chat         | <i>Icteria virens</i>            |           | S  |
| <b>Family: Thraupidae</b>  |                              |                                  |           |  |
| 609.0                      | Hepatic Tanager              | <i>Piranga flava</i>             | (AS)      | A  |
| 610.0                      | Summer Tanager               | <i>Piranga rubra</i>             | (AS)      | M  |
| 608.0                      | Scarlet Tanager              | <i>Piranga olivacea</i>          | (AS)      | A  |
| 607.0                      | Western Tanager              | <i>Piranga ludoviciana</i>       |           | S  |
| <b>Family: Emberizidae</b> |                              |                                  |           |  |
| 590.0                      | Green-tailed Towhee          | <i>Pipilo chlorurus</i>          |           | S  |
| 587.0                      | Spotted Towhee               | <i>Pipilo maculatus</i>          |           | S  |
| 591.0                      | Canyon Towhee                | <i>Pipilo fuscus</i>             | (AS)      | A  |
| 578.0                      | Cassin's Sparrow             | <i>Aimophila cassinii</i>        | (AS)      | A, (AS) except Torrington area                             |
| 559.0                      | American Tree Sparrow        | <i>Spizella arborea</i>          |           | W  |
| 560.0                      | Chipping Sparrow             | <i>Spizella passerina</i>        |           | S  |
| 561.0                      | Clay-colored Sparrow         | <i>Spizella pallida</i>          |           | S  |
| 562.0                      | Brewer's Sparrow             | <i>Spizella breweri</i>          |           | S, NSS4  |
| 563.0                      | Field Sparrow                | <i>Spizella pusilla</i>          | (AS)      | S  |
| 540.0                      | Vesper Sparrow               | <i>Pooecetes gramineus</i>       |           | S  |
| 552.0                      | Lark Sparrow                 | <i>Chondestes grammacus</i>      |           | S  |
| 573.0                      | Black-throated Sparrow       | <i>Amphispiza bilineata</i>      | (AS)      | S  |
| 574.0                      | Sage Sparrow                 | <i>Amphispiza belli</i>          |           | S, NSS4  |
| 605.0                      | Lark Bunting                 | <i>Calamospiza melanocorys</i>   |           | S, NSS4  |
| 542.0                      | Savannah Sparrow             | <i>Passerculus sandwichensis</i> |           | S  |
| 546.0                      | Grasshopper Sparrow          | <i>Ammodramus savannarum</i>     |           | S, NSS4  |

| Spp. Code                   | Common Name                   | Scientific Name                      | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup>   |
|-----------------------------|-------------------------------|--------------------------------------|-----------|--|
| 545.0                       | Baird's Sparrow               | <i>Ammodramus bairdii</i>            | (AS)      | S  |
| 548.0                       | Le Conte's Sparrow            | <i>Ammodramus leconteii</i>          | (AS)      | M  |
| 549.1                       | Nelson's Sharp-tailed Sparrow | <i>Ammodramus nelsoni</i>            | (AS)      | A  |
| 585.0                       | Fox Sparrow                   | <i>Passerella iliaca</i>             |           | R  |
| 581.0                       | Song Sparrow                  | <i>Melospiza melodia</i>             |           | R  |
| 583.0                       | Lincoln's Sparrow             | <i>Melospiza lincolni</i>            |           | S  |
| 584.0                       | Swamp Sparrow                 | <i>Melospiza georgiana</i>           | (FL)      | M  |
| 558.0                       | White-throated Sparrow        | <i>Zonotrichia albicollis</i>        |           | M  |
| 553.0                       | Harris's Sparrow              | <i>Zonotrichia querula</i>           |           | W  |
| 554.0                       | White-crowned Sparrow         | <i>Zonotrichia leucophrys</i>        |           | S  |
| 557.0                       | Golden-crowned Sparrow        | <i>Zonotrichia atricapilla</i>       | (AS)      | A  |
| 567.0                       | Dark-eyed Junco               | <i>Junco hyemalis</i>                |           | R, Includes White-winged (566.0), Slate-colored (567.0), Oregon (567.1), Pink-sided (568.0), and Gray-headed (569.0) |
| 539.0                       | McCown's Longspur             | <i>Calcarius mccownii</i>            |           | S, NSS4  |
| 536.0                       | Lapland Longspur              | <i>Calcarius lapponicus</i>          |           | W  |
| 537.0                       | Smith's Longspur              | <i>Calcarius pictus</i>              | (AS)      | A  |
| 538.0                       | Chestnut-collared Longspur    | <i>Calcarius ornatus</i>             | (FL)      | S, NSS4  |
| 534.0                       | Snow Bunting                  | <i>Plectrophenax nivalis</i>         |           | W  |
| <b>Family: Cardinalidae</b> |                               |                                      |           |  |
| 593.0                       | Northern Cardinal             | <i>Cardinalis cardinalis</i>         | (AS)      | M  |
| 594.1                       | Yellow Grosbeak               | <i>Pheucticus chrysopheplus</i>      | (AS)      | A  |
| 595.0                       | Rose-breasted Grosbeak        | <i>Pheucticus ludovicianus</i>       | (FL)      | S  |
| 596.0                       | Black-headed Grosbeak         | <i>Pheucticus melanocephalus</i>     |           | S  |
| 597.0                       | Blue Grosbeak                 | <i>Passerina caerulea</i>            |           | S  |
| 599.0                       | Lazuli Bunting                | <i>Passerina amoena</i>              |           | S  |
| 598.0                       | Indigo Bunting                | <i>Passerina cyanea</i>              | (FL)      | S  |
| 601.0                       | Painted Bunting               | <i>Passerina ciris</i>               | (AS)      | A  |
| 604.0                       | Dickcissel                    | <i>Spiza americana</i>               | (FL)      | S, NSS4  |
| <b>Family: Icteridae</b>    |                               |                                      |           |  |
| 494.0                       | Bobolink                      | <i>Dolichonyx oryzivorus</i>         |           | S, NSS4  |
| 498.0                       | Red-winged Blackbird          | <i>Agelaius phoeniceus</i>           |           | S  |
| 501.1                       | Western Meadowlark            | <i>Sturnella neglecta</i>            |           | S  |
| 497.0                       | Yellow-headed Blackbird       | <i>Xanthocephalus xanthocephalus</i> |           | S  |
| 509.0                       | Rusty Blackbird               | <i>Euphagus carolinus</i>            | (AS)      | M  |
| 510.0                       | Brewer's Blackbird            | <i>Euphagus cyanocephalus</i>        |           | S  |
| 511.0                       | Common Grackle                | <i>Quiscalus quiscula</i>            |           | S  |
| 512.0                       | Great-tailed Grackle          | <i>Quiscalus mexicanus</i>           | (AS)      | A  |
| 495.0                       | Brown-headed Cowbird          | <i>Molothrus ater</i>                |           | S  |
| 506.0                       | Orchard Oriole                | <i>Icterus spurius</i>               | (FL)      | S  |
| 508.0                       | Bullock's Oriole              | <i>Icterus bullockii</i>             |           | S  |
| 507.0                       | Baltimore Oriole              | <i>Icterus galbula</i>               | (AS)      | A  |
| 504.0                       | Scott's Oriole                | <i>Icterus parisorum</i>             | (AS)      | S, NSS3  |
| <b>Family: Fringillidae</b> |                               |                                      |           |  |
| 514.1                       | Brambling                     | <i>Fringilla montifringilla</i>      | (AS)      | A  |
| 524.0                       | Gray-crowned Rosy-Finch       | <i>Leucosticte tephrocotis</i>       |           | R  |

| Spp. Code  | Common Name             | Scientific Name                   | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|--|-------------------------|-----------------------------------|-----------|--|
| 525.0  | Black Rosy-Finch        | <i>Leucosticte atrata</i>         |           | R  |
| 526.0  | Brown-capped Rosy-Finch | <i>Leucosticte australis</i>      | (FL)      | R  |
| 515.0  | Pine Grosbeak           | <i>Pinicola enucleator</i>        |           | R  |
| 517.0  | Purple Finch            | <i>Carpodacus purpureus</i>       | (AS)      | W  |
| 518.0  | Cassin's Finch          | <i>Carpodacus cassinii</i>        |           | R  |
| 519.0  | House Finch             | <i>Carpodacus mexicanus</i>       |           | R  |
| 521.0  | Red Crossbill           | <i>Loxia curvirostra</i>          |           | R  |
| 522.0  | White-winged Crossbill  | <i>Loxia leucoptera</i>           | (FL)      | R  |
| 528.0  | Common Redpoll          | <i>Carduelis flammea</i>          |           | W  |
| 527.0  | Hoary Redpoll           | <i>Carduelis hornemanni</i>       | (AS)      | W  |
| 533.0  | Pine Siskin             | <i>Carduelis pinus</i>            |           | R  |
| 530.0  | Lesser Goldfinch        | <i>Carduelis psaltria</i>         | (FL)      | M  |
| 531.0  | Lawrence's Goldfinch    | <i>Carduelis lawrencei</i>        | (AS)      | A  |
| 529.0  | American Goldfinch      | <i>Carduelis tristis</i>          |           | R  |
| 514.0  | Evening Grosbeak        | <i>Coccothraustes vespertinus</i> |           | R  |
| <b>Family: Passeridae</b>  |                         |                                   |           |  |
| 688.2  | House Sparrow           | <i>Passer domesticus</i>          |           | R  |
| <b>Note: the following avian species have been documented in Wyoming, but these are human-assisted species and, as such, are not recognized as wild, naturally occurring species in the State.</b> |                         |                                   |           |  |
| <b><u>Waterfowl</u></b>  |                         |                                   |           |  |
| <b>Order: Anseriformes</b>   |                         |                                   |           |  |
| <b>Family: Anatidae</b>  |                         |                                   |           |  |
| 178.2  | Mute Swan               | <i>Cygnus olor</i>                | (AS)      | A, Controlled  |
| 141.2  | Ruddy Shelduck          | <i>Tadorna ferruginea</i>         | (AS)      | A, Controlled  |
| 141.1  | Common Shelduck         | <i>Tadorna tadorna</i>            | (AS)      | A, Controlled  |
| <b><u>Doves and Pigeons</u></b>  |                         |                                   |           |  |
| <b>Order: Columbiformes</b>  |                         |                                   |           |  |
| <b>Family: Columbidae</b>  |                         |                                   |           |  |
| 315.2  | African Collared-Dove   | <i>Streptopelia roseogrisea</i>   | (AS)      | A, Controlled  |
| <b><u>Passerines</u></b>   |                         |                                   |           |  |
| <b>Order: Passeriformes</b>  |                         |                                   |           |  |
| <b>Family: Fringillidae</b>  |                         |                                   |           |  |
| 526.1  | European Goldfinch      | <i>Carduelis carduelis</i>        | (AS)      | A, Controlled  |

| Spp. Code                       | Common Name                 | Scientific Name                  | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|---------------------------------|-----------------------------|----------------------------------|-----------|--|
| <b>MAMMALS<sup>d, e</sup></b>   |                             |                                  |           |  |
| <b>Marsupials</b>               |                             |                                  |           |  |
| <b>Order: Marsupialia</b>       |                             |                                  |           |  |
| <b>Family: Didelphidae</b>      |                             |                                  |           |  |
| 800.0                           | Virginia Opossum            | <i>Didelphis virginiana</i>      |           | A  |
| <b>Insectivores</b>             |                             |                                  |           |  |
| <b>Order: Insectivora</b>       |                             |                                  |           |  |
| <b>Family: Soricidae</b>        |                             |                                  |           |  |
| 801.0                           | Masked Shrew                | <i>Sorex cinereus</i>            |           | R  |
| 801.1                           | Hayden's Shrew              | <i>Sorex haydeni</i>             |           | R, NSS4  |
| 806.0                           | Pygmy Shrew                 | <i>Sorex hoyi</i>                |           | R, NSS2  |
| 805.0                           | Merriam's Shrew             | <i>Sorex merriami</i>            |           | R  |
| 807.0                           | Dusky Shrew                 | <i>Sorex monticolus</i>          |           | R  |
| 803.0                           | Dwarf Shrew                 | <i>Sorex nanus</i>               |           | R, NSS3  |
| 804.0                           | American Water Shrew        | <i>Sorex palustris</i>           |           | R, NSS4  |
| 804.1                           | Preble's Shrew              | <i>Sorex preblei</i>             |           | R, NSS3  |
| 802.0                           | Vagrant Shrew               | <i>Sorex vagrans</i>             |           | R, NSS3  |
| <b>Family: Talpidae</b>         |                             |                                  |           |  |
| 810.0                           | Eastern Mole                | <i>Scalopus aquaticus</i>        |           | R  |
| <b>Bats</b>                     |                             |                                  |           |  |
| <b>Order: Chiroptera</b>        |                             |                                  |           |  |
| <b>Family: Vespertilionidae</b> |                             |                                  |           |  |
| 815.1                           | California Myotis           | <i>Myotis californicus</i>       |           | U  |
| 816.0                           | Western Small-footed Myotis | <i>Myotis ciliolabrum</i>        |           | U, NSS3  |
| 818.0                           | Long-eared Myotis           | <i>Myotis evotis</i>             |           | U, NSS2  |
| 819.0                           | Northern Myotis             | <i>Myotis septentrionalis</i>    |           | U, NSS2  |
| 815.0                           | Little Brown Myotis         | <i>Myotis lucifugus</i>          |           | U, NSS3  |
| 826.0                           | Fringed Myotis              | <i>Myotis thysanodes</i>         |           | U, NSS2  |
| 817.0                           | Long-legged Myotis          | <i>Myotis volans</i>             |           | U, NSS2  |
| 817.1                           | Yuma Myotis                 | <i>Myotis yumanensis</i>         |           | U  |
| 821.0                           | Eastern Red Bat             | <i>Lasiurus borealis</i>         |           | S, NSS4  |
| 822.0                           | Hoary Bat                   | <i>Lasiurus cinereus</i>         |           | S, NSS4  |
| 820.0                           | Silver-haired Bat           | <i>Lasionycteris noctivagans</i> |           | U, NSS4  |
| 820.1                           | Eastern Pipistrelle         | <i>Pipistrellus subflavus</i>    |           | U  |
| 825.0                           | Big Brown Bat               | <i>Eptesicus fuscus</i>          |           | U, NSS3  |
| 824.0                           | Spotted Bat                 | <i>Euderma maculatum</i>         |           | S, NSS2  |
| 823.0                           | Townsend's Big-eared Bat    | <i>Corynorhinus townsendii</i>   |           | U, NSS2  |
| 827.0                           | Pallid Bat                  | <i>Antrozous pallidus</i>        |           | S, NSS2  |
| <b>Family: Molossidae</b>       |                             |                                  |           |  |
| 828.0                           | Brazilian Free-tailed Bat   | <i>Tadarida brasiliensis</i>     |           | A  |
| 829.0                           | Big Free-tailed Bat         | <i>Nyctinomops macrotis</i>      |           | A  |
| <b>Lagomorphs</b>               |                             |                                  |           |  |
| <b>Order: Lagomorpha</b>        |                             |                                  |           |  |
| <b>Family: Ochotonidae</b>      |                             |                                  |           |  |
| 830.0                           | American Pika               | <i>Ochotona princeps</i>         |           | R  |
| <b>Family: Leporidae</b>        |                             |                                  |           |  |
| 837.0                           | Pygmy Rabbit                | <i>Brachylagus idahoensis</i>    |           | R, NSS3  |
| 833.0                           | Desert Cottontail *         | <i>Sylvilagus audubonii</i>      |           | R  |
| 834.0                           | Eastern Cottontail *        | <i>Sylvilagus floridanus</i>     |           | R  |
| 835.0                           | Mountain Cottontail *       | <i>Sylvilagus nuttallii</i>      |           | R  |

| Spp. Code                   | Common Name                    | Scientific Name                      | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|-----------------------------|--------------------------------|--------------------------------------|-----------|--|
| 836.0                       | Snowshoe Hare *                | <i>Lepus americanus</i>              |           | R  |
| 832.0                       | Black-tailed Jackrabbit *      | <i>Lepus californicus</i>            |           | R, Predatory animal  |
| 831.0                       | White-tailed Jackrabbit *      | <i>Lepus townsendii</i>              |           | R, Predatory animal  |
| <b>Rodents</b>              |                                |                                      |           |  |
| <b>Order: Rodentia</b>      |                                |                                      |           |  |
| <b>Family: Sciuridae</b>    |                                |                                      |           |  |
| 841.0                       | Yellow-pine Chipmunk           | <i>Neotamias amoenus</i>             |           | R  |
| 842.0                       | Cliff Chipmunk                 | <i>Neotamias dorsalis</i>            |           | R, NSS3  |
| 840.0                       | Least Chipmunk                 | <i>Neotamias minimus</i>             |           | R  |
| 843.0                       | Uinta Chipmunk                 | <i>Neotamias umbrinus</i>            |           | R  |
| 844.0                       | Yellow-bellied Marmot          | <i>Marmota flaviventris</i>          |           | R  |
| 846.0                       | Uinta Ground Squirrel          | <i>Spermophilus armatus</i>          |           | R  |
| 845.0                       | Wyoming Ground Squirrel        | <i>Spermophilus elegans</i>          |           | R  |
| 849.0                       | Golden-mantled Ground Squirrel | <i>Spermophilus lateralis</i>        |           | R  |
| 847.0                       | Spotted Ground Squirrel        | <i>Spermophilus spilosoma</i>        |           | R, NSS3  |
| 848.0                       | Thirteen-lined Ground Squirrel | <i>Spermophilus tridecemlineatus</i> |           | R  |
| 851.0                       | White-tailed Prairie Dog       | <i>Cynomys leucurus</i>              |           | R, NSS4  |
| 850.0                       | Black-tailed Prairie Dog       | <i>Cynomys ludovicianus</i>          |           | R, NSS3  |
| 855.0                       | Abert's Squirrel               | <i>Sciurus aberti</i>                |           | R, NSS3  |
| 856.0                       | Eastern Gray Squirrel *        | <i>Sciurus carolinensis</i>          |           | R  |
| 852.0                       | Eastern Fox Squirrel *         | <i>Sciurus niger</i>                 |           | R  |
| 854.0                       | Red Squirrel *                 | <i>Tamiasciurus hudsonicus</i>       |           | R  |
| 853.0                       | Northern Flying Squirrel       | <i>Glaucomys sabrinus</i>            |           | R, NSS4  |
| <b>Family: Geomyidae</b>    |                                |                                      |           |  |
| 862.0                       | Wyoming Pocket Gopher          | <i>Thomomys clusius</i>              |           | R  |
| 863.0                       | Idaho Pocket Gopher            | <i>Thomomys idahoensis</i>           |           | R, NSS3  |
| 860.0                       | Northern Pocket Gopher         | <i>Thomomys talpoides</i>            |           | R  |
| 861.0                       | Plains Pocket Gopher           | <i>Geomys bursarius</i>              |           | R, NSS4  |
| <b>Family: Heteromyidae</b> |                                |                                      |           |  |
| 865.0                       | Olive-backed Pocket Mouse      | <i>Perognathus fasciatus</i>         |           | R, NSS3  |
| 893.0                       | Plains Pocket Mouse            | <i>Perognathus flavescens</i>        |           | R, NSS3  |
| 866.0                       | Silky Pocket Mouse             | <i>Perognathus flavus</i>            |           | R, NSS3  |
| 867.0                       | Great Basin Pocket Mouse       | <i>Perognathus parvus</i>            |           | R, NSS3  |
| 868.0                       | Hispid Pocket Mouse            | <i>Chaetodipus hispidus</i>          |           | R, NSS3  |
| 869.0                       | Ord's Kanagroo Rat             | <i>Dipodomys ordii</i>               |           | R  |
| <b>Family: Castoridae</b>   |                                |                                      |           |  |
| 875.0                       | Beaver *                       | <i>Castor canadensis</i>             |           | R  |
| <b>Family: Muridae</b>      |                                |                                      |           |  |
| 877.0                       | Western Harvest Mouse          | <i>Reithrodontomys megalotis</i>     |           | R  |
| 876.0                       | Plains Harvest Mouse           | <i>Reithrodontomys montanus</i>      |           | R, NSS3  |
| 878.0                       | Canyon Mouse                   | <i>Peromyscus crinitus</i>           |           | R, NSS3  |
| 881.0                       | White-footed Mouse             | <i>Peromyscus leucopus</i>           |           | R  |
| 880.0                       | Deer Mouse                     | <i>Peromyscus maniculatus</i>        |           | R  |
| 879.0                       | Piñon Mouse                    | <i>Peromyscus truei</i>              |           | R, NSS3  |
| 882.0                       | Northern Grasshopper Mouse     | <i>Onychomys leucogaster</i>         |           | R  |
| 883.0                       | Bushy-tailed Woodrat           | <i>Neotoma cinerea</i>               |           | R  |
| 884.0                       | Southern Red-backed Vole       | <i>Clethrionomys gapperi</i>         |           | R  |
| 885.0                       | Western Heather Vole           | <i>Phenacomys intermedius</i>        |           | R, NSS3  |
| 888.0                       | Long-tailed Vole               | <i>Microtus longicaudus</i>          |           | R  |

| Spp. Code                     | Common Name                    | Scientific Name                 | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|-------------------------------|--------------------------------|---------------------------------|-----------|--|
| 887.0                         | Montane Vole                   | <i>Microtus montanus</i>        |           | R  |
| 890.0                         | Prairie Vole                   | <i>Microtus ochrogaster</i>     |           | R, NSS3  |
| 886.0                         | Meadow Vole                    | <i>Microtus pennsylvanicus</i>  |           | R  |
| 889.0                         | Water Vole                     | <i>Microtus richardsoni</i>     |           | R, NSS3  |
| 891.0                         | Sagebrush Vole                 | <i>Lemmiscus curtatus</i>       |           | R, NSS4  |
| 892.0                         | Common Muskrat *               | <i>Ondatra zibethicus</i>       |           | R  |
| 894.2                         | Norway Rat                     | <i>Rattus norvegicus</i>        |           | R  |
| 894.1                         | House Mouse                    | <i>Mus musculus</i>             |           | R  |
| <b>Family: Zapodidae</b>      |                                |                                 |           |  |
| 895.0                         | Meadow Jumping Mouse           | <i>Zapus hudsonius</i>          |           | R  |
| 895.1                         | Preble's Meadow Jumping Mouse  | <i>Zapus hudsonius preblei</i>  |           | R  |
| 896.0                         | Western Jumping Mouse          | <i>Zapus princeps</i>           |           | R  |
| <b>Family: Erethizontidae</b> |                                |                                 |           |  |
| 900.0                         | North American Porcupine *     | <i>Erethizon dorsatum</i>       |           | R, Predatory animal  |
| <b>Carnivores</b>             |                                |                                 |           |  |
| <b>Order: Carnivora</b>       |                                |                                 |           |  |
| <b>Family: Canidae</b>        |                                |                                 |           |  |
| 901.0                         | Coyote *                       | <i>Canis latrans</i>            |           | R, Predatory animal  |
| 902.0                         | Gray Wolf *                    | <i>Canis lupus</i>              |           | R, Threatened,<br>No season                                |
| 904.0                         | Swift Fox                      | <i>Vulpes velox</i>             |           | R, NSS4  |
| 903.0                         | Red Fox *                      | <i>Vulpes vulpes</i>            |           | R, Predatory animal  |
| 905.0                         | Common Gray Fox                | <i>Urocyon cinereoargenteus</i> |           | R  |
| <b>Family: Ursidae</b>        |                                |                                 |           |  |
| 940.0                         | Black Bear *                   | <i>Ursus americanus</i>         |           | R  |
| 941.0                         | Grizzly Bear *                 | <i>Ursus arctos</i>             |           | R, NSS3  |
| <b>Family: Procyonidae</b>    |                                |                                 |           |  |
| 906.0                         | Ringtail                       | <i>Bassariscus astutus</i>      |           | R  |
| 907.0                         | Northern Raccoon *             | <i>Procyon lotor</i>            |           | R, Predatory animal  |
| <b>Family: Mustelidae</b>     |                                |                                 |           |  |
| 908.0                         | American Marten *              | <i>Martes americana</i>         |           | R, NSS4  |
| 909.0                         | Fisher                         | <i>Martes pennanti</i>          |           | R  |
| 910.0                         | Short-tailed Weasel (Ermine) * | <i>Mustela erminea</i>          |           | R  |
| 911.0                         | Long-tailed Weasel *           | <i>Mustela frenata</i>          |           | R  |
| 913.0                         | Black-footed Ferret            | <i>Mustela nigripes</i>         |           | R, Endangered, NSS1  |
| 919.0                         | Least Weasel                   | <i>Mustela nivalis</i>          |           | R, NSS3  |
| 912.0                         | American Mink *                | <i>Mustela vison</i>            |           | R  |
| 914.0                         | Wolverine                      | <i>Gulo gulo</i>                |           | R, NSS3  |
| 915.0                         | American Badger *              | <i>Taxidea taxus</i>            |           | R  |
| 916.1                         | Western Spotted Skunk *        | <i>Spilogale gracilis</i>       |           | R, Predatory animal  |
| 916.0                         | Eastern Spotted Skunk *        | <i>Spilogale putorius</i>       |           | R, Predatory animal  |
| 917.0                         | Striped Skunk *                | <i>Mephitis mephitis</i>        |           | R, Predatory animal  |
| 918.0                         | Northern River Otter           | <i>Lontra canadensis</i>        |           | R, NSS4  |
| <b>Family: Felidae</b>        |                                |                                 |           |  |
| 922.0                         | Mountain Lion (Puma) *         | <i>Puma concolor</i>            |           | R  |
| 920.0                         | Canada Lynx                    | <i>Lynx canadensis</i>          |           | R, Threatened, NSS1  |
| 921.0                         | Bobcat *                       | <i>Lynx rufus</i>               |           | R  |

| Spp. Code                     | Common Name                      | Scientific Name               | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|-------------------------------|----------------------------------|-------------------------------|-----------|--|
| <b>Ungulates</b>              |                                  |                               |           |  |
| <b>Order: Artiodactyla</b>    |                                  |                               |           |  |
| <b>Family: Cervidae</b>       |                                  |                               |           |  |
| 930.0                         | Elk (Wapiti) *                   | <i>Cervus canadensis</i>      |           | R  |
| 932.0                         | Mule Deer (Black-tailed Deer) *  | <i>Odocoileus hemionus</i>    |           | R  |
| 933.0                         | White-tailed Deer *              | <i>Odocoileus virginianus</i> |           | R  |
| 931.0                         | Moose *                          | <i>Alces alces</i>            |           | R, NSS3  |
| <b>Family: Antilocapridae</b> |                                  |                               |           |  |
| 935.0                         | Pronghorn *                      | <i>Antilocapra americana</i>  |           | R  |
| <b>Family: Bovidae</b>        |                                  |                               |           |  |
| 925.0                         | Bison *                          | <i>Bos bison</i>              |           | R  |
| 926.0                         | Mountain Goat *                  | <i>Oreamnos americanus</i>    |           | R  |
| 927.0                         | Bighorn Sheep (Mountain Sheep) * | <i>Ovis canadensis</i>        |           | R, NSS3  |

| Spp. Code                     | Common Name                               | Scientific Name                                 | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|-------------------------------|---|---|-----------|--|
| <b>AMPHIBIANS<sup>†</sup></b> |   |   |           |  |
| <b>Salamanders</b>            |   |   |           |  |
| <b>Order: Caudata</b>         |   |   |           |  |
| <b>Family: Ambystomatidae</b> |   |   |           |  |
| 950.0                         | Tiger Salamander                          | <i>Ambystoma mavortium</i>                      |           | R, NSS4  |
|                               |   |   |           |  |
|                               |   |   |           |  |
|                               |   |   |           |  |
| <b>Toads and Frogs</b>        |   |   |           |  |
| <b>Order: Anura</b>           |   |   |           |  |
| <b>Family: Pelobatidae</b>    |   |   |           |  |
| 951.0                         | Plains Spadefoot                          | <i>Spea bombifrons</i>                          |           | R, NSS4  |
| 951.1                         | Great Basin Spadefoot                     | <i>Spea intermontana</i>                        |           | R, NSS4  |
| <b>Family: Bufonidae</b>      |   |   |           |  |
| 951.2                         | Boreal Toad                               | <i>Anaxyrus boreas boreas</i>                   |           | R, NSS1  |
| 951.3                         | Great Plains Toad                         | <i>Anaxyrus cognatus</i>                        |           | R, NSS4  |
| 951.5                         | Wyoming Toad                              | <i>Anaxyrus baxteri</i>                         |           | R, NSS1  |
| 951.4                         | Rocky Mountain Toad<br>(Woodhouse's Toad) | <i>Anaxyrus woodhousii</i><br><i>woodhousii</i> |           | R, NSS4  |
| <b>Family: Ranidae</b>        |   |   |           |  |
| 952.1                         | American Bullfrog                         | <i>Lithobates catesbeianus</i>                  |           | R, NSS4  |
| 952.2                         | Northern Leopard Frog                     | <i>Lithobates pipiens</i>                       |           | R, NSS4  |
| 952.3                         | Columbia Spotted Frog                     | <i>Rana luteiventris</i>                        |           | R, NSS4  |
| 952.4                         | Wood Frog                                 | <i>Lithobates sylvatica</i>                     |           | R, NSS3  |
| <b>Family: Hylidae</b>        |   |   |           |  |
| 952.0                         | Boreal Chorus Frog                        | <i>Pseudacris maculata</i>                      |           | R, NSS4  |

| Spp. Code                   | Common Name                   | Scientific Name                              | Doc. Type | Seasonal Status and Additional Information <sup>a, b</sup> |
|-----------------------------|-------------------------------|--|-----------|--|
| <b>REPTILES<sup>†</sup></b> |                               |  |           |  |
| <b>Turtles</b>              |                               |  |           |  |
| <b>Order: Testudines</b>    |                               |  |           |  |
| <b>Family: Trionychidae</b> |                               |  |           |  |
| 953.0                       | Western Spiny Softshell       | <i>Apalone spinifera hartwegi</i>            |           | R, NSS4  |
| <b>Family: Testudinidae</b> |                               |  |           |  |
| 953.2                       | Ornate Box Turtle             | <i>Terrapene ornata ornata</i>               |           | R, NSS4  |
| 953.3                       | Western Painted Turtle        | <i>Chrysemys picta bellii</i>                |           | R, NSS4  |
| <b>Family: Chelydridae</b>  |                               |  |           |  |
| 953.1                       | Eastern Snapping Turtle       | <i>Chelydra serpentina serpentina</i>        |           | R  |
| <b>Lizards</b>              |                               |  |           |  |
| <b>Order: Squamata</b>      |                               |  |           |  |
| <b>Family: Teiidae</b>      |                               |  |           |  |
| 954.0                       | Prairie Racerunner            | <i>Aspidozelis sexlineatus viridis</i>       |           | R, NSS4  |
| <b>Family: Scincidae</b>    |                               |  |           |  |
| 954.1                       | Northern Many-lined Skink     | <i>Plestidon multivirgatus multivirgatus</i> |           | R, NSS4  |
| <b>Family: Iguanidae</b>    |                               |  |           |  |
| 954.3                       | Northern Sagebrush Lizard     | <i>Sceloporus graciosus graciosus</i>        |           | R, NSS4  |
| 954.4                       | Plateau Fence Lizard          | <i>Sceloporus tristichus</i>                 |           | R, NSS3  |
| 954.6                       | Prairie Lizard                | <i>Sceloporus consobrinus</i>                |           | R, NSS4  |
| 954.8                       | Northern Tree Lizard          | <i>Urosaurus ornatus wrighti</i>             |           | R, NSS2  |
| 954.2                       | Greater Short-horned Lizard   | <i>Phrynosoma hernandesi</i>                 |           | R, NSS4  |
| 954.7                       | Great Plains Earless Lizard   | <i>Holbrookia maculata maculata</i>          |           | R, NSS4  |
| <b>Snakes</b>               |                               |  |           |  |
| <b>Order: Squamata</b>      |                               |  |           |  |
| <b>Family: Boidae</b>       |                               |  |           |  |
| 955.2                       | Northern Rubber Boa           | <i>Charina bottae</i>                        |           | R, NSS2  |
| <b>Family: Colubridae</b>   |                               |  |           |  |
| 955.3                       | Plains Hog-nosed Snake        | <i>Heterodon nasicus</i>                     |           | R, NSS4  |
| 956.2                       | Eastern Yellow-bellied Racer  | <i>Coluber constrictor flaviventris</i>      |           | R, NSS4  |
| 956.3                       | Smooth Greensnake             | <i>Opheodrys vernalis</i>                    |           | R, NSS2  |
| 955.4                       | Black Hills Red-bellied Snake | <i>Storeria occipitomaculata pahasapae</i>   |           | R, NSS3  |
| 956.1                       | Pale Milksnake                | <i>Lampropeltis triangulum multistriata</i>  |           | R, NSS2  |
| 955.6                       | Great Basin Gophersnake       | <i>Pituophis catenifer deserticola</i>       |           | R, NSS2  |
| 955.5                       | Bullsnake                     | <i>Pituophis catenifer sayi</i>              |           | R, NSS4  |
| 956.4                       | Plains Black-headed Snake     | <i>Tantilla nigriceps</i>                    |           | R, NSS3  |
| 955.8                       | Wandering Gartersnake         | <i>Thamnophis elegans vagrans</i>            |           | R, NSS4  |
| 956.5                       | Common Gartersnake            | <i>Thamnophis sirtalis</i>                   |           | R, NSS4  |
| 955.7                       | Plains Gartersnake            | <i>Thamnophis radix</i>                      |           | R, NSS4  |
| <b>Family: Crotalidae</b>   |                               |  |           |  |
| 955.0                       | Prairie Rattlesnake           | <i>Crotalus viridis</i>                      |           | R, NSS3  |
| 955.1                       | Midget Faded Rattlesnake      | <i>Crotalus oreganus concolor</i>            |           | R, NSS2  |

- <sup>a</sup> Species seasonal status: R = year-round resident, S = summer resident, W = winter resident, M = migrant, A = accidental occurrence in Wyoming, U = residency status in Wyoming is unknown.
- <sup>b</sup> Wyoming Game and Fish Department Species of Greatest Conservation Need with a Native Species Status (NSS) of 1, 2, 3, or 4.
- <sup>c</sup> Common and scientific names and species order are from the American Ornithologists' Union (1983, 2008). An "(AS)" indicates species for which full written documentation of all sightings is requested by the Wyoming Bird Records Committee; an "(FL)" indicates species for which documentation is only requested for the first sighting in each latilong and all nesting observations. In addition, full documentation is required for any species not listed here and for observations of breeding attempts.
- <sup>d</sup> An asterisk following a species common name indicates those species classified as game, predacious bird, predatory animal, or furbearer by state statute or Wyoming Game and Fish Commission Regulation.
- <sup>e</sup> Common and scientific names (except *C. townsendii*) and species order are from Baker et al. (2003).
- <sup>f</sup> Common and scientific names and species order are from Baxter and Stone (1992) and Moriarty (2008).

## LITERATURE CITED

American Ornithologists' Union. 1983. Check-list of North American Birds, Sixth Edition. Allen Press, Inc., Lawrence, Kansas. 877pp.

American Ornithologists' Union. 2008. Forty-ninth supplement to the American Ornithologists' Union check-list of North American birds. *Auk* 125(3)758-768.

Baker, R. J., L. C. Bradley, R. D. Bradley, J. W. Dragoo, M. D. Engstrom, R. S. Hoffman, C. A. Jones, F. Reid, D. W. Rice, and C. Jones. 2003. Revised Checklist of North American Mammals North of Mexico, 2003. Occasional Papers, Museum of Texas Technical University, Number 229. 24pp.

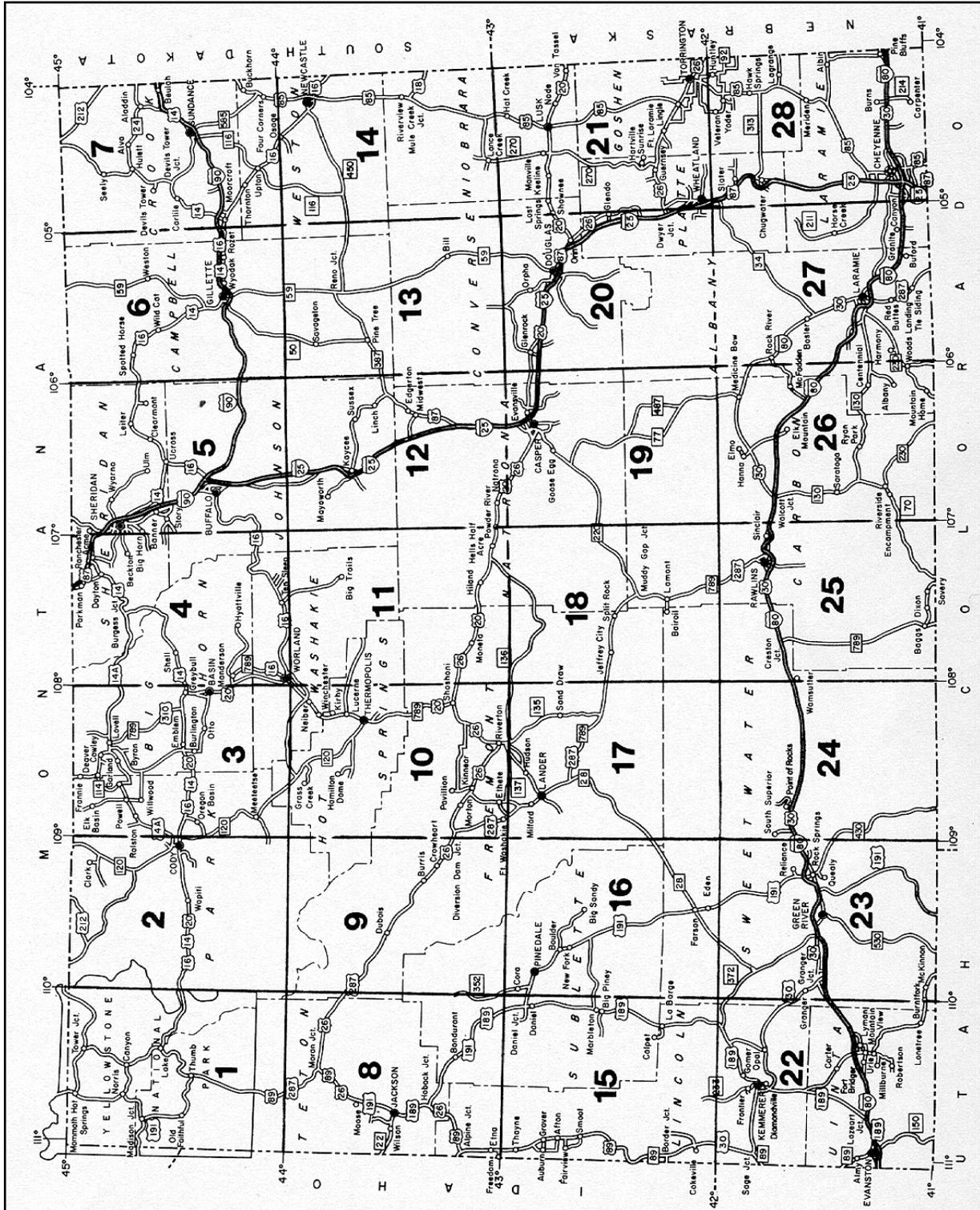
Baxter, G. T., and M. D. Stone. 1992. Amphibians and Reptiles of Wyoming. Wyoming Game and Fish Department, Cheyenne. 137pp.

Moriarty, J. J., editor. 2008. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, with Comments Regarding Confidence in Our Understanding, Sixth Edition. Society for the Study of Amphibians and Reptiles Herpetological Circular 37. 94pp.

APPENDIX II

LATILONGS (DEGREE BLOCKS) IN WYOMING

From: Dorn, J. L., and R. D. Dorn. 1990. Wyoming birds. Mountain West Publishing, Cheyenne, Wyoming. 138pp.



**APPENDIX III**

**NATIVE SPECIES STATUS MATRIX**

**HABITAT VARIABLES**

|   |   | A On-going significant loss of habitat | B Habitat is restricted or vulnerable but no recent or on-going significant loss; species may be sensitive to human disturbance | C Habitat is not restricted, vulnerable but no loss; species is not sensitive to human disturbance | D Habitat is stable and not restricted |
|---|---|--|---|--|--|
| <b>P<br/>O<br/>P<br/>U<br/>L<br/>A<br/>T<br/>I<br/>O<br/>N<br/><br/>V<br/>A<br/>R<br/>I<br/>A<br/>B<br/>L<br/>E<br/>S</b> | 1<br>Populations are greatly restricted or declining - extirpation appears possible                         | NSS1<br><br><b>1A</b>                  | NSS2<br><br><b>1B</b>   | NSS3<br><br><b>1C</b>  | NSS4<br><br><b>1D</b>                  |
|   | 2<br>Populations are declining or restricted in numbers and/or distribution - extirpation is not imminent   | NSS2<br><br><b>2A</b>                  | NSS3<br><br><b>2B</b>   | NSS4<br><br><b>2C</b>  | NSS5<br><br><b>2D</b>                  |
|   | 3<br>Species is widely distributed; population status and trends are unknown but are suspected to be stable | NSS3<br><br><b>3A</b>                  | NSS4<br><br><b>3B</b>   | NSS5<br><br><b>3C</b>  | NSS6<br><br><b>3D</b>                  |
|   | 4<br>Populations are stable or increasing and not restricted in numbers and/or distribution                 | NSS4<br><br><b>4A</b>                  | NSS5<br><br><b>4B</b>   | NSS6<br><br><b>4C</b>  | NSS7<br><br><b>4D</b>                  |

## AVIAN SPECIES OF GREATEST CONSERVATION NEED IN WYOMING

### NSS1 (Native Species Status 1)

---

**Common Loon (1A)** – Populations are greatly restricted in numbers and distribution; extirpation appears possible / On-going significant loss of habitat; species is sensitive to human disturbance

### NSS2 (Native Species Status 2)

---

**Bald Eagle (2A)** – Populations are restricted in numbers and distribution / On-going significant loss of habitat; species is sensitive to human disturbance

**Greater Sage-Grouse (2A)** – Populations are declining / On-going significant loss of habitat

**Trumpeter Swan (2A)** – Populations are restricted in numbers and distribution / On-going significant loss of habitat; species is sensitive to human disturbance

**Yellow-billed Cuckoo (2A)** – Populations are restricted in numbers and distribution / On-going significant loss of habitat

### NSS3 (Native Species Status 3)

---

**American Bittern (2B)** – Populations are restricted in numbers and distribution / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance

**American White Pelican (2B)** – Populations are restricted in numbers and distribution / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance

**Ash-throated Flycatcher (2B)** – Populations are restricted in distribution / Habitat is restricted but no on-going significant loss

**Barrow's Goldeneye (2B)** – Populations are restricted in distribution / Habitat is restricted and vulnerable but no on-going significant loss

**Black-crowned Night-Heron (2B)** – Populations are restricted in numbers and distribution / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance

**Black Tern (2B)** – Populations are restricted in numbers and distribution / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance

**Bushtit (2B)** – Populations are restricted in distribution / Habitat is restricted but no on-going significant loss

**Canvasback (2B)** – Populations are restricted in distribution / Habitat is restricted and vulnerable but no on-going significant loss

**Caspian Tern (2B)** – Populations are restricted in numbers and distribution / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance

**Columbian Sharp-tailed Grouse (2B)** – Populations are restricted in numbers and distribution / Habitat is vulnerable but no on-going significant loss

## NSS3 (Continued)

---

- Forster's Tern (2B)** – Populations are restricted in numbers and distribution / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance
- Franklin's Gull (2B)** – Populations are restricted in numbers and distribution / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance
- Greater Sandhill Crane (2B)** – Rocky Mountain population is restricted in number and distribution / Habitat is restricted and vulnerable but no recent or on-going significant loss; species is sensitive to human disturbance
- Harlequin Duck (2B)** – Populations are restricted in numbers and distribution / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance
- Juniper Titmouse (2B)** – Populations are restricted in distribution / Habitat is restricted but no on-going significant loss
- Lesser Scaup (2B)** – Populations are declining / Habitat is restricted and vulnerable but no on-going significant loss
- Lewis's Woodpecker (2B)** – Populations are restricted in distribution / Habitat is restricted but no on-going significant loss
- Long-billed Curlew (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Merlin (2B)** – Populations are restricted in numbers / Habitat is restricted but no on-going significant loss; species is sensitive to human disturbance
- Northern Pintail (2B)** – Populations are declining / Habitat is restricted and vulnerable but no on-going significant loss
- Peregrine Falcon (2B)** – Populations are restricted in distribution / Habitat is restricted but no on-going significant loss; species is sensitive to human disturbance
- Redhead (2B)** – Populations are restricted in numbers / Habitat is restricted and vulnerable but no on-going significant loss
- Scott's Oriole (2B)** – Populations are restricted in distribution / Habitat is restricted but no on-going significant loss
- Snowy Egret (2B)** – Populations are restricted in numbers and distribution / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance
- Virginia Rail (2B)** – Populations are restricted in numbers and distribution / Habitat is restricted and vulnerable but no on-going significant loss
- White-faced Ibis (2B)** – Populations are restricted in numbers and distribution / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance
- Willow Flycatcher (2B)** – Populations are declining / Habitat is restricted and vulnerable but no on-going significant loss
- Ferruginous Hawk (3A)** – Species is widely distributed; population status and trends are unknown but are suspected to be stable / On-going significant loss of habitat; species is sensitive to human disturbance

## **NSS4 (Native Species Status 4)**

---

- Bobolink (2C)** – Populations are restricted in distribution / Habitat is vulnerable but no loss; species is not sensitive to human disturbance
- Brewer's Sparrow (2C)** – Populations are declining / Habitat is vulnerable but no loss; species is not sensitive to human disturbance
- Chestnut-collared Longspur (2C)** – Populations are restricted in distribution / Habitat is vulnerable but no loss; species is not sensitive to human disturbance
- Dickcissel (2C)** – Populations are restricted in distribution / Habitat is vulnerable but no loss; species is not sensitive to human disturbance
- Grasshopper Sparrow (2C)** – Populations are restricted in distribution / Habitat is vulnerable but no loss; species is not sensitive to human disturbance
- Lark Bunting (2C)** – Populations are restricted in distribution / Habitat is vulnerable but no loss; species is not sensitive to human disturbance
- McCown's Longspur (2C)** – Populations are restricted in distribution / Habitat is vulnerable but no loss; species is not sensitive to human disturbance
- Sage Sparrow (2C)** – Populations are declining / Habitat is vulnerable but no loss; species is not sensitive to human disturbance
- Sage Thrasher (2C)** – Populations are declining / Habitat is vulnerable but no loss; species is not sensitive to human disturbance
- Short-eared Owl (2C)** – Populations are restricted in distribution / Habitat is vulnerable but no loss; species is not sensitive to human disturbance
- American Three-toed Woodpecker (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is restricted and vulnerable but no on-going significant loss
- Black-backed Woodpecker (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is restricted and vulnerable but no on-going significant loss
- Boreal Owl (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is restricted and vulnerable but no on-going significant loss
- Burrowing Owl (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no on-going significant loss; species is sensitive to human disturbance
- Clark's Grebe (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance
- Great Blue Heron (3B)** – Species is widely distributed / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance
- Great Gray Owl (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is restricted and vulnerable but no on-going significant loss
- Mountain Plover (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no on-going significant loss; species is sensitive to human disturbance
- Northern Goshawk (3B)** – Species is widely distributed; population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no on-going significant loss; species is sensitive to human disturbance

#### **NSS4 (Continued)**

---

**Northern Pygmy-Owl (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is restricted and vulnerable but no on-going significant loss

**Pygmy Nuthatch (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is restricted and vulnerable but no on-going significant loss

**Swainson's Hawk (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is restricted and vulnerable but no on-going significant loss

**Upland Sandpiper (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no on-going significant loss; species is sensitive to human disturbance

**Western Grebe (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is restricted and vulnerable but no on-going significant loss; species is sensitive to human disturbance

---

## MAMMALIAN SPECIES OF GREATEST CONSERVATION NEED IN WYOMING

### NSS1 (Native Species Status 1)

---

**Black-footed Ferret (1A)** – Populations are greatly restricted in numbers and distribution; extirpation appears possible / On-going significant loss of habitat

**Canada Lynx (1A)** – Populations are greatly restricted in numbers and distribution; extirpation appears possible / On-going significant loss of habitat

### NSS2 (Native Species Status 2)

---

**Pygmy Shrew (1B)** – Populations are greatly restricted; extirpation appears possible / Habitat is restricted but no on-going significant loss

**Fringed Myotis (2A)** – Populations are restricted in distribution / On-going significant loss of habitat; species is sensitive to human disturbance

**Long-eared Myotis (2A)** – Populations are restricted in distribution / On-going significant loss of habitat; species is sensitive to human disturbance

**Long-legged Myotis (2A)** – Populations are restricted in distribution / On-going significant loss of habitat; species is sensitive to human disturbance

**Northern Myotis (2A)** – Populations are restricted in distribution / On-going significant loss of habitat; species is sensitive to human disturbance

**Pallid Bat (2A)** – Populations are restricted in distribution / On-going significant loss of habitat; species is sensitive to human disturbance

**Spotted Bat (2A)** – Populations are restricted in distribution / On-going significant loss of habitat; species is sensitive to human disturbance

**Townsend's Big-eared Bat (2A)** – Populations are restricted in distribution / On-going significant loss of habitat; species is sensitive to human disturbance

### NSS3 (Native Species Status 3)

---

**Preble's Shrew (1C)** – Populations are greatly restricted / Habitat is vulnerable but no loss; species is not sensitive to human disturbance

**Abert's Squirrel (2B)** – Populations are restricted in distribution / Habitat is restricted but no recent or on-going significant loss

**Bighorn Sheep (2B)** – Populations are declining and restricted in distribution / Habitat is restricted, but no recent or on-going significant loss

**Black-tailed Prairie Dog (2B)** – Populations are declining / Habitat is vulnerable but no on-going significant loss

**Canyon Mouse (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss

**Cliff Chipmunk (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss

**Dwarf Shrew (2B)** – Populations are restricted in numbers / Habitat is vulnerable but no on-going significant loss

## NSS3 (Continued)

---

- Great Basin Pocket Mouse (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Grizzly Bear (2B)** – Populations are restricted in distribution / Habitat is restricted but no on-going significant loss
- Hispid Pocket Mouse (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Idaho Pocket Gopher (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Least Weasel (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Moose (2B)** – Populations are declining / Habitat is vulnerable but no on-going significant loss
- Olive-backed Pocket Mouse (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Pinyon Mouse (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Plains Harvest Mouse (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Plains Pocket Mouse (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Prairie Vole (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Pygmy Rabbit (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Silky Pocket Mouse (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Spotted Ground Squirrel (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Western Heather Vole (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Water Vole (2B)** – Populations are restricted in distribution / Habitat is vulnerable but no on-going significant loss
- Vagrant Shrew (2B)** – Populations are restricted in numbers / Habitat is vulnerable but no on-going significant loss
- Wolverine (2B)** – Populations are restricted in numbers / Habitat is vulnerable but no on-going significant loss, species is sensitive to human disturbance
- Big Brown Bat (3A)** – Species is widely distributed; population status and trends are unknown but are suspected to be stable / On-going significant loss of habitat
- Little Brown Myotis (3A)** – Species is widely distributed; population status and trends are unknown but are suspected to be stable / On-going significant loss of habitat
- Western Small-footed Myotis (3A)** – Species is widely distributed; population status and trends are unknown but are suspected to be stable / On-going significant loss of habitat

#### **NSS4 (Native Species Status 4)**

---

**Hayden's Shrew (2C)** – Populations are restricted in distribution / Habitat is vulnerable but no loss

**Northern Flying Squirrel (2C)** – Populations are restricted in distribution / Habitat is vulnerable but no loss

**Plains Pocket Gopher (2C)** – Populations are restricted in distribution / Habitat is vulnerable but no loss

**Eastern Red Bat (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no on-going significant loss; species is sensitive to human disturbance

**Hoary Bat (3B)** – Species is widely distributed; population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no on-going significant loss; species is sensitive to human disturbance

**Marten (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no recent or on-going significant loss

**River Otter (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no on-going significant loss

**Sagebrush Vole (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no on-going significant loss

**Silver-haired Bat (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no on-going significant loss; species may be sensitive to human disturbance

**Swift Fox (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no on-going significant loss

**Water Shrew (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no on-going significant loss

**White-tailed Prairie Dog (3B)** – Population status and trends are unknown but are suspected to be stable / Habitat is vulnerable but no on-going significant loss

---