



Migratory Bird Status Literature Review

**Uncompahgre Field Office
U.S. Department of the Interior
Bureau of Land Management**

**Rare Earth Science
PO Box 1245
Paonia, Colorado 81428**

October 2009

DOCUMENT INFORMATION AND ACKNOWLEDGEMENTS

This document was prepared by Rare Earth Science, LLC, under U.S. Bureau of Land Management Contract L09PX00471.

Authors

Ronald E. Lambeth, Wildlife Biologist, Grand Junction, Colorado
rolambeth@yahoo.com

Dawn R. Reeder, Principal Biologist, Rare Earth Science, LLC, Paonia, Colorado
dawn@rareearthscience.com

Contract Manager

Melissa S. Siders, Biological Staff Supervisor
U.S. Bureau of Land Management, Uncompahgre Field Office
2465 South Townsend Avenue
Montrose, Colorado 81401
(970) 240-5332
Melissa_siders@blm.gov

Cover Photograph

Northern saw-whet owl photographed in 2003 on U.S. Bureau of Land Management land by R. E. Lambeth.

Suggested Citation

Lambeth, R. E. and D. R. Reeder. 2009. Migratory Bird Status Literature Review. Prepared by Rare Earth Science, LLC, for the U.S. Bureau of Land Management, Uncompahgre Field Office, Montrose, Colorado.

Acknowledgements

Many thanks to Coen Dexter of Nucla, Colorado and Jason Beason of Paonia, Colorado for providing expert review and input for the List of Birds of the Uncompahgre Field Office Area.

EXECUTIVE SUMMARY

This Migratory Bird Status Literature Review is intended to support the development of the Environmental Impact Statement and Resource Management Plan for the Uncompahgre Planning Area (“study area”) within U.S. Department of the Interior Bureau of Land Management’s (BLM’s) Uncompahgre Field Office (UFO) administrative boundary.

The principal tasks of this document are as follows:

1. Compile a database of all known migratory birds occurring in the study area, along with their season(s) of occurrence, preferred habitats, nesting periods, relative abundances, conservation status, and population status;
2. Map migratory bird diversity for all seasons on a regional scale across the study area;
3. Develop a list of “status species” for the study area (those assigned a special status by a government agency, a conservation entity, or other expert organization, and that warrant priority consideration during BLM’s planning, decision-making, and land management activities in the UFO);
4. Develop a list of “key watch species” for the study area (species perceived to be in decline or with unknown status in the study area);
5. Develop a list of “management focus species” for the study area (potential flagship species for each land cover type in the study area whose habitat requirements should inform UFO’s planning, decision-making, and land management planning activities in the study area);
6. Review and synthesize existing migratory bird conservation strategies (publicly available published documents) applicable to the study area;
7. Compile management recommendations that benefit birds and bird habitats and identify conservation opportunities applicable to the UFO; and
8. Identify gaps in knowledge and potential research questions pertaining to migratory bird species or their habitats in the study area.

In [Chapters 1](#) and [2](#), we describe the study area, which encompasses 3.2 million acres in the Colorado Plateau and Southern Rocky Mountain physiographic regions, and lies within Bird Conservation Region 16 in the Intermountain West Avifaunal Biome. Approximately 0.78 million acres of the 3.2 million acre study area are BLM lands. Approximately 1.57 million acres of the study area are split-estate lands or non-BLM lands with subsurface minerals held by the federal government. BLM has the potential to be involved with the management of split-estate lands or other lands with federal minerals when mineral exploration or extraction occurs. The remaining approximately 0.86 million acres of the study area are lands for which BLM has no management potential.

To characterize bird habitat in the study area on a landscape scale, we used Geographic Information Systems (GIS) software to reclass the publicly available Colorado Vegetation Classification Project (CVCP) land cover raster dataset into 31 land cover types. The most abundant land cover types in the study area on BLM lands are the pinyon-juniper woodland types (0.4 million acres), followed by semi-

desert shrubland land cover types (0.16 million acres) and sagebrush land cover types (0.14 million acres). These land cover types together account for over 90 percent of all BLM lands in the study area.

In [Chapter 3](#), we identify and describe the birds of the study area. Of the 336 documented bird species in the study area, more than 240 are considered annual residents or visitors. One hundred and ninety-six (196) of the bird species in the study area have been observed on BLM land, and the bulk of at least 30 species in the study area are produced (i.e., the species nest and rear young) on BLM land. An estimated 29 species recorded in the study area are peripheral (at the edge of their range in the study area), 22 species are stenotopic, 43 are habitat obligates, 39 are cavity nesters, and 41 prefer old growth woodlands or forests.

[Chapter 4](#) presents our GIS analysis of bird species richness and diversity across the study area. We found that overall relative species richness in the study area is highest during spring and fall (migration seasons) and lowest during winter. Water and riparian land cover types are consistently highest in species richness throughout the year, whereas the snow, bare soil, alpine/subalpine meadow and shrub, and cliff/rock/talus land cover types are consistently the least species rich. Across the spring, summer, and fall seasons, species richness in the upland land cover types is generally higher in the mid to high-elevation upland forests and woodlands than in shrublands. In winter, pinyon-juniper types and low-elevation shrubland types support the highest upland bird species richness across the study area. BLM lands are relatively more species rich during fall and winter than during summer and spring, and BLM lands are relatively more species rich during winter than other lands in the study area. The highest species richness in the study area during summer, spring, and fall occurs in riparian areas in the river valleys, and on National Forest Lands on the Uncompahgre Plateau, Grand Mesa, the West Elk Mountains, and the San Juan Mountains. Obligate species richness mapping across the study area for summer illustrates the relative importance of BLM lands to the breeding success of obligate birds of the study area.

Our GIS analysis of bird diversity (using the Shannon Index) across the study area suggests that a high level of bird diversity characterizes more land cover types during fall than any other season. The lowest levels of bird diversity across the study area occur during winter, due to lower seasonal bird abundance and lower species richness. Pinyon-juniper woodland land cover types generally support high bird diversity during spring, fall, and winter, and relatively moderate diversity during summer. Ponderosa pine land cover types are also highly bird diverse during spring, summer, and fall. Riparian and water land cover types, although species rich, tend to have only a few species dominating the bird community in terms of relative abundance. Thus their diversity indices are relatively moderate. The spatial pattern of bird diversity across the study area suggests that BLM lands are relatively more bird diverse during spring and winter than during summer and fall, and that BLM lands have significantly higher bird diversity during winter and spring than other lands in the study area.

[Chapters 5, 6, and 7](#) describe the context of the study area and its birds within the current bird conservation geography, summarize bird conservation status and population trend data, and provide recommendations for three types of management species in the study area: 66 “status species,” 23 “key watch species,” and from two to 15 “management focus species” for each land cover type in the study area. Status species are birds recognized by a government agency, a conservation entity, or other expert organization, which warrant priority consideration during the UFO’s planning, decision-making, and land management activities in the study area, and generally include only species that have, or potentially have, a significant presence on lands managed by the UFO. Key watch species are bird species perceived to be in decline or with unknown status in the study area that could reasonably be monitored on BLM lands. Key watch species may or may not be recognized by other entities as a species of conservation priority (i.e., they may not be status species in the study area). Management

focus species are representative species for each land cover type in the study area (some would make appropriate “flagship” species) whose habitat requirements should inform the UFO’s planning, decision-making, and land management activities in the study area. Management focus species may or may not be status species or key watch species (i.e., they may not be in decline), but they are often obligates of the land cover type they were chosen to represent.

Chapter 8 summarizes management practices compatible with the maintenance of bird populations and recommendations to specifically benefit birds, organized by BLM activity or permitted activity and by land cover type (habitat). We emphasize management recommendations regarding right-of-way and energy development, recreation, and livestock grazing—activities on BLM lands with the greatest potential to affect birds and their habitats. We place the highest priority on management of land cover types for which BLM has the greatest responsibility in the study area, namely, the pinyon-juniper woodland types, the sagebrush types, and the semi-desert shrubland types, which collectively make up more than 90 percent of BLM lands (surface ownership) in the study area, and 43 percent of all lands with BLM management potential (BLM lands and federal minerals lands) in the study area. A high proportion of the study area’s obligate birds are dependent on pinyon-juniper woodland and sagebrush land cover types, implying that BLM has high management responsibility for these species in the region.

In **Chapter 9** we identify general knowledge gaps and offer suggestions for further research.

TABLE OF CONTENTS

Document Information and Acknowledgements (i)

Executive Summary (ii)

Table of Contents (iii)

List of Maps (iii)

List of Tables (iv)

Acronyms and Abbreviations (v)

Common and Scientific Names of Species (vi)

Glossary (vii)

[Chapter 1](#) Introduction

[Chapter 2](#) Overview of Habitat and Land Status in the Study Area

[Chapter 3](#) Birds of the Uncompahgre Planning Area

[Chapter 4](#) Bird Diversity in the Study Area

[Chapter 5](#) The Study Area in the Context of Existing Bird Conservation Strategies

[Chapter 6](#) Birds of the Study Area: Conservation Status, Population Trends, and Threats

[Chapter 7](#) Management Species

[Chapter 8](#) Management Recommendations

[Chapter 9](#) Data Gaps and Potential Research Questions

[Chapter 10](#) Conclusions

List of Maps

[1-1](#) Location and overview of the study area (Uncompahgre Planning Area).

[2-1](#) Land status in the study area.

[2-2](#) Land cover types in the study area.

[3-1](#) Significant water and land bird sites in or near the study area.

[3-2](#) Gunnison sage-grouse range in and near the study area depicted with sagebrush land cover types.

[3-3](#) Sage sparrow range in and near the study area depicted with sagebrush land cover types.

[4-1](#) Bird species richness by season.

[4-2](#) Estimated relative bird abundances by season.

[4-3](#) Bird species diversity (Shannon Index) by season.

[4-4](#) Obligate species richness in primary habitats in summer.

- [5-1](#) The study area in the context of the existing bird conservation geography.
- [6-1](#) Breeding Bird Survey (BBS) routes touching the study area.
- [7-1](#) Status species richness in primary habitats for each season.
- [8-1](#) PCAs and ACECs overlaid on summer relative bird diversity mapping in the study area.

List of Tables

- [2-1](#) Land cover types in the study area (in shaded cells and bold font), consolidated and reclassified from the Colorado Vegetation Classification Project (CVCP) dataset.
- [2-2](#) Areas and percentages of land cover types in the study area by land status, sorted from highest to lowest amounts on BLM lands.
- [3-1](#) Birds of the Uncompahgre Planning Area, listed with qualitative seasonal occurrence data and nesting periods.
- [3-2](#) Scientific names, American Ornithologists' Union numbers, orders, and families of the birds of the study area.
- [3-3](#) Summer habitat matrix for birds of the study area.
- [3-4](#) Winter habitat matrix for birds of the study area.
- [3-5](#) Spring habitat matrix for birds of the study area.
- [3-6](#) Fall habitat matrix for birds of the study area.
- [3-7](#) Habitat preferences and characteristics of selected birds of the study area.
- [3-8](#) Summer habitat matrix for obligate birds of the study area.
- [4-1](#) Bird species richness (S) and estimated relative bird abundances (N) sorted from highest to lowest for each land cover type in the study area in each season.
- [4-2](#) Estimated relative bird diversity (H') for each land cover type in the study area, sorted from highest to lowest for each season.
- [6-1](#) Summary of conservation status, selected conservation priority rankings, and population trend estimates for all birds of the study area.
- [6-2](#) Explanation of Partners In Flight (PIF) population trend scores presented in Table 6-1.
- [6-3](#) Sensitivities of selected birds of the study area.
- [6-4](#) Selected wildlife sensitivity and indicator thresholds.
- [7-1](#) Status species (total of 66) for the study area.
- [7-2](#) Key watch species (total of 23) for the study area.
- [7-3](#) Recommended management focus species for each land cover type in the study area.
- [8-1](#) Areas and percentages of eleven land cover type management groups on BLM land and other land with federal minerals.
- [8-2](#) Recommended raptor buffers.

ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
AOU	American Ornithologists' Union
APD	Application for Permit to Drill
APHIS	Animal and Plant Health Inspection Service
BBA	Breeding Bird Atlas
BBS	North American Breeding Bird Survey
BCR	Bird Conservation Region
BHCA	Bird Habitat Conservation Area
BLM	U.S. Department of the Interior, Bureau of Land Management
BMP	best management practice
CACWG	Colorado All-Bird Conservation Work Group
CDOW	Colorado Division of Wildlife
CNHP	Colorado Natural Heritage Program
CVCP	Colorado Vegetation Classification Project
GIS	geographic information systems
GMUG	Grand Mesa, Uncompahgre, and Gunnison National Forests
GuSGRSC	Gunnison Sage-grouse Rangewide Steering Committee
H'	diversity, as calculated using the Shannon Index
IAFWA	International Association of Fish and Wildlife Agencies
IMW	Intermountain West
MAPS	Monitoring Avian Productivity and Survivorship Project
MCB	Monitoring Colorado's Birds
MIS	Management Indicator Species
N	relative abundance (number of individual birds)
NABCI	North American Bird Conservation Initiative
NCA	National Conservation Area
NSO	No surface occupancy
PCA	Potential Conservation Area
PIF	Partners In Flight
RMBO	Rocky Mountain Bird Observatory
RMP	Resource Management Plan
ROW	right-of-way
S	species richness
SSS	Special Status Species
UFO	Uncompahgre Field Office
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service

COMMON & SCIENTIFIC NAMES OF SPECIES

Birds¹

Bell's vireo	<i>Vireo bellii</i>
Black-capped vireo	<i>Vireo atricapilla</i>
Bronzed cowbird	<i>Molothrus aeneus</i>
Cactus wren	<i>Campylorhynchus brunneicapillus</i>
California condor	<i>Gymnogyps californianus</i>
Chihuahuan raven	<i>Corvus cryptoleucus</i>
Prothonotary warbler	<i>Protonotaria citrea</i>
Pyrrhuloxia	<i>Cardinalis sinuatus</i>
Southwest willow flycatcher	<i>Empidonax traillii extimus</i>
Vermilion flycatcher	<i>Pyrocephalus rubinus</i>
White-eyed vireo	<i>Vireo griseus</i>

Plants

Alkali sacaton	<i>Sporobolus airoides</i>
Aspen	<i>Populus tremuloides</i>
Basin big sagebrush	<i>Artemisia tridentata subsp. tridentata</i>
Big sagebrush	<i>Artemisia tridentata</i>
Bitterbrush	<i>Purshia tridentata</i>
Black sagebrush	<i>Artemisia nova</i>
Box elder	<i>Acer negundo</i>
Broom snakeweed	<i>Gutierrezia sarothrae</i>
Cheatgrass	<i>Bromus tectorum</i>
Chokecherry	<i>Prunus virginiana</i>
Colorado blue spruce	<i>Picea pungens</i>
Cottonwood	<i>Populus sp.</i>
Coyote willow	<i>Salix exigua</i>
Douglas fir	<i>Pseudotsuga menziesii</i>
Drummond willow	<i>Salix drummondiana</i>
Engelmann spruce	<i>Picea engelmannii</i>
Field horsetail	<i>Equisetum arvense</i>
Fourwing saltbush	<i>Atriplex canescens</i>
Fremont cottonwood	<i>Populus deltoides</i>
Galleta	<i>Pleuraphis jamesii</i>
Gambel oak	<i>Quercus gambelii</i>
Geyer willow	<i>Salix geyeriana</i>
Golden currant	<i>Ribes aureum</i>
Greasewood	<i>Sarcobatus vermiculatus</i>
Indian ricegrass	<i>Achnatherum hymenoides</i>
Lodgepole pine	<i>Pinus contorta</i>
Mat saltbush	<i>Atriplex corrugata</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Mountain alder	<i>Alnus incana tenuifolia</i>
Mountain big sagebrush	<i>Artemisia tridentata var. pauciflora</i>

¹ Common and scientific names of bird species of the study area are presented in Table 3-2 and follow the nomenclature of the American Ornithologists' Union. Other birds listed here are non-study area bird species mentioned in this document.

Mountain mahogany	<i>Cercocarpus sp.</i>
Mountain willow	<i>Salix monticola</i>
Muttongrass	<i>Poa fendleriana</i>
Narrowleaf cottonwood	<i>Populus angustifolia</i>
Peachleaf willow	<i>Salix amygdaloides</i>
Pinyon pine	<i>Pinus edulis</i>
Planeleaf willow	<i>Salix planifolia</i>
Ponderosa pine	<i>Pinus ponderosa</i>
Pricklypear	<i>Opuntia sp.</i>
Quaking aspen	<i>Populus tremuloides</i>
Rabbitbrush	<i>Chrysothamnus sp.</i>
Redosier dogwood	<i>Cornus sericea</i>
Fremont cottonwood	<i>Populus deltoides wislizenii</i>
Rocky Mountain juniper	<i>Juniperus scopulorum</i>
Russian knapweed	<i>Acroptilon repens</i>
Saltbush	<i>Atriplex sp.</i>
Sandberg bluegrass	<i>Poa secunda</i>
Serviceberry	<i>Amelanchier sp.</i>
Shadscale	<i>Atriplex confertifolia</i>
Silver buffaloberry	<i>Shepherdia argentea</i>
Silver sagebrush	<i>Artemisia cana</i>
Snowberry	<i>Symphoricarpos sp.</i>
Spikerush	<i>Eleocharis sp.</i>
Squawapple	<i>Peraphyllum ramosissimum</i>
Strapleaf willow	<i>Salix ligulifolia</i>
Subalpine fir	<i>Abies lasiocarpa</i>
Subalpine willow	<i>Salix brachycarpa</i>
Tamarisk	<i>Tamarix sp.</i>
Three-leaf sumac	<i>Rhus trilobata</i>
Utah juniper	<i>Juniperus osteosperma</i>
Wild rose	<i>Rosa sp.</i>
Willow	<i>Salix sp.</i>
Wyoming big sagebrush	<i>Artemisia tridentata subsp. Wyomingensis</i>

Mammals

Beaver	<i>Castor Canadensis</i>
Bison	<i>Bison bison</i>
Black bear	<i>Ursus americanus</i>
Deer (mule deer)	<i>Odocoileus hemionus</i>
Elk	<i>Cervus elaphus</i>
Wolf	<i>Canus lupus</i>

GLOSSARY

BLM land	Land in the study area managed by BLM on behalf of the public (both the surface estate and subsurface minerals are managed by BLM).
Diversity (H')	Species diversity. An index of bird community diversity that takes into account both species richness (S) and the relative abundance of individual birds (N). In this document, bird diversity for a habitat (land cover type) is calculated using the Shannon Index.
Endemic species	A species restricted to a particular locality; a species native to a particular region.
Federal minerals land	For the purposes of this document, any land where the subsurface minerals are administered by the federal government (BLM), but the surface estate is owned and managed by another party (a non-BLM entity). The surface estate of such land has potential for BLM management when subsurface federal mineral rights are leased and exercised.
Fossorial mammal	A mammal adapted for digging or burrowing (e.g., prairie dog).
Fragmentation	The breaking up of a habitat or ecosystem into smaller pieces or patches. In a fragmented habitat, suitable habitat remains only as remnant patches surrounded by unusable environment. Populations of species, especially obligate species, decline because of lower reproduction rates or higher mortality in remaining habitat. With increasing fragmentation in a landscape, the importance of stochastic effects increases and may hasten local extirpation. With the reduction of the number of suitable patches and connectivity of patches in a region, regional extinction, especially of obligate species, also becomes more probable.
Krumholz formation	Woodlands of high elevations with stunted trees (trees with shrub-like stature) caused by harsh climate conditions.
Land status	Ownership or administrative status of land parcels, both surface (real estate) and subsurface (mineral rights or mineral estate). See "BLM land," "federal minerals land," and "split-estate land."
Locally nesting species	The species' nesting activities are restricted to a particular locale; not widespread in a region.
Obligate species	A species dependent on a particular habitat or habitat feature for survival.
Passerine	A bird belonging to the order Passeriformes, the largest order of birds. Sometimes referred to as perching birds, or less accurately, as songbirds.

Peripheral species	A species at the edge of its ecological range or habitat zone; a geographically or ecologically marginal species.
Philopatric species	Species with tendency of offspring to return to their natal home range to reproduce, or species with the tendency to remain in or habitually return to its native regions or territories.
Population	A group of individuals of one species in an area or region.
Range	The geographic spatial range of a species. Used synonymously with “species distribution.”
Relative abundance (N)	The number of individual birds.
Species richness (S)	The number of species.
Split-estate land	A parcel of property consisting of two separate legal estates: the “surface estate” and the “mineral estate.” The surface estate is typically owned and managed by a private party (or non-federal government entity) and the subsurface mineral estate is owned, leased, and managed by the federal government (BLM).
Stenotopic species	A species able to tolerate only a narrow range of environmental conditions.
Visitor	During summer, a bird that occupies the area during nesting season but does not behave like a summer resident and does not nest. During other seasons, “visitor” implies that the species is not found in the area every year.

Chapter 1

INTRODUCTION

Purpose & Scope

This Migratory Bird Status Literature Review is intended to support the development of the Environmental Impact Statement for the upcoming revisions to the U.S. Department of the Interior Bureau of Land Management's (BLM's) Resource Management Plans (RMPs) and help guide BLM's ongoing resource management activities in the Uncompahgre Planning Area within BLM's Uncompahgre Field Office (UFO) administrative boundary. The Uncompahgre Planning Area (BLM 2008) encompasses all lands lying within the UFO administrative boundary ([Map 1-1](#)) except the Gunnison Gorge National Conservation Area (NCA) and Wilderness (the Gunnison Gorge Planning Area).

The Uncompahgre Planning Area is currently managed under two RMPs: the San Juan-San Miguel RMP (BLM 1986) and the Uncompahgre Basin RMP (BLM 1988). After the completion of the upcoming RMP revisions, the Uncompahgre Planning Area will be managed under a new Uncompahgre RMP (resulting from the consolidation of the San Juan-San Miguel and Uncompahgre Basin RMPs) and an RMP to be developed for the newly designated Dominguez-Escalante NCA, a portion of which lies within the UFO ([Map 1-1](#)).

Throughout the remainder of this document, we refer to the Uncompahgre Planning Area as the "study area." Certain aspects of this document (e.g., management recommendations) do have relevance for the entire UFO area.

The principal tasks of this document are as follows:

9. Compile a database of all known migratory birds occurring in the study area, along with their season(s) of occurrence, preferred habitats, nesting periods, relative abundances, conservation status, and population status;
10. Map migratory bird diversity for all seasons on a regional scale across the study area;
11. Develop a list of "status species" for the study area (those assigned a special status by a government agency, a conservation entity, or other expert organization, and that warrant priority consideration during BLM's planning, decision-making, and land management activities in the UFO);
12. Develop a list of "key watch species" for the study area (species perceived to be in decline or with unknown status in the study area);
13. Develop a list of "management focus species" for the study area (potential flagship species for each land cover type in the study area whose habitat requirements should inform UFO's planning, decision-making, and land management planning activities in the study area);
14. Review and synthesize existing migratory bird conservation strategies (publicly available published documents) applicable to the study area;

15. Compile management recommendations that benefit birds and bird habitats and identify conservation opportunities applicable to the UFO; and
16. Identify gaps in knowledge and potential research questions pertaining to migratory bird species or their habitats in the study area.

Document Organization and Nomenclature

This document is arranged in chapters hyperlinked to the table of contents. Literature citations for each chapter are found at the end of each chapter's text. Maps and tables follow the text of the chapter in which they were first referenced.

Nomenclature for migratory birds (both common and scientific names) throughout this document follows the American Ornithologists' Union check-list of North American Birds (AOU 2009). Scientific names for plants and non-domestic animals mentioned by common name throughout this document are listed in the front matter (page viii). Selected terms are explained in the glossary beginning on page xi.

Datasets Generated for this Review

To produce maps and facilitate landscape scale habitat analysis for this review, we generated a spatial (raster) dataset using ESRI® geographic information systems (GIS) software, ArcGIS 9.3™. We generated a database (Master List of Birds of BLM's Uncompahgre Planning Area and bird habitat matrices) in Microsoft Office Excel 2007®, from which the tables presented in this document are derived.

These data or portions thereof are available by request from the UFO in Montrose, Colorado (contact information is provided on page i of this document).

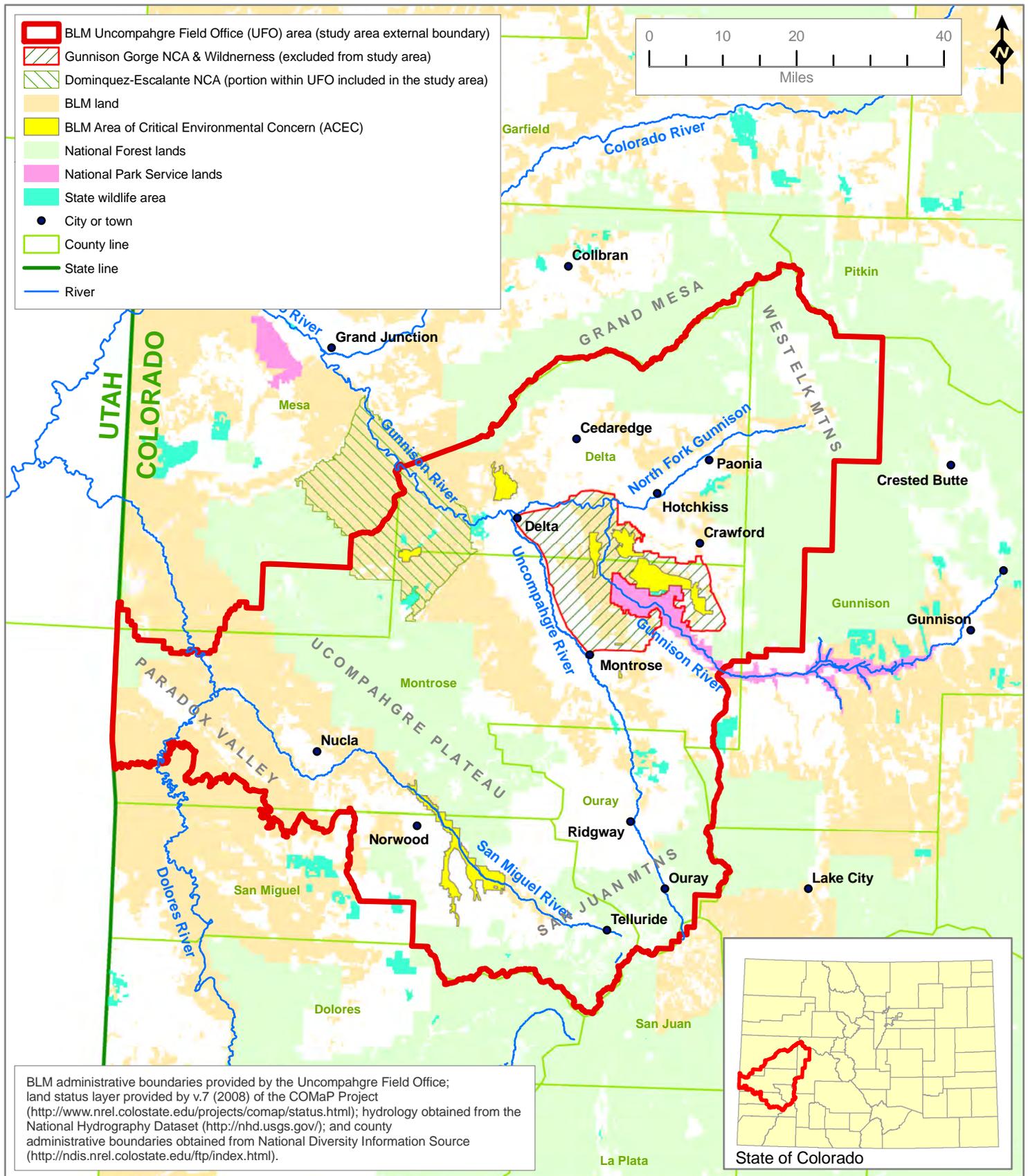
Limitations

While maps included with hard copies or electronic copies of this document help the user visualize the concepts presented on a study-wide regional scale, users wishing to use this mapping for resource management or planning purposes should view the spatial data directly at high resolution using GIS software.

Literature Cited

- AOU. 2009. *Check-list of North American birds, 7th ed.* Lawrence, KS: American Ornithologists' Union.
- BLM. 1986. San Juan-San Miguel resource management plan and environmental impact statement: U. S. Department of the Interior, Bureau of Land Management, Montrose District, San Juan Resource Area and Uncompahgre Basin Resource Area, Colorado.
- BLM. 1988. Uncompahgre Basin resource management plan and environmental impact statement: U. S. Department of the Interior, Bureau of Land Management, Montrose District, Uncompahgre Basin Resource Area, Colorado.
- BLM. 2008. Preparation Plan for the Uncompahgre Resource Management Plan: U. S. Department of the Interior, Bureau of Land Management, Uncompahgre Field Office, Montrose, Colorado.

Map 1-1
Location and overview of the study area (Uncompahgre Planning Area).



Chapter 2

OVERVIEW OF HABITAT AND LAND STATUS IN THE STUDY AREA

The area considered by this document (“study area”) encompasses the 3.2 million acre Uncompahgre Planning Area, or all lands lying within the UFO administrative boundary except the Gunnison Gorge NCA and Wilderness (also referred to as the Gunnison Gorge Planning Area). The study area is bounded on the west by the Colorado state line and spans all or parts of several western Colorado counties, including Delta, Gunnison, Mesa, Montrose, San Miguel, and Ouray counties ([Map 1-1](#)). The varied topography and vegetation communities within the study area range from lowland riparian along the Dolores River in Montrose County (at approximately 4,700 feet above mean sea level) to alpine on the San Juan Mountains in Ouray County (rising to over 14,000 feet above mean sea level). Four river systems, the Gunnison, the San Miguel, the Dolores and the Uncompahgre, bisect the study area. The Uncompahgre Plateau is a major landform bisecting the south part of the study area ([Map 1-1](#)).

[Map 2-1](#) shows the land status of the study area. Approximately 0.78 million acres of the 3.2 million acre study area are BLM lands. Approximately 1.57 million acres of the study area are split-estate lands or non-BLM lands with subsurface minerals held by the federal government. BLM has the potential to be involved with the management of split-estate lands or other lands with federal minerals when mineral exploration or extraction occurs. The remaining approximately 0.86 million acres of the study area are lands for which BLM has no management potential.

[Map 2-2](#) shows land cover types in the study area. This mapping was created using the methodology described below, and is used in subsequent analyses of bird diversity across the study area ([Chapter 4](#)).

Methods and Results

To characterize the habitat in the study area on a landscape scale, we used the publicly available Colorado Vegetation Classification Project (CVCP) land cover raster dataset (CDOW 2004) which was created by interpretation of satellite imagery in a cooperative effort by the Colorado Division of Wildlife (CDOW), BLM, and the U.S. Forest Service (USFS). We clipped the CVCP raster dataset to the study area boundary using UFO and Gunnison Gorge Planning Area boundary shapefiles provided by the UFO’s GIS Specialist.

The CVCP dataset maps 63 land cover classes in the study area (see [Table 2-1](#)). To improve the utility of the CVCP dataset for analysis of bird habitat, we grouped and reclassified the 63 CVCP land cover classes into 31 land cover types based on habitat relevance and similarity for birds occurring in the study area. The resulting 31 reclassified land cover types (in subsequent chapters of this document, simply “land cover types”) are shown on [Map 2-2](#) and summarized on [Table 2-1](#), along with abbreviated descriptions of the original land cover classes.

We used ESRI® ArcGIS Spatial Analyst™ to derive acreages of the 31 land cover types in the study area and according to land status. Land status was obtained from a Colorado federal mineral ownership polygon shapefile (BLM 2006) provided by the UFO’s GIS Specialist. [Table 2-2](#) summarizes the acreages and percentages of our reclassified land cover types in the study area by land status (on BLM land, on non-BLM lands with federal minerals, and on lands with no BLM management potential).

The land cover types are sorted in [Table 2-2](#) from most abundant to least abundant on BLM lands in the study area.

Discussion

Our reclassified raster dataset maps all but two of the land cover types on BLM lands in the study area ([Table 2-2](#); conifer riparian and snow). Some minor amounts of conifer riparian land cover is certainly present on BLM lands in the study area given the presence of montane and subalpine forested types, but not in the patch size or spatial patterns that the CVCP project methodology could map. Snow is an insignificant land cover type in the study area at large (total of 65 acres). Land cover types that appear to be underrepresented in the study area (based on the authors' familiarity with the region) include cliff/rock/talus, juniper, and shrub riparian (see the Land Cover Descriptive Narratives, below). The most abundant land cover type in the study area at large is mountain shrub (0.5 million acres), whereas the most abundant land cover type on BLM land is pinyon-juniper woodland (0.24 million acres).

The CVCP dataset has a 25-meter pixel resolution and an estimated accuracy of approximately 80 percent (Sinton 2009). Our work did not attempt to verify the level of accuracy or spatially identify the inaccuracies of the CVCP dataset. Additionally, a small amount of gross error (approximately 367 acres) in the form of unclassified or blank pixels in the study area existed in the CVCP dataset. This gross error and other classification inaccuracies were carried through to our reclassified land cover raster dataset.

In [Chapter 3](#), we assign the land cover types as habitats to bird species.¹ These assignments, which are used to produce the bird diversity mapping presented in [Chapter 4](#), are based on our knowledge of the study area and cover class descriptions provided in the CVCP documentation. The land cover descriptive narratives below provide our general interpretation of, and assumptions about, the mapped land cover conditions on the ground.

Land Cover Descriptive Narratives

The following paragraphs provide brief descriptions of the 31 land cover types we created by reclassing the CVCP dataset ([Table 2-1](#)). Acreages of each land cover type by land status are presented in [Table 2-2](#). The land cover types appear in the narratives below and in [Table 2-1](#) in the order of their value assignments in our reclassified raster dataset. [Map 2-2](#) depicts the spatial locations of the land cover types across the study area.

1. Developed ("Dev"). The *urban/built up, residential, and commercial* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. These lands are developed to the extent that human-built structures dominate the land. Only 12 acres are mapped on BLM land in the study area (a small amount is on split-estate lands in or south of Nucla).
2. Agriculture land ("Agri"). The *Agriculture Land and Irrigated Ag* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area, which encompasses cropland mapped mostly on private land with private minerals. Notable amounts are on split-estate lands on Leroux Creek and upper North Fork of the Gunnison River areas. Small

¹ In Chapter 8 (Management Recommendations), similar land cover types are aggregated into eleven land cover type management groups.

acreages (a total of 2,049 acres) are mapped on BLM land across the study area, implying trespass or CVCP mapping methodology errors.

3. Tall semi-desert shrub (“TDS”). This cover type is mapped by CVCP as *Rangeland* and *Greasewood* and in the study area is a varying mixture of greasewood, fourwing saltbush, and other tall aridland shrubs. The understory typically has a high percentage of bare ground. Non-native annual mustards and grasses may be scattered to common in the understory. The great majority of this type on BLM land is north and northwest of the City of Delta. It is common up dry canyons and washes, yet conspicuously absent southwest of the Uncompahgre Plateau. Thirty-two percent (7,145 acres) of this land cover type in the study area is mapped on BLM lands.
4. Herbaceous rangeland (“Herb”). This cover type is mapped by CVCP as *Grass/Forb Rangeland*, *Grass Dominated*, and *Grass/Forb Mix* in the study area. This type contrasts with other adjacent desert types by having denser ground cover of grasses and forbs (usually annual weed species), and lack of woody plants. On BLM land, herbaceous rangeland is most prevalent on gentle slopes with deeper soils at lower elevations in the study area, especially around the City of Delta and northwest of Nucla. Forty-two percent (96,553 acres) of this land cover type in the study area is mapped on BLM lands.
5. Sagebrush community (“SagC”). This cover type is mapped by CVCP as *Sagebrush Community* and *Sagebrush/Greasewood* in the study area, and represents a low-elevation sagebrush and greasewood mix, and low to mid-elevation sagebrush cover. Basin big sagebrush, Wyoming big sagebrush, and black sagebrush are the dominant species. Other shrubs present may include rabbitbrush, bitterbrush, and saltbush species. In undisturbed stands of this land cover type, tall sagebrush species are typically dominant, native forbs and bunchgrasses are relatively sparse, and patches of bare ground or biological soil crusts are common throughout. Disturbed areas may have a significantly non-native annual grass and forb understory. This land cover type is scattered throughout the mid to low-elevation ranges in the study area, but the best expressions of it are on the west side of the study area. Fifty percent (72,456 acres) of this land cover type in the study area is mapped on BLM lands.
6. Short semi-desert shrub (“SDS”). The *Salt Desert Shrub Community*, *Saltbush Community*, *Shrub/Grass/Forb Mix*, and *Snakeweed* CVCP cover classes were grouped and reclassified to represent this land cover type. This type is abundant in the lower elevations of the study area and is dominated by mat saltbush, shadscale, broom snakeweed, and other short desert shrubs or sub-shrubs. The understory features galleta, Indian rice grass, prickly pear, and other native grasses and forbs, and a high percentage of bare ground. Non-native annual mustards and cheatgrass may be scattered to common in the understory. The split-estate lands around Delta and Hotchkiss have significant amounts of this land cover, as well as the “adobe” badland areas throughout western and central Delta County and eastern and central Montrose County. Sixty percent (50,662 acres) of this land cover type in the study area is mapped on BLM lands.
7. Sagebrush/mountain shrub (“SagMS”). The *Sagebrush/Gambel Oak Mix* and *Sagebrush/Mesic Mtn Shrub Mix* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. This land cover type is a mosaic of mountain big sagebrush (and some silver sagebrush) patches and Gambel oak or serviceberry mottes. Other shrub species occur, including chokecherry, squawapple, and snowberry. This land cover type generally has a diverse understory of native forbs and grasses with a low amount of bare ground. This type is mapped most extensively in the study area northwest of Dallas Divide. On BLM land, the most extensive coverage is north of Paonia and the North Fork of the Gunnison River. Federal

mineral lands between Cerro Summit and Cimarron also feature this land cover type. Eleven percent (4,752 acres) of this land cover type in the study area is mapped on BLM lands.

8. Mountain shrub (“MS”). The *Snowberry/Shrub Mix*, *Gambel Oak*, *Xeric Mountain Shrub Mix*, *Mesic Mountain Shrub Mix*, *Serviceberry/Shrub Mix*, and *Aspen/Mesic Mountain Shrub Mix* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. This land cover type contours with the topography of the study area between approximately the 7,000 and 8,000 foot levels. The Aspen/Mesic Mountain Shrub component contains dense Gambel oak and relatively short and scattered aspens at the edge of their ecological range. As mapped by CVCP, Aspen/Mixed Mountain Shrub conditions occur upgradient from Gambel Oak dominated shrublands, which occur upgradient from the Mixed Mountain Shrub type. CVCP detected a significant quantity of Snowberry/Mountain Shrub at the northwest end of the Uncompahgre National Forest and very little on BLM land. The best expression of the mountain shrub type on BLM land is in the upper North Fork of the Gunnison River drainage. Six percent (31,393 acres) of this land cover type in the study area is mapped on BLM lands.
9. Sagebrush shrub-steppe (“MStp”). The *Sagebrush/Grass Mix* and *Rabbitbrush/Grass Mix* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. Although CVCP maps some of this type at low elevations (Paradox Valley), this is typical mid-elevation sagebrush country. Wyoming big sagebrush is predominant, but mountain big sagebrush and black sagebrush also occur. In undisturbed sagebrush shrubsteppe, tall sagebrush species are typically co-dominant with native perennial bunchgrasses. The northeast slope of the Uncompahgre Plateau from Transfer Road southeastward is the most extensive mapped area of this type. BLM lands west of Paonia, southwest of Montrose, and in the west end of the study area also have good representative stands of this type. Thirty-eight percent (65,573 acres) of this land cover type in the study area is mapped on BLM lands.
10. Pinyon-juniper (“PJ”). This land cover type remains unchanged from its original classification by the CVCP dataset. Pinyon-juniper woodlands are dominated by pinyon pines and Utah juniper or nearly pure stands of either species. This by far is the most extensive land cover type on BLM land in the study area (31 percent of BLM lands in the study area). Sixty-five percent (245,237 acres) of this land cover type in the study area is mapped on BLM lands. Rangeland health in this cover type ranges from meeting standards, to meeting standards with problems, to not meeting standards (Clements 2009). PJ woodlands in west-central Colorado are in remarkably better condition than almost anywhere else in the Intermountain West (Monsen 2004). Being an expansive mid-elevation land cover type, the number of species of both plants and animals is high, although at any one site, diversity and abundance, particularly of plants, is often relatively low.
11. Juniper (“Juni”). This land cover type remains unchanged from its original classification by the CVCP dataset. CVCP mapped only 557 acres of this type in the study area, concentrated in the vicinity of Hotchkiss and Paonia. Most of the trees are Utah juniper and the canopy cover is lower than the pinyon-juniper type. Low-elevation pure juniper stands have a unique bird community. Very little of the juniper land cover type is mapped on BLM land (39 acres) or federal mineral lands (13 acres). Based on the experience of the authors, the juniper cover type is under-represented in the CVCP dataset in the study area. The scattered Utah juniper savannahs at the lower edge of the pinyon-juniper zone were not captured as distinct from pinyon-juniper woodland by CVCP and are probably underestimated in area and scope.

Distinguishing between the pinyon juniper and juniper types at the local scale would help in identifying management options.

12. Alpine/subalpine shrub community (“AlpS”). The *Upland Willow/Shrub Mix* and *Subalpine Shrub Community* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. The majority of this type is on the Grand Mesa, Uncompahgre, and Gunnison National Forests (GMUG) in the study area. However, the densest mapping of this is in the upper Horsefly Creek area west of the town of Ridgway on private ground and well below the alpine zone. The type could be labeled high country shrubland. Mountain, Geyer, and Drummond willows, water birch, mountain alder, red-osier dogwood, and wild rose are widespread throughout this community, although short-statured subalpine and planeleaf willows and dwarf birch occupy the highest elevation sites (Lyon and Sovell 2000). The dense cover and abundant surface water make these sites productive for birdlife. The greatest amount on BLM land and on split-estate is in the vicinity of Cimarron Ridge. Only one percent (182 acres) of this land cover type in the study area is mapped on BLM lands.
13. PJ-mountain shrub mix (“PJMS”). The *PJ-Oak Mix* and *PJ-Mtn Shrub Mix* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. The habitat values of both pinyon-juniper and mountain shrub cover are almost all present in this mixed habitat. Utah junipers are plentiful in this cover type, yet stands where almost all the trees are pinyon pine are common. With the two conifer trees are Gambel oak and mountain mahoganies, and lesser amounts of other shrubs. This is the abundant vegetation cover of the upper elevations of BLM land. The Uncompahgre National Forest and split-estate lands have considerable, although lesser amounts, of this cover type. Thirty-eight percent (54,057 acres) of this land cover type in the study area is mapped on BLM lands.
14. PJ-sagebrush mix (“PJSa”). The *PJ-Sagebrush Mix* and *Sparse PJ/Shrub/Rock Mix* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. Between the approximately 5,500 to 7,500-foot elevation contours, pinyon pine and Utah juniper mix with big sagebrush and black sagebrush species. The mix is in patches dominated by the trees interspersed with patches dominated by sagebrush that are too small to be distinguished by CVCP’s resolution. Pinyon-juniper stands, if not too dense, may have a considerable amount of sagebrush, usually Wyoming big sagebrush, in the understory. We assume this land cover type is where most of the pinyon-juniper encroachments into sagebrush land cover types have occurred in the last 125 years. Herbaceous understories are usually not dense. In the pinyon-juniper component, the *Poa* grasses tend to be muttongrass and in the sagebrush component, Sandberg bluegrass. BLM lands hold 67 percent of this land cover type (103,515 acres), its greatest monopoly of any land cover type in the study area. Split-estate lands and national forests have minor amounts.
15. Aspen (“Asp”). This land cover type remains unchanged from its original classification by the CVCP dataset. Aspen woodlands and forests are brightly sunlit. A low shrub and lush herbaceous understory is typical, but not universal, for this land cover type. For a woodland type, aspen attracts a disproportionate number of low-nesting and ground-nesting birds. Aspen trees are conducive for cavity formation/construction, and cavity-nesting birds are therefore common in this type. Some of the largest expanses of aspen in the west exist in the GMUG. The small acreages of aspen on BLM lands are found north of the upper North Fork of the Gunnison River, in the Cimarron Ridge parcels, along the San Miguel River, and only a few other sites. A considerable amount of aspen is mapped on split-estate lands along the south slope of Grand Mesa, southeast of Crawford, east of the Cimarron River, and west of Cimarron

Ridge. Only one percent (1,579 acres) of this land cover type in the study area is mapped on BLM lands.

16. Ponderosa pine ("PP"). This land cover type remains unchanged from its original classification by the CVCP dataset. Of upland vegetation types, ponderosa pine is often the dominant plant where birds at least appear to be most abundant. This is in part because of open understories facilitating vision and mobility. It is also in part due to niche diversity and temperate climate providing for more birds. Except for a few scattered stands, some artificially planted, around Crawford and between Montrose and Ridgway, ponderosa pine occurs west of the Uncompahgre and Gunnison Rivers in the study area. The Uncompahgre and Manti-La Sal National Forests hold the bulk of this land cover type. BLM lands around the town of Norwood and to the north-northwest of Nucla have several stands, as well as Loghill Mesa outside of Ridgway. Fourteen percent (2,844 acres) of this land cover type in the study area is mapped on BLM lands.
17. Engelmann spruce-fir ("SF"). The *Engelmann Spruce/Fir Mix*, *Lodgepole Pine*, and *Fir/Lodgepole Pine Mix* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. Engelmann spruce and subalpine fir form closed canopy or more open forests just below the alpine tundra zone. Typically, herbaceous understory cover is low and accumulations of deadfall timber are common. Wood-dwelling insects, voles, and cone crops are major food sources for birds in this habitat. Lodgepole pine is a minor constituent of this type (less than 800 acres in the study area). The GMUG contains the vast majority of this cover class. The best expression of this type on BLM land is on the Storm King parcel east of Colona. Most of this type on BLM land is mapped along the San Miguel River below Placerville, implying that at least some of this mapped land cover type would be better identified as conifer riparian. Split-estate lands have a minor amount of this vegetation type. Four percent (8,327 acres) of this land cover type in the study area is mapped on BLM lands.
18. Douglas fir ("DF"). This land cover type remains unchanged from its original classification by the CVCP dataset. Douglas fir forests are represented by scattered wind-hedged trees along ridgelines and in steep drainage stringers, and closed canopy mountain slope stands. Where the largest trees grow in shady ravines, these stands can be classed as conifer riparian. The great majority of Douglas fir forest land is on the GMUG. On BLM lands, Douglas fir stands occur around Paonia Reservoir and scattered to the west as far as 29 Road and scattered along the east study area boundary in isolated parcels south to Cimarron Ridge. On split-estate lands the majority of this type is south of the North Fork of the Gunnison River above Somerset, and around the Town of Ouray. Five percent (1,114 acres) of this land cover type in the study area is mapped on BLM lands.
19. Conifer riparian ("CRip"). The *Douglas Fir/Engelmann Spruce Mix* (only 2 acres mapped in the study area) and *Conifer Riparian* (only 170 acres mapped in the study area) CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. This is the habitat of Colorado blue spruce. However, ponderosa pine and Douglas fir are more likely dominant along lower, drier, and more open drainages. Engelmann spruce and subalpine fir are common in the cooler, moister ravines. Rocky Mountain and Drummond willows, red-osier dogwood, mountain alder, and field horsetail are frequent in the understory. CVCP's satellite imagery failed to detect most of this cover class in the study area (see comments under Engelmann spruce-fir and mixed conifer/aspen land cover types). None of this land cover type is mapped on BLM lands.

20. Mixed conifer/aspens (“MCAs”). The *Spruce/Fir/Aspen Mix* and *Douglas Fir/Aspen Mix* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. All of the other tall conifer trees are present in this land cover type with Douglas fir and/or subalpine fir predominating. As is true of the CVCP spruce-fir cover class, some of this cover type could be appropriately mapped as conifer riparian. Herbaceous understory cover is more prevalent in mixed conifer/aspens forest than in most spruce-fir forests as is the variety of bird foraging opportunities. The National Forest lands take in most of this land cover type. BLM lands along the San Miguel River and Cimarron Ridge feature this land cover type, as well as split-estate lands in the southeast part of the study area. Three percent (5,598 acres) of this land cover type in the study area is mapped on BLM lands.
21. Ponderosa pine/Gambel oak mix (“PPO”). This land cover type remains unchanged from its original classification by the CVCP dataset. This is the typical ponderosa pine forest or woodland, with Gambel oak providing the important mid story and mast that contributes significantly to attracting the species of a ponderosa pine community. The southwest slope of the Uncompahgre Plateau and similar elevations further west is where this type predominates. The Uncompahgre National Forest contains most of this vegetation cover; however, BLM land southwest of Norwood drained by upper Hamilton Creek and its tributaries is well-forested with this cover type. On the fringes of this BLM land and the Uncompahgre National Forest are split-estate lands also featuring this land cover type. Eleven percent (10,426 acres) of this land cover type in the study area is mapped on BLM lands.
22. Ponderosa pine/oak/aspens mix (“PPOA”). The *Ponderosa Pine/Aspen Mix* and *P. Pine/Aspen/Gambel Oak Mix* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. Whereas most ponderosa pine stands have some Gambel oak, CVCP maps this type where aspens is a significant component. The southern half of the study area is where this condition was found. Nine percent (1,120 acres) of this land cover type in the study area is mapped on BLM lands.
23. Bare soil (“BrSo”). The *Barren Land* and *Soil* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. This type is more accurately described as lands with significant bare ground between plants. It includes the lands locally called “the adobies,” (Mancos shale bandlands). These lands at least partially make up for their sparse plant production by their nutrient richness. CVCP maps Barren Land on BLM lands around the City of Delta, southeast of the City of Montrose, and Carpenter Flats north of Paradox Valley. CVCP maps the Soil cover class on BLM lands north of Crawford. Smaller amounts are scattered across the study area, mostly on BLM land. Fifty-nine percent (7,185 acres) of this land cover type in the study area is mapped on BLM lands.
24. Cliff/rock/talus (“CRT”). The *Talus Slopes and Rock Outcrops* and *Rock* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. Durable cover in sentinel habitat is a requirement of a suite of bird species. CVCP satellite imagery found almost all of this type on the GMUG. Lower-elevation BLM lands are likely richer in cliff and rock habitats than CVCP suggests. Although talus slopes are reasonably common on BLM lands in the study area, they were not well detected by CVCP, and were likely mapped as part of the surrounding vegetation or as barren land. CVCP prevalently mapped talus in the high country of the National Forests within the study area. Two percent (1,596 acres) of this land cover type in the study area is mapped on BLM lands.

25. Alpine/subalpine meadow (“AlpH”). All of the alpine herbaceous (*Alpine Meadow*, *Alpine Forb Dominated*, *Alpine Grass Dominated*, *Alpine Grass/Forb Mix*, and *Subalpine Grass/Forb Mix*) and the *Subalpine Grass/Forb Mix* CVCP cover classes (Table 2-1) were grouped and reclassified to represent this land cover type in the study area. The floral display of this land cover type fuels migrant and resident hummingbirds. It provides cover for ground nesting birds. It provides food with plant parts, arthropods and mammals. Virtually all of this land cover type is on the GMUG. A sizeable exception follows the rim around Hull Ridge and Horsefly Peak west of Ridgway. It is also mapped on the BLM parcels of Cimarron Ridge. On split-estate lands, this type mapped is above Dallas Divide. Only one percent (498 acres) of this land cover type in the study area is mapped on BLM lands.
26. Snow (“Snow”). This land cover type remains unchanged from its original classification by the CVCP dataset. Snow that persists through summer and fall at and above timberline was detected by the CVCP in the northeast of the study area in the Raggeds Wilderness of the Gunnison National Forest. Plants grow at their receding edges, yet no vascular plants, and only algae, can grow on this cover type. Its function to birds is for roosting and visible food collection (insects and seeds). There are no perennial snow fields on BLM or split-estate lands. Sixty-five acres are mapped on National Forest lands.
27. Riparian mix (“RipX”). This land cover type remains unchanged from its original classification by the CVCP dataset. Tree cover is less than in the cottonwood land cover type. Many of the sites of this type have enough tree cover to be considered woodlands; however, shrub species make up a high percent of the canopy vegetation. Native cottonwood and box elder plus exotic tree species and native and exotic shrubs make up this habitat throughout the mid and lower elevations of the study area. Private lands contain most of this land cover type, yet it is mapped in several drainages on BLM land. La Sal Creek on public land at the west end of the study area holds a rare, perhaps unique plant association, the Box Elder/Water Birch plant association (Lyon and Sovell 2000). With surface water often or always nearby and plenty of vegetal structure in this land cover type, many habitat niches are provided for birds. The relatively moderate climate also tends to provide for a diverse bird community. Twenty percent (5,925 acres) of this land cover type in the study area is mapped on BLM lands.
28. Cottonwood (“Cotw”). This land cover type remains unchanged from its original classification by the CVCP dataset. Much of the character of the riparian mix land cover type is present in the cottonwood land cover type; however, the cottonwood type is more strongly characteristic of woodlands or forests. The increased tall woody structure attracts more bark gleaners and high canopy foragers. Large birds, such as eagles, hawks, cormorants, and herons, prefer its cover volume and height advantages. Low-elevation cottonwoods are dominated by Fremont cottonwoods with three-leaf sumac understories and species common to the shrub riparian land cover type. Mid elevation cottonwoods are dominated by narrowleaf cottonwoods with shrubs such as silver buffaloberry, strapleaf willow, and Rocky Mountain juniper. The most extensive stands are along the Uncompahgre River and its major tributaries, Dry Creek south of the City of Delta, and Cow and Dallas creeks near Ridgway. Sizable stands are on the North Fork of the Gunnison River and Leroux Creek northwest of Hotchkiss. The most extensive stands on BLM land are shown along Dry Creek. Cottonwood stands are mapped on the BLM lands of Hubbard, Terror, Stevens, and Roatcap creeks near Paonia, and along Jay and Leroux creeks and Short Draw near Hotchkiss. CVCP satellite imagery only recognized the cottonwood stands along the San Miguel River as the riparian mix land cover type. This is another case of the spectral angle or timing of satellite photography yielding differing results for each side of the

Uncompahgre Plateau. Seven percent (562 acres) of this land cover type in the study area is mapped on BLM lands.

29. Shrub riparian (“SRip”). The *Shrub Riparian* and *Exotic Riparian Shrubs* CVCP cover classes were grouped and reclassified to represent this land cover type in the study area. CVCP satellite imagery analysis identified this type at almost all elevations. Excellent hiding cover, long productive season, and proximity to water make this land cover type attractive to birds, even exceeding woodlands in songbird numbers during early fall migration. The high country expressions of shrub riparian vegetation are high country tall willows and subalpine shrubs. However, the great majority of the shrub riparian cover class is mapped at low elevations. To maintain habitat distinctions in assessing avian biodiversity, this document will consider the entire shrub riparian cover class to be the low-elevation expression of it. This expression contains the exotic and abundant tamarisk along with two to five predominant native shrub species. The exotic riparian shrub class appears to be underrepresented in CVCP mapping. Additionally, CVCP was not able to detect shrub riparian cover west of the Uncompahgre Plateau divide. Thirteen percent (429 acres) of this land cover type in the study area is mapped on BLM lands.
30. Willow (“Willo”). This land cover type remains unchanged from its original classification by the CVCP dataset. Both this CVCP mapped Willow cover class and the more widespread Alpine/subalpine shrub land cover type are predominantly high country willow habitat. This type is dominated by mid and high country tall willow vegetation, with water birch, mountain alder, red-osier dogwood, wild rose, and other native riparian shrubs. The percent willow in these stands averages greater than that of the alpine/subalpine shrub community land cover type. The majority of this land cover type is on the GMUG in the study area. Split-estate lands include this type on Leroux Creek. A few small stands are mapped on BLM lands near Crawford and Paonia. Seven percent (98 acres) of this land cover type in the study area is mapped on BLM lands.
31. Water (“Water”). This land cover type remains unchanged from its original classification by the CVCP dataset. It is the primary type for most of the water birds, and is assumed to include wetlands not mappable at the 25 meter pixel scale (for example, marsh, mud flat, and boulder-strewn stream channels), as well as open water. Where a water bird species make significant use of shore vegetation other than wetlands, it will also be considered a species characterizing those habitats. Seven percent (490 acres) of this land cover type in the study area is mapped on BLM lands.

Literature Cited

- BLM. 2006. BLM Colorado federal sub-surface ownership. GIS polygon shapefile. Lakewood: BLM Colorado State Office. October.
- CDOW. 2004. Colorado Vegetation Classification Project Statewide Mosaic. A digital landcover raster dataset at 25 meter resolution. Downloaded at <http://ndis.nrel.colostate.edu/coveg/>.
- Clements, A. 2009. Range Ecologist, U. S. Bureau of Land Management, Uncompahgre Field Office, Montrose, Colorado: personal communication with R. E. Lambeth. September 19.
- Lyon, P., and S. Sovell. 2000. A natural assessment: San Miguel and western Montrose counties, Colorado. Fort Collins, CO: Colorado Natural Heritage Program. Accessed at:

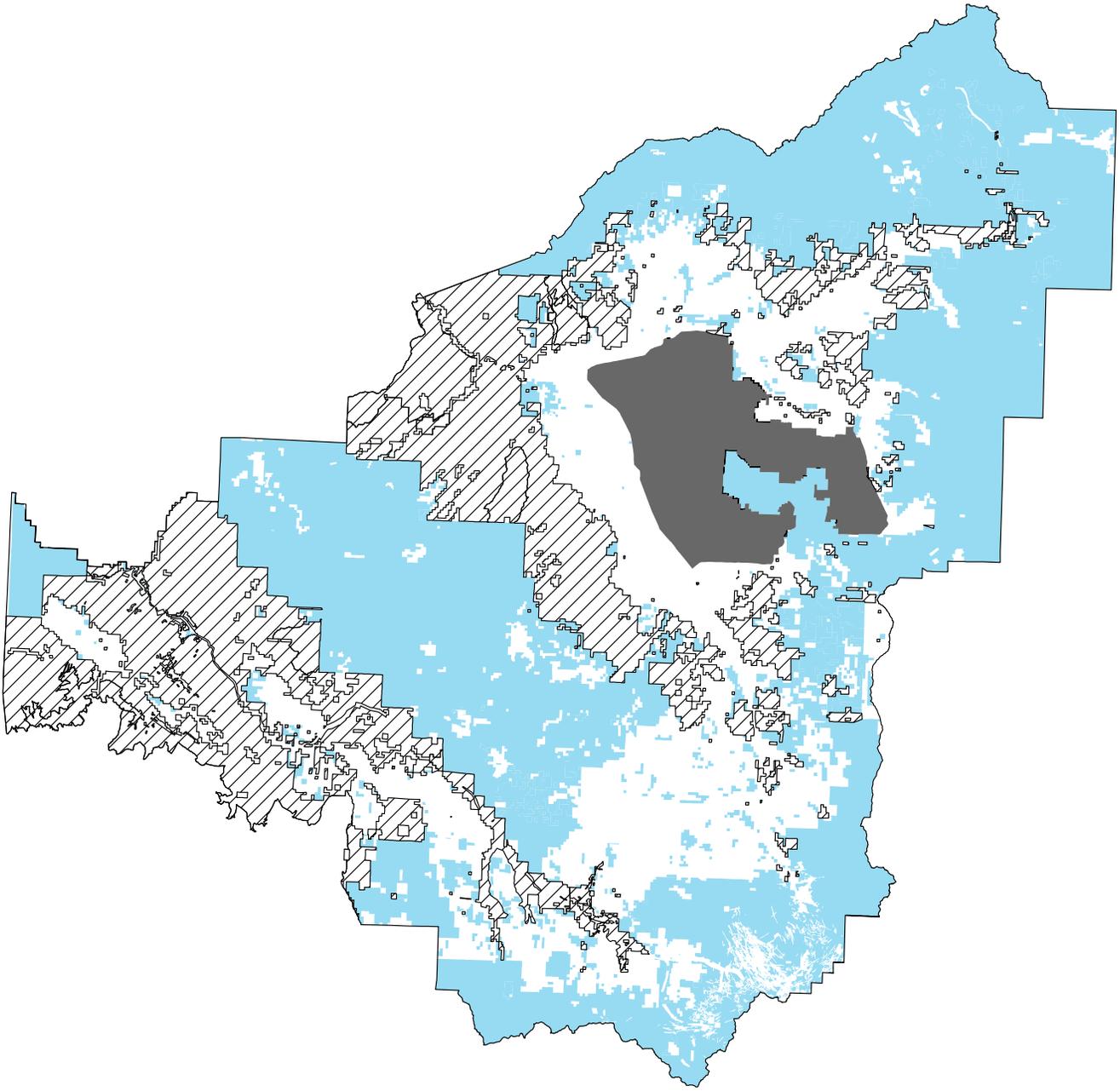
http://www.cnhp.colostate.edu/download/documents/2000/San_Miguel_and_Western_Montrose.pdf.

Monsen, S. B. 2004. Shrub Sciences Laboratory, USDA Forest Service Intermountain Research Station, Provo, Utah: personal communication with R. E. Lambeth.

Sinton, D. 2009. GIS data availability for the UFO and the estimated accuracy of the Colorado Vegetation Classification Project. Personal communication between D. R. Reeder (Rare Earth Science) and D. Sinton (UFO GIS Specialist). May 1, 2009.

Map 2-1
Land status in the study area.

-  BLM land - approximately 0.78 million acres
-  Other (non-BLM) land with subsurface federal minerals (potential for BLM management responsibility) - approximately 1.57 million acres
-  Land with no BLM management potential (non-BLM land with no subsurface federal minerals) - approximately 0.86 million acres
-  Gunnison Gorge NCA & Wilderness (not part of the study area)



BLM administrative boundaries provided by the Uncompahgre Field Office;
minerals status information derived from BLM Colorado Federal Sub-Surface
Ownership GIS shapefile, BLM Colorado State Office, Lakewood, Colorado (BLM 2006).



Map 2-2
 Land cover types in the study area.

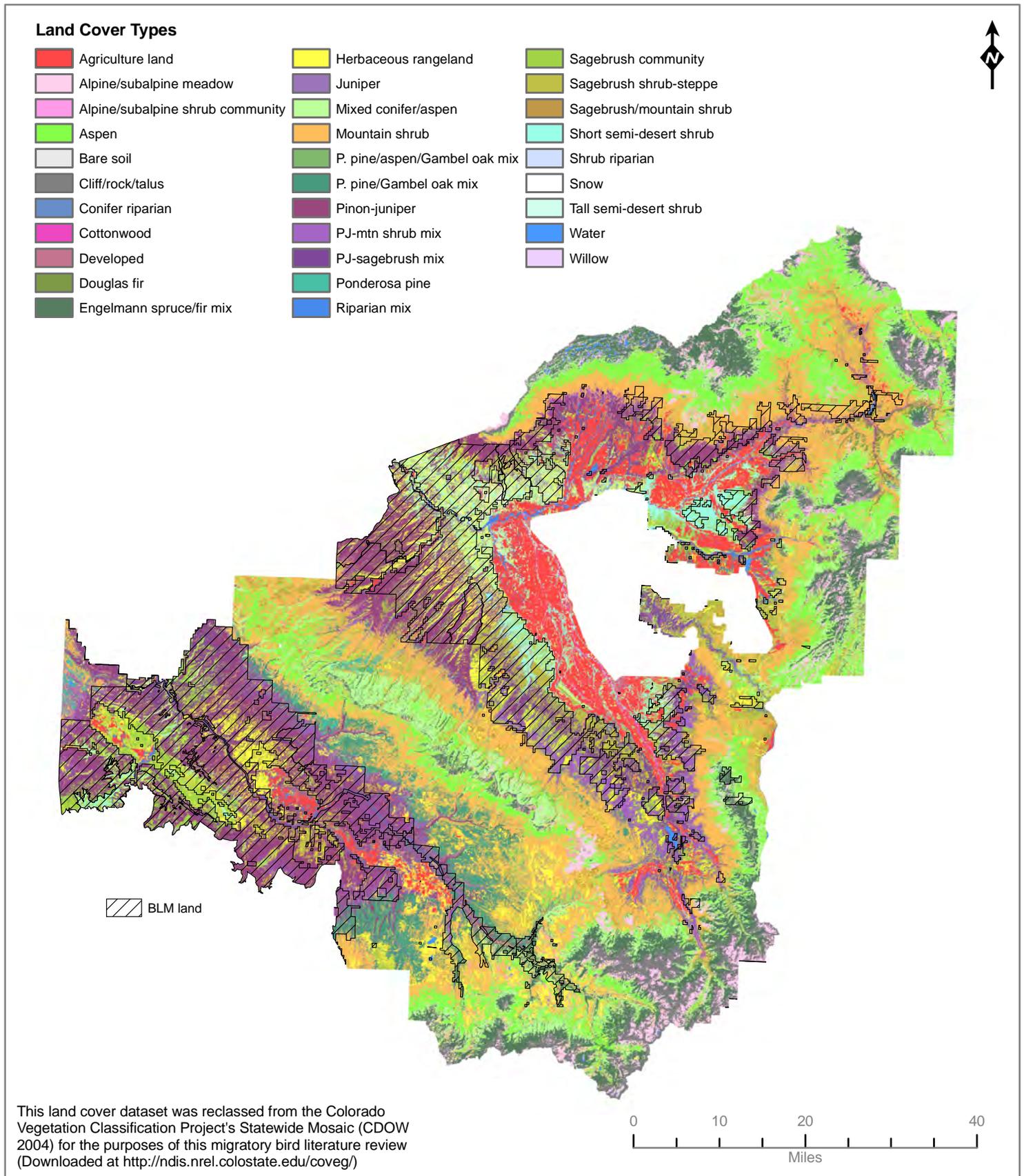


Table 2-1. Land cover types in the study area (in shaded cells and bold font), consolidated and reclassified from the Colorado Vegetation Classification Project (CVCP) dataset.

Value	CVCP Reclassified Vegetation Coverages	Abbreviated Original Class Descriptions	Subtotal Acres	Total Acres	% of study area
1	Developed (Dev)			2,019	0.06
1	Urban/Built Up	High density commercial or high density residential areas.	292		
11	Residential	High density residential areas, lawns, planted trees.	871		
12	Commercial	High density urban areas, parking lots, buildings, etc.	856		
2	Agriculture land (Agri)			188,052	5.8
2	Agriculture Land	Row crops, irrigated pasture, dry farm crops.	78,838		
22	Irrigated Ag	Irrigated crops and fields.	109,214		
3	Tall semi-desert shrub (TDS)			22,079	0.7
3	Rangeland	Consists of grass/forb range, shrub/brush range, or mixed range.	4,199		
3203	Greasewood	Low elevation shrubland dominated by greasewood.	17,881		
4	Herbaceous rangeland (Herb)			232,308	7.2
31	Grass/Forb Rangeland	Perennial and annual grasslands and/or mixed forbs.	199,087		
3102	Grass Dominated	Rangeland dominated by annual and perennial grasses.	25,204		
3104	Grass/Forb Mix	Rangeland codominated by grasses and forbs.	8,017		
5	Sagebrush community (SagC)			145,013	4.5
3201	Sagebrush Community	Sagebrush with rabbitbrush, bitterbrush, other shrubs, low to mid-elevations.	145,013		
3210	Sagebrush/Greasewood	Shrubland codominated by sagebrush and greasewood, with some rabbitbrush.	0.3		
6	Short semi-desert shrub (SDS)			84,692	2.6
3202	Saltbush Community	Saltbrush on alkaline soils associated with snakeweed, sagebrush.	75,291		
3205	Snakeweed	Low elevation shrubland dominated by snakeweed.	2,663		
3209	Salt Desert Shrub Community	Low-elevation shrublands found on alluvial salt fans or flats.	5,293		
33	Shrub/Grass/Forb Mix	Mixed grass/forb and shrub/grass rangeland.	1,445		
7	Sagebrush/mountain shrub (SaMS)			44,628	1.4
3204	Sagebrush/Gambel Oak Mix	Shrubland codominated by big sagebrush and Gambel oak.	18,789		
3303	Sagebrush/Mesic Mtn Shrub Mix	Codominated by sagebrush/mesic mountain shrub mixed with grass/forb.	25,840		

Table 2-1. Land cover types in the study area (in shaded cells and bold font), consolidated and reclassified from the Colorado Vegetation Classification Project (CVCP) dataset.

Value	CVCP Reclassified Vegetation Coverages	Abbreviated Original Class Descriptions	Subtotal Acres	Total Acres	% of study area
8	Mountain shrub (MS)			512,480	15.9
3207	Snowberry/Shrub Mix	Deciduous shrubland codominated by mountain snowberry and mixed shrubs.	1,431		
4201	Gambel Oak	Deciduous woodland (or tall shrubland) dominated by Gambel oak.	191,468		
4202	Xeric Mountain Shrub Mix	Deciduous woodland (or tall shrubland) dominated by mtn. mahogany.	72		
4203	Mesic Mountain Shrub Mix	Oak dominant with sagebrush, snowberry, grass.	304,530		
4204	Serviceberry/Shrub Mix	Deciduous woodland (or tall shrubland) dominated by serviceberry.	1,107		
5102	Aspen/Mesic Mountain Shrub Mix	Codominant Aspen and Gambel oak deciduous woodland.	13,873		
9	Sagebrush shrub-steppe (MStp)			172,615	5.4
3301	Sagebrush/Grass Mix	Codominated by mountain big sagebrush shrubland and perennial grassland.	172,608		
3302	Rabbitbrush/Grass Mix	Codominated by rabbitbrush and perennial grassland.	7		
10	Pinon-Juniper (PJ)			379,403	11.8
4101	Pinon-Juniper	Pinon-juniper woodland with mixed understory.	379,403		
11	Juniper (Juni)			557	0.02
4102	Juniper	Woodland principally dominated by Utah juniper	557		
12	Alpine/subalpine shrub community (AlpS)			28,953	0.9
4205	Upland Willow/Shrub Mix	High elevation shrubland dominated by willow and mixed shrubs.	20,041		
72	SubAlpine Shrub Community	Tundra shrubs from 7,000 to 11,500 feet.	8,912		
13	PJ-Mtn Shrub Mix (PJMS)			140,952	4.4
4301	PJ-Oak Mix	Codominated by Gambel oak and pinyon-juniper woodland.	26,587		
4303	PJ-Mtn Shrub Mix	Codominated by pinyon-juniper and oak, mtn. mahogany or other deciduous shrubs.	114,365		
14	PJ-Sagebrush Mix (PJSa)			154,222	4.8
4302	PJ-Sagebrush Mix	Codominated by pinyon-juniper and sagebrush.	105,163		
4304	Sparse PJ/Shrub/Rock Mix	<25 percent pinon-juniper with sagebrush and rock.	49,059		
15	Aspen (Asp)			308,946	9.6
5101	Aspen	Deciduous forest dominated by aspen.	308,946		

Table 2-1. Land cover types in the study area (in shaded cells and bold font), consolidated and reclassified from the Colorado Vegetation Classification Project (CVCP) dataset.

Value	CVCP Reclassed Vegetation Coverages	Abbreviated Original Class Descriptions	Subtotal Acres	Total Acres	% of study area
16	Ponderosa Pine (PP)			20,761	0.6
5201	Ponderosa Pine	Coniferous forest dominated by ponderosa pine.	20,761		
17	Engelmann Spruce/Fir Mix (SF)			207,527	6.5
5202	Engelmann Spruce/Fir Mix	Coniferous forest codominated by Engelmann spruce and subalpine fir.	206,756		
5204	Lodgepole Pine	Coniferous forest dominated by lodgepole pine.	770		
5214	Fir/Lodgepole Pine Mix	Coniferous forest codominated by subalpine fir and lodgepole pine.	0.5		
18	Douglas Fir (DF)			24,224	0.8
5203	Douglas Fir	Coniferous forest dominated by Douglas fir.	24,224		
19	Conifer Riparian (CRip)			172	0.01
5215	Douglas Fir/Engelmann Spruce Mix	Coniferous forest co-dominated by Douglas fir & Engelmann spruce	2		
8103	Conifer Riparian	Wooded mid-upper elevation riparian areas with mixed conifers.	170		
20	Mixed Conifer/Aspen (MCAs)			201,236	6.3
5301	Spruce/Fir/Aspen Mix	Mixed forest codominated by Engelmann spruce, subalpine fir, and aspen.	170,224		
5304	Douglas Fir/Aspen Mix	Mixed forest codominated by Douglas fir and aspen.	31,012		
21	P. Pine/Gambel Oak Mix (PPO)			94,905	3.0
5302	P. Pine/Gambel Oak Mix	Coniferous forest / tall shrubland codominated by ponderosa pine and Gambel oak.	94,905		
22	P. Pine/Aspen/Gambel Oak Mix (PPOA)			12,835	0.4
5303	Ponderosa Pine/Aspen Mix	Mixed forest codominated by ponderosa pine and aspen.	4,737		
5305	P. Pine/Aspen/Gambel Oak Mix	Mixed forest codominated by ponderosa pine, oak, and aspen.	8,098		
23	Bare Soil (BrSo)			12,205	0.4
6	Barren Land	<10 percent vegetation cover.	10,484		
62	Soil	Bare soil and fallow agriculture fields.	1,720		
24	Cliff/Rock/Talus (CRT)			91,917	2.9
61	Rock	<10 percent vegetation cover, with rock outcrops, red sandstones, etc.	80,591		
6101	Talus Slopes & Rock Outcrops	Talus and scree slopes, nearly 100 percent rock.	11,325		

Table 2-1. Land cover types in the study area (in shaded cells and bold font), consolidated and reclassified from the Colorado Vegetation Classification Project (CVCP) dataset.

Value	CVCP Reclassified Vegetation Coverages	Abbreviated Original Class Descriptions	Subtotal Acres	Total Acres	% of study area
25	Alpine/subalpine Meadow (AlpH)			84,093	2.6
71	Alpine Meadow	Tundra vegetation including grasses, forbs, sedges at >11,500 feet.	32,546		
7101	Alpine Forb Dominated	Meadow dominated by alpine forbs >11,500 feet.	4,139		
7102	Alpine Grass Dominated	Meadow dominated by alpine grasses >11,500 feet.	243		
7103	Alpine Grass/Forb Mix	Mixed meadow codominated by alpine grasses and forbs >11,500 feet.	7,602		
7401	Subalpine Grass/Forb Mix	High elevation meadows co-dominated by grass and forbs (9,000 - 11,500 feet).	39,563		
26	Snow (Snow)			65	0.002
73	Snow	Perennial snow fields.	65		
27	Mixed Riparian (RipX)			29,186	0.9
8	Riparian	Cottonwood, willow, sedges along waterways.	29,186		
28	Cottonwood (Cotw)			8,262	0.3
8101	Cottonwood	Wooded riparian areas dominated by cottonwood.	8,262		
29	Shrub Riparian (SRip)			3,410	0.1
82	Shrub Riparian	Shrub riparian areas consisting primarily of shrub willows.	3,410		
8202	Exotic Riparian Shrubs	Shrub Riparian area dominated by salt cedar and Russian olive.	0.2		
30	Willow (Willo)			1,464	0.05
8201	Willow	Shrub riparian areas dominated by shrub willow species.	1,464		
31	Water (Water)			7,251	0.2
9	Water	Lakes, reservoirs, rivers, streams.	7,251		
0	<Blank pixels>			367	0.01
	<Blank pixels>	Unclassified pixels (resulting from stitching or clipping operations).	367		
Total Acres in Study Area				3,216,798	100.0

Table 2-2. Areas and percentages of land cover types^a in the study area by land status, sorted from highest to lowest amounts on BLM land.

Code	Land Cover Type	On BLM Land ^b		On Federal Minerals Land ^c		On BLM Land and Federal Mineral Land ^d		On Other Lands ^e		Study Area
		Acres	% ^f	Acres	% ^f	Acres	% ^f	Acres	% ^f	Total Acres
PJ	Pinon-juniper	245,237	65	69,427	18	314,664	83	64,740	17	379,403
PJSa	PJ-sagebrush mix	103,515	67	20,149	13	123,664	80	30,557	20	154,221
Herb	Herbaceous rangeland	96,553	42	50,830	22	147,383	63	84,924	37	232,307
SagC	Sagebrush community	72,456	50	25,977	18	98,434	68	46,579	32	145,013
MStp	Sagebrush shrub-steppe	65,573	38	60,780	35	126,353	73	46,262	27	172,615
PJMS	PJ-mtn shrub mix	54,057	38	48,392	34	102,449	73	38,503	27	140,952
SDS	Short semi-desert shrub	50,662	60	7,048	8	57,710	68	26,983	32	84,692
MS	Mountain shrub	31,393	6	345,713	67	377,106	74	135,373	26	512,479
PPO	P. pine/Gambel oak mix	10,426	11	68,328	72	78,754	83	16,151	17	94,905
SF	Engelmann spruce/fir mix	8,327	4	182,997	88	191,324	92	16,202	8	207,526
BrSo	Bare soil	7,185	59	1,578	13	8,763	72	3,441	28	12,205
TDS	Tall semi-desert shrub	7,145	32	1,784	8	8,929	40	13,150	60	22,079
RipX	Riparian mix	5,925	20	4,789	16	10,714	37	18,473	63	29,186
MCA	Mixed conifer/aspens	5,598	3	172,854	86	178,452	89	22,785	11	201,237
SaMS	Sagebrush/mountain shrub	4,752	11	25,324	57	30,076	67	14,553	33	44,629
PP	Ponderosa pine	2,844	14	15,887	77	18,731	90	2,030	10	20,761
Agri	Agriculture land	2,049	1	6,272	3	8,322	4	179,729	96	188,051
Asp	Aspen	1,579	1	260,182	84	261,761	85	47,185	15	308,946
CRT	Cliff/rock/talus	1,396	2	79,618	87	81,014	88	10,902	12	91,917
PPOA	P. pine/aspens/Gambel oak mix	1,120	9	6,972	54	8,092	63	4,743	37	12,835
DF	Douglas fir	1,114	5	20,932	86	22,046	91	2,178	9	24,224
Cotw	Cottonwood	562	7	302	4	865	10	7,398	90	8,262
AlpH	Alpine/subalpine meadow	498	1	69,457	83	69,954	83	14,138	17	84,093
Water	Water	490	7	3,165	44	3,655	50	3,596	50	7,251
SRip	Shrub riparian	429	13	853	25	1,282	38	2,128	62	3,410
Blank	<Blank pixels>unclassified	224	61	83	23	307	84	60	16	367
AlpS	Alpine/subalpine shrub	182	1	22,099	76	22,281	77	6,672	23	28,953
Willo	Willow	98	7	928	63	1,026	70	438	30	1,464
Juni	Juniper	39	7	13	2	52	9	505	91	557
Dev	Developed	12	1	36	2	47	2	1,972	98	2,019
CRip	Conifer Riparian	-	0	168	98	168	98	4	2	172
Snow	Snow	-	0	65	100	65	100	-	0	65
Totals		781,439		1,573,002		2,354,441		862,354		3,216,795

Table 2-2. Areas and percentages of land cover types^a in the study area by land status, sorted from highest to lowest amounts on BLM land.

Notes

- a. Reclassed from the Colorado Vegetation Classification Project (see Table 2-1).
- b. Land managed by BLM (both the surface and subsurface estates are managed by BLM).
- c. Land where the subsurface estate is administered by the federal government (BLM) but the surface estate is owned by a different entity.
- d. All lands described in notes b and c, above (e.g., lands with BLM management potential).
- e. "Other Lands" have no BLM management potential (i.e., non-BLM lands with no federal minerals).
- f. Percent of the land cover type by land status across the entire study area (e.g., 65% of all PJ in the study area is on BLM Land).

Chapter 3

BIRDS OF THE UNCOMPAHGRE PLANNING AREA

This chapter presents a list of bird species known to occur in the Uncompahgre Planning Area (the study area), a habitat matrix for study area birds for each season, and mapping of important bird sites in the study area. We use the habitat matrices, along with the land cover raster dataset ([Chapter 2](#)), to map bird diversity in the study area in [Chapter 4](#).

Methods and Results

Three hundred and thirty-six (336) species of birds have been recorded within the study area and are compiled in [Table 3-1](#),¹ along with qualitative seasonal occurrence data and estimated nesting periods. To compile these data, we referred to published texts (Andrews and Righter 1992; Davis 1969; Righter et al. 2004), the Colorado Breeding Bird Atlas project (Kingery 1998), bird monitoring data available from Rocky Mountain Bird Observatory (RMBO 2009), and local expert knowledge. [Table 3-2](#) provides the species' scientific names and taxonomic groups.

[Table 3-3](#) through [Table 3-6](#) provide seasonal habitat matrices for birds in the study area. We constructed the matrices using professional judgment and the same resources we relied on to compile the bird list. The cells of the matrices represent the estimated relative abundances of each bird species in each land cover type where the bird is considered relatively abundant, common, uncommon, or rare (if the bird does not occur or is considered accidental or extremely rare in a land cover type, the cell is blank). We used conditional formatting in Excel to assign a graded color scale (green through red) to the cells so the matrix grids can be easily scanned for the land cover types most important to each species. White (blank) cells indicate that the habitat is not occupied or not important. Green cells indicate a habitat is of relatively minor importance to a species. Red cells with bold black values indicate the habitat is of primary importance to a species. The matrices use the land cover classes explained in [Chapter 2](#) as proxies for bird habitats. Estimated relative abundance numbers in the matrix cells are explained in [Chapter 4](#).

Because our habitat matrices are coarse guides to the habitat requirements of the study area's birds, we offer further detail regarding habitat preferences and characteristics of selected birds in [Table 3-7](#). [Table 3-7](#) lists the stenotopic, obligate, cavity nesting, old-growth dependent, and peripheral species in the study area. We created these lists using the same resources we relied on to compile the bird list. An estimated 29 species recorded in the study area are peripheral (at the edge of their range in the study area), 22 species are stenotopic, 43 are habitat obligates, 39 are cavity nesters, and 41 prefer old growth woodlands or forests.

[Map 3-1](#) depicts significant water and land bird sites in or near the study area where concentrations or localized occurrences of certain birds may be found, including burrowing owl potential nest sites, black swift potential nest sites, peregrine falcon nest sites, a significant documented sandhill crane migratory stopover site (Fruitgrowers Reservoir [also known as Hart's Basin]), sandhill crane wintering sites, black phoebe sites, important hawk migration and wintering sites, and generally-significant water bird sites. Significant bird site information was provided by a local bird expert (Beason 2009; Beason in prep.), the authors' personal records, and by M. Siders (2009).

¹ Table 3-1 is derived from the Master List of Birds of BLM's Uncompahgre Planning Area, a companion Excel database to this document.

[Map 3-2](#) depicts the known range of Gunnison sage-grouse (CDOW 2005a) in and near the study area, and [Map 3-3](#) depicts the estimated range of sage sparrow (Boyle and Reeder 2005) in the study area. Only 8 percent (approximately 5,400 acres) of mapped Gunnison sage-grouse range in the study area occurs on BLM lands. Approximately 44 percent (approximately 28,700 acres) of mapped Gunnison sage-grouse range in the study area occurs on other lands with federal minerals (where BLM does not administer the surface estate but has potential surface management input if the subsurface minerals are leased). BLM lands intersect 74 percent of the estimated sage sparrow range in the study area. Both Gunnison sage-grouse and sage sparrow ranges are overlaid on sagebrush land cover types in [Map 3-2](#) and [3-3](#) to illustrate the extent of potentially suitable habitat in the study area that remains unoccupied by these stenotopic species.

Discussion

Of the 336 documented bird species in the study area, more than 240 are considered annual residents or visitors. One hundred and ninety-six (196) of the bird species in the study area have been observed on BLM land, and the bulk of at least 30 species in the study area are produced (i.e., the species nest and rear young) on BLM land. Species produced primarily on BLM land in the study area are birds of drier, low to mid-elevation habitats and include chukar, ferruginous hawk, peregrine falcon, white-throated swift, gray flycatcher, black phoebe, gray vireo, pinyon jay, horned lark, juniper titmouse, Bewick's wren, northern mockingbird, black-throated sparrow, sage sparrow, Scott's oriole, and lesser goldfinch.

BLM land in the study area includes some of every land cover type except snowfields and conifer riparian (see [Chapter 2](#)), suggesting that virtually every nesting species of the study area could nest on BLM land (the presence of nesting black swifts at waterfall sites in the Escalante Canyon area [[Map 3-1](#)] on BLM lands has yet to be confirmed). However, it is important to recognize that land cover types are imperfect proxies for bird habitats, which by nature are more specific and refined than the land cover type descriptions ([Chapter 2](#)) imply. It is also important to recognize that not every species will be present everywhere that its assigned land cover types exist, and that a species will not be evenly distributed in assigned land cover types across the study area. This is especially true for birds with specialized nest site requirements, birds with traditional migratory stopover sites, and stenotopic species ([Table 3-7](#)) such as sage sparrow and Gunnison sage-grouse, which occupy only a limited amount of potentially suitable habitat in the study area ([Map 3-2](#) and [Map 3-3](#)).

The number of bird species documented in the study area is sure to rise as more observers become interested in recording this information. In the last 30 years, increasing numbers of active and capable birders in the study area have allowed the area to reach the standards of more populous regions of the state in bird statistics.

Species Composition in the Study Area – Past and Future

The state of bird species composition in the study area is dynamic, and [Table 3-1](#) (Birds of the Uncompahgre Planning Area) should not be considered definitive. Within the last century, numbers of Canada geese, mallards, and red-winged blackbirds have increased with the development of irrigation practices around the region. Exotic species have arrived and most are common. These include European starlings, house sparrows, rock pigeons, ring-necked pheasants, chukars, and since 2003, Eurasian collared doves. Gambel's quail were probably introduced in 1885 near Montrose (Figgins 1906). Of the introduced species, only the chukar is found predominantly on BLM land. Despite the success of exotic species, the native house finch has adapted to modern human settlement even better than the very commensal house sparrow.

California condors are thought to have ranged into Colorado 200 years ago. With the reintroduction of California condors to north-central Arizona, this may occur again. Condors have been tracked to Grand Mesa, immediately north of the study area (Righter et al. 2004), and to Flaming Gorge, Utah, approximately 300 miles from their release site (Feltis 2009), and well within the range of the study area. The demise of the condor likely came with European settlement in their core range in California and the decline of large game in Colorado. Snowy egrets, burrowing owls, eastern and Cassin's kingbirds, and veerys were substantially more numerous in the first half of the 20th century than they are today (Andrews and Righter 1992; Davis 1969). Lewis' woodpeckers have been greatly reduced after a short period of prosperity before the arrival of European starlings in approximately 1945. Yellow-billed cuckoos apparently began their decline in the 1960s (Davis 1969). Gunnison sage-grouse have declined in numbers since the early part of the last century (Rogers 1964). We discuss bird population trends in [Chapter 6](#).

Climate change models suggest that the summer distributions of many western Colorado migratory songbirds nesting in the study area will change in the coming decades. At least nine species (olive-sided fly catcher, marsh wren, Wilson's warbler, sage sparrow, fox sparrow, Lincoln's sparrow, white-crowned sparrow, pine grosbeak, and evening grosbeak) could move north of Colorado entirely, while many more may undergo summer range contractions as a result of climate change (Price 2002). Approximately five species (vermillion flycatcher, Chihuahuan raven, cactus wren, pyrrhuloxia, and bronzed cowbird) may expand their summer ranges into the study area from southern latitudes (Price 2002). As this document was being prepared, a common black-hawk was reported near Hotchkiss in Delta County (Beason 2009). With climate change, the common black-hawk may move north into Colorado as a regular nesting species.

Literature Cited

- Andrews, R., and R. Righter. 1992. Colorado birds: a reference to their distribution and habitat. Denver: Denver Museum of Natural History.
- Beason, J. 2009. Common black-hawk sighting in Hotchkiss, Colorado, and important bird sites in the region: personal communication with R. E. Lambeth. June 22.
- Beason, J. in prep. An inventory of peregrine falcons and burrowing owls on lands managed by the Uncompahgre Field Office of the Bureau of Land Management in western Colorado. Rocky Mountain Bird Observatory, Ft. Collins, Colorado.
- Boyle, S. A., and D. R. Reeder. 2005. Colorado sagebrush: a conservation assessment and strategy. Accessed at: <http://wildlife.state.co.us/WildlifeSpecies/SagebrushConservation/>. Grand Junction: Colorado Division of Wildlife.
- CDOW. 2005. GIS shapefiles depicting distribution of Gunnison sage-grouse in Colorado. Downloaded at <http://ndis.nrel.colostate.edu/ftp/index.html>. Fort Collins: Colorado Division of Wildlife.
- Davis, W. 1969. Birds of western Colorado: Colorado Field Ornithologists.
- Feltis, E. 2009. Travel distances of condors in the Arizona reintroduction program. Personal communication between Melissa Siders (BLM) and E. Felton (Peregrine Fund Arizona Condor Field Supervisor). August 21, 2009.
- Figgins, J. D. 1906. The fallacy of the tendency towards ultra-minute distinctions. *Auk* 31 (1):62-69.

Kingery, H. E., ed. 1998. Colorado Breeding Bird Atlas. Denver: Colorado Bird Atlas Partnership & Colorado Div. of Wildlife.

Price, J. 2002. Global warming and songbirds: Colorado. American Bird Conservancy and National Wildlife Federation. Accessed at:
<http://www.abcbirds.org/newsandreports/globalwarming/Colorado.pdf>.

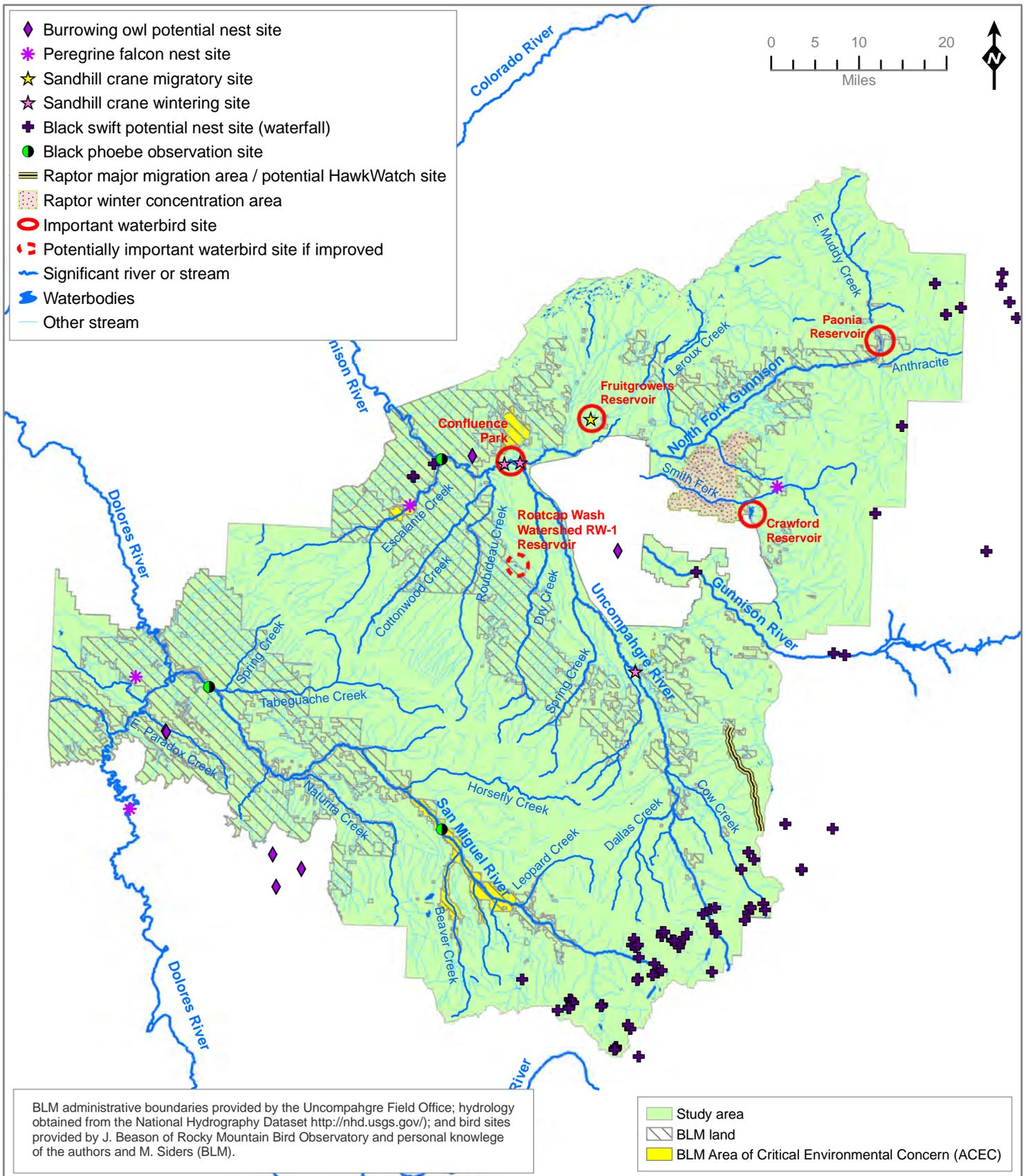
Righter, R., R. Leivad, C. Dexter, and K. Potter. 2004. Birds of western Colorado plateau and mesa country. Grand Junction: Grand Valley Audubon Society.

RMBO. 2009. Habitat-based point transect survey data queries. Accessed at:
<http://www.rmbo.org/public/monitoring/speciesByHabitat.aspx>.

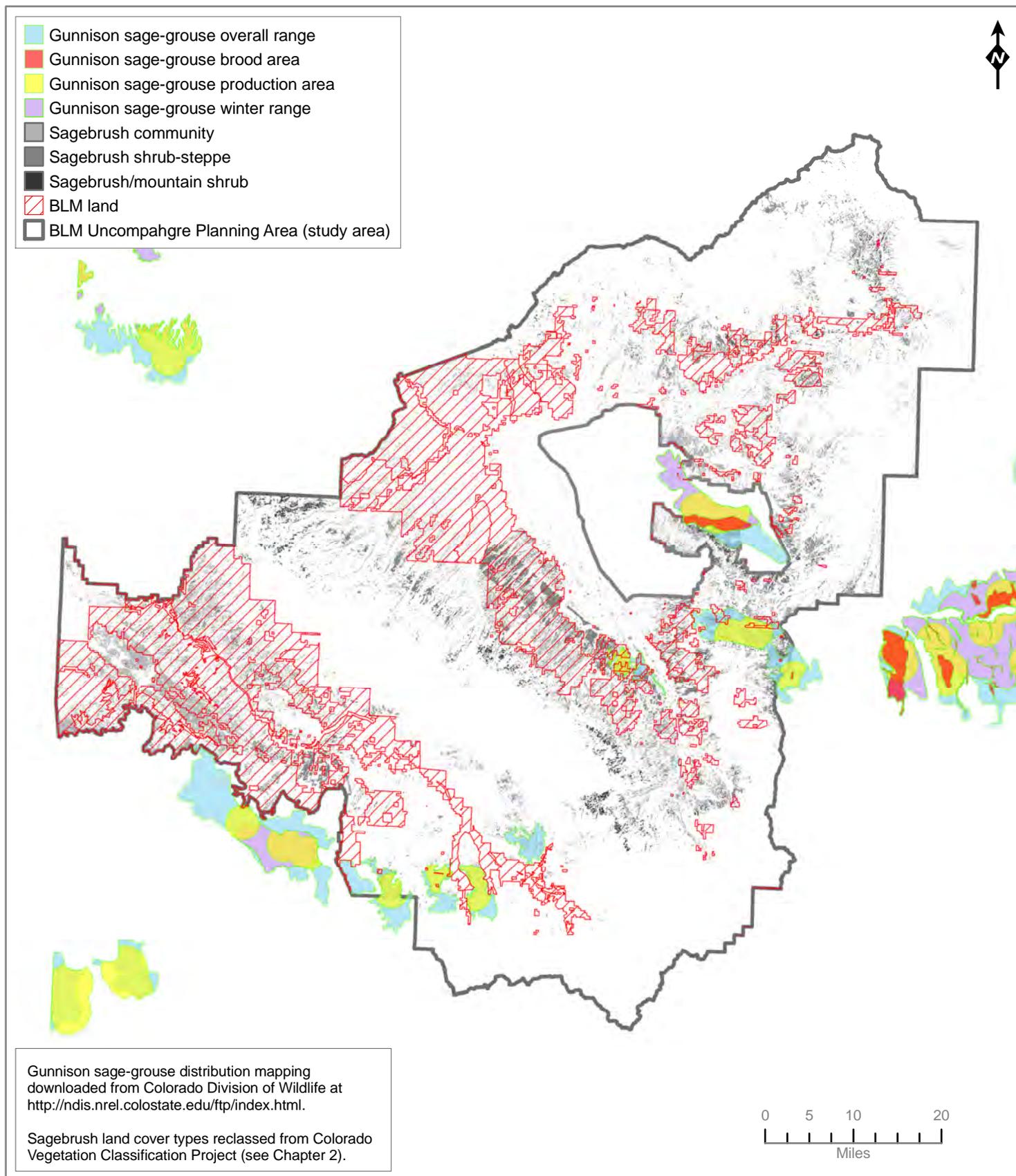
Rogers, B. E. 1964. Sage grouse investigations in Colorado. Technical Publication 16. Denver: Colorado Game, Fish, and Parks Dept.

Siders, M. 2009. Locations of important bird sites in the region (sandhill crane wintering sites and black phoebe sites): personal communications with R. E. Lambeth and D. R. Reeder during October.

Map 3-1
Significant water and land bird sites in or near the study area.



Map 3-2
Gunnison sage-grouse range in and near the study area
depicted with sagebrush land cover types.



Map 3-3
Sage sparrow range in and near the study area
depicted with sagebrush land cover types.

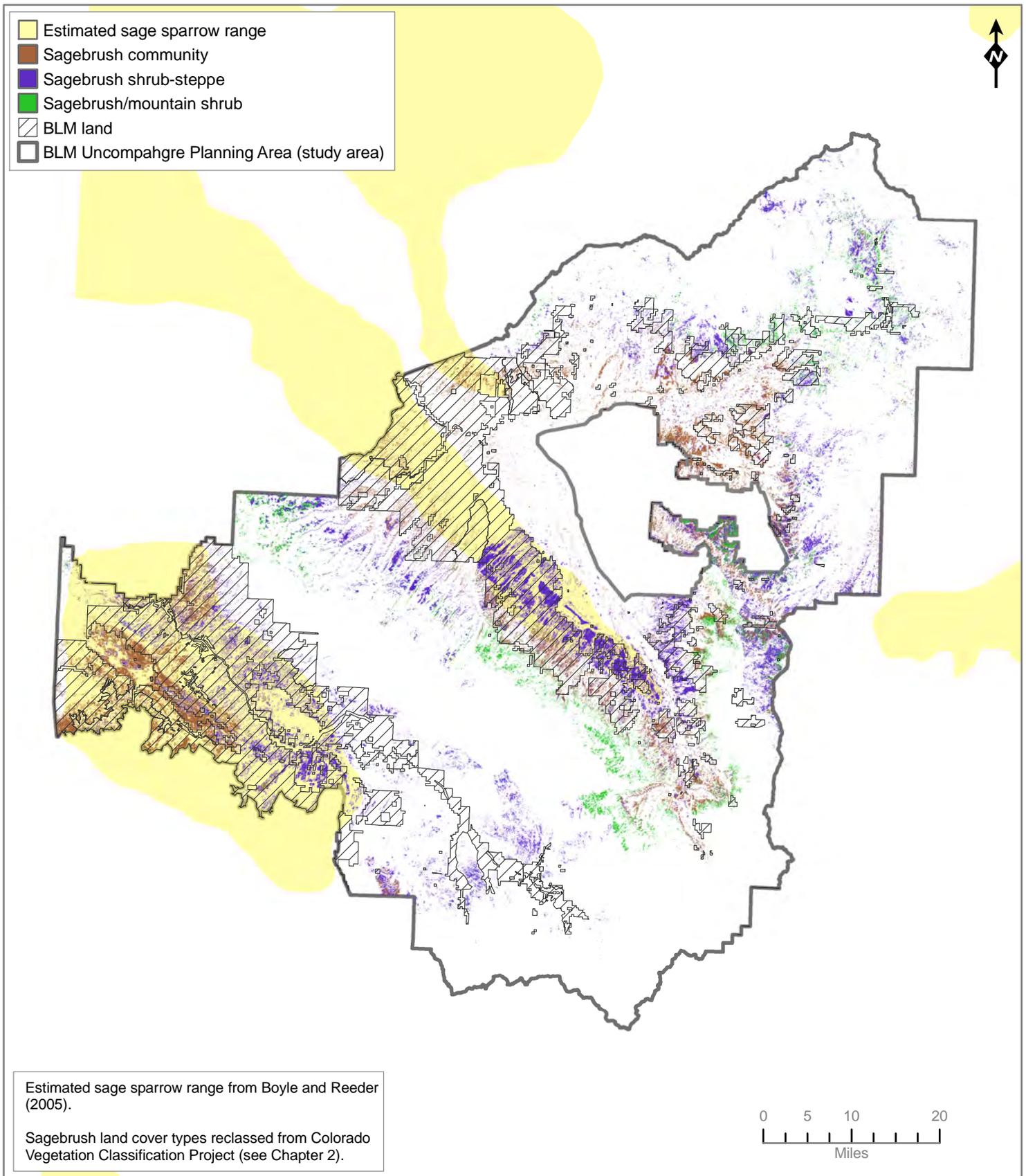


Table 3-1. Birds^a of the Uncompahgre Planning Area, listed with occurrence data and nesting periods.

Common Name ^b	Occurs on BLM	Recorded in UFO Annually	Seasonal Occurrence ^c				Nesting ^d	
			Spring	Summer	Winter	Fall	Begin	End
Ducks, Geese and Swans								
Greater White-fronted Goose			r				r	
Snow Goose		x	u		u		u	
Ross's Goose		x	u		u		u	
Cackling Goose			r		r		r	
Canada Goose	x	x	a	a	a	a	3/11	8/31
Trumpeter Swan			e		e		e	
Tundra Swan			r				r	
Wood Duck	x	x	u	u	u	u	5/1	7/31
Gadwall	x	x	c	c		c	4/21	8/31
Eurasian Widgeon			e		e	e		
American Widgeon	x	x	c	u	u	c	5/1	8/31
Mallard	x	x	a	c	a	a	3/11	8/10
Blue-winged Teal	x	x	u	r		u	5/1	8/20
Cinnamon Teal	x	x	c	c		c	4/21	8/20
Northern Shoveler	x	x	c	u	r	c	4/1	8/31
Northern Pintail	x	x	c	r	u	f	5/11	8/20
Green-winged Teal	x	x	c	c	f	c	4/21	9/10
Canvasback		x	u		u	u		
Redhead	x	x	f	u	u	f		
Ring-necked Duck	x	x	c	u	c	c	5/21	8/31
Greater Scaup			r			r		
Lesser Scaup	x	x	f	r	u	f	5/11	8/10
Surf Scoter			e			e		
White-winged Scoter			e			e		
Black Scoter			e			e		
Long-tailed Duck			r			r		
Bufflehead	x	x	c		u	c		
Common Goldeneye	x	x			c			
Barrow's Goldeneye		x			r			
Hooded Merganser	x	x	u		u	u		
Common Merganser	x	x	c	u	c	c	5/11	8/10
Red-breasted Merganser		x	r			r		
Ruddy Duck	x	x	c	u	u	c	5/11	8/20
Chicken-like Birds								
Chukar	x	x	u	u	u	u	4/21	8/20
Ring-necked Pheasant	x	x	f	f	f	f	4/1	9/10
Gunnison Sage-grouse	x	x	r	r	r	r	3/1	8/31
White-tailed Ptarmigan	x	x	u	u	u	u	6/11	9/20
Dusky Grouse	x	x		f	f		3/21	9/10
Sharp-tailed Grouse			E	E	E	E		
Wild Turkey	x	x	u	u	u	u	3/15	8/31
Gambel's Quail	x	x	u	u	u	u	3/1	7/31
Loons and Grebes								
Red-throated Loon			e			e		
Pacific Loon			r			r		
Common Loon		x	u			u		

Table 3-1. Birds^a of the Uncompahgre Planning Area, listed with occurrence data and nesting periods.

Common Name ^b	Occurs on BLM	Recorded in UFO Annually	Seasonal Occurrence ^c				Nesting ^d	
			Spring	Summer	Winter	Fall	Begin	End
Pied-billed Grebe	x	x	c	u	u	c	4/1	9/20
Horned Grebe			r			r		
Red-necked Grebe					A			
Eared Grebe		x	f	u		f	5/10	8/31
Western Grebe		x	f	u		f	5/11	8/31
Clark's Grebe		x	u	r		u	5/11	8/31
Pelicans and Cormorants								
American White Pelican		x	u	e	r	u		
Brown Pelican						A		
Double-crested Cormorant	x	x	u	r	r	u	4/1	8/20
Neotropic Cormorant						A		
Bitterns, Herons, and Ibises								
American Bittern		x	r	r		r	4/11	8/10 ^d
Great Blue Heron	x	x	c	c	u	c	3/15	7/20
Great Egret			r			r		
Snowy Egret		x	u	r?		u		
Little Blue Heron			e			e		
Cattle Egret			r			r		
Green Heron			r	e		r	5/12	8/20
Black-crowned Night Heron	x	x	u	u		u	4/1	8/20
Glossy Ibis			A					
White-faced Ibis	x	x	f			f		
New World Vultures								
Turkey Vulture	x	x	c	c,r nester		c	4/21	8/15
Eagles, Hawks, and Falcons								
Osprey	x	x	u			u		
Mississippi Kite				A				
Bald Eagle	x	x	u	u,r nester	f	u	1/1	8/10
Northern Harrier	x	x	u	u	f	u	4/11	8/5
Sharp-shinned Hawk	x	x	f	f	f	f	4/20	8/31
Coopers Hawk	x	x	f	f	u	f	4/1	8/31
Northern Goshawk	x	x	u	u	u	u	4/1	9/11
Common Black-hawk			A					
Broad-winged Hawk		x	e					
Swainson's Hawk	x	x	u	u		u	4/14	8/20
Red-tailed Hawk	x	x	c	c	c	c	3/1	8/25
Ferruginous Hawk	x	x	r	r	u	r	3/5	7/31
Rough-legged Hawk	x	x			f local			
Golden Eagle	x	x	f	f	f	f	2/1	8/15
American Kestrel	x	x	c	c	c	c	4/1	8/15
Merlin	x	x			u			
Peregrine Falcon	x	x	r	r	r	r	3/20	8/15
Prairie Falcon	x	x	u	u	u	u	3/10	7/25

Table 3-1. Birds^a of the Uncompahgre Planning Area, listed with occurrence data and nesting periods.

Common Name ^b	Occurs on BLM	Recorded in UFO Annually	Seasonal Occurrence ^c				Nesting ^d	
			Spring	Summer	Winter	Fall	Begin	End
Rails, Coots, and Cranes								
Virginia Rail	x	x	f	f	u	f	3/25	8/20
Sora	x	x	u	f	r	u	4/20	8/20
American Coot	x	x	a	c	r	a	4/15	8/25
Sandhill Crane	x	x	f	r	u	f	5/1	7/31
Plovers								
Black-bellied Plover			r			r		
American Golden Plover			A			e		
Snowy Plover			r					
Semipalmated Plover		x	u			u		
Piping Plover			A?					
Killdeer	x	x	c	c	r	c	4/1	9/10
Mountain Plover			e			e		
Stilts and Avocets								
Black-necked Stilt		x	u			u		
American Avocet	x	x	f			f		
Sandpipers								
Spotted Sandpiper	x	x	c	c	e	c	4/21	9/10
Solitary Sandpiper		x	u			u		
Greater Yellowlegs	x	x	u		e	u		
Willet		x	u	r			5/10	6/31 ^u
Lesser Yellowlegs	x	x	c			c		
Whimbrel			r					
Long-billed Curlew		x	r			r		
Marbled Godwit		x	u			e		
Sanderling			e			e		
Semipalmated Sandpiper			r			r		
Western Sandpiper	x	x	u			f		
Least Sandpiper	x	x	u			f		
White-rumped Sandpiper			e					
Baird's Sandpiper	x	x	r			f		
Pectoral Sandpiper						r		
Dunlin			r		e	r		
Stilt Sandpiper		x	r			r		
Short-billed Dowitcher						e		
Long-billed Dowitcher	x	x	f			f		
Wilson's Snipe	x	x	f	f	u	f	4/11	7/31
Wilson's Phalarope	x	x	c	u		c	5/11	7/31
Red-necked Phalarope	x	x	u			u		
Red Phalarope						A		
Gulls and Terns								
Sabine's Gull						r		
Bonaparte's Gull		x	u	e		u		
Franklin's Gull		x	f			r		
Ring-billed Gull		x	f	r	r	f		
California Gull		x	f	r	r	f		
Herring Gull			r	A	A	r		
Thayer's Gull					A			
Lesser Black-backed Gull						A		
Least Tern			r					
Caspian Tern			r	e		r		

Table 3-1. Birds^a of the Uncompahgre Planning Area, listed with occurrence data and nesting periods.

Common Name ^b	Occurs on BLM	Recorded in UFO Annually	Seasonal Occurrence ^c				Nesting ^d	
			Spring	Summer	Winter	Fall	Begin	End
Black Tern		x	u	e		r		
Common Tern		x	r			r		
Forster's Tern		x	u	r		u		
Pigeons and Doves								
Rock Pigeon	x	x	c	c	c	c	1/1	12/31
Band-tailed Pigeon	x	x	r	u		r	4/21	9/30
Eurasian Collared Dove		x	c local	c local	c local	c local	2/1	10/31
White-winged Dove				r			4/15	9/10
Mourning Dove	x	x	a	a	c local	a	4/1	9/10
Cuckoos								
Yellow-billed Cuckoo		x		r			6/11	8/20
Black-billed Cuckoo						A?		
Owls								
Barn Owl		x	u	u	u	u	4/1	7/31
Flammulated Owl	x	x	u	f		u	5/11	8/10
Western Screech-Owl	x	x	f	f	f	f	2/10	8/31
Great Horned Owl	x	x	f	f	f	f	1/15	7/31
Northern Pygmy-Owl	x	x	u	u	u	u	2/15	7/31
Burrowing Owl	x	x	u	u		u	4/1	8/10
Spotted Owl				A(?)		e		
Long-eared Owl	x	x	u	u	u	u	2/10	7/15
Short-eared Owl						A		
Boreal Owl		x	r	r	r	r	2/10	8/10
Northern Saw-whet Owl	x	x	f	f	u	f	2/10	8/15
Nightjars								
Lesser Nighthawk		x	r					
Common Nighthawk	x	x	c	c		c	5/20	8/20
Common Poorwill	x	x	f	f		f	5/1	8/15
Swifts								
Black Swift		x	r	r local		r	8/4	9/11
Chimney Swift				A				
White-throated Swift	x	x	c	c		c	4/15	8/25
Hummingbirds								
Broad-tailed Hummingbird	x	x	c	c		c	5/1	8/20
Blue-throated Hummingbird						A		
Magnificent Hummingbird				A				
Ruby-throated Hummingbird						A		
Black-chinned Hummingbird	x	x	c	c		c	5/1	8/10
Anna's Hummingbird						A		
Calliope Hummingbird		x	e			r		
Rufous Hummingbird	x	x				c		
Kingfishers								
Belted Kingfisher	x	x	f	f	u	f	5/1	8/15

Table 3-1. Birds^a of the Uncompahgre Planning Area, listed with occurrence data and nesting periods.

Common Name ^b	Occurs on BLM	Recorded in UFO Annually	Seasonal Occurrence ^c				Nesting ^d	
			Spring	Summer	Winter	Fall	Begin	End
Woodpeckers								
Lewis's Woodpecker	x	x	u	u	u	u	4/15	8/5
Red-headed Woodpecker		x			A			
Williamson's Sapsucker	x	x	r	u		r	5/1	8/15
Yellow-bellied Sapsucker					A			
Red-naped Sapsucker	x	x	u	f		u	5/10	8/25
Downy Woodpecker	x	x	f	f	f	f	5/1	8/15
Hairy Woodpecker	x	x	f	f	f	f	4/25	8/10
American Three-toed Woodpecker		x	u	u	u	u	5/1	8/15
Northern Flicker	x	x	c	c	c	c	4/10	8/15
Tyrant Flycatchers								
Olive-sided Flycatcher	x	x	u	u		u	6/1	7/31
Western Wood Pewee	x	x	c	c		c	5/25	8/10
Willow Flycatcher	x	x	r	r local		r	6/5	8/10
Least Flycatcher				e				
Hammond's Flycatcher	x	x	r	u			5/30	8/5
Gray Flycatcher	x	x	u	c		u	5/5	8/5
Dusky Flycatcher	x	x	u	c		u	5/20	8/5
Cordilleran Flycatcher	x	x	u	f		u	5/20	8/10
Black Phoebe	x	x	r	u local		r	4/20	7/20
Eastern Phoebe			A			A		
Say's Phoebe	x	x	f	f	r	f	4/10	8/10
Ash-throated Flycatcher	x	x		c			5/1	7/31
Cassin's Kingbird	x	x		u local		r	5/1	7/31
Western Kingbird	x	x		a			5/5	8/20
Eastern Kingbird		x	r	r		r	5/5	8/20
Scissor-tailed Flycatcher				A				
Shrikes and Vireos								
Loggerhead Shrike	x	x	u	u	r	u	4/10	8/20
Northern Shrike	x	x			u			
Gray Vireo	x	x	r	f		r	5/15	7/25
Plumbeous Vireo	x	x	f	c		f	5/15	7/31
Cassin's Vireo	x	x				r		
Warbling Vireo	x	x	f	a		f	5/20	8/20
Red-eyed Vireo			e			e		
Jays, Magpies, and Crows								
Gray Jay		x	f	f	f	f	2/21	7/10
Steller's Jay	x	x	f	f	f	f	4/1	8/25
Blue Jay					r			
Western Scrub Jay	x	x	f	f	f	f	4/5	8/25
Pinyon Jay	x	x	f	f	f	f	2/21	8/20
Clark's Nutcracker	x	x	f	f	f	f	3/1	8/20
Black-billed Magpie	x	x	c	c	c	c	3/1	8/20
American Crow	x	x	f	f	f	f	3/1	8/1
Common Raven	x	x	c	c	c	c	3/1	8/1

Table 3-1. Birds^a of the Uncompahgre Planning Area, listed with occurrence data and nesting periods.

Common Name ^b	Occurs on BLM	Recorded in UFO Annually	Seasonal Occurrence ^c				Nesting ^d	
			Spring	Summer	Winter	Fall	Begin	End
Larks								
Horned Lark	x	x	a	a	a	a	3/1	8/20
Swallows								
Purple Martin		x	r	u local		r	6/5	8/5
Tree Swallow	x	x	a	f		a	5/1	8/10
Violet-green Swallow	x	x	c	c		c	5/1	8/20
N. Rough-winged Swallow	x	x	f	f		f	4/15	7/25
Bank Swallow	x	x	u	r local		u	5/5	7/31
Cliff Swallow	x	x	c	c		f	5/5	8/25
Barn Swallow	x	x	f	c		f	4/20	8/31
Tits								
Black-capped Chickadee	x	x	f	f	f	f	4/20	8/10
Mountain Chickadee	x	x	c	c	c	c	5/1	8/20
Juniper Titmouse	x	x	f	f	f	f	4/20	8/10
Bushtit	x	x	u	u	u	u	3/26	8/5
Nuthatches and Creepers								
Red-breasted Nuthatch	x	x	f	f	f	f	5/8	8/20
White-breasted Nuthatch	x	x	f	f	f	f	4/9	8/10
Pygmy Nuthatch	x	x	c	c	c	c	5/1	8/25
Brown Creeper	x	x	u	u	u	u	5/10	8/15
Wrens and Water Ousels								
Rock Wren	x	x	f	c	r	c	4/20	8/10
Canyon Wren	x	x	f	f	r	c	3/15	8/10
Bewick's Wren	x	x	f	a	f	f	3/25	8/5
House Wren	x	x		a			5/1	8/20
Winter Wren					r			
Marsh Wren		x	u	u local	u	u	5/15	7/31
American Dipper	x	x	f	f	f	f	2/21	8/15
Kinglets and Gnatcatchers								
Golden-crowned Kinglet	x	x	r	u	e	r	5/1	8/21
Ruby-crowned Kinglet	x	x	c	c	u	c	5/10	8/15
Blue-gray Gnatcatcher	x	x	u	c		u		
Thrushes								
Eastern Bluebird					e			
Western Bluebird	x	x	u	f	u	u	5/1	8/10
Mountain Bluebird	x	x	c	c	u	c	4/11	8/10
Townsend's Solitaire	x	x	f	f	f	f	4/1	8/20
Swainson's Thrush		x	r	u local		r	6/5	8/10
Hermit Thrush	x	x	u	f	r	u	5/20	8/25
American Robin	x	x	a	a	a local	a	3/20	8/25
Varied Thrush					e			
Mockingbirds and Thrashers								
Gray Catbird	x	x	r	u local		r	5/9	8/10
Northern Mockingbird	x	x	u	f	r	u	5/9	7/25
Sage Thrasher	x	x	f	f		f	5/10	8/5
Brown Thrasher			A	A	A	A		
Starlings								
European Starling	x	x	c	c	c	c	3/1	8/1

Table 3-1. Birds^a of the Uncompahgre Planning Area, listed with occurrence data and nesting periods.

Common Name ^b	Occurs on BLM	Recorded in UFO Annually	Seasonal Occurrence ^c				Nesting ^d	
			Spring	Summer	Winter	Fall	Begin	End
Pitpits and Wagtails								
American Pipit	x	x	u	u local	u	u	6/10	8/20
Waxwings								
Bohemian Waxwing	x				u erratic			
Cedar Waxwing	x	x	u erratic	u erratic	u erratic	u erratic	5/6	9/15
Wood Warblers								
Blue-winged Warbler			A					
Tennessee Warbler			e			e		
Orange-crowned Warbler	x	x	f	f		f	5/25	8/10
Nashville Warbler	x	x	r			r		
Virginia's Warbler	x	x	u	f		f	5/15	8/15
Northern Parula				A		A		
Yellow Warbler	x	x	f	c		f	5/1	8/15
Chestnut-sided Warbler			e			e		
Magnolia Warbler						A		
Black-throated Blue Warbler						A		
Yellow-rumped Warbler	x	x	a	f	f	a	5/15	8/15
Black-throated Gray Warbler	x	x	c	c		c	5/5	8/5
Townsend's Warbler	x	x	e			u		
Hermit Warbler			A					
Blackburnian Warbler						A		
Graces's Warbler	x	x		u			5/15	8/5
Palm Warbler			A			A		
Black-and-white Warbler			r			r		
American Redstart			r			r		
Ovenbird				A				
Northern Waterthrush	x	x	r			r		
Kentucky Warbler			A					
MacGillivray's Warbler	x	x	u	f		u	5/25	8/5
Common Yellowthroat	x	x	u	u		u	5/15	8/20
Hooded Warbler				A		A		
Wilson's Warbler	x	x	f	f		c	5/20	8/25
Painted Redstart			A					
Yellow-breasted Chat	x	x		f			5/20	7/25
Tanagers								
Summer Tanager			r			r		
Western Tanager	x	x	f	f		f	5/15	8/10
Sparrows								
Green-tailed Towhee	x	x	u	c		u	5/1	8/20
Spotted Towhee	x	x	c	c	u	c	5/5	8/25
Am. Tree Sparrow	x	x			u			
Chipping Sparrow	x	x	c	c		c	5/1	8/20
Clay-colored Sparrow			e			e		
Brewer's Sparrow	x	x	f	c		f	5/11	8/15
Field Sparrow						A		
Vesper Sparrow	x	x	c	a	e	c	5/11	8/10
Lark Sparrow	x	x	f	f		f	4/15	8/15
Black-throated Sparrow	x	x		u			4/20	7/31
Sage Sparrow	x	x	u	u		u	4/11	8/5
Lark Bunting	x		r irruptive	r irruptive		r irruptive	5/5	8/5

Table 3-1. Birds^a of the Uncompahgre Planning Area, listed with occurrence data and nesting periods.

Common Name ^b	Occurs on BLM	Recorded in UFO Annually	Seasonal Occurrence ^c				Nesting ^d	
			Spring	Summer	Winter	Fall	Begin	End
Savannah Sparrow	x	x	f	u	e	f	5/20	8/5
Grasshopper Sparrow						e		
Fox Sparrow	x	x	r	u	e	r	5/5	8/5
Song Sparrow	x	x	c	c	c	c	5/11	8/15
Lincoln's Sparrow	x	x	u	c		u	5/25	8/20
Swamp Sparrow		x			r			
White-throated Sparrow					r			
Harris's Sparrow					r			
White-crowned Sparrow	x	x	a	f	a	a	5/15	8/20
Golden-crowned Sparrow					e			
Dark-eyed Junco	x	x	a	c	a	a	5/5	8/20
Lapland Longspur			e					
Snow Bunting					r erratic			
Grosbeaks and Buntings								
Rose-breasted Grosbeak	x		r			r		
Black-headed Grosbeak	x	x		f		u	5/15	8/25
Blue Grosbeak	x	x		f		f	5/20	8/25
Lazuli Bunting	x	x	f	f		f	5/5	8/15
Indigo Bunting		x	r	r		r	5/5	8/15
Dickcissel			A	A		A		
Blackbirds and Orioles								
Bobolink			r	e		r	5/2	7/10
Red-winged Blackbird	x	x	c	c	c	c	4/11	8/20
Western Meadowlark	x	x	c	c	c local	c	4/15	8/10
Yellow-headed Blackbird		x		f local			4/15	8/5
Rusty Blackbird						e		
Brewer's Blackbird	x	x	f	c	u	f	4/25	8/20
Common Grackle		x	r	u local	r	r	4/10	7/31
Great-tailed Grackle		x	u local	u local	u local	u local	4/20	7/15
Brown-headed Cowbird	x	x	u	f	r	u	4/25	8/20
Orchard Oriole			A					
Bullock's Oriole	x	x		c			5/5	7/25
Scott's Oriole	x	x		e local			5/10	7/25
Finches								
Gray-crowned Rosy Finch	x	x			u erratic			
Black Rosy Finch	x	x			u erratic			
Brown-capped Rosy Finch	x	x	u erratic	u local	u erratic	u erratic	6/15	8/25
Pine Grosbeak	x	x	f	f	f	f	5/5	8/10
Purple Finch					A			
Cassin's Finch	x	x	u	f	u	u	4/10	8/20
House Finch	x	x	a	a	a	a	3/5	8/15
Red Crossbill	x	x	f erratic	f erratic	f erratic	f erratic	1/1	12/31
White-winged Crossbill			r erratic	r erratic	r erratic	r erratic	1/1	12/31
Common Redpoll					e			
Pine Siskin	x	x	f erratic	c	f erratic	c erratic	4/25	8/20
Lesser Goldfinch	x	x	f	f	r	f	6/1	8/31
American Goldfinch	x	x	f	f	f	f	5/25	9/5
Evening Grosbeak	x	x	f erratic	u erratic	f erratic	f erratic	5/20	8/31

Table 3-1. Birds^a of the Uncompahgre Planning Area, listed with occurrence data and nesting periods.

Common Name ^b	Occurs on BLM	Recorded in UFO Annually	Seasonal Occurrence ^c				Nesting ^d	
			Spring	Summer	Winter	Fall	Begin	End
Old World Sparrows								
House Sparrow		x	c	c	c	c	2/27	8/25

Notes

- a. Birds protected under the Migratory Bird Treaty Act are indicated on Table 6-1.
- b. Nomenclature and taxonomic arrangement of this list follows that of the American Ornithologists' Union (AOU 2009).
- c. Explanation of occurrence categories:
 - e = extremely rare, more than 3 records, but not recorded annually in the study area
 - r = rare, recorded annually in the UFO but chance of finding in a day <5%
 - u = uncommon, chance of finding in a day <75%
 - f = fairly common, chance of finding in a day >75%
 - c = common, chance of finding in a day almost 100%
 - a = abundant, usually several found in a day's search
 - A = accidental, only one or two records in the study area
 - E = believed to be extirpated
 - local = occurrence localized, not widespread
 - erratic = irregular, unpredictable in occurrence and abundance
 - irruptive = displays occasional population explosions
- d. Nesting periods are from statewide Breeding Bird Atlas II (in progress) data sheets. Birds with summer occurrences but no nest dates are either non-breeding or no documented nesting records exist.
- e. Known only to nest in the study area at Hart's Basin (Fruitgrower's Reservoir) in Delta County

Table 3-2. Scientific names, American Ornithologists' Union numbers, orders, and families of the birds of the study area.^a

AOU No. ^b	Common Name	Scientific Name	Order	Family
Ducks, Geese and Swans				
14	Greater White-fronted Goose	<i>Anser albifrons</i>	Anseriformes	Anatidae
17	Snow Goose	<i>Chen caerulescens</i>	Anseriformes	Anatidae
18	Ross's Goose	<i>Chen rossii</i>	Anseriformes	Anatidae
21	Cackling Goose	<i>Branta hutchinsii</i>	Anseriformes	Anatidae
22	Canada Goose	<i>Branta canadensis</i>	Anseriformes	Anatidae
25	Trumpeter Swan	<i>Cygnus buccinator</i>	Anseriformes	Anatidae
26	Tundra Swan	<i>Cygnus columbianus</i>	Anseriformes	Anatidae
31	Wood Duck	<i>Aix sponsa</i>	Anseriformes	Anatidae
32	Gadwall	<i>Anas strepera</i>	Anseriformes	Anatidae
34	Eurasian Widgeon	<i>Anas penelope</i>	Anseriformes	Anatidae
35	American Widgeon	<i>Anas americanus</i>	Anseriformes	Anatidae
37	Mallard	<i>Anas platyrhynchos</i>	Anseriformes	Anatidae
42	Blue-winged Teal	<i>Anas discors</i>	Anseriformes	Anatidae
43	Cinnamon Teal	<i>Anas cyanoptera</i>	Anseriformes	Anatidae
44	Northern Shoveler	<i>Anas clypeata</i>	Anseriformes	Anatidae
46	Northern Pintail	<i>Anas acuta</i>	Anseriformes	Anatidae
49	Green-winged Teal	<i>Anas crecca</i>	Anseriformes	Anatidae
50	Canvasback	<i>Aythya valisineria</i>	Anseriformes	Anatidae
51	Redhead	<i>Aythya americana</i>	Anseriformes	Anatidae
53	Ring-necked Duck	<i>Aythya collaris</i>	Anseriformes	Anatidae
55	Greater Scaup	<i>Aythya marila</i>	Anseriformes	Anatidae
56	Lesser Scaup	<i>Aythya affinis</i>	Anseriformes	Anatidae
63	Surf Scoter	<i>Melanitta perspicillata</i>	Anseriformes	Anatidae
64	White-winged Scoter	<i>Melanitta fusca</i>	Anseriformes	Anatidae
65	Black Scoter	<i>Melanitta nigra</i>	Anseriformes	Anatidae
66	Long-tailed Duck	<i>Clangula hyemalis</i>	Anseriformes	Anatidae
67	Bufflehead	<i>Bucephala albeola</i>	Anseriformes	Anatidae
68	Common Goldeneye	<i>Bucephala clangula</i>	Anseriformes	Anatidae
69	Barrow's Goldeneye	<i>Bucephala islandica</i>	Anseriformes	Anatidae
71	Hooded Merganser	<i>Lophodytes cucullatus</i>	Anseriformes	Anatidae
72	Common Merganser	<i>Mergus merganser</i>	Anseriformes	Anatidae
73	Red-breasted Merganser	<i>Mergus serrator</i>	Anseriformes	Anatidae
75	Ruddy Duck	<i>Oxyura jamaicensis</i>	Anseriformes	Anatidae
Chicken-like Birds				
87	Chukar	<i>Alectoris chukar</i>	Galliformes	Phasianidae
96	Ring-necked Pheasant	<i>Phasianus colchicus</i>	Galliformes	Phasianidae
100	Gunnison Sage-grouse	<i>Centrocercus minimus</i>	Galliformes	Tetraonidae
104	White-tailed Ptarmigan	<i>Lagopus leucurus</i>	Galliformes	Tetraonidae
105	Dusky Grouse	<i>Dendragapus obscurus</i>	Galliformes	Tetraonidae
107	Sharp-tailed Grouse	<i>Tympanuchus phasianellus</i>	Galliformes	Tetraonidae
110	Wild Turkey	<i>Meleagris gallopavo</i>	Galliformes	Meleagrididae
120	Gambel's Quail	<i>Callipepla gambelii</i>	Galliformes	Odontophoridae
Loons and Grebes				
134	Red-throated Loon	<i>Gavia stellata</i>	Gaviiformes	Gaviidae
136	Pacific Loon	<i>Gavia pacifica</i>	Gaviiformes	Gaviidae
137	Common Loon	<i>Gavia immer</i>	Gaviiformes	Gaviidae
140	Pied-billed Grebe	<i>Podilymbus podiceps</i>	Podicipediformes	Podicipedidae

AOU No. ^b	Common Name	Scientific Name	Order	Family
142	Horned Grebe	<i>Podiceps auritus</i>	Podicipediformes	Podicipedidae
143	Red-necked Grebe	<i>Podiceps grisegena</i>	Podicipediformes	Podicipedidae
144	Eared Grebe	<i>Podiceps nigricollis</i>	Podicipediformes	Podicipedidae
145	Western Grebe	<i>Aechmophorus occidentalis</i>	Podicipediformes	Podicipedidae
146	Clark's Grebe	<i>Aechmophorus clarkii</i>	Podicipediformes	Podicipedidae
Pelicans and Cormorants				
216	American White Pelican	<i>Pelecanus erythrorhynchos</i>	Pelicaniformes	Pelicanidae
217	Brown Pelican	<i>Pelecanus occidentalis</i>	Pelicaniformes	Pelicanidae
220	Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Pelicaniformes	Phalacrocoracidae
218	Neotropic Cormorant	<i>Phalacrocorax brasilianus</i>	Pelicaniformes	Phalacrocoracidae
Bitterns, Herons, and Ibises				
229	American Bittern	<i>Botaurus lentiginosus</i>	Ciconiiformes	Ardeidae
235	Great Blue Heron	<i>Ardea herodias</i>	Ciconiiformes	Ardeidae
238	Great Egret	<i>Ardea alba</i>	Ciconiiformes	Ardeidae
243	Snowy Egret	<i>Egretta thula</i>	Ciconiiformes	Ardeidae
244	Little Blue Heron	<i>Egretta caerulea</i>	Ciconiiformes	Ardeidae
247	Cattle Egret	<i>Bubulcus ibis</i>	Ciconiiformes	Ardeidae
249	Green Heron	<i>Butorides virescens</i>	Ciconiiformes	Ardeidae
253	Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Ciconiiformes	Ardeidae
258	Glossy Ibis	<i>Plegadis falcinellus</i>	Ciconiiformes	Threskiornithidae
259	White-faced Ibis	<i>Plegadis chihi</i>	Ciconiiformes	Threskiornithidae
New World Vultures				
266	Turkey Vulture	<i>Cathartes aura</i>	Falconiformes	Cathartidae
Eagles, Hawks, and Falcons				
270	Osprey	<i>Pandion haliaetus</i>	Falconiformes	Pandionidae
279	Mississippi Kite	<i>Ictinia mississippiensis</i>	Falconiformes	Accipitridae
282	Bald Eagle	<i>Haliaeetus leucocephalus</i>	Falconiformes	Accipitridae
286	Northern Harrier	<i>Circus cyaneus</i>	Falconiformes	Accipitridae
290	Sharp-shinned Hawk	<i>Accipiter striatus</i>	Falconiformes	Accipitridae
291	Coopers Hawk	<i>Accipiter cooperii</i>	Falconiformes	Accipitridae
294	Northern Goshawk	<i>Accipiter gentilis</i>	Falconiformes	Accipitridae
300	Common Black-hawk	<i>Buteogallus anthracinus</i>	Falconiformes	Accipitridae
309	Broad-winged Hawk	<i>Buteo platypterus</i>	Falconiformes	Accipitridae
312	Swainson's Hawk	<i>Buteo swainsoni</i>	Falconiformes	Accipitridae
316	Red-tailed Hawk	<i>Buteo jamaicensis</i>	Falconiformes	Accipitridae
317	Ferruginous Hawk	<i>Buteo regalis</i>	Falconiformes	Accipitridae
318	Rough-legged Hawk	<i>Buteo lagopus</i>	Falconiformes	Accipitridae
321	Golden Eagle	<i>Aquila chrysaetos</i>	Falconiformes	Accipitridae
334	American Kestrel	<i>Falco sparverius</i>	Falconiformes	Falconidae
336	Merlin	<i>Falco columbarius</i>	Falconiformes	Falconidae
342	Peregrine Falcon	<i>Falco peregrinus</i>	Falconiformes	Falconidae
343	Prairie Falcon	<i>Falco mexicanus</i>	Falconiformes	Falconidae
Rails, Coots, and Cranes				
353	Virginia Rail	<i>Rallus limicola</i>	Gruiformes	Rallidae
359	Sora	<i>Porzana carolina</i>	Gruiformes	Rallidae
371	American Coot	<i>Fulica americana</i>	Gruiformes	Rallidae
376	Sandhill Crane	<i>Grus canadensis</i>	Gruiformes	Gruidae
Plovers				
382	Black-bellied Plover	<i>Pluvialis squatarola</i>	Charadriiformes	Charadriidae
384	American Golden Plover	<i>Pluvialis dominica</i>	Charadriiformes	Charadriidae
389	Snowy Plover	<i>Charadrius alexandrinus</i>	Charadriiformes	Charadriidae
392	Semipalmated Plover	<i>Charadrius semipalmatus</i>	Charadriiformes	Charadriidae

AOU No. ^b	Common Name	Scientific Name	Order	Family
393	Piping Plover	<i>Charadrius melodus</i>	Charadriiformes	Charadriidae
395	Killdeer	<i>Charadrius vociferus</i>	Charadriiformes	Charadriidae
396	Mountain Plover	<i>Charadrius montanus</i>	Charadriiformes	Charadriidae
Stilts and Avocets				
402	Black-necked Stilt	<i>Himantopus mexicanus</i>	Charadriiformes	Recurvirostidae
403	American Avocet	<i>Recurvirostra americana</i>	Charadriiformes	Recurvirostidae
Sandpipers				
408	Spotted Sandpiper	<i>Actitis macularia</i>	Charadriiformes	Scolopacidae
410	Solitary Sandpiper	<i>Tringa solitaria</i>	Charadriiformes	Scolopacidae
414	Greater Yellowlegs	<i>Tringa melanoleuca</i>	Charadriiformes	Scolopacidae
416	Willet	<i>Tringa semipalmata</i>	Charadriiformes	Scolopacidae
417	Lesser Yellowlegs	<i>Tringa flavipes</i>	Charadriiformes	Scolopacidae
424	Whimbrel	<i>Numenius phaeopus</i>	Charadriiformes	Scolopacidae
429	Long-billed Curlew	<i>Numenius americanus</i>	Charadriiformes	Scolopacidae
433	Marbled Godwit	<i>Limosa fedoa</i>	Charadriiformes	Scolopacidae
439	Sanderling	<i>Calidris alba</i>	Charadriiformes	Scolopacidae
440	Semipalmated Sandpiper	<i>Calidris pusilla</i>	Charadriiformes	Scolopacidae
441	Western Sandpiper	<i>Calidris mauri</i>	Charadriiformes	Scolopacidae
446	Least Sandpiper	<i>Calidris minutilla</i>	Charadriiformes	Scolopacidae
447	White-rumped Sandpiper	<i>Calidris fuscicollis</i>	Charadriiformes	Scolopacidae
448	Baird's Sandpiper	<i>Calidris bairdii</i>	Charadriiformes	Scolopacidae
449	Pectoral Sandpiper	<i>Calidris melanotos</i>	Charadriiformes	Scolopacidae
453	Dunlin	<i>Calidris alpina</i>	Charadriiformes	Scolopacidae
455	Stilt Sandpiper	<i>Calidris himantopus</i>	Charadriiformes	Scolopacidae
460	Short-billed Dowitcher	<i>Limnodromus griseus</i>	Charadriiformes	Scolopacidae
461	Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>	Charadriiformes	Scolopacidae
463	Wilson's Snipe	<i>Gallinago delicata</i>	Charadriiformes	Scolopacidae
468	Wilson's Phalarope	<i>Phalaropus tricolor</i>	Charadriiformes	Scolopacidae
469	Red-necked Phalarope	<i>Phalaropus lobatus</i>	Charadriiformes	Scolopacidae
470	Red Phalarope	<i>Phalaropus fulicarius</i>	Charadriiformes	Scolopacidae
Gulls and Terns				
476	Sabine's Gull	<i>Xema sabini</i>	Charadriiformes	Laridae
477	Bonaparte's Gull	<i>Larus minutus</i>	Charadriiformes	Laridae
484	Franklin's Gull	<i>Larus pipixcan</i>	Charadriiformes	Laridae
489	Ring-billed Gull	<i>Larus delawarensis</i>	Charadriiformes	Laridae
492	California Gull	<i>Larus californicus</i>	Charadriiformes	Laridae
493	Herring Gull	<i>Larus argentatus</i>	Charadriiformes	Laridae
495	Thayer's Gull	<i>Larus theyeri</i>	Charadriiformes	Laridae
497	Lesser Black-backed Gull	<i>Larus fuscus</i>	Charadriiformes	Laridae
512	Least Tern	<i>Sterna antillarum</i>	Charadriiformes	Sternidae
516	Caspian Tern	<i>Sterna caspia</i>	Charadriiformes	Sternidae
518	Black Tern	<i>Chlidonias niger</i>	Charadriiformes	Sternidae
522	Common Tern	<i>Sterna hirundo</i>	Charadriiformes	Sternidae
524	Forster's Tern	<i>Sterna forsteri</i>	Charadriiformes	Sternidae
Pigeons and Doves				
558	Rock Pigeon	<i>Columba livia</i>	Columbiformes	Columbidae
565	Band-tailed Pigeon	<i>Patagioenas fasciata</i>	Columbiformes	Columbidae
572	Eurasian Collared Dove	<i>Streptopelia decaocto</i>	Columbiformes	Columbidae
575	White-winged Dove	<i>Zenaida asiatica</i>	Columbiformes	Columbidae
578	Mourning Dove	<i>Zenaida macroura</i>	Columbiformes	Columbidae
Cuckoos				
666	Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Cuculiformes	Cuculidae
670	Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Cuculiformes	Cuculidae

AOU No. ^b	Common Name	Scientific Name	Order	Family
Owls				
686	Barn Owl	<i>Tyto alba</i>	Strigiformes	Tytonidae
688	Flammulated Owl	<i>Otus flammeolus</i>	Strigiformes	Strigidae
690	Western Screech-Owl	<i>Megascops kennicottii</i>	Strigiformes	Strigidae
703	Great Horned Owl	<i>Bubo virginianus</i>	Strigiformes	Strigidae
706	Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	Strigiformes	Strigidae
714	Burrowing Owl	<i>Athene cunicularia</i>	Strigiformes	Strigidae
717	Spotted Owl	<i>Strix occidentalis</i>	Strigiformes	Strigidae
721	Long-eared Owl	<i>Asio otus</i>	Strigiformes	Strigidae
723	Short-eared Owl	<i>Asio flammeus</i>	Strigiformes	Strigidae
726	Boreal Owl	<i>Aegolius funereus</i>	Strigiformes	Strigidae
727	Northern Saw-whet Owl	<i>Aegolius acadicus</i>	Strigiformes	Strigidae
Nightjars				
730	Lesser Nighthawk	<i>Chordeiles acutipennis</i>	Caprimulgiformes	Caprimulgidae
731	Common Nighthawk	<i>Chordeiles minor</i>	Caprimulgiformes	Caprimulgidae
734	Common Poorwill	<i>Phalaenoptilus nuttallii</i>	Caprimulgiformes	Caprimulgidae
Swifts				
756	Black Swift	<i>Cypseloides niger</i>	Apodiformes	Apodidae
763	Chimney Swift	<i>Chaetura pelagica</i>	Apodiformes	Apodidae
777	White-throated Swift	<i>Aeronautes saxatalis</i>	Apodiformes	Apodidae
Hummingbirds				
865	Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	Trochiliformes	Trochilidae
867	Blue-throated Hummingbird	<i>Lampornis clemenciae</i>	Trochiliformes	Trochilidae
873	Magnificent Hummingbird	<i>Eugenes fulgens</i>	Trochiliformes	Trochilidae
886	Ruby-throated Hummingbird	<i>Archilochus colubris</i>	Trochiliformes	Trochilidae
887	Black-chinned Hummingbird	<i>Archilochus alexandri</i>	Trochiliformes	Trochilidae
890	Anna's Hummingbird	<i>Calypte anna</i>	Trochiliformes	Trochilidae
892	Calliope Hummingbird	<i>Stellula calliope</i>	Trochiliformes	Trochilidae
896	Rufous Hummingbird	<i>Selasphorus rufus</i>	Trochiliformes	Trochilidae
Kingfishers				
934	Belted Kingfisher	<i>Ceryle alcyon</i>	Coraciiformes	Alcedinidae
Woodpeckers				
962	Lewis's Woodpecker	<i>Melanerpes lewis</i>	Piciformes	Picidae
965	Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Piciformes	Picidae
980	Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	Piciformes	Picidae
981	Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	Piciformes	Picidae
982	Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>	Piciformes	Picidae
988	Downy Woodpecker	<i>Picoides pubescens</i>	Piciformes	Picidae
989	Hairy Woodpecker	<i>Picoides villosus</i>	Piciformes	Picidae
994	American Three-toed Woodpecker	<i>Picoides dorsalis</i>	Piciformes	Picidae
1004	Northern Flicker	<i>Colaptes auratus</i>	Piciformes	Picidae
Tyrant Flycatchers				
1159	Olive-sided Flycatcher	<i>Contopus cooperi</i>	Passeriformes	Tyrannidae
1163	Western Wood Pewee	<i>Contopus sordidulus</i>	Passeriformes	Tyrannidae
1173	Willow Flycatcher	<i>Empidonax traillii</i>	Passeriformes	Tyrannidae
1175	Least Flycatcher	<i>Empidonax minimus</i>	Passeriformes	Tyrannidae
1176	Hammond's Flycatcher	<i>Empidonax hammondi</i>	Passeriformes	Tyrannidae
1177	Gray Flycatcher	<i>Empidonax wrightii</i>	Passeriformes	Tyrannidae
1178	Dusky Flycatcher	<i>Empidonax oberholseri</i>	Passeriformes	Tyrannidae

AOU No. ^b	Common Name	Scientific Name	Order	Family
1181	Cordilleran Flycatcher	<i>Empidonax occidentalis</i>	Passeriformes	Tyrannidae
1185	Black Phoebe	<i>Sayornis nigricans</i>	Passeriformes	Tyrannidae
1186	Eastern Phoebe	<i>Sayornis phoebe</i>	Passeriformes	Tyrannidae
1187	Say's Phoebe	<i>Sayornis saya</i>	Passeriformes	Tyrannidae
1199	Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	Passeriformes	Tyrannidae
1225	Cassin's Kingbird	<i>Tyrannus vociferans</i>	Passeriformes	Tyrannidae
1227	Western Kingbird	<i>Tyrannus verticalis</i>	Passeriformes	Tyrannidae
1228	Eastern Kingbird	<i>Tyrannus tyrannus</i>	Passeriformes	Tyrannidae
1232	Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	Passeriformes	Tyrannidae
Shrikes and Vireos				
1276	Loggerhead Shrike	<i>Lanius ludovicianus</i>	Passeriformes	Laniidae
1277	Northern Shrike	<i>Lanius excubitor</i>	Passeriformes	Laniidae
1291	Gray Vireo	<i>Vireo vicinior</i>	Passeriformes	Vireonidae
1294	Plumbeous Vireo	<i>Vireo plumbeus</i>	Passeriformes	Vireonidae
1295	Cassin's Vireo	<i>Vireo cassinii</i>	Passeriformes	Vireonidae
1300	Warbling Vireo	<i>Vireo gilvus</i>	Passeriformes	Vireonidae
1303	Red-eyed Vireo	<i>Vireo olivaceus</i>	Passeriformes	Vireonidae
Jays, Magpies, and Crows				
1315	Gray Jay	<i>Perisoreus canadensis</i>	Passeriformes	Corvidae
1316	Steller's Jay	<i>Cyanocitta stelleri</i>	Passeriformes	Corvidae
1317	Blue Jay	<i>Cyanocitta cristata</i>	Passeriformes	Corvidae
1335	Western Scrub Jay	<i>Aphelocoma californica</i>	Passeriformes	Corvidae
1338	Pinyon Jay	<i>Gymnorhynchus cyanocephalus</i>	Passeriformes	Corvidae
1339	Clark's Nutcracker	<i>Nucifraga columbiana</i>	Passeriformes	Corvidae
1340	Black-billed Magpie	<i>Pica hudsonia</i>	Passeriformes	Corvidae
1343	American Crow	<i>Corvus brachyrhynchos</i>	Passeriformes	Corvidae
1354	Common Raven	<i>Corvus corax</i>	Passeriformes	Corvidae
Larks				
1357	Horned Lark	<i>Ermophila alpestris</i>	Passeriformes	Alaudidae
Swallows				
1358	Purple Martin	<i>Progne subis</i>	Passeriformes	Hirundinidae
1365	Tree Swallow	<i>Tachycineta bicolor</i>	Passeriformes	Hirundinidae
1368	Violet-green Swallow	<i>Tachycineta thalassina</i>	Passeriformes	Hirundinidae
1373	N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	Passeriformes	Hirundinidae
1375	Bank Swallow	<i>Riparia riparia</i>	Passeriformes	Hirundinidae
1376	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	Passeriformes	Hirundinidae
1378	Barn Swallow	<i>Hirundo rustica</i>	Passeriformes	Hirundinidae
Tits				
1381	Black-capped Chickadee	<i>Poecile atricapillus</i>	Passeriformes	Paridae
1382	Mountain Chickadee	<i>Poecile gambeli</i>	Passeriformes	Paridae
1389	Juniper Titmouse	<i>Baeolophus ridgwayi</i>	Passeriformes	Paridae
1393	Bushtit	<i>Psaltriparus minimus</i>	Passeriformes	Paridae
Nuthatches and Creepers				
1394	Red-breasted Nuthatch	<i>Sitta canadensis</i>	Passeriformes	Sittidae
1395	White-breasted Nuthatch	<i>Sitta carolinensis</i>	Passeriformes	Sittidae
1396	Pygmy Nuthatch	<i>Sitta pygmaea</i>	Passeriformes	Sittidae
1398	Brown Creeper	<i>Certhia americana</i>	Passeriformes	Certhiidae

AOU No. ^b	Common Name	Scientific Name	Order	Family
Wrens and Water Ousels				
1409	Rock Wren	<i>Salpinctes obsoletus</i>	Passeriformes	Troglodytidae
1410	Canyon Wren	<i>Catherpes mexicanus</i>	Passeriformes	Troglodytidae
1429	Bewick's Wren	<i>Thryomanes bewickii</i>	Passeriformes	Troglodytidae
1431	House Wren	<i>Troglodytes aedon</i>	Passeriformes	Troglodytidae
1436	Winter Wren	<i>Troglodytes troglodytes</i>	Passeriformes	Troglodytidae
1438	Marsh Wren	<i>Cistothorus palustris</i>	Passeriformes	Troglodytidae
1446	American Dipper	<i>Cinclus mexicanus</i>	Passeriformes	Cinclidae
Kinglets and Gnatcatchers				
1449	Golden-crowned Kinglet	<i>Regulus satrapa</i>	Passeriformes	Regulidae
1450	Ruby-crowned Kinglet	<i>Regulus calendula</i>	Passeriformes	Regulidae
1464	Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	Passeriformes	Polioptilidae
Thrushes				
1486	Eastern Bluebird	<i>Sialia sialis</i>	Passeriformes	Turdidae
1487	Western Bluebird	<i>Sialia mexicana</i>	Passeriformes	Turdidae
1488	Mountain Bluebird	<i>Sialia currucoides</i>	Passeriformes	Turdidae
1489	Townsend's Solitaire	<i>Myadestes townsendi</i>	Passeriformes	Turdidae
1511	Swainson's Thrush	<i>Catharus ustulatus</i>	Passeriformes	Turdidae
1512	Hermit Thrush	<i>Catharus guttatus</i>	Passeriformes	Turdidae
1531	American Robin	<i>Turdus migratorius</i>	Passeriformes	Turdidae
1537	Varied Thrush	<i>Ixoreus naevius</i>	Passeriformes	Turdidae
Mockingbirds and Thrashers				
1544	Gray Catbird	<i>Dumetella carolinensis</i>	Passeriformes	Mimidae
1546	Northern Mockingbird	<i>Mimus polyglottus</i>	Passeriformes	Mimidae
1550	Sage Thrasher	<i>Oreoscoptes montanus</i>	Passeriformes	Mimidae
1551	Brown Thrasher	<i>Toxostoma rufum</i>	Passeriformes	Mimidae
Starlings				
1568	European Starling	<i>Sturnus vulgaris</i>	Passeriformes	Sturnidae
Pitpits and Wagtails				
1580	American Pipit	<i>Anthus rubescens</i>	Passeriformes	Motacillidae
Waxwings				
1583	Bohemian Waxwing	<i>Bombycilla garrulus</i>	Passeriformes	Bombycillidae
1584	Cedar Waxwing	<i>Bombycilla cedrorum</i>	Passeriformes	Parulidae
Wood Warblers				
1592	Blue-winged Warbler	<i>Vermivora pinus</i>	Passeriformes	Parulidae
1594	Tennessee Warbler	<i>Vermivora peregrina</i>	Passeriformes	Parulidae
1595	Orange-crowned Warbler	<i>Vermivora celata</i>	Passeriformes	Parulidae
1596	Nashville Warbler	<i>Vermivora ruficapilla</i>	Passeriformes	Parulidae
1597	Virginia's Warbler	<i>Vermivora virginiae</i>	Passeriformes	Parulidae
1602	Northern Parula	<i>Parula americana</i>	Passeriformes	Parulidae
1604	Yellow Warbler	<i>Dendroica petechia</i>	Passeriformes	Parulidae
1605	Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	Passeriformes	Parulidae
1606	Magnolia Warbler	<i>Dendroica magnolia</i>	Passeriformes	Parulidae
1608	Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	Passeriformes	Parulidae
1609	Yellow-rumped Warbler	<i>Dendroica coronata</i>	Passeriformes	Parulidae
1610	Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	Passeriformes	Parulidae
1613	Townsend's Warbler	<i>Dendroica townsendi</i>	Passeriformes	Parulidae
1614	Hermit Warbler	<i>Dendroica occidentalis</i>	Passeriformes	Parulidae
1615	Blackburnian Warbler	<i>Dendroica fusca</i>	Passeriformes	Parulidae
1617	Graces's Warbler	<i>Dendroica graciae</i>	Passeriformes	Parulidae
1626	Palm Warbler	<i>Dendroica palmarum</i>	Passeriformes	Parulidae

AOU No. ^b	Common Name	Scientific Name	Order	Family
1634	Black-and-white Warbler	<i>Mniotilta varia</i>	Passeriformes	Parulidae
1635	American Redstart	<i>Setophaga ruticilla</i>	Passeriformes	Parulidae
1639	Ovenbird	<i>Seiurus aurocapilla</i>	Passeriformes	Parulidae
1640	Northern Waterthrush	<i>Seiurus noveboracensis</i>	Passeriformes	Parulidae
1642	Kentucky Warbler	<i>Oporornis formosus</i>	Passeriformes	Parulidae
1645	MacGillivray's Warbler	<i>Oporornis tolmiei</i>	Passeriformes	Parulidae
1646	Common Yellowthroat	<i>Geothlypis trichas</i>	Passeriformes	Parulidae
1659	Hooded Warbler	<i>Wilsonia citrina</i>	Passeriformes	Parulidae
1660	Wilson's Warbler	<i>Wilsonia pusilla</i>	Passeriformes	Parulidae
1665	Painted Redstart	<i>Myioborus pictus</i>	Passeriformes	Parulidae
1677	Yellow-breasted Chat	<i>Icteria virens</i>	Passeriformes	Parulidae
Tanagers				
1713	Summer Tanager	<i>Piranga rubra</i>	Passeriformes	Thraupidae
1715	Western Tanager	<i>Piranga ludoviciana</i>	Passeriformes	Thraupidae
Sparrows				
1798	Green-tailed Towhee	<i>Pipilo chlorurus</i>	Passeriformes	Emberizidae
1800	Spotted Towhee	<i>Pipilo maculatus</i>	Passeriformes	Emberizidae
1820	Am. Tree Sparrow	<i>Spizella arborea</i>	Passeriformes	Emberizidae
1821	Chipping Sparrow	<i>Spizella passerina</i>	Passeriformes	Emberizidae
1822	Clay-colored Sparrow	<i>Spizella pallida</i>	Passeriformes	Emberizidae
1823	Brewer's Sparrow	<i>Spizella breweri</i>	Passeriformes	Emberizidae
1824	Field Sparrow	<i>Spizella pusilla</i>	Passeriformes	Emberizidae
1827	Vesper Sparrow	<i>Poocetes gramineus</i>	Passeriformes	Emberizidae
1828	Lark Sparrow	<i>Chondestes grammacus</i>	Passeriformes	Emberizidae
1829	Black-throated Sparrow	<i>Amphispiza bilineata</i>	Passeriformes	Emberizidae
1830	Sage Sparrow	<i>Amphispiza belli</i>	Passeriformes	Emberizidae
1831	Lark Bunting	<i>Calamospiza melanocorys</i>	Passeriformes	Emberizidae
1832	Savannah Sparrow	<i>Passerculus sandwichensis</i>	Passeriformes	Emberizidae
1833	Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Passeriformes	Emberizidae
1841	Fox Sparrow	<i>Passerella iliaca</i>	Passeriformes	Emberizidae
1842	Song Sparrow	<i>Melospiza melodia</i>	Passeriformes	Emberizidae
1843	Lincoln's Sparrow	<i>Melospiza lincolni</i>	Passeriformes	Emberizidae
1844	Swamp Sparrow	<i>Melospiza georgiana</i>	Passeriformes	Emberizidae
1846	White-throated Sparrow	<i>Zonotrichia albicollis</i>	Passeriformes	Emberizidae
1847	Harris's Sparrow	<i>Zonotrichia querula</i>	Passeriformes	Emberizidae
1848	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	Passeriformes	Emberizidae
1849	Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	Passeriformes	Emberizidae
1851	Dark-eyed Junco	<i>Junco hyemalis</i>	Passeriformes	Emberizidae
1854	Lapland Longspur	<i>Calcarius lapponicus</i>	Passeriformes	Emberizidae
1865	Snow Bunting	<i>Plectrophenax nivalis</i>	Passeriformes	Emberizidae
Grosbeaks and Buntings				
1880	Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	Passeriformes	Cardinalidae
1881	Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	Passeriformes	Cardinalidae
1884	Blue Grosbeak	<i>Passerina caerulea</i>	Passeriformes	Cardinalidae
1885	Lazuli Bunting	<i>Passerina amoena</i>	Passeriformes	Cardinalidae
1886	Indigo Bunting	<i>Passerina cyanea</i>	Passeriformes	Cardinalidae
1891	Dickcissel	<i>Spiza americana</i>	Passeriformes	Cardinalidae
Blackbirds and Orioles				
1892	Bobolink	<i>Dolichonyx oryzivorus</i>	Passeriformes	Icteridae
1893	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Passeriformes	Icteridae
1901	Western Meadowlark	<i>Sturnella neglecta</i>	Passeriformes	Icteridae
1902	Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	Passeriformes	Icteridae
1905	Rusty Blackbird	<i>Euphagus carolinus</i>	Passeriformes	Icteridae

AOU No. ^b	Common Name	Scientific Name	Order	Family
1906	Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	Passeriformes	Icteridae
1907	Common Grackle	<i>Quiscalus quiscula</i>	Passeriformes	Icteridae
1909	Great-tailed Grackle	<i>Quiscalus mexicanus</i>	Passeriformes	Icteridae
1916	Brown-headed Cowbird	<i>Molothrus ater</i>	Passeriformes	Icteridae
1925	Orchard Oriole	<i>Icterus spurius</i>	Passeriformes	Icteridae
1932	Bullock's Oriole	<i>Icterus bullockii</i>	Passeriformes	Icteridae
1940	Scott's Oriole	<i>Icterus parisorum</i>	Passeriformes	Icteridae
Finches				
1967	Gray-crowned Rosy Finch	<i>Leucosticte tephrocotis</i>	Passeriformes	Fringillidae
1968	Black Rosy Finch	<i>Leucosticte atrata</i>	Passeriformes	Fringillidae
1969	Brown-capped Rosy Finch	<i>Leucosticte australis</i>	Passeriformes	Fringillidae
1970	Pine Grosbeak	<i>Pinicola enucleator</i>	Passeriformes	Fringillidae
1972	Purple Finch	<i>Carpodacus purpureus</i>	Passeriformes	Fringillidae
1973	Cassin's Finch	<i>Carpodacus cassinii</i>	Passeriformes	Fringillidae
1974	House Finch	<i>Carpodacus mexicanus</i>	Passeriformes	Fringillidae
1975	Red Crossbill	<i>Loxia curvirostra</i>	Passeriformes	Fringillidae
1977	White-winged Crossbill	<i>Loxia leucoptera</i>	Passeriformes	Fringillidae
1978	Common Redpoll	<i>Carduelis flammea</i>	Passeriformes	Fringillidae
1981	Pine Siskin	<i>Carduelis pinus</i>	Passeriformes	Fringillidae
1987	Lesser Goldfinch	<i>Carduelis psaltria</i>	Passeriformes	Fringillidae
1989	American Goldfinch	<i>Carduelis tristis</i>	Passeriformes	Fringillidae
1996	Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Passeriformes	Fringillidae
Old World Sparrows				
2030	House Sparrow	<i>Passer domesticus</i>	Passeriformes	Passeridae

Notes

- a. Nomenclature and taxonomic arrangement of this list follows that of the American Ornithologists' Union (AOU 2009).
- b. American Ornithologists' Union (AOU) unique checklist sort number.

Table 3-3. Summer habitat matrix^a for birds of the study area.

Estimated Relative Abundances^b of Birds Occupying Each Land Cover Type (Habitat)^c

Common Name	Dev	Agri	TDS	Herb	SagC	SDS	SaMS	MS	MStp	PJ	Juni	AlpS	PJMS	PJSa	Asp	PP	SF	DF	CRip	MCA	PPO	PPOA	BrSo	CRT	AlpH	Snow	RipX	Cotw	SRip	Willo	Water		
Townsend's Warbler																																	
Hermit Warbler																																	
Blackburnian Warbler																																	
Grace's Warbler										1			1			325						325	320										
Palm Warbler																																	
Black-and-white Warbler																																	
American Redstart																														1			
Ovenbird																																	
Northern Waterthrush																																	
Kentucky Warbler																																	
MacGillivray's Warbler								55					3		55	55	55	55	55	55	55	55	55						55				
Common Yellowthroat																											70				125		
Hooded Warbler																																	
Wilson's Warbler												20						55												878			
Painted Redstart																																	
Yellow-breasted Chat																											125	70	250			45	
Summer Tanager																																	
Western Tanager								15		15			15		65	889	25	1190	1190	1190	889	850											
Green-tailed Towhee		5		200		1122	400	200	20	8		125	60	225	255	10	170	215	150	300	260												
Spotted Towhee		9		55		350	350	30	55	25		125	55	45	145		150	185	150	150	150									45			
Am. Tree Sparrow																																	
Chipping Sparrow				45		55	125	45	400	70		230	230	160	400	80	400	400	400	400	400												
Clay-colored Sparrow																																	
Brewer's Sparrow		100	3	300		1300		1400				53		100																			
Field Sparrow																																	
Vesper Sparrow		12	70	125	800	800		800					10																				
Lark Sparrow		250	50	125	8	25		11	45	150		50		8			8		8	8	4												
Black-throated Sparrow		50		4	13				3	30		5											4										
Sage Sparrow		15		55		8		8																									
Lark Bunting		2	1	1	1				1																								
Savannah Sparrow		15		6					4			30														30					70		
Grasshopper Sparrow																																	
Fox Sparrow																			95														
Song Sparrow																			180														
Lincoln's Sparrow												432			125		300	40	300	40							10	2000	10	180	250		
Swamp Sparrow																																3	
White-throated Sparrow																																	
Harris's Sparrow																																	
White-crowned Sparrow												520			33		39			15						45						60	
Golden-crowned Sparrow																																	
Dark-eyed Junco						13		35					35		87	117	210	100	60	120	90	117										50	
Lapland Longspur																																	
Snow Bunting																																	
Rose-breasted Grosbeak																																	
Black-headed Grosbeak					37		55	300					55		48	148		100	50	60	250	150					125	125	100	40			
Blue Grosbeak			15		15																												
Lazuli Bunting			15		15		15	30					30		9					100		15	15										
Indigo Bunting			1		1			1					1							1		1	1										
Dickcissel																																	
Bobolink																																	
Red-winged Blackbird	25	125		15																								55	40	55			1200
Western Meadowlark		125	400	220	220	400			60		15			8																			
Yellow-headed Blackbird																																	50
Rusty Blackbird																																	
Brewer's Blackbird		200	20	100	70	6	70		150			1													1								250
Common Grackle	3																																5
Great-tailed Grackle	3																											3	3	3			8
Brown-headed Cowbird		25	20	25	45	4	45	95	45	45	45		45	45	73	45	2	45	55	45	65	65										45	
Orchard Oriole																																	
Bullock's Oriole	125	125	25																										1000	2275	70		
Scott's Oriole										1	1			1																			
Gray-crowned Rosy Finch																																	
Black Rosy Finch																																	
Brown-capped Rosy Finch													233																				
Pine Grosbeak															8		80	8		8						233	30						

Table 3-3. Summer habitat matrix^a for birds of the study area.

Common Name	Estimated Relative Abundances ^b of Birds Occupying Each Land Cover Type (Habitat) ^c																															
	Dev	Agri	TDS	Herb	SagC	SDS	SaMS	MS	MStp	PJ	Juni	AlpS	PJMS	PJSa	Asp	PP	SF	DF	CRip	MCA	PPO	PPOA	BrSo	CRT	AlpH	Snow	RipX	Cotw	SRip	Willo	Water	
Purple Finch																																
Cassin's Finch								15				25			35	133	75	133	120	133	133	133			25							
House Finch	400	200	44	25	12	12	8	7	12	70	70		70	70		12		12	12	6	12	7	200	175			200	250	200			
Red Crossbill										10		40	10		10	275	840	275	170	275	275	275			40							
White-winged Crossbill												1						6							1							
Common Redpoll																																
Pine Siskin					12				30	12	20		240	20		752	400	1200	400	400	400	400	400		240							
Lesser Goldfinch	25	25									65	65		20	65													105	265	125		
American Goldfinch	25	25																										100	1000	110		15
Evening Grosbeak	1														7	15	30	100	100	100	15	15				7	7	7	5			
House Sparrow	125	125																									1		1			

- Notes**
- a. Explanation of matrix (color coding on a spectrum of green to red based on cell value)
 - White cells indicate habitat not occupied or not important
 - Green cells indicate habitat is of relatively minor importance to the species
 - Red cells with bold black values indicate habitat is of primary importance to the species
 - b. The derivation of relative abundances is explained in Chapter 4.
 - c. A key to land cover codes is provided in Table 2-2.

Table 3-4. Winter habitat matrix² for birds of the study area.

Common Name	Estimated Relative Abundances ^b of Birds Occupying Each Land Cover Type (Habitat) ^c																																	
	Dev	Agri	TDS	Herb	SagC	SDS	SaMS	MS	MStp	PJ	Juni	AlpS	PJMS	PJSa	Asp	PP	SF	DF	CRip	MCAs	PPO	PPOA	BrSo	CRT	AlpH	Snow	RipX	Cotw	SRip	Willow	Water			
Greater White-fronted Goose																																1		
Snow Goose																																	3	
Ross's Goose																																	3	
Cackling Goose																																	1	
Canada Goose	400	400		6	3																						450	450					800	
Trumpeter Swan																																		
Tundra Swan																																		
Wood Duck																											11	14	8				10	
Gadwall																																	3	
Eurasian Widgeon																																		
American Widgeon	80	80		6																													200	
Mallard	125	625			4														8								400	400	300	8			871	
Blue-winged Teal																			8															
Cinnamon Teal																																		
Northern Shoveler																																		45
Northern Pintail																																		15
Green-winged Teal																											4	4	4	12				35
Canvasback																																		2
Redhead																																		20
Ring-necked Duck																																		400
Greater Scaup																																		
Lesser Scaup																																		7
Surf Scoter																																		
White-winged Scoter																																		
Black Scoter																																		
Long-tailed Duck																																		1
Bufflehead																																		30
Common Goldeneye																																		175
Barrow's Goldeneye																																		1
Hooded Merganser																																		5
Common Merganser																			4								50	50		5			75	
Red-breasted Merganser																																		
Ruddy Duck																																		4
Chukar			4	3		4				4	4			1										5	5									
Ring-necked Pheasant	15	25	34	12	8				3																		200	50	330				45	
Gunnison Sage-grouse					1		2			5																								
White-tailed Ptarmigan												67													5	20								
Dusky Grouse																			65	35	55													
Sharp-tailed Grouse																																		
Wild Turkey			3				4	6	4	4	4		6	4		4	6	4	4	4	4	4					20	20	9	4				
Gambel's Quail	5		23			3																					30	20	100					
Red-throated Loon																																		
Pacific Loon																																		
Common Loon																																		
Pied-billed Grebe																																		5
Horned Grebe																																		
Red-necked Grebe																																		
Eared Grebe																																		
Western Grebe																																		
Clark's Grebe																																		
American White Pelican																																		1
Brown Pelican																																		
Neotropic Cormorant																																		
Double-crested Cormorant																											4	4						8
American Bittern																																		
Great Blue Heron																											90	200						10
Great Egret																																		
Snowy Egret																																		
Little Blue Heron																																		
Cattle Egret																																		
Green Heron																																		
Black-crowned Night Heron																																		
Glossy Ibis																																		
White-faced Ibis																																		
Turkey Vulture																																		

Table 3-4. Winter habitat matrix^a for birds of the study area.

Estimated Relative Abundances^b of Birds Occupying Each Land Cover Type (Habitat)^c

Common Name	Dev	Agri	TDS	Herb	SagC	SDS	SaMS	MS	MStp	PJ	Juni	AlpS	PJMS	PJSA	Asp	PP	SF	DF	CRip	MCA	PPO	PPOA	BrSo	CRT	AlpH	Snow	RipX	Cotw	SRip	Willow	Water	
Osprey																																
Mississippi Kite																																
Bald Eagle			11			12			25	8	8		8					5					2	15			18	30			70	
Northern Harrier		25	20	25	25	15	12		25			15															15	4			45	
Sharp-shinned Hawk	10																										30	30	30	6		
Coopers Hawk											3																8	8	8			
Northern Goshawk							4	4		12		5	12	12	6	6	6	6	18	6	6	6				4	8	6				
Common Black-hawk																																
Broad-winged Hawk																																
Swainson's Hawk																																
Red-tailed Hawk		125	55	25	60	20	50	5	40	50	50		50	50	4	1	4	4	4	4	4	4				200	300	35	6	45		
Ferruginous Hawk			10	4	8	5			4		10																					
Rough-legged Hawk			12	3	8	11			9		10																					
Golden Eagle			50	20	50	50	12	5	15	12	20	8	12	20	4	12	3	5	5	5	5	12	12	25	25	8					3	
American Kestrel	20	125	70	40	60	55	55		30	25	45		25	30													200	250	30		50	
Merlin	4	8	10	6	8	6			5	5	7			7													12	12	10			
Peregrine Falcon	1		1	1	1	1			1	1	1													1			2	1	2		2	
Prairie Falcon		10	5	5	6	5			3	1	1			1										5			4	2	4			
Virginia Rail																																45
Sora																																1
American Coot																																32
Sandhill Crane		4		2	1																								40			3
Black-bellied Plover																																
American Golden Plover																																
Snowy Plover																																
Semipalmated Plover																																
Piping Plover																																
Killdeer		1																														2
Mountain Plover																																
Black-necked Stilt																																
American Avocet																																
Spotted Sandpiper																																
Solitary Sandpiper																																
Greater Yellowlegs																																
Willet																																
Lesser Yellowlegs																																
Whimbrel																																
Long-billed Curlew																																
Marbled Godwit																																
Sanderling																																
Semipalmated Sandpiper																																
Western Sandpiper																																
Least Sandpiper																																
White-rumped Sandpiper																																
Baird's Sandpiper																																
Pectoral Sandpiper																																
Dunlin																																
Stilt Sandpiper																																
Short-billed Dowitcher																																
Long-billed Dowitcher																																
Wilson's Snipe																																
Wilson's Phalarope																																
Red-necked Phalarope																																
Red Phalarope																																
Sabine's Gull																																
Bonaparte's Gull																																
Franklin's Gull																																
Ring-billed Gull																																
California Gull																																
Herring Gull																																
Thayer's Gull																																
Lesser Black-backed Gull																																
Least Tern																																
Caspian Tern																																
Black Tern																																

Table 3-4. Winter habitat matrix^a for birds of the study area.

Common Name	Estimated Relative Abundances ^b of Birds Occupying Each Land Cover Type (Habitat) ^c																																
	Dev	Agri	TDS	Herb	SagC	SDS	SaMS	MS	MStp	PJ	Juni	AlpS	PJMS	PJSa	Asp	PP	SF	DF	CRip	MCA	PPO	PPOA	BrSo	CRT	AlpH	Snow	RipX	Cotw	SRip	Willo	Water		
Purple Finch																																	
Cassin's Finch	5							15								75	12	75	75	75	75	75						8	15	8	75		
House Finch	450	200	200	15	12	15	8	7	12	50	85		50	50									55					200	200	200			
Red Crossbill										10			10		10	275	840	275	170	275	275	275			10								
White-winged Crossbill																	6								1								
Common Redpoll																																	
Pine Siskin	25				3				12	3	20			20		20	200	1000	200	200	200	200	200					25	25	25			
Lesser Goldfinch	3	1																										2	3	2			
American Goldfinch	30	10																										100	100	100			
Evening Grosbeak	3															10	10	10	10	10	10	10					10	10	7	5			
House Sparrow	125	125																									1		1				

Notes

- a. Explanation of matrix (color coding on a spectrum of green to red based on cell value)
 - White cells indicate habitat not occupied or not important
 - Green cells indicate habitat is of relatively minor importance to the species
 - Red cells with bold black values indicate habitat is of primary importance to the species
- b. The derivation of relative abundances is explained in Chapter 4.
- c. A key to land cover codes is provided in Table 2-2.

Table 3-5. Spring habitat matrix² for birds of the study area.

Common Name	Estimated Relative Abundances ^b of Birds Occupying Each Land Cover Type (Habitat) ^c																																
	Dev	Agri	TDS	Herb	SagC	SDS	SaMS	MS	MStp	PJ	Juni	AlpS	PJMS	PJSA	Asp	PP	SF	DF	CRip	MCA	PPO	PPOA	BrSo	CRT	AlpH	Snow	RipX	Cotw	SRip	Willow	Water		
Greater White-fronted Goose																																1	
Snow Goose																																3	
Ross's Goose																																3	
Cackling Goose																																1	
Canada Goose	400	400		6	3														5					1			450	450	350			800	
Trumpeter Swan																																	
Tundra Swan																																	
Wood Duck																											11	14	8			10	
Gadwall																										9		9				250	
Eurasian Widgeon																																	
American Widgeon	80	80		6																									3			200	
Mallard	125	625			4																						400	400	300	15		871	
Blue-winged Teal																																5	
Cinnamon Teal																																	175
Northern Shoveler																																	185
Northern Pintail																														3			110
Green-winged Teal																											18	8	18	12			150
Canvasback																																	10
Redhead																																	30
Ring-necked Duck																														2			400
Greater Scaup																																	1
Lesser Scaup																														1			45
Surf Scoter																																	
White-winged Scoter																																	
Black Scoter																																	
Long-tailed Duck																																	1
Bufflehead																																	50
Common Goldeneye																																	90
Barrow's Goldeneye																																	
Hooded Merganser																																	5
Common Merganser																												50	50		8		125
Red-breasted Merganser																																	1
Ruddy Duck																																	45
Chukar			4	3		4				4	4			1										5	5								
Ring-necked Pheasant	15	25	15	12	8				3																		120	30	250			45	
Gunnison Sage-grouse					1		2		5																								
White-tailed Ptarmigan												55												5	67								
Dusky Grouse					6		25	15	25	4			10	4	22	35	20	45	25	45	35	35						3		25			
Sharp-tailed Grouse																																	
Wild Turkey			3				4	6	4	4	4		6	4	5	15	6	3	15	15	15	12				15	20	9	15				
Gambel's Quail	5		12			3																					25	15	80				
Red-throated Loon																																	
Pacific Loon																																	1
Common Loon																																	3
Pied-billed Grebe																																	100
Horned Grebe																																	1
Red-necked Grebe																																	
Eared Grebe																																	25
Western Grebe																																	50
Clark's Grebe																																	4
American White Pelican																																	3
Brown Pelican																																	
Neotropic Cormorant																																	
Double-crested Cormorant																											11	15					20
American Bittern																																	
Great Blue Heron																											500	1000					125
Great Egret																																	1
Snowy Egret																																	3
Little Blue Heron																																	
Cattle Egret																																	2
Green Heron																																	1
Black-crowned Night Heron																																	5
Glossy Ibis																																	
White-faced Ibis		11		5																													25
Turkey Vulture	18	40	51	15	51	51	44	44	30	37	37		37	37	12	15	3	15	3	12	15	10				40	150	30	3		50		

Table 3-5. Spring habitat matrix² for birds of the study area.

Common Name	Estimated Relative Abundances ^b of Birds Occupying Each Land Cover Type (Habitat) ^c																																		
	Dev	Agri	TDS	Herb	SagC	SDS	SaMS	MS	MStp	PJ	Juni	AlpS	PJMS	PJSA	Asp	PP	SF	DF	CRip	MCA	PPO	PPOA	BrSo	CRT	AlpH	Snow	RipX	Cotw	SRip	Willo	Water				
Osprey																											20	20				5			
Mississippi Kite																																			
Bald Eagle			2			2			5	8	8		8						5					1	10		15	15				4			
Northern Harrier		5	6	7	8	3	5	5	7																		15	4				45			
Sharp-shinned Hawk	10						8	8							12	12	12	12	12	12	12	12				20	20	20	12						
Coopers Hawk						4	4		50	25			50	50	6	10		10	10	10	10	10				18	18	18							
Northern Goshawk						4	4		6			5	6	6	14	18	18	18	18	18	18	18			5	2	2	2	2	5					
Common Black-hawk																																			
Broad-winged Hawk																																			
Swainson's Hawk			4	3	3	4	3		5					3			2										3	4							
Red-tailed Hawk		125	60	55	60	20	50	25	55	50	50		50	50	12	12	3	12	12	12	12	12				250	250	35	5	45					
Ferruginous Hawk			2	4	2	4			2		6													1											
Rough-legged Hawk			50	20	50	50	12	7	15	12	20	8	12	20	5	12	3	8	8	8	12	12	25	25	8	9	6	9							
Golden Eagle																																			
American Kestrel	20	125	95	40	60	55	55	20	30	25	60		25	30	6	12	2	11			11	12	8		60	200	250	30			50				
Merlin																																			
Peregrine Falcon			1	1	1	1		1	1	1	1		1	1											2		2	1	2			2			
Prairie Falcon			9	8	6	9	3	1	4	1	1		1	1											15		4	2	4						
Virginia Rail																																	150		
Sora																															6	20			
American Coot	300																																1000		
Sandhill Crane		1		2	2				3																			40	5				15		
Black-bellied Plover																																	1		
American Golden Plover																																		1	
Snowy Plover																																		4	
Semipalmated Plover																																		1	
Piping Plover																																		4	
Killdeer	25	100																												15			150		
Mountain Plover																																		3	
Black-necked Stilt																																		25	
American Avocet																																		60	
Spotted Sandpiper																				55										55				4	
Solitary Sandpiper		3																		3										3			10		
Greater Yellowlegs																																		4	
Willet																																		10	
Lesser Yellowlegs																																		4	
Whimbrel																																			9
Long-billed Curlew		1	1	1		1			1																									1	
Marbled Godwit																																		3	
Sanderling																																		5	
Semipalmated Sandpiper																																		1	
Western Sandpiper																																		10	
Least Sandpiper																																		10	
White-rumped Sandpiper																																			7
Baird's Sandpiper																																			1
Pectoral Sandpiper																																			1
Dunlin																																			1
Stilt Sandpiper																																			1
Short-billed Dowitcher																																			45
Long-billed Dowitcher																																			35
Wilson's Snipe																																			100
Wilson's Phalarope																																			10
Red-necked Phalarope																																			4
Red Phalarope																																			13
Sabine's Gull																																			30
Bonaparte's Gull																																			8
Franklin's Gull			5																																1
Ring-billed Gull		1	5																																1
California Gull		1	1																																1
Herring Gull																																			1
Thayer's Gull																																			1
Lesser Black-backed Gull																																			1
Least Tern																																			1
Caspian Tern																																			1
Black Tern																																			4

Table 3-5. Spring habitat matrix² for birds of the study area.

Common Name	Estimated Relative Abundances ^b of Birds Occupying Each Land Cover Type (Habitat) ^c																																				
	Dev	Agri	TDS	Herb	SagC	SDS	SaMS	MS	MStp	PJ	Juni	AlpS	PJMS	PJSA	Asp	PP	SF	DF	CRip	MCA	PPO	PPOA	BrSo	CRT	AlpH	Snow	RipX	Cotw	SRip	Willo	Water						
Townsend's Warbler																																					
Hermit Warbler																																					
Blackburnian Warbler																																					
Graces's Warbler										1																											
Palm Warbler													1				25																				
Black-and-white Warbler																																					
American Redstart																												1			1		2				
Ovenbird																																					
Northern Waterthrush																																					
Kentucky Warbler																																					
MacGillivray's Warbler											15																										
Common Yellowthroat																																					
Hooded Warbler																																					
Wilson's Warbler																																					
Painted Redstart																																					
Yellow-breasted Chat																																					
Summer Tanager																																					
Western Tanager																																					
Green-tailed Towhee																																					
Spotted Towhee																																					
Am. Tree Sparrow																																					
Chipping Sparrow																																					
Clay-colored Sparrow																																					
Brewer's Sparrow																																					
Field Sparrow																																					
Vesper Sparrow																																					
Lark Sparrow																																					
Black-throated Sparrow																																					
Sage Sparrow																																					
Lark Bunting																																					
Savannah Sparrow																																					
Grasshopper Sparrow																																					
Fox Sparrow																																					
Song Sparrow																																					
Lincoln's Sparrow																																					
Swamp Sparrow																																					
White-throated Sparrow																																					
Harris's Sparrow																																					
White-crowned Sparrow																																					
Golden-crowned Sparrow																																					
Dark-eyed Junco																																					
Lapland Longspur																																					
Snow Bunting																																					
Rose-breasted Grosbeak																																					
Black-headed Grosbeak																																					
Blue Grosbeak																																					
Lazuli Bunting																																					
Indigo Bunting																																					
Dickcissel																																					
Bobolink																																					
Red-winged Blackbird																																					
Western Meadowlark																																					
Yellow-headed Blackbird																																					
Rusty Blackbird																																					
Brewer's Blackbird																																					
Common Grackle																																					
Great-tailed Grackle																																					
Brown-headed Cowbird																																					
Orchard Oriole																																					
Bullock's Oriole																																					
Scott's Oriole																																					
Gray-crowned Rosy Finch																																					
Black Rosy Finch																																					
Brown-capped Rosy Finch																																					
Pine Grosbeak																																					

Table 3-5. Spring habitat matrix² for birds of the study area.

Common Name	Estimated Relative Abundances ^b of Birds Occupying Each Land Cover Type (Habitat) ^c																															
	Dev	Agri	TDS	Herb	SagC	SDS	SaMS	MS	MStp	PJ	Juni	AlpS	PJMS	PJSa	Asp	PP	SF	DF	CRip	MCA	PPO	PPOA	BrSo	CRT	AlpH	Snow	RipX	Cotw	SRip	Willo	Water	
Purple Finch																																
Cassin's Finch								15					35	100	75	100	100	100	100	100	100	100					8	15	8	100		
House Finch	450	300	200	25	12	20	8	7	12	70	85		70	70		12		12	12	6	12	7	200	60			300	300	300			
Red Crossbill										10		40	10		10	275	840	275	170	275	275	275										
White-winged Crossbill												1					6															
Common Redpoll																																
Pine Siskin					6			12	6	20			20		20	200	1000	200	200	200	200	200					25	25	25			
Lesser Goldfinch	30	25								25	25		12	25													125	200	100			
American Goldfinch	30	25																									550	550	100		6	
Evening Grosbeak	3															10	10	10	10	10	10	10					12	12	7	5		
House Sparrow	125	125																									1		1			

- Notes**
- a. Explanation of matrix (color coding on a spectrum of green to red based on cell value)
 - White cells indicate habitat not occupied or not important
 - Green cells indicate habitat is of relatively minor importance to the species
 - Red cells with bold black values indicate habitat is of primary importance to the species
 - b. The derivation of relative abundances is explained in Chapter 4.
 - c. A key to land cover codes is provided in Table 2-2.

Table 3-6. Fall habitat matrix² for birds of the study area.

Common Name	Estimated Relative Abundances ^b of Birds Occupying Each Land Cover Type (Habitat) ^c																																	
	Dev	Agri	TDS	Herb	SagC	SDS	SaMS	MS	MStp	PJ	Juni	AlpS	PJMS	PJSa	Asp	PP	SF	DF	CRip	MCA	PPO	PPOA	BrSo	CRT	AlpH	Snow	RipX	Cotw	SRip	Willo	Water			
Purple Finch																																		
Cassin's Finch								15				25			35	100	75	100	100	100	100	100			25			4	8	4	100			
House Finch	300	200	300	25	12	20	8	7	12	70	85		70	70		12		12	12	6	12	7	300	60			300	300	300					
Red Crossbill										10		40	10		10	275	840	275	170	275	275	275			10									
White-winged Crossbill												1					6								1									
Common Redpoll																																		
Pine Siskin					6				12	6	20		120	20		20	200	1200	200	200	200	200	200		120			25	25	25				
Lesser Goldfinch	30	25									25	25		12	25													175	265	135				
American Goldfinch	30	25																									100	1000	125					
Evening Grosbeak	1																10	10	10	10	10	10	10				7	7	7	5				
House Sparrow	125	125																									1		1					

Notes

- a. Explanation of matrix (color coding on a spectrum of green to red based on cell value)
 - White cells indicate habitat not occupied or not important
 - Green cells indicate habitat is of relatively minor importance to the species
 - Red cells with bold black values indicate habitat is of primary importance to the species
- b. The derivation of relative abundances is explained in Chapter 4.
- c. A key to land cover codes is provided in Table 2-2.

Table 3-7. Habitat preferences and characteristics of selected birds of the study area.

Common Name ^a	Periferal Species	Stenotopic Species	Habitat Obligate ^b	Cavity Nester	Old Growth Preference	Notes on Habitat or Management
Canada Goose						nests on ground, tree platforms, cliff ledges near water
Wood Duck	x			x	x	nests usually in tree cavity & boxes, but also on ground
Mallard						prefers nest cover (grass,weeds,brush,litter) height > 8 inches
Ring-necked Duck						good nesting found next to and in beaver ponds in high country
Bufflehead				x		
Common Goldeneye				x		
Barrow's Goldeneye				x		
Hooded Merganser				x		
Common Merganser				x	x	cliffs over water may be more important than cavity trees
Ruddy Duck	x					
Chukar						benefits from water developments next to junctions of ephemeral drainages
Gunnison Sage-grouse		x	x		x	sagebrush obligate; human activity on ridgelines disturb high percentage of sage-grouse
White-tailed Ptarmigan			x			alpine tundra obligate; feeds primarily on willows
Dusky Grouse						nests upper PJ to timberline, needs shrubs, Douglas fir for winter food
Sharp-tailed Grouse						historically on Uncompahgre Plateau, mountain shrub and grasslands
Gambel's Quail		x				
Pied-billed Grebe	x					
Eared Grebe	x					spike rush is adequate nesting cover, although taller wetland graminoid cover is preferred
Western Grebe	x					
Clark's Grebe	x					
Double-crested Cormorant	x		x		x	cottonwoods or other trees along streams or islands in lakes or reservoirs
American Bittern	x					
Great Blue Heron			x		x	nests along major river systems; camping near heronries can affect nesting success

Table 3-7. Habitat preferences and characteristics of selected birds of the study area.

Common Name ^a	Periferal Species	Stenotopic Species	Habitat Obligate ^b	Cavity Nester	Old Growth Preference	Notes on Habitat or Management
Snowy Egret						its high energy foraging style requires high food concentrations
Green Heron	x		x			non-colonial nester, nests in low branches over water
Black-crowned Night Heron						nests quietly alone or in noisy mixed species heronries
Turkey Vulture	x					
Osprey						nesting just to north & south of study area; expect nesting records in future
Bald Eagle			x		x	nests in large trees next to reservoirs or large river systems; largest roosts in cottonwoods, but PJ & Douglas fir also popular
Northern Harrier	x		x			rare nester in study area in marsh habitat or irrigated tall grass
Sharp-shinned Hawk						prefers tall, dense conifer stands near aspen or mountain shrub
Coopers Hawk						lowest elevation nesting accipiter in study area
Northern Goshawk					x	
Common Black-hawk	x					
Swainson's Hawk	x					tree nest at fringes of agriculture lands and high open country
Red-tailed Hawk						stick nest usually high in tree or cliff, most adaptable buteo
Ferruginous Hawk			x			grassland/sparse shrubland obligate; of study area raptors, nest most sensitive to disturbance, prairie dogs important prey
Rough-legged Hawk						winter raptor, notable on Fruitland and Scenic mesas and west end of Montrose County
Golden Eagle						the stick nest with greenery in it is considered the active one
American Kestrel				x	x	nests where trees and cliffs have cavities
Merlin						winter raptor seen in rural farmland, but also open rangeland
Peregrine Falcon			x			obligate of cliff habitat; eyries are usually within sight of riparian areas, esp. rivers
Prairie Falcon			x			obligate of cliff habitat; possibly less common than peregrine falcon
Virginia Rail						prefers tall emergent gramoniods, cattails
Sora						short & tall emergent mix preferred, seedy plants
Sandhill Crane	x					nests in large wet meadows, roosts in shallow open water

Table 3-7. Habitat preferences and characteristics of selected birds of the study area.

Common Name ^a	Periferal Species	Stenotopic Species	Habitat Obligate ^b	Cavity Nester	Old Growth Preference	Notes on Habitat or Management
Semipalmated Plover						5 cm water depth & less to mudflat
Black-necked Stilt						20 cm water depth & less to mudflat
American Avocet	x					20 cm water depth & less to mudflat, swims
Greater Yellowlegs						15 cm water depth & less to mudflat
Lesser Yellowlegs						10 cm water depth & less to mudflat
Long-billed Curlew	x	x	x			potential nester in tallest perennial grass part of desert
Marbled Godwit						10 cm water depth & less to mudflat
Western Sandpiper						5 cm water depth & less to mudflat
Least Sandpiper						5 cm water depth & less to mudflat
Baird's Sandpiper						5 cm water depth & less to mudflat
Stilt Sandpiper						10 cm water depth & less to mudflat
Long-billed Dowitcher						10 cm water depth & less to mudflat
Wilson's Snipe						short vegetation wetlands, decomposing plant litter
Wilson's Phalarope						forages on mudflat & open water; nesting in spikerush in study area?
Ring-billed Gull						dumps appear less attractive to gulls in western Colorado than elsewhere
Band-tailed Pigeon		x			x	forests, mast (acorns,berries) production vital
Eurasian Collared Dove						not likely to replace mourning doves in natural habitats
Yellow-billed Cuckoo		x	x		x	nests in cottonwoods (or other tall deciduous trees), w/ tall willow understory
Barn Owl	x	x				prefers low-use buildings, dirt bank holes; irrigated pasture for voles
Flammulated Owl				x	x	prefers open understory old growth forest
Western Screech-Owl				x	x	prefers Fremont cottonwoods for nesting, often in towns; PJ important, esp. post-nesting
Great Horned Owl						most ubiquitous owl
Northern Pygmy-Owl				x	x	7,000-9,000 ft mostly, removal of cavity trees proven harmful

Table 3-7. Habitat preferences and characteristics of selected birds of the study area.

Common Name ^a	Periferal Species	Stenotopic Species	Habitat Obligate ^b	Cavity Nester	Old Growth Preference	Notes on Habitat or Management
Burrowing Owl		x				plentiful prairie dogs necessary, grasshopper spraying a threat
Spotted Owl	x	x		x	x	near study area, prefers canyons & preys on woodrats, perhaps old growth tall conifers
Long-eared Owl						refurbishes magpie nests in tamarisk, junipers, Gambel oak
Boreal Owl			x	x	x	spruce-fir obligate; small openings in spruce-fir forest acceptable
Northern Saw-whet Owl				x	x	nests in mature/old growth conifers (including PJ), old growth important to migrants
Common Poorwill						birds commonly collide with vehicles on dirt roads in mtn. shrub
Black Swift			x			nest on vertical rock faces near waterfalls; high humidity at nest site, high flying ants are major food
White-throated Swift			x			rock or cliff nester; forages everywhere, its problems probably not in study area
Broad-tailed Hummingbird						red electric fence insulators are fatal attractants, mid elev tubular flowers favorable
Black-chinned Hummingbird			x			prefers trees for nests, esp. PJ, but brush & herb land for foraging
Rufous Hummingbird						mid July thru August <i>Castilleja</i> spp. important for forage
Belted Kingfisher						nest holes in exposed dirt bank
Lewis's Woodpecker		x		x	x	flourishes after wildfires, but also favors large old Gambel oaks
Red-headed Woodpecker				x		
Williamson's Sapsucker				x	x	conifers for food vital, aspens for nest holes good
Yellow-bellied Sapsucker				x		
Red-naped Sapsucker				x	x	
Downy Woodpecker				x	x	deciduous trees preferred, at least 5 snags/acre >6 inch diameter breast height trees
Hairy Woodpecker				x	x	
American Three-toed Woodpecker			x	x	x	subalpine spruce-fir obligate; fresh dead trees (<2yrs) popular, but live trees suitable
Northern Flicker				x	x	ground foraging and ants important
Olive-sided Flycatcher					x	prefers old growth forest with snags & natural openings
Willow Flycatcher		x	x		x	prefers to nest in willow <10ft tall, stand <30ft wide, wet below, few to no cows

Table 3-7. Habitat preferences and characteristics of selected birds of the study area.

Common Name ^a	Periferal Species	Stenotopic Species	Habitat Obligate ^b	Cavity Nester	Old Growth Preference	Notes on Habitat or Management
Hammond's Flycatcher		x			x	prefers old growth tall conifers with open understories
Gray Flycatcher			x			PJ bird in Colorado, with snags & a little sagebrush helps
Dusky Flycatcher						most any tall shrub stand between PJ and Spruce-Fir zones
Cordilleran Flycatcher						shady ledge nester often near streams or moist ravines
Black Phoebe	x	x				newcomer to study area, nests on shady cliffs & under bridges near water
Ash-throated Flycatcher			x	x	x	nests almost exclusively in PJ
Cassin's Kingbird	x	x	x			PJ obligate; may be attracted to PJ burns
Western Kingbird						attracted to manmade structures for nest sites, power poles
Loggerhead Shrike						nests in tall greasewood, scattered junipers, or sagebrush (listed in order of preference)
Gray Vireo	x		x			PJ obligate; tends to replace plumbeous vireo in lower elevation PJ
Gray Jay			x			conifer obligate (spruce or pine)
Pinyon Jay			x			PJ obligate; threatened by PJ eradication, and predation by ravens, crows, accipiters
Horned Lark						prefers wide open spaces, short herbaceous veg and sparse, low shrubs
Purple Martin		x	x	x	x	requires mature to old growth aspen plus a habitat element yet to be defined
Tree Swallow				x	x	nests in trees or nest boxes near water
Violet-green Swallow				x		nests in aspen & cliffs mostly, but other tree types too
N. Rough-winged Swallow						nests in dirt bank holes like bank swallows, but not in colonies
Bank Swallow		x				after martin, least common swallow even though nesting in colonies
Black-capped Chickadee				x	x	
Mountain Chickadee				x	x	
Juniper Titmouse			x	x	x	PJ obligate; range expands in winter to ponderosa pine and lowland riparian areas
Bushtit			x			PJ obligate
Red-breasted Nuthatch				x	x	

Table 3-7. Habitat preferences and characteristics of selected birds of the study area.

Common Name ^a	Periferal Species	Stenotopic Species	Habitat Obligate ^b	Cavity Nester	Old Growth Preference	Notes on Habitat or Management
White-breasted Nuthatch				x	x	
Pygmy Nuthatch			x	x		ponderosa pine woodland obligate
Rock Wren			x			obligate of open arid habitats dominated by rocks, talus, boulders, scree, and cliffs
Bewick's Wren				x		
House Wren				x		
Winter Wren						winters along small streams & occasionally large streams
Marsh Wren	x					
American Dipper						Steve Bouricious, Palisade, CO has successfully designed nestbox accepted by this species
Golden-crowned Kinglet		x	x		x	obligate of conifer forests (spruce-fir, Douglas fir, lodgepole, and ponderosa pine)
Eastern Bluebird				x	x	
Western Bluebird			x	x	x	nests in open coniferous woodland, preferring woodland interior more than mountain bluebird
Mountain Bluebird				x	x	nests in open woodland, prefers more edge than western bluebird
Swainson's Thrush		x				willow, alder, & riparian conifer on east side of study area provides good nesting
Gray Catbird	x	x				
Northern Mockingbird	x		x			in western Colorado, prefers juniper savannah and greasewood
Sage Thrasher			x			a sagebrush or greasewood obligate, but may also nest in rabbitbrush or saltbushes
Brown Thrasher						
European Starling				x	x	
American Pipit			x			alpine tundra obligate; prefers mossier wetter nesting habitat than horned larks
Virginia's Warbler						heavy grazing harmful to habitat, may destroy nests
Black-throated Gray Warbler			x			PJ obligate; nests usually near end of limb
Graces's Warbler	x		x		x	ponderosa pine obligate; nests and forages in tops of tallest trees, Gambel oak understory attractive
MacGillivray's Warbler						attracted to dense thickets

Table 3-7. Habitat preferences and characteristics of selected birds of the study area.

Common Name ^a	Periferal Species	Stenotopic Species	Habitat Obligate ^b	Cavity Nester	Old Growth Preference	Notes on Habitat or Management
Wilson's Warbler			x			riparian shrub obligate; usually nests on the ground at the base of a shrub
Yellow-breasted Chat			x			riparian shrub obligate; of tall riparian shrubs tamarisk is least favored
Green-tailed Towhee						a varied mix of shrubs is best
Brewer's Sparrow			x			sagebrush obligate; nest at shrub edge vulnerable to large ungulate disturbance
Sage Sparrow		x	x		x	sagebrush obligate; requires large (>150 acre) sagebrush patch for breeding success; a ground feeder that prefers a modest amount of understory
Lark Bunting						pos. response to moderate grazing in taller grasses, neg. response to heavy grazing in shorter grasses
Grasshopper Sparrow						pos. response to moderate grazing in taller grasses, neg. response to heavy grazing in shorter grasses
Fox Sparrow						large willows (stems >2 inch diam) over water are best
Blue Grosbeak						uses tamarisk as much as it does any lowland riparian shrub
Lazuli Bunting						usually builds nest within 4 feet of ground in shrubs
Bobolink	x	x				early hayfield mowing precludes nesting success at mid elevations
Yellow-headed Blackbird						nests in tall emergents in water >1 foot deep
Rusty Blackbird						forages along edges of wooded ponds
Common Grackle	x					in western Colorado, Fremont cottonwoods of towns may be significant
Great-tailed Grackle	x					
Brown-headed Cowbird						rest rotation & deferred grazing systems disperse parasitism by this species
Scott's Oriole	x	x	x			PJ obligate; nests in junipers, yet constructs nest of yucca leaf fibers
Brown-capped Rosy Finch						but for global climate change, has most secure nesting habitat
Pine Grosbeak			x			spruce-fir obligate
Cassin's Finch						house finches may discourage low & mid elevation habitat use
White-winged Crossbill	x		x			coniferous forest obligate
Pine Siskin						conifer, thistle, & esp. dandelion seeds important forage
Lesser Goldfinch						dependent upon surface water, but PJ quite popular habitat

Table 3-7. Habitat preferences and characteristics of selected birds of the study area.

Common Name ^a	Periferal Species	Stenotopic Species	Habitat Obligate ^b	Cavity Nester	Old Growth Preference	Notes on Habitat or Management
American Goldfinch						dependent upon surface water nearby
Evening Grosbeak		x				spruce budworm, Siberian elm seeds, sunflower seeds important forage
House Sparrow				x		common species "never" found on public land
TOTALS	30	22	43	39	41	

Notes

a. Birds listed in taxonomic order according to the the American Ornithologists' Union (AOU 2009).

b. Obligate species selected for this table do not include waterbirds and shorebirds unless non-aquatic habitat factors were important.

Table 3-8. Summer habitat matrix^a for obligate^b birds of the study area.

Common Name ^d	Estimated Relative Abundances of Birds Occupying Each Land Cover Type (Habitat) ^c																															
	Dev	Agri	TDS	Herb	SagC	SDS	SaMS	MS	MStp	PJ	Junj	AlpS	PJMS	PJSA	Asp	PP	SF	DF	CRip	MCA	PPO	PPOA	BrSo	CRT	AlpH	Snow	RipX	Cotw	SRip	Willo	Water	
Gunnison Sage-grouse				1	1		2		5																5	5	5				2	2
White-tailed Ptarmigan												67																				
Double-crested Cormorant																											15	20				2
Great Blue Heron																											500	1000				125
Green Heron																											3	3	3			1
Bald Eagle																								1			1	1			3	
Northern Harrier		6	7	8	3	5	5	8				15																			10	
Ferruginous Hawk		2	2	2	2			2			6													1	1							
Peregrine Falcon		1	1	1	1		1	1	1	1	1	1	1	1											1	1		2	1	2	1	
Prairie Falcon		9	6	3	9	3		4	1	4	1	25	1	1									5	5	25		4	2	4		3	
Long-billed Curlew		2	2		2				1																						1	
Yellow-billed Cuckoo																																
Boreal Owl															1			30														
Black Swift												2													2	2						
White-throated Swift												55													125	55						60
Black-chinned Hummingbird	10		11	16	6	12	16	12	7	242	120		100	245		4			3	4	4						100	250	70		14	
American Three-toed Woodpecker																14	185	14		14	4	2										
Willow Flycatcher																														1	1	
Gray Flycatcher					12		20			625	275		300	625																		
Ash-throated Flycatcher					5		18			250	125		200	250		12		4				12							25			
Cassin's Kingbird		4								6	6			7																		
Gray Vireo					2					45	55		1	50																		
Gray Jay															20			424	5		5											
Pinyon Jay	20			30	12	35	20	20	225	225		200	225		27			27	16	17	27	27					5	5	5			
Purple Martin															28																	1
Juniper Titmouse						3				200	125		200	200		3							3									
Bushitit										40	20		40	30		8							8						75	3	3	
Pygmy Nuthatch										2			2					815		25	25	12	815	800								
Rock Wren	55	25	25	70						55	60	81	20	55		5	1	240	8	25	25	1	1		125	125	81	3				
Golden-crowned Kinglet							4	4		20	20		25		15		287		20		12	200	200									
Western Bluebird																																
Northern Mockingbird		45	25	6							5			1																		
Sage Thrasher		50		225		225		225																								
American Pipit				1								825						8														7
Black-throated Gray Warbler		4		8		11	11	8	650	125		650	400		10			10	13	10	10	10										
Graces's Warbler										1			1				325					325	320									
Wilson's Warbler												20																				
Yellow-breasted Chat																												125	70	250		878
Brewer's Sparrow		100	3	200		1200		1400				53		100																		
Sage Sparrow		15		55		8		8																								
Scott's Oriole										1	1			1																		
Pine Grosbeak																		80	8		8											
White-winged Crossbill												1						6									1					
Total Number of Species (S) for which habitat is "primary"			2	1	2	1	1		3	6	4	4	2	6	1	3	6					2		1	3	4		3	5	5	1	2

- Notes**
- Explanation of matrix (color coding on a spectrum of green to red based on cell value)
 - White cells indicate habitat not occupied or not important
 - Green cells indicate habitat is of relatively minor importance to the species
 - Red cells with bold black values indicate habitat is of primary importance to the species
 - Waterfowl and shorebirds are not included here with obligate species.
 - A key to land cover codes is provided in Table 2-2.
 - Bird names shown in bold red are status species (Table 7-1).

Chapter 4

BIRD DIVERSITY IN THE STUDY AREA

In this chapter we estimate overall seasonal relative bird abundances (N) and bird species richness (S) for each land cover type in the study area (Table 4-1), and use these estimates to calculate Shannon Index (H') diversity scores (Magurran 1988) for each land cover type (Table 4-2). We then join N, S, and H' values to our land cover raster dataset to symbolize each of these factors by season across the study area (Maps 4-1, 4-2, and 4-3). We also map species richness of habitat obligate birds across the study area (Map 4-4). This mapping is intended to help planners locate the most important bird habitat areas on the landscape for management (see Chapter 8).

Methods

First we estimated relative abundances (see the habitat matrices, Tables 3-3 through 3-6) of each bird species within each relevant land cover type for each season. Estimated relative abundances were assigned by the authors based on professional experience and judgment, on published sources (Andrews and Righter 1992; Kingery 1998; Righter et al. 2004), and ongoing bird count programs (RMBO 2009). Using qualitative seasonal occurrence categories from Table 3-1 (qualitative rankings of rare, uncommon, fairly common, common, and abundant), we made number assignments for estimated relative abundances generally as follows, breaking along a logarithmic (base-2) progression:

<u>Seasonal Occurrence Category</u>	<u>Numeric Estimated Relative Abundance Assignment</u>
Accidental (A) or extremely rare (e)	None
Rare (r)	1 or 2
Uncommon (u)	3 to 10
Fairly Common (f)	11 to 50
Common (c)	51 to 250
Abundant (a)	251 to 1250 or more

We then subjectively tuned these numbers based on review of RMBO's statewide point-count survey data (RMBO 2009), adjusted for effort (based on the varying number of point counts in each habitat), according to the following guidelines and assumptions:

- We used RMBO's Monitoring Colorado's Birds (MCB) statewide habitat-based point count dataset (RMBO 2009) to guide our estimated relative abundance assignment for each bird species in each land cover type (where applicable) in the study area. We used the statewide rather than the regional dataset because the larger sample size suggests the statewide dataset is more powerful. We estimated and adjusted for the fact that RMBO's statewide dataset would reflect significant numbers of certain species that were inflated by eastern Colorado and the San Luis Valley populations (for example, we assumed that high numbers of ring-necked pheasants and lark buntings in sagebrush, and significant numbers of blue jays in lowland riparian habitats

reflect survey results in eastern not western Colorado, and high numbers for several waterfowl and water bird species were influenced by survey results in the San Luis Valley).

- Only the birds that are characteristic of the habitat (land cover type) were assigned relative abundance numbers because habitat discrimination will be clearer if habitat information is not cluttered with all the species that could pass through a habitat. Rare species may form part of the character of a habitat. However, species listed as accidental (A) or extremely rare were not assigned relative abundance numbers (and therefore do not figure into our diversity mapping exercise).
- We assigned the “water” land cover type to most of the water birds, which we assumed to include marsh, mud flat, boulder-strewn stream channels, and open water. Where water bird species make significant use of shore vegetation other than wetlands, we also consider the species as characterizing the shore vegetation habitat.
- We assigned slightly inflated relative abundance estimates to bird species substantially attracted to one type of vegetation or plant species (e.g., obligate bird species) to demonstrate and differentiate the importance of that habitat. An estimated relative abundance number for an obligate species is likely to be somewhat greater than truly representative of conditions in the field.

To estimate species richness (S) in each land cover type, we counted the number of species that received an estimated relative abundance assignment in each seasonal habitat matrix (Table 3-3 through Table 3-6). These counts are summarized in Table 4-1. Finally, we calculated diversity (H') in Excel using the Shannon Index (Magurran 1988) as follows:

$$H' = - \sum_{i=1}^S p_i \ln p_i - [(S - 1)/2N]$$

Where

n_i is the number of individuals in species i ; the abundance of species i .

S is the number of species (species richness).

N is the total number of all individuals

p_i is the relative abundance of each species, calculated as the proportion of individuals of a given species to the total number of individuals in the community: $\frac{n_i}{N}$

Our Shannon Index (H') calculations are presented on Table 4-2.

We then joined N, S, and H' values to our land cover raster dataset to spatially symbolize each of these factors by season across the study area (Maps 4-1, 4-2, and 4-3). To generate Map 4-4 (obligate species richness in primary habitats in summer), we used the obligate sub-set of the bird species of the study area shown on Table 3-8.

Limitations

Estimated relative abundances presented in this document and used in our mapping exercises must be considered semi-qualitative, and should not be construed as actual survey results (actual relative abundance numbers could only be obtained by censusing each habitat during each season). All relative abundance estimates required subjective adjustment according to the authors' professional experience. RMBO has performed statewide habitat-based point count surveys during the summer season only, and these data were used to estimate summer season relative abundances, and to a lesser extent, spring abundances. Fall and winter relative abundances were adjusted by comparison/contrast with spring/summer relative abundances. Christmas count data is not habitat-based and thus was only marginally assistive in assigning relative abundance estimates. Additionally, RMBO's habitat designations differ somewhat from the land cover types used by this review. However, with judgment the differences were reconciled to assign estimated relative abundance numbers to study area land cover types.

The habitat-specific point count methodology has limitations. Typically, the data show that conspicuous species outnumbered inconspicuous species (e.g., broad-tailed hummingbird vs. black-chinned hummingbird, common nighthawk vs. common poorwill), potentially reflecting surveyor or sampling bias. Birds are potentially documented as occurring in the habitat at a surveyor's location even if they are detected from different (adjacent) habitats. Flyovers are also recorded in the habitat at the surveyor's location, which may or may not reflect the importance of the habitats to the birds.

It should be recognized that virtually every species of bird that exists in the study area passes through every habitat at some time. However, if this fact were reflected in the habitat matrices, the value of the comparison would be trivialized. Thus birds such as Cooper's hawks that may pursue a prey species in the water land cover type are not counted as occurring in the water land cover type. It also should be recognized that the seasonal occurrence categories themselves have the same weakness that point count data do. Conspicuous species are found more readily and thus are apt to rate a higher seasonal occurrence category. However, over the many years of active bird watching in western Colorado, the state of the art has reduced this weakness and using the RMBO data simply permits finer adjustments when comparing habitats. Even so, the estimated relative abundance figures within groups (ducks, raptors, shorebirds etc.) are better than between groups.

In nature, the expected distribution of species is not uniform. Stating that a species is fairly common in a habitat does not necessarily mean that the species is fairly common *throughout* that particular habitat. Typically the distribution will be spotty at the upper or lower elevation limits of that upland habitat. A species shown as "common" in a habitat is more likely to be generally distributed across that habitat. In some cases (for obligates) we assigned a higher N than is likely to be truly relative to other species in the habitat or its own occurrence in other habitats. We made such adjustments in order to enhance the power to discriminate between diversity levels across habitats in our diversity mapping exercise.

Discussion

Our analysis of bird species richness (S) across the study area and between seasons ([Table 4-1](#) and [Map 4-1](#)) reveals that overall relative species richness in the study area is highest during spring and fall (migration seasons) and lowest during winter. Water and riparian land cover types are consistently highest in species richness throughout the year ([Table 4-1](#)), whereas the snow, bare soil, alpine/subalpine meadow and shrub, and cliff/rock/talus land cover types are consistently the least species rich. Across the spring, summer, and fall seasons, species richness in the upland land cover types is generally higher in the mid to high-elevation upland forests and woodlands than in shrublands.

In winter, pinyon-juniper types and low-elevation shrubland types support the highest upland bird species richness across the study area. Species richness distribution illustrated on [Map 4-1](#) suggests that BLM lands are relatively more species rich during fall and winter than during summer and spring, and that BLM lands are relatively more species rich during winter than other lands in the study area. The highest species richness in the study area during summer, spring, and fall occurs in riparian areas in the river valleys, and on National Forest Lands on the Uncompahgre Plateau, Grand Mesa, the West Elk Mountains, and the San Juan Mountains. Obligate species richness mapping across the study area for summer ([Map 4-4](#)) illustrates the relative importance of BLM lands to the breeding success of obligate birds of the study area. Obligate species richness on BLM lands is relatively higher than on other lands in the study area. A high proportion of the study area's obligate birds are dependent on pinyon-juniper woodland and sagebrush land cover types ([Table 3-7](#)), and a high proportion of these land cover types in the study area are mapped on BLM lands ([Chapter 2](#)).

Relative bird abundances (N) across the study area ([Table 4-1](#)) are more subjective and qualitative than species richness estimates. Overall, birds are generally most abundant throughout the study area in summer, moderately abundant in spring and fall, and least abundant in winter ([Map 4-2](#)). Our analysis suggests that riparian woodlands (especially cottonwoods) and mixed riparian shrublands support the highest abundance of bird life in spring, fall, and winter. Across all seasons, snowfields and alpine/subalpine meadows and shrublands support the lowest bird abundance. During summer, high to mid-elevation upland forested land cover types support relatively high abundance. The water land cover type, registering at relatively moderate bird abundance, appears to be underestimated across the seasons, especially during summer. This is an artifact of our process of emphasizing the relative importance of the water type in non-breeding seasons and the relative importance of riparian types in sheltering birds in winter. The cottonwood land cover type registers with the highest bird abundance in all seasons, perhaps suggesting overestimation. This is due to the wide elevation range of this cover type in addition to its exceptional vegetative structure. Comparing the spectrum of upland forest and woodland land cover types, the higher elevation Engelmann spruce/fir mix has greater numbers of birds in all seasons and the lower-elevation pinyon-juniper has greater species richness in all seasons. The tall semi-desert shrub land cover type holds the most species and highest relative abundance of birds among the driest, lowest elevation land cover types.

Our analysis of bird diversity (H') across the study area ([Table 4-2](#) and [Map 4-3](#)) suggests that a high level of bird diversity characterizes more land cover types during fall than any other season. The lowest levels of bird diversity across the study area occur during winter, due to lower seasonal bird abundance and lower species richness. Pinyon-juniper woodland land cover types generally support high bird diversity during spring, fall, and winter, and relatively moderate diversity during summer. Ponderosa pine land cover types are also highly bird diverse during spring, summer, and fall. The land cover types with the highest relative bird diversity are quite diverse due not only to being species rich, but also because number of individuals is spread out equitably among their species. Riparian and water land cover types, although species rich, tend to have only a few species dominating the bird community in terms of relative abundance. Thus their diversity indices drop to the middle ranks. The distribution of bird diversity illustrated on [Map 4-3](#) suggests that BLM lands are relatively more bird diverse during spring and winter than during summer and fall, and that BLM lands have significantly higher bird diversity during winter and spring than other lands in the study area.

Literature Cited

Andrews, R., and R. Righter. 1992. Colorado birds: a reference to their distribution and habitat. Denver: Denver Museum of Natural History.

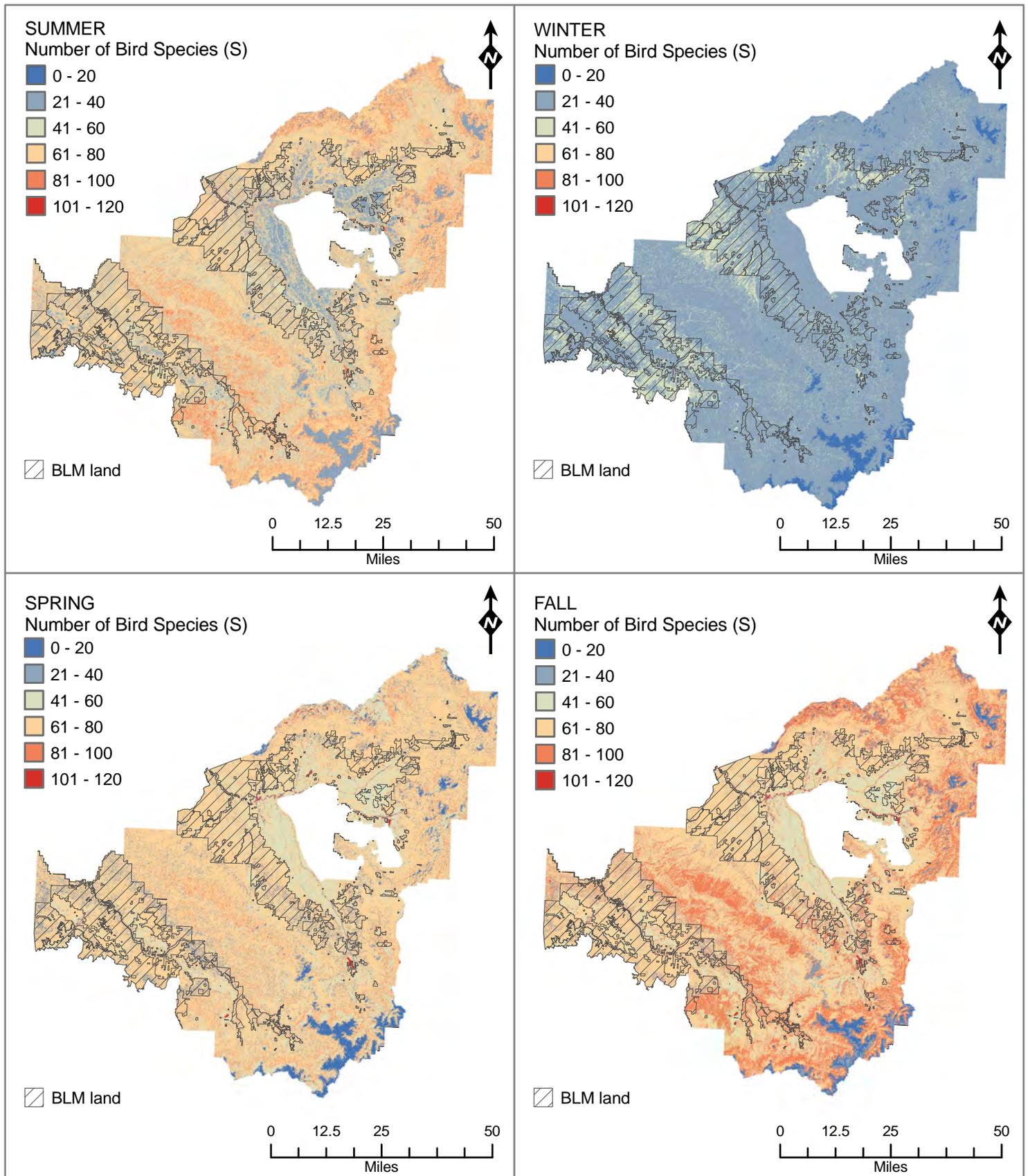
Kingery, H. E., ed. 1998. Colorado Breeding Bird Atlas. Denver: Colorado Bird Atlas Partnership & Colorado Div. of Wildlife.

Magurran, A. E. 1988. Ecological diversity and its measurement. Princeton, NJ: Princeton University Press.

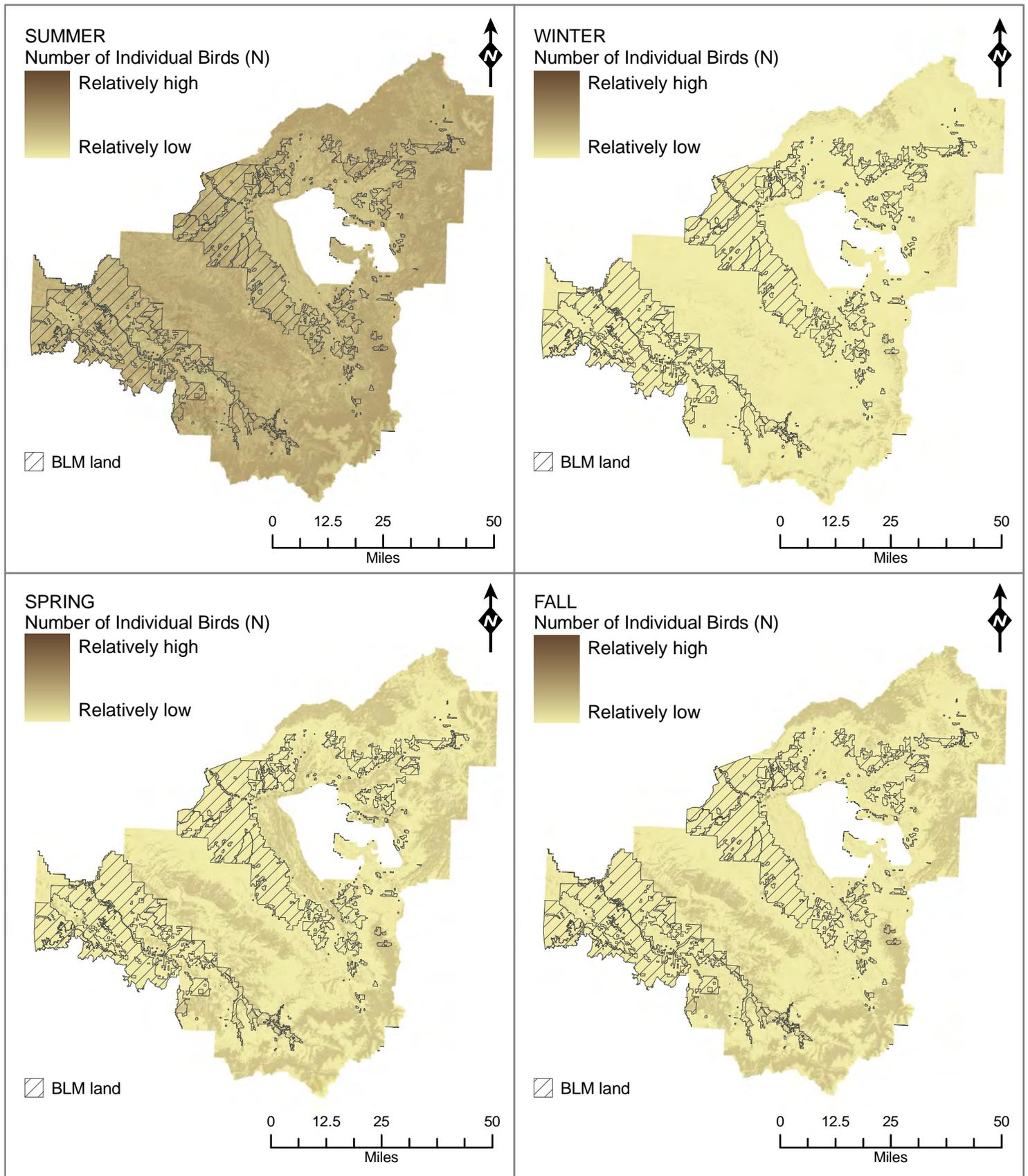
Righter, R., R. Leivad, C. Dexter, and K. Potter. 2004. Birds of western Colorado plateau and mesa country. Grand Junction: Grand Valley Audubon Society.

RMBO. 2009. Habitat-based point transect survey data queries. Accessed at:
<http://www.rmbo.org/public/monitoring/speciesByHabitat.aspx>.

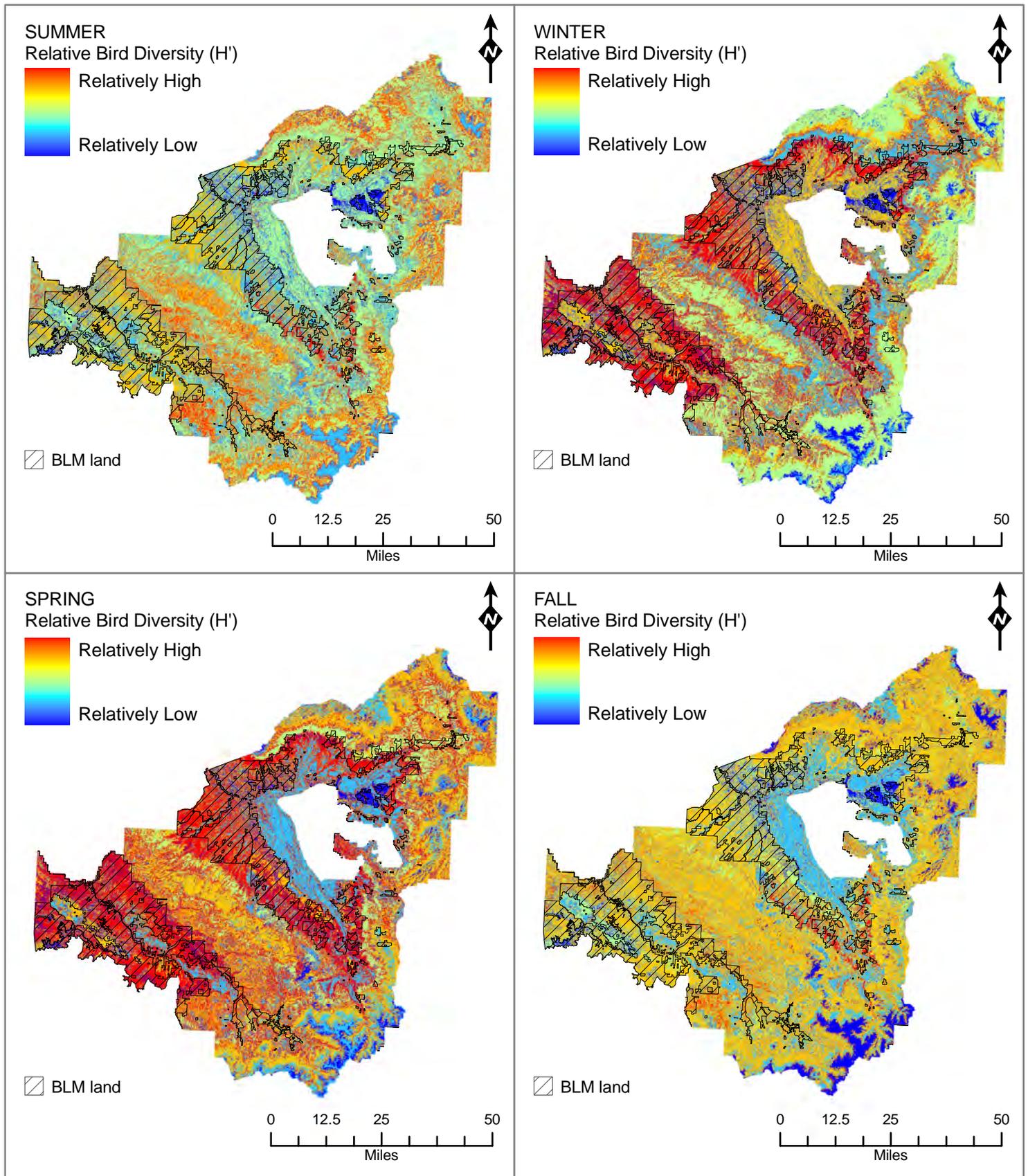
Map 4-1
Bird species richness by season.



Map 4-2
Estimated relative bird abundances by season.



Map 4-3
Bird diversity (Shannon Index) by season.



Map 4-4
Obligate species richness in primary habitats in summer.

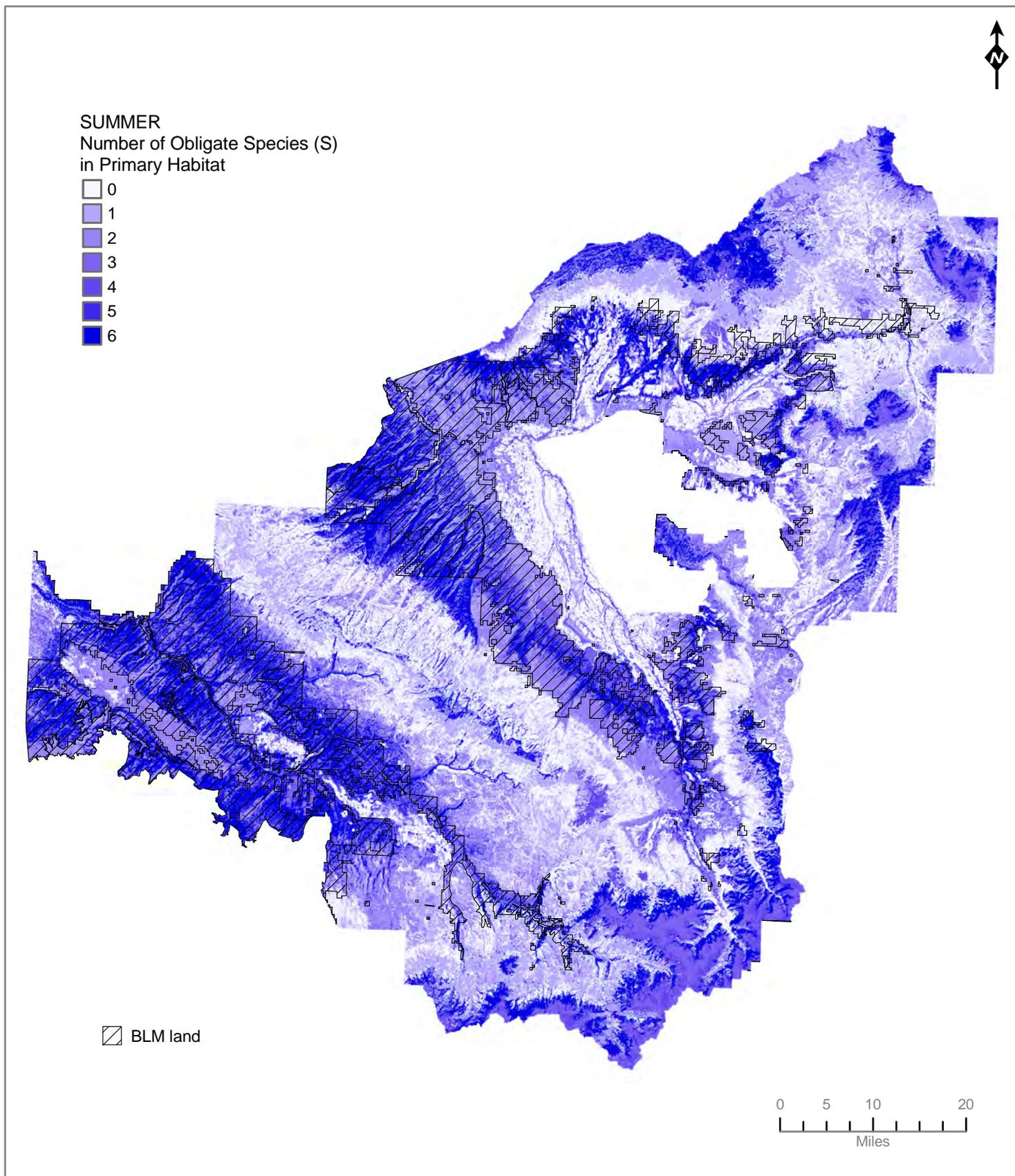


Table 4-1. Bird species richness (S) and estimated relative bird abundances (N) sorted from highest to lowest for each land cover type^a in the study area in each season.

Estimated Bird Species Richness (S) ^{b,c} by Land Cover Type							
Summer	S	Winter	S	Spring	S	Fall	S
Water	91	RipX	75	Water	121	Water	119
CRip	87	Cotw	74	Cotw	112	Cotw	118
Cotw	83	SRip	70	RipX	109	RipX	112
PPO	82	Water	58	SRip	102	SRip	102
PP	81	Dev	49	CRip	86	CRip	92
MCA	80	PJ	46	PJMS	80	PJMS	85
DF	79	Juni	45	PPO	78	PPO	85
PPOA	78	Agri	40	PJ	76	PP	83
Asp	77	TDS	40	PP	76	DF	83
PJMS	74	PJSa	38	DF	76	MCA	82
RipX	73	PJMS	35	MCA	76	PPOA	82
PJ	71	PP	35	Willo	76	PJ	78
SagC	64	SagC	34	PPOA	75	Willo	78
SaMS	64	CRip	34	SagC	70	Asp	75
SRip	64	PPO	34	Juni	69	MS	72
MS	63	DF	33	Asp	69	SaMS	70
Willo	63	MCA	32	PJSa	68	Juni	70
SF	62	PPOA	29	SaMS	67	SagC	69
Juni	61	MStp	28	MS	66	PJSa	68
MStp	57	Herb	27	TDS	63	TDS	63
PJSa	57	SDS	27	MStp	61	SF	63
TDS	53	SaMS	26	SF	55	MStp	62
Herb	45	SF	26	Herb	50	Herb	51
Dev	40	MS	22	Agri	48	Agri	47
Agri	37	Asp	22	Dev	45	Dev	46
AlpS	36	Willo	19	SDS	42	SDS	44
SDS	35	BrSo	14	CRT	19	AlpS	37
AlpH	31	CRT	13	BrSo	14	AlpH	36
CRT	22	AlpS	9	AlpH	11	BrSo	17
BrSo	15	AlpH	9	AlpS	8	CRT	17
Snow	9	Snow	0	Snow	0	Snow	8

Estimated Relative Bird Abundances (N) ^{b,c} by Land Cover Type							
Summer	N	Winter	N	Spring	N	Fall	N
Cotw	31142	Cotw	15140	Cotw	25715	Cotw	23770
PPO	15139	RipX	8909	RipX	17070	RipX	15853
PP	14602	SRip	7395	SRip	10195	SRip	10006
PPOA	14356	SF	5385	Water	9675	Water	9805
RipX	14159	Water	4482	PP	7291	PP	8499
CRip	13264	Agri	3960	PPO	6693	SF	8230
MCA	13081	PP	3883	PPOA	6458	PPO	7759
DF	12582	PPO	3497	SF	6451	PPOA	7377
Asp	11529	Dev	3371	CRip	5950	CRip	7104
SF	11497	DF	3358	DF	5800	MCA	7002
Water	7250	MCA	3297	MCA	5750	DF	6988
Willo	7121	PPOA	3154	Agri	5230	TDS	5262
SRip	6849	CRip	2960	TDS	5106	Agri	4837
SaMS	6387	TDS	2746	Dev	4759	Dev	4506
MS	6173	SDS	2009	PJMS	3931	Asp	4079
PJMS	6164	PJ	1536	PJ	3604	PJMS	4077
PJ	5757	PJSa	1320	PJSa	3527	PJSa	3792
PJSa	4893	PJMS	1297	Asp	3261	PJ	3771
SagC	4808	Juni	1224	SDS	3140	SagC	3618
TDS	4298	SagC	968	Willo	2996	SaMS	3496
MStp	4228	MS	751	Juni	2892	Willo	3449
Agri	3865	SaMS	607	SagC	2872	SDS	3303
SDS	3662	MStp	500	MS	2827	MS	3243
AlpS	3357	BrSo	358	SaMS	2559	AlpS	3243
AlpH	3323	CRT	349	MStp	1974	MStp	3103
Juni	3119	Asp	332	Herb	1469	Juni	2856
Dev	2841	Herb	320	CRT	943	AlpH	2569
CRT	1452	Willo	303	BrSo	566	Herb	1665
Herb	1394	AlpS	129	AlpH	233	BrSo	930
BrSo	752	AlpH	89	AlpS	129	CRT	817
Snow	160	Snow	0	Snow	0	Snow	109

Notes

- a. Key to land cover type codes provided in Table 2-2.
- b. See Map 4-1 for spatial depiction of bird species richness and Map 4-2 for spatial depiction of estimated relative bird abundances across the study area.
- c. Results are subjectively color coded to highlight relative differences between land cover types and between seasons as follows:

Richness 101 to 120 species (red) = relatively high richness
 81 to 100 species (orange) = relatively moderately high richness
 61 to 80 species (light yellow) = relatively moderate richness
 41 to 60 species (green) = relatively moderately low richness
 21 to 40 species (light blue) = relatively low richness
 0 to 20 species (dark blue) = relatively very low richness

Abundance ≥10,000 (dark brown) = relatively high abundance
 ≤9,999 and ≥5,000 (med. brown) = relatively moderately high abundance
 ≤4,999 and ≥1,500 (lt. brown) = relatively moderate abundance
 ≤1,400 and ≥500 (light tan) = relatively moderately low abundance
 ≤499 (light yellow) = relatively low abundance

Table 4-2. Estimated relative bird diversity (H')^a for each land cover type in the study area, sorted from highest to lowest for each season.

Estimated Relative Bird Diversity (H') by Land Cover Type ^{b,c}							
Summer	H'	Winter	H'	Spring	H'	Fall	H'
PPO	5.34	RipX	4.58	PJMS	5.45	PJMS	5.51
PPOA	5.32	PJ	4.19	PJ	5.24	PPOA	5.40
PP	5.31	Juni	4.15	PPOA	5.23	PPO	5.35
CRip	5.21	PJMS	4.10	PJSa	5.18	PJ	5.17
PJMS	5.14	SRip	4.08	SaMS	5.17	PP	5.17
MCAAs	5.09	Dev	4.05	Juni	5.17	CRip	5.16
DF	5.09	Agri	4.03	PPO	5.17	Juni	5.13
Juni	5.03	SagC	4.01	CRip	5.08	Asp	5.12
PJ	4.76	Herb	3.94	SagC	5.04	PJSa	5.10
Water	4.74	Cotw	3.92	PP	5.03	DF	5.09
PJSa	4.62	PJSa	3.92	MCAAs	4.98	MS	5.08
MS	4.57	MStp	3.91	MStp	4.98	MCAAs	5.07
RipX	4.48	Asp	3.86	DF	4.97	Water	4.99
SagC	4.35	PPOA	3.74	Asp	4.96	SaMS	4.89
SF	4.35	PPO	3.70	Water	4.95	Willo	4.84
Asp	4.34	SaMS	3.68	MS	4.90	SagC	4.78
Cotw	4.31	CRip	3.63	Willo	4.90	SRip	4.65
Agri	4.27	DF	3.63	SRip	4.70	MStp	4.61
SaMS	4.26	Water	3.59	RipX	4.52	Agri	4.47
SRip	4.20	MCAAs	3.57	Agri	4.47	RipX	4.42
Willo	4.14	PP	3.56	Cotw	4.43	TDS	4.38
Herb	3.99	Willo	3.56	Herb	4.37	Herb	4.36
TDS	3.99	SF	3.37	TDS	4.33	Cotw	4.34
AlpS	3.89	TDS	3.09	Dev	4.21	SF	4.32
Dev	3.74	MS	3.06	SF	4.13	Dev	4.23
MStp	3.73	AlpH	2.59	CRT	3.54	AlpS	3.92
CRT	3.61	BrSo	2.57	SDS	3.07	CRT	3.24
AlpH	3.25	AlpS	2.36	AlpH	2.83	SDS	3.23
BrSo	2.79	CRT	2.31	BrSo	2.61	BrSo	3.18
Snow	2.55	SDS	1.48	AlpS	2.16	AlpH	3.18
SDS	2.39	Snow	0.00	Snow	0.00	Snow	2.30

Notes

- a. See Map 4-3 for spatial depiction of estimated relative bird diversity (Shannon Index) across the study area.
- b. Key to land cover type codes provided in Table 2-2.
- c. Results are subjectively color coded to highlight relative differences in diversity between land cover types and between seasons as follows:
 - ≥5.00 (red) = relatively high diversity
 - ≤4.99 and ≥4.00 (yellow) = relatively moderate diversity
 - ≤3.99 (blue) = relatively low diversity

Chapter 5

THE STUDY AREA IN THE CONTEXT OF EXISTING BIRD CONSERVATION STRATEGIES

Overview

National, even international, bird conservation initiatives have united to a remarkable degree within the last score years. The various initiatives use similar language and maps, have parallel assessment methods, and their projects are often joint. State and federal land and wildlife agencies can now more easily respond.

Four continental-scale initiatives have developed conservation plans covering all bird species regularly breeding in North America: the North American Waterfowl Management Plan (USFWS and Environment-Canada 1986 [as updated]), the United States Shorebird Conservation Plan (Brown et al. 2001), the North American Waterbird Conservation Plan (Kushlan et al. 2002), and the North American Landbird Conservation Plan (Rich et al. 2004).

Each initiative, except the Intermountain West Waterbird Conservation Plan, maintains a hierarchy of officers and/or committees from international to regional and more local levels. The Colorado Steering Committee for Intermountain West Joint Venture and the Colorado All-bird Conservation Working Group developed the Coordinated Implementation Plan for Bird Conservation in Western Colorado (CACWG and IWJV 2005) to digest the continental plans for application to all birds in western Colorado. Following the Coordinated Plan was CDOW's Wildlife Action Plan (CDOW 2006). And finally, rangewide (GuSGRSC 2005) and local working group plans (GSGLWG 1998a; GSGLWG 1998b) were developed to conserve the Gunnison sage-grouse, the "flagship" endemic species of the region. These conservation plans are briefly discussed below as they are perceived to apply to the study area.

To assess the conservation status and population trends of the birds of the study area ([Chapter 6](#)) our report uses today's bird conservation geography ([Map 5-1](#)). The major geographic divisions are Avifaunal Biome, Bird Conservation Region (BCR), and physiographic region. The Avifaunal Biome is the largest bird conservation map unit. Multiple BCRs compose an Avifaunal Biome, and BCR boundaries generally follow physiographic region boundaries. BCRs are a recent invention of the North American Bird Conservation Initiative (NABCI 2009), and recognize similarities in bird communities and resource management issues. Physiographic regions are used to assure that the North American Breeding Bird Survey (BBS) adequately samples the variety of continental bird life (Sauer et al. 2008). The study area lies within west part of the Southern Rocky Mountain Physiographic Region and the northeastern part of the Colorado Plateau Physiographic Region, which make up the Southern Rocky Mountain BCR (BCR16), which is itself at the southeastern end of the Intermountain West Avifaunal Biome.

North American Waterfowl Management Plan

The first and inspiration for the other three continental plans was the North American Waterfowl Management Plan (USFWS and Environment-Canada 1986 [as updated]). This plan considers the 33 waterfowl species in the study area. The advantage of this plan over the others is years of intensive objective population data. Armed with this information plus a dedicated constituency of hunters and long familiarity with laws and regulations, and firmly instituted funding sources, this plan has made considerable progress. The plan's strategy is to direct action through state wildlife agencies and flyway

councils with annually revised and reviewed action plans. With this plan's development, the concept of conservation joint ventures was conceived, where private and public-sector partners combine forces to secure and restore habitat for waterfowl and other migrant wildlife. North America has been divided into Joint Venture areas, now closely corresponding to Avifaunal Biomes. Within the Joint Venture areas local focus area committees are formed to identify habitat projects, research them, and bring proposals forward for funding. Proposals are brought by states to the North American Wetlands Conservation Council. The Five Rivers Wetlands Focus Area, taking in the study area, is currently inactive after success with what it believed to be the most implementable projects.

This plan rates trumpeter swan, mallard, northern pintail, and lesser scaup rate as "high" in continental priority for conservation action. However, due to the generally low value of BCR16 (WCR16 in the plan) for waterfowl, only trumpeter swan rates a determination of "high" need for action in BCR16. The need for action in BCR16 for migrant populations of tundra swan, Canada goose, and mallard is only "moderate." The need for action in BCR 16 to conserve breeding populations of mallards, northern pintails, and lesser scaup is "moderate" under the plan. Inversely, common merganser has a "moderately low" continental priority rating, but the relative importance of BCR16 to common mergansers (rated "moderately high") allows it to receive a "moderate" rating in need for action in BCR16. All other waterfowl species of the study area are rated "low" to "moderately low" in need for conservation action. The plan carefully points out even if a BCR is relatively unimportant to waterfowl, there may be hotspots in it deserving high levels of attention. [Map 3-1](#) in this document identifies important waterbird hotspots in the study area. [Chapter 6](#) provides a tabular summary of waterfowl conservation prioritizations discussed above.

United States Shorebird Plan

The United States Shorebird Conservation Plan (Brown et al. 2001) serves 32 species in the study area, from plovers, avocet, stilt, sandpipers, snipe and phalaropes. As with the other continental initiatives, for UFO purposes, the more actionable information is outlined in a regional plan. The Intermountain West Regional Shorebird Plan (Oring et al. 2000) emphasizes that in the Intermountain West "the most important issue facing shorebird conservation...is the very great human-driven competition for water. Finding ample high quality fresh water will be the greatest challenge faced by future shorebird conservation interests." The Intermountain West Regional Shorebird Plan's five goals and associated objectives and strategies deal with habitat management, monitoring and assessment, research, outreach, and planning. In Colorado, the Intermountain West Regional Shorebird Plan only addresses Browns Park National Wildlife Refuge.

The importance of mudflat creation at critical times by draw-downs of reservoirs, reduction of disturbance on river sandbars and mudflats during shorebird migration, grassland maintenance for nesting long-billed curlews, not mowing marsh grasses before mid-July, and coordinating projects with the IMW Joint Ventures are some of the points of the Intermountain West Regional Shorebird Plan. The highest priority species are snowy plover and long-billed curlew. Other priority species include American avocet, black-necked stilt, long-billed dowitcher, Wilson's phalarope, red-necked phalarope, marbled godwit, and western and least sandpipers. [Map 3-1](#) in this document identifies important water bird/shorebird hotspots in the study area. [Chapter 6](#) provides a tabular summary of shorebird priority species discussed above.

North American Waterbird Conservation Plan

The North American Waterbird Conservation Plan (Kushlan et al. 2002) pulls in 40 water-oriented species in the study area that are not readily described as waterfowl or shorebirds (e.g., loons, grebes,

pelican, cormorants, herons, ibises, rails, coot, crane, gulls, and terns). The plan identifies several key issues requiring conservation action, and defers most prioritizing to its “local” or Avifaunal Biome plans. Implementation of the plan in the U.S. is primarily entrusted to state wildlife agencies. Coordination among states is through the International Association of Fish and Wildlife Agencies (IAFWA). IAFWA’s Shorebird and Waterbird Working Group has as its charge the support of the waterbird initiative. The plan’s goals and strategies are necessarily broad. In the case of the study area, the Intermountain West Waterbird Conservation Plan (Ivey and Herziger 2006) is the local plan. A habitat objective for all “guild habitats” is to increase the amount conserved by 25 percent over the next 50 years. Guild habitats are identified types of habitat that specific waterbirds require (e.g., shallows, soft substrate, hard substrate). [Map 3-1](#) in this document identifies important waterbird hotspots in the study area that include important guild habitats. [Chapter 6](#) provides a tabular summary of waterbird conservation rankings specified by the plan.

North American Landbird Conservation Plan

The Partners In Flight (PIF) North American Landbird Conservation Plan (Rich et al. 2004) covers the remaining species in the study area. Liberally illustrated, the plan shows where immediate action is needed, where management is necessary to arrest population declines, and where planning and research is needed. The issues in each Avifaunal Biome are raised. Maps plot where the species of each biome concentrate in the winter. Two PIF concepts appear: Watch List Species and Stewardship Species. A PIF Watch List Species is one that scores 14 or above in the assessment of six factors (if the population trend score is 5, a combined assessment factors score of 13 or above triggers the Watch List Species designation). Thirty-four of the Watch List Species designated by the North American Landbird Conservation Plan occur in the study area, yet only 12 have management significance in the study area (see [Chapter 6](#)). A Stewardship Species is one that has at least 75 percent of its population within one Avifaunal Biome. Seventeen of the study area’s species are Stewardship Species of the Intermountain West Avifaunal Biome. Fifteen of the North American Landbird Conservation Plan’s 17 Stewardship Species are proposed as management species for the study area by this review (see [Chapter 7](#)). The two excluded species (black rosy finch and Calliope hummingbird), have too few management options in the study area.

The PIF Plan’s primary achievement has been to provide population estimates of each species in North America. From these estimates, the plan develops continental population objectives. PIF, of which BLM is a charter member (since 1989), maintains the plan. PIF’s Western Working Group is active, meeting twice a year. The Western Working Group conducts a list-serve posting current information and events (<http://www.pwrc.usgs.gov/pif/>). Colorado PIF has been subsumed by CDOW’s bird coordinator and the Intermountain West Joint Venture. Rocky Mountain Bird Observatory, Brighton, Colorado, supplies PIF with regional bird data and, with PIF collaboration, performs the species assessments. The local action plan under the umbrella of the North American Landbird Conservation Plan is the Colorado Land Bird Conservation Plan (PIF 2000). Its priority species are included in the recommended status species ([Chapter 7](#)), and its relevant recommendations are incorporated into [Chapter 8](#) of this document.

Coordinated Implementation Plan for Bird Conservation in Western Colorado (BCR-16)

This concise, well-developed plan (CACWG and IWJV 2005) should be a close companion to this document. It summarizes histories, authorities, plans, and opportunities, mentioning facts not repeated in this document. The Coordinated Implementation Plan lists Bird Habitat Conservation Areas (BHCAs), three of which intersect the study area: 1. Uncompahgre River, Dry Creek, and Coal Creek; 2. Gunnison River, North Fork Gunnison River, Smith Fork River, and Fruitgrowers Reservoir; and 3. west Montrose, Dolores, San Miguel, and Montezuma counties. The Colorado Steering Committee, made up

of the Colorado All-bird Conservation Working Group and the Intermountain West Joint Ventures (IWJV) board chair, used Colorado Natural Heritage Program county assessments and various bird data sources to map these BHCAs, rich in elements of natural diversity and also particularly rich in birds (Damm et al. 2000; Lyon and Sovell 2000; Lyon et al. 1999; Lyon and Williams 1998; Rocchio et al. 2003; Stevens et al. 1999). The habitats of western Colorado are prioritized and, with consulting the IWJV plans, assigned objectives (these are summarized in [Chapter 6](#) of this document). Currently coordinated bird conservation across western Colorado has leadership in the CDOW's Wildlife Conservation Department (David Klute 303-291-7320) and in the Intermountain West Joint Venture (Dave Smith 406-493-0925).

Colorado Comprehensive Wildlife Conservation Strategy

The "Conservation Strategy" (CDOW 2006) identifies the top priority species and habitats for conservation in the state, and the potential conservation actions that can be used by everyone in Colorado as a guide for planning, partnership building, and project design and implementation. The planning process resulted in a list of 210 Species of Greatest Conservation Need for Colorado. Eighty-seven species are birds. The list has been prioritized using a two-tier system, with 45 species of birds in Tier 1. Eight criteria were used to draft the initial list of Tier 1 species:

1. Knowledge of management techniques needed for recovery
2. Impact on federal recovery
3. Cost of recovery or management action implementation
4. Direct cost of recovery action to others
5. Public appeal or interest in the species
6. Economic impacts of listing (cost incurred by listing)
7. Importance to state biological diversity
8. Multiple species benefits from management of target species.

What separates Tier 1 from Tier 2 species primarily is the species' status in a declining trend by federal or state listing designation, the state's perceived ability to effectively implement conservation/recovery actions on the ground, and state's ability to contribute to a meaningful change in federal status through actions in Colorado. Each species is assigned a population status and trend, distribution in the state, primary and secondary habitats, threats and prioritized conservation actions. Key habitats are also assigned characteristic species, threats to the habitat, necessary conservation actions. Four of the 12 high priority habitats in Colorado are in the study area: ponderosa pine, west slope streams, west slope rivers, and sagebrush. The conservation strategy identifies existing conservation, recovery, and other action plans that are species-specific and multi-species. Tier 1 and 2 species are shown in tabular form in [Chapter 6](#) of this document.

Gunnison Sage-grouse Conservation Plans

With world attention upon this endemic sage-grouse species, the UFO is a major participant in Gunnison Sage-grouse Rangewide Conservation Plan (GuSGRSC 2005) and in the local plans that

preceded it. The guidelines in Appendix H of the Rangewide Conservation Plan are indispensable during project scoping and environmental assessment. Some of the points in the Management Recommendations of [Chapter 8](#) of this document derive from the rangewide plan and the two local working group plans (GSGLWG 1998a; GSGLWG 1998b) that involve the study area.

Literature Cited

- Brown, S., C. Hickey, B. Harrington, and R. Gill. 2001. United States shorebird conservation plan. 2nd ed. Manomet, MA: Manomet Center for Conservation Sciences.
- CACWG, and IWJV. 2005. Coordinated implementation plan for bird conservation in western Colorado. Denver: Colorado Steering Committee - Intermountain West Joint Venture and the Colorado All-bird Conservation Working Group.
- CDOW. 2006. Colorado's Comprehensive Wildlife Conservation Strategy and Wildlife Conservation Plans. Denver: Colorado Division of Wildlife.
- Damm, M., J. Stevens, and S. Boyle. 2000. Assessment of riparian vegetation and wildlife habitat structure, North Fork of the Gunnison River tributaries and lower Gunnison River tributaries. Accessed at:
http://www.cnhp.colostate.edu/download/documents/2000/Gunnison_River_Tributaries_Riparian_Assessment.pdf.
- GSGLWG, Crawford Area. 1998a. Gunnison sage-grouse conservation plan - Crawford area, Colorado. Crawford Area Gunnison Sage-grouse Local Working Group. Accessed at:
http://wildlife.state.co.us/NR/rdonlyres/72278533-3174-4DC4-94E1-04AD72CF421E/0/GunnisonSageGrouseLocalPlan_Crawford.pdf.
- GSGLWG, San Miguel. 1998b. Gunnison sage-grouse conservation plan - San Miguel Basin, Colorado. San Miguel Area Gunnison Sage-grouse Local Working Group. Accessed at:
http://wildlife.state.co.us/NR/rdonlyres/B19BA1CA-4B4C-489D-8542-8CF41FD271B3/0/GunnisonSageGrouseLocalPlan_SanMiguelBasin.pdf.
- GuSGRSC. 2005. Gunnison sage-grouse rangewide conservation plan. Gunnison Sage-Grouse Rangewide Steering Committee. Available at
<http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/Birds/GunnisonConsPlan.htm>. Denver, Colorado: Colorado Division of Wildlife.
- Ivey, G. L., and C. P. Herziger. 2006. Intermountain West Waterbird Conservation Plan, Version 1.2: a plan associated with the Waterbird Conservation for the Americas Initiative. Portland, Oregon.: U.S. Fish and Wildlife Service Pacific Region.
- Kushlan, J. A., M. J. Steinkamp, K. C. Parsons, J. Capp, M. Acosta Cruz, M. Coulter, I. Davidson, L. Dickson, N. Edelson, R. Elliot, R. M. Erwin, S. Hatch, S. Kress, R. Milko, S. Miller, K. Mills, R. Paul, R. Phillips, J. E. Saliva, B. Sydeman, J. Trapp, J. Wheeler, and K. Wohl. 2002. Waterbird Conservation for the Americas: the North American waterbird conservation plan, Version 1. Washington, DC: Waterbird Conservation for the Americas. Accessed at:
<http://www.waterbirdconservation.org/nawcp.html>.

- Lyon, P., and S. Sovell. 2000. A natural assessment: San Miguel and western Montrose counties, Colorado. Fort Collins, CO: Colorado Natural Heritage Program. Accessed at: http://www.cnhp.colostate.edu/download/documents/2000/San_Miguel_and_Western_Montrose.pdf.
- Lyon, P., T. Stephens, J. Siemers, D. Culver, P. Pineda, and J. Zoerner. 1999. The Uncompahgre River Basin: a natural heritage assessment, volume 1. Fort Collins, CO: Colorado Natural Heritage Program. Accessed at: http://www.cnhp.colostate.edu/download/documents/1999/Uncompahgre_River_Basin_Natural_Heritage_Assessment.pdf.
- Lyon, P., and E. Williams. 1998. Natural heritage biological survey of Delta County, Colorado. Fort Collins, CO: Colorado Natural Heritage Program. Accessed at: http://www.cnhp.colostate.edu/download/documents/1998/Natural_Heritage_Biological_Survey_of_Delta_County_Colorado.pdf.
- NABCI. 2009. Integrated bird conservation in the United States. North American Bird Conservation Initiative, online at <http://www.nabci-us.org/main2.html>.
- Oring, L. W., L. Neel, and K. E. Oring. 2000. Intermountain west regional shorebird plan, version 1.0. In U.S. Shorebird Conservation Plan. Available at: <http://www.fws.gov/shorebirdplan/RegionalShorebird/downloads/IMWEST4.pdf>.
- PIF. 2000. Colorado Land Bird Conservation Plan. Colorado Partners In Flight. Available at <http://www.rmbo.org/pif/bcp/intro/exsum.htm>.
- Rich, T. D., C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D. W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Inigo-Elias, J. A. Kennedy, A. M. Martell, A. O. Panjabi, D. N. Pashley, K. V. Rosenberg, C. M. Rustay, J. S. Wendt, and T. C. Will. 2004. Partners in Flight North American Landbird Conservation Plan. Ithaca, NY: Cornell Lab of Ornithology. Accessed at: http://www.partnersinflight.org/cont_plan/. (VERSION: March 2005).
- Rocchio, J., G. Doyle, and R. Rondeau. 2003. Survey of critical wetlands and riparian areas in Gunnison County.
- Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 - 2007: USGS Patuxent Wildlife Research Center, Laurel, MD.
- Stevens, T., D. Culver, J. Zoemer, and P. Lyon. 1999. A natural heritage assessment of wetlands and riparian areas in the Uncompahgre River Basin, Eastern Montrose and Ouray counties, Vol. II. Accessed at: http://www.cnhp.colostate.edu/download/documents/1999/Uncompahgre_River_Basin_wetlands.pdf.
- USFWS, and Environment-Canada. 1986 [as updated]. North American Waterfowl Management Plan: A Strategy for Cooperation: U.S. Fish & Wildlife Service and Environment Canada. Available at <http://www.fws.gov/birdhabitat/NAWMP/files/NAWMP.pdf>.

Map 5-1
The study area in the context of the existing bird conservation geography.



Chapter 6

BIRDS OF THE STUDY AREA: CONSERVATION STATUS, POPULATION TRENDS, AND THREATS

This chapter summarizes the conservation status and population trends of the birds of the study area, and discusses primary threats to birds and their habitats in the region.

Conservation Status

The conservation statuses of all birds in the study area are summarized on [Table 6-1](#). To compile this digest, we consulted the conservation plans, initiatives, and strategies discussed in [Chapter 5](#) as well as various resources cited at the end of [Table 6-1](#). Of the birds found in the study area, 326 are protected under the Migratory Bird Treaty Act, 13 are BLM sensitive species (BLM 2000), seven have or have had protective status under the federal Endangered Species Act, 14 have or have had protective status under the State of Colorado's Nongame, Endangered, or Threatened Species Conservation Act, 24 are recognized as species of concern in BCR 16 by USFWS (USFWS 2008), 35 species are tracked in some capacity by the Colorado Natural Heritage Program (CNHP), and 63 are prioritized by continental and regional conservation plans (Brown et al. 2001; CACWG and IWJV 2005; Kushlan et al. 2002; PIF 2000; Rich et al. 2004; USFWS and Environment-Canada 1986 [as updated]). In [Chapter 7](#), we select from this digest a suite of "status species" with management potential in the study area.

Population Trends

Population trends of birds in the study area are summarized in [Table 6-1](#). We used the PIF species assessment database (Panjabi et al. 2005; PIF 2009) to compile trend information at both the continental and regional (BCR 16) scales. In [Table 6-1](#), the column "PT-c" gives the continental population trend assessment score for all study area species. The column "PT-r" gives a regional population trend assessment score for species considered regular breeders in BCR16. The population trend score range is 1 to 5 (as explained in [Table 6-2](#)), where 1 indicates a significant increasing trend, and 5 indicates a significant declining trend. A score of 3 indicates a highly variable or uncertain trend.

The PIF species assessment database ([Table 6-1](#)) estimates that 164 birds of the study area are experiencing increasing continental population trends (score of 1 or 2), 47 have highly variable or uncertain trends (score of 3), and 124 species are in continental decline (score of 4 or 5). Regionally (in BCR 16), 31 species are experiencing increasing population trends, 165 species have highly variable or uncertain trends, and 40 species are in decline (100 species in the study area are not considered regular breeders in BCR 16 and therefore are not regionally scored by PIF). Notable species in decline are Gunnison sage-grouse (estimated decrease of 50 percent or more over a period of 30 years, with 100 percent of its population in BCR 16), pinyon jay (estimated continental and regional decrease of 50 percent or more over a period of 30 years, with 48 percent of its population in BCR 16), juniper titmouse (estimated continental population trend uncertain, and regional decrease of 50 percent or more over a period of 30 years, with 50 percent of its population in BCR 16), and Virginia's warbler (estimated continental and regional decrease of 15 to 49 percent over a period of 30 years, with 59 percent of its population in BCR 16). We use the population trend data compiled in [Table 6-1](#), considered with other PIF rankings, to recommend "key watch species" for the study area in [Chapter 7](#).

The primary source of PIF's trends assessment was the BBS, augmented with Christmas Bird Count or specialized data sources (further described below). Where empirical data did not exist, PIF assigned PT-c with expert opinion, using the qualitative definitions below as guidelines. PIF used BBS (or other source) trend estimates from the longest period available. On the assumption that rate of change has been reasonably constant over the long term, PIF calculated PT-c scores based on the annual rates of change that would produce population size change of a particular size over 30 years (see [Table 6-2](#)). PT-c scores include consideration of data quality when possible. PIF calculated the regional (BCR16) population trend (PT-r) scores the same way except that a different (typically shorter) span of years was used to calculate the probable 30-year trend. Species for which continental or regional trends were uncertain, either because of highly variable data or poor sample size, received a score of 3. This intermediate score was assigned by PIF on the reasoning that uncertain trends should invoke more concern than stable trends (for which PT-c or PT-r is 2). Any species assigned a PT-c score of 3 by PIF received expert review to determine whether a more appropriate score could be assigned (PIF 2009).

The BBS is a roadside survey that began in 1966 (<http://www.mbr-pwrc.usgs.gov/bbs/>). The oldest BBS survey in the study area is the Delta Route, established 1989. There are six BBS routes entirely or with significant portions within the study area ([Map 6-1](#)). BBS routes contain 50 stops (point count stations). Each route is run at the height of nesting season at the same time (early morning) and date (as near as possible) each year. At each stop all bird detections within three minutes are recorded. The protocols are more narrowly defined than the Christmas Bird Count. The BBS is the most widely used dataset for estimating bird population trends.

RMBO's Monitoring Colorado's Birds (MCB) project was initiated in 1999 to collect statistically rigorous data for estimating long-term population trends of most of Colorado's regularly breeding landbird species (Leukering et al. 2000). The program exists due to the delay in achieving a national monitoring program that adequately monitors the birds missed or poorly monitored by the BBS. It also seeks to discriminate better between habitats than the BBS does. The location of MCB transects is not divulged so as to prevent knowledge of the project from influencing the treatment of the lands around them. BLM, CDOW, and the USFS are funding contributors to MCB. MCB's reports are available online at http://www.rmbo.org/v2/web/science/bpm_state_co.aspx. The MCB project has not yet collected data for a long enough period to generate statistically reliable trend estimates. However, we use MCB data in [Chapter 4](#) to help make relative abundance estimates for bird species in the study area. Within the coming decade, land managing agencies in Colorado should be turning to RMBO for reliable trend data.

December 1900 saw the first Christmas Bird Count (<http://www.mbr-pwrc.usgs.gov/cbc/cbcnew.html>). Pueblo was Colorado's participant in that first year. Christmas Bird Count has the longest history and gathers the greatest participation in citizen science of any project in the world. It is not as rigorously controlled as the BBS or MCB programs. Even so, it has defined the winter bird population of North America. It informs climate change models and has identified species in trouble. Delta, Hotchkiss, and Montrose have Christmas Bird Count circles, each 15 miles in diameter. Other monitoring projects investigating bird population trends include Monitoring Avian Productivity and Survivorship (MAPS) Project (<http://www.birdpop.org/maps.htm>), Cornell University's e-Bird Project (<http://ebird.org/content/ebird/>) and the Colorado Breeding Bird Atlas II (<http://www.cobreedingbirdatlasii.org/>).

Threats to Birds in the Study Area

In this section we briefly discuss threats to birds in the study area. [Table 6-3](#) summarizes potential sensitivities of selected study area birds or their habitats to various threats or stressors, including

human disturbance, livestock grazing, habitat fragmentation, stock water development, vegetation treatments, herbaceous weeds, forestry (logging), and the presence of aerial obstacles (e.g., communications towers, wind turbines, overhead power lines). These general sensitivities or stressors indicated on [Table 6-3](#) were compiled from a variety of resources (Belnap 1994; Best 1972; Bock and Bock 1987; Bock et al. 1999; Bock et al. 1984; Bock et al. 1992; Boyle and Reeder 2005; Burhans and Thompson 2006; CDOW 2005b; Craig 2002; Crawford et al. 2004; Dechant et al. 2000; Dobkin and Sauder 2004; Franzreb and Ohmart 1978; Freddy et al. 1986; Gehring et al. 2009; Gillihan 2006; GuSGRSC 2005; Hemstrom et al. 2002; Hutchings Unpublished; Ingelfinger 2001; Ingelfinger and Anderson 2004; Kantrud and Kologiski 1982; Knick et al. 2003; Knick and Rotenberry 1999; Knick and Rotenberry 2000; Knick and Rotenberry 2002; Knopf 1994; Knopf et al. 1990; Miller and A. 1999; Miller et al. 1998; Mills et al. 1989; Naugle et al. 2006; Ortega and Capen 1999; Oyler-McCance et al. 2001; Paige et al. 1999; Paige and Ritter 1999; Reed 1986; Reijnen et al. 1995; Reynolds 1981; Reynolds and Linkhart 1992; Richardson and Miller 1997; Rosenberg et al. 1999; Rotenberry and Wiens 1980a; Rotenberry and Knick 1999; Rotenberry and Wiens 1980b; Saab et al. 1995; Schaid et al. 1983; Schroeder and Sturges 1975; Sedgwick 1987; Vickery and Herkert 1999; Wiens and Rotenberry 1981; Wiens and Rotenberry 1985; Wilbert et al. 2008; Winter and Best 1985; Winternitz 1976; Wisdom et al. 2002a; Wray and Whitmore 1979). It should be noted that some of the sensitivities or stressors indicated on [Table 6-3](#) are derived from sources with small sample sizes, or are qualitative or anecdotal in nature. Additionally, the majority of the information about threats to birds is derived from research conducted outside the region.

[Table 6-4](#) presents selected wildlife sensitivity and indicator thresholds supported by literature. We included large mammals in the selection because land managers must integrate conservation measures for all wildlife resources, and because the majority of the literature examines road and human disturbance effects on large mammals.

Habitat Fragmentation

The primary threat to birds in the study area, specifically birds on BLM land and other federal minerals lands, is habitat fragmentation. The mechanisms of habitat fragmentation are various, and include linear right-of-way projects, oil and gas and other energy development, recreation infrastructure development, and wildfire. Habitat obligate birds and those obligates ([Table 3-7](#)) with area sensitivity are most vulnerable to the effects of habitat fragmentation ([Table 6-3](#)). The sagebrush obligate passerines sage sparrow and Brewer's sparrow are vulnerable even when the fragmentation or loss of habitat is not permanent because they may require decades to expand their populations back into reclaimed habitat (Ingelfinger and Anderson 2004; Wiens 1977). The sage sparrow is perhaps the most sensitive of sagebrush passerine birds to habitat fragmentation, requiring very large patches of suitable habitat and habitat interiors rather than edges. The acceptable range of physiognomic and floristic habitat structure is not well defined at either the landscape scale or the regional scale. Patch size may be one measure of habitat integrity that could aid managers in conserving the sage sparrow, but equal probabilities of breeding bird occupancy are possible with different combinations of patch size and sagebrush cover (Knick and Rotenberry 1995). See [Chapter 9](#) for research recommendations (and potential confounding factors to research interpretation) pertaining to the sage sparrow.

Habitat Degradation

Habitat degradation via herbaceous weed encroachment is a significant threat to several land cover types in the study area, notably, the low to mid-elevation sagebrush, semi-desert shrubland, and pinyon-juniper communities. Invasion of the shrubland understory by non-native annual grasses and forbs can be facilitated by energy development, recreational activities, grazing, or improper range

management practices. Certain sagebrush species such as sage sparrow are found in lower abundances in sagebrush habitats with annual weed understories (Boyle and Reeder 2005), and ground cover densities of annual weed understories may be unsuited to foraging activities and/or nesting of several of the species of concern (see Herbaceous Weed column in [Table 6-3](#)). Annual weed understories, especially cheatgrass, can provide dry fuel that accelerates fire-return intervals in sagebrush, eventually resulting in conversion of sagebrush shrublands to cheatgrass monocultures.

Roads

Of the many human alterations to the landscape, roads contend to be most pervasive and impactful to birds and other wildlife. Roads cause direct effects (roadkills, displacement from habitat, loss of habitat), indirect effects (introduction of increased human disturbance to habitat interiors, increase in predacious generalist species that associate with human activity), and long-term effects (habitat fragmentation, introduction of weeds). On the other hand, roads provide access for humans to enjoy birds and perform actions that can benefit birds. Roadkills feed scavenging birds, and it has been suggested that roads and roadkills provide an effective wildlife population monitoring opportunity (Erritzoe et al. 2003). Yet despite their usefulness, it is the adverse effects of roads on birds and other wildlife that warrant assessment. Lalo (1987) reports that birds make up two-thirds of the wildlife roadkills in the United States. The observations made should give insights into other public land activities, particularly to other rights-of-way forms, usually to a lesser degree (see discussion of trails below).

Roads affect wildlife through collision mortality, physical barriers, habitat reduction/fragmentation, importation of disturbance and elevated harvest rates, paths for spread of weeds, pollution, and increased erosion and sedimentation. Road width, traffic volume, nature of the right-of-way edges, and species of animal are relevant factors. Erritzoe et al. (2003) cite several studies implicating collisions with motor vehicles as the prime source of mortality in declining owl populations, notably barn owls. They offer suggestions on how to reduce roadkills, some of which may be useful to public land managers (we have incorporated relevant suggestions in [Chapter 8](#))

Reijnen et al. (1995), in paired site testing, estimated in the Netherlands that 60 percent of woodland bird species showed evidence of depressed numbers near roads. Even in a heavily forested area of Vermont, ovenbirds showed reduced densities of breeding territories and reduced pairing success within 500 feet of forest roads (Ortega and Capen 1999). Habitat patch size was apparently truncated by roads. Rosenberg et al. (1999) suggest that sensitivity to habitat patch size is present, yet may be less in birds of the intermountain west. Whatever the specific effect of roads on wildlife, the effects correlate with the density of roads across the landscape.

Fuller et al. (1992) found road density tolerance by wolves in Minnesota be related to human population densities. Wolves would persist where road density was less than 1.12 mi/mi² and human population density was less than 10 persons per square mile or where road density was less than 0.8 mi/mi² in area with human population density was less than 20 persons per square mile. Mech et al. (1988) and Mech (1989) found that the road density tolerance threshold for wolves in Minnesota was related to an area's surroundings, 0.58 mi/mi² if far from a roadless area and 0.73 mi/mi² if next to a roadless area. Hightower (2001) found neither aversion nor attraction behavior by black bears to trails or low-traffic volume roads in a forested habitat of Louisiana. In a study at Big Bend National Park, Texas, a more open habitat, black bears avoided areas within 328 feet of trails (Onorato et al. 2003). Both the Louisiana and Texas cases were where bears were not hunted. In a Vermont study, roads that were used by houndsmen pursuing bears were generally avoided by black bears (Hammond 2002). Brody and Pelton (1989) state that as road densities rise within a bear's home range, a threshold is reached,

whereupon black bears abandon their habitats and seek new home ranges with lower road densities. The authors observe that before reaching that road density threshold, bears adjust their movements within existing home ranges so as to minimize the risks associated with road crossings. [Table 6-4](#) presents road effect thresholds for selected wildlife found in literature.

Trails

Trails typically have far fewer adverse effects on wildlife habitats than roads. They are usually less of a barrier, lower on collision hazards, and import fewer other disturbance factors. Miller et al. (1998) summarized that generalist bird species are more abundant near trails and specialist species are less common. At their study sites in the Boulder Colorado Open Space the grassland birds were less likely to nest near trails. Within both grassland and forests, nest predation was greater near trails. In forests, the rate of brood parasitism was not influenced by trails. No brood parasitism was found in the grassland ecosystem. Miller et al. (2001) determined alarm responses in three species of birds and mule deer to pedestrians and dogs ([Table 6-4](#)). The significant findings were that the birds were equally disturbed by humans and dogs yet the deer were more alarmed by dogs, and responses were significantly less when humans and/or dogs were on a trail than off-trail. Predictability of human activity appears to matter to both birds and deer. The findings above are statistically significant. That they are biologically significant is suggested by the finding that birds tend to avoid nesting close to trails, although there are exceptions, such as great horned owls that begin nesting in the winter before trail use becomes heavy. Trail routes through constricted habitats, especially along streams, should consider the effect on birds and include deviations that leave sections of the habitat intact.

Grazing

The effects of livestock grazing on birds depend on a complex array of variables such as timing, intensity, duration, and season of grazing; grazing rotation schedules; plant community composition; drought and other climatic factors; and a particular species' structural and physiognomic habitat requirements (Bock et al. 1992; Saab et al. 1995). Livestock can trample nests of breeding passerines, northern harriers, and other low or ground nesting birds, directly affecting reproductive success. Livestock may attract cowbirds that parasitize passerine nests (see below). Livestock trample biological soil crusts in sagebrush, semi-desert, and pinyon-juniper habitats, which are slow to recover and play an important role in the germination of native grass and forb seeds. Livestock also selectively graze grasses and forbs that may be necessary cover or forage for species of concern. In the long-term, selective removal of plant components by livestock may result in floristic and physiognomic shifts in plant communities that benefit some species of concern but not others.

Cowbird Parasitism

The brown-headed cowbird's reproductive strategy is to deposit its eggs in other birds' nests to be incubated, hatched, and raised by foster parents (brood or nest parasitism). The cowbird followed bison until the demise of the great migratory herds (Rothstein 1994). Since then, it has developed an association with domestic livestock, which is generally consistently resident in the same pastures over time. Cowbirds were likely rare or accidental in the study area before the arrival of domestic livestock; cowbird numbers have almost certainly increased in western Colorado. Thus, philopatric bird species nesting on rangelands are under greater pressure from cowbird parasitism during the course of their lifetimes than they were prior to Euro-American settlement in the study area. By law, the Migratory Bird Treaty Act and its accompanying regulations, identifies the brown-headed cowbird to be a native species in the study area. Nest parasitism generally appears to be less impactful to the host than nest predation.

As of the mid 1990s, 59 species of birds were known to host cowbird eggs and chicks in Colorado (Chase in Kingery (1998)). The effects on cowbird predation on the reproductive success of these species in the study area are unknown. Cowbirds typically choose birds smaller than they are for hosts. Flycatchers, warblers, buntings, and sparrows are common hosts. Even the cavity-nesters, house and Bewick's wrens have hosted cowbirds. The Colorado Breeding Bird Atlas project identified the western kingbird and the significantly larger common grackle as hosts. One optimistic cowbird female entrusted her egg with a blue-winged teal hen. Vireos, as a group, seem particularly susceptible to population impacts from host nest parasitism, e.g., Bell's vireos in California, black-capped and white-eyed vireos in Oklahoma and Texas, and warbling and plumbeous vireos in Colorado (Brown 1993; Chase 1995; Grzybowski 1995; Ortega and Peer 2005). A cowbird can lay up to 40 eggs a season. The effects on hosts vary because of differing host responses to cowbird eggs appearing in the nest. In southwest Colorado 36 percent of yellow warbler nests were parasitized and yet nesting success was equal to unparasitized nests (Ortega and Mermoz 2005). Yellow warblers often add nest floor material to cover up the cowbird egg. Some species are able to raise their own young along with the foster chick. Others can re-nest and raise a brood of their own species. Northern mockingbirds will drive cowbirds away. Some, such as the western meadowlark, will usually, but not always, push a cowbird egg out of its nest (Peer et al. 2000). In a study of prothonotary warblers, Lovette (2008) found that cowbirds apparently monitored the intended hosts' nests. Whenever a cowbird egg was removed or destroyed, the cowbirds retaliated and destroyed the unwilling hosts' eggs. Furthermore, if cowbirds found the warbler eggs were too close to hatching they would destroy the eggs, obliging the warblers to begin a new clutch suitable for the cowbirds to deposit their eggs with them. This was called "egg farming." Burhans and Thompson (2006) determined that in a Missouri shrubland the higher the nest the less it was parasitized. Cowbird parasitism increased by 1.42 percent for every 1 meter height of the nest.

Livestock grazing management can modify levels of cowbird parasitism. A review of each grazing allotment to determine if any pastures have livestock in them sometime within every nesting season could reveal where adjustments for nesting birds should be made. Small and custodial allotments would have less flexibility. Fortunately for potential host bird species, continuous season-long grazing is no longer a popular grazing prescription. Cowbirds are daily commuters. Curson et al. (2000) cite studies that show that the typical limit of the commute between roosting/feeding areas and breeding areas is under 7 km (4.3 mi). Understanding this, managers in Arizona's Coconino National Forest are using livestock to create enhanced cowbird feeding areas away from Southwest willow flycatcher nesting areas. Curson et al. (2000) cite studies showing that the density of parasitizing cowbirds begins to diminish a short distance out from their roosting and feeding areas.

Noise

Francis et al. (2009) studied high noise sites at oil and gas fields and showed that that noise alone reduces nesting species richness and leads to different avian communities. Their findings suggested that noise can have cascading consequences for communities through altered species interactions. Contrary to expectations, noise indirectly facilitates reproductive success of noise-tolerant individuals nesting in noisy areas as a result of the disruption of predator-prey interactions. The higher reproductive success for birds within noisy habitats may be a previously unrecognized factor contributing to the success of urban-adapted species and the loss of birds less tolerant of noise.

Literature Cited

Belnap, J. 1994. Potential role of cryptobiotic crusts in semiarid rangelands. In Ecology and management of annual rangelands, edited by S. B. Monsen and S. G. Kitchen: USDA Forest Service Technical Report INT-GTR-313. Intermountain Research Station, Ogden, UT.

- Best, Louis. B. 1972. First-year effects of sagebrush control on two sparrows. *Journal of Wildlife Management* 36:534-544.
- BLM. 2000. Colorado BLM State Director's sensitive species list (animals and plants) June, 2000: U. S. Bureau of Land Management.
- Bock, C. E., and J. H. Bock. 1987. Avian habitat occupancy following fire in a Montana shrubsteppe. *Prairie Naturalist* 19:153-158.
- Bock, C. E., J. H. Bock, and B. C. Bennett. 1999. Songbird abundance in grasslands at a suburban interface on the Colorado high plains. *Studies in Avian Biology* 19:131-136.
- Bock, C. E., J. H. Bock, W. R. Kenney, and V. M. Hawthorne. 1984. Responses of birds, rodents, and vegetation to livestock exclosure in a semidesert grasslands site. *Journal of Range Management* 37:239-242.
- Bock, C. E., V. A. Saab, T. D. Rich, and D. S. Dobkin. 1992. Effects of livestock grazing on neotropical migratory landbirds in western North America. In *Status and management of neotropical migratory birds*, edited by D. M. Finch and P. W. Stangel: USDA Forest Service, General Technical Report RM-229.
- Boyle, S. A., and D. R. Reeder. 2005. Colorado sagebrush: a conservation assessment and strategy. Accessed at: <http://wildlife.state.co.us/WildlifeSpecies/SagebrushConservation/>. Grand Junction: Colorado Division of Wildlife.
- Brody, A. J., and M. R. Pelton. 1989. Effects of roads on black bear movements in western North Carolina. *Wildlife Society Bulletin* 17:5-10.
- Brown, B. T. 1993. Bell's Vireo (*Vireo bellii*). In *The Birds of North America Online*, edited by A. Poole. Ithaca: Cornell Lab of Ornithology. Accessed at: <http://bna.birds.cornell.edu/bna/species/035>.
- Brown, S., C. Hickey, B. Harrington, and R. Gill. 2001. United States shorebird conservation plan. 2nd ed. Manomet, MA: Manomet Center for Conservation Sciences.
- Burhans, D., and F. Thompson. 2006. Songbird abundance and parasitism differ between urban and rural shrublands. *Ecological Applications* 16 (1):394-405.
- CACWG, and IWJV. 2005. Coordinated implementation plan for bird conservation in western Colorado. Denver: Colorado Steering Committee - Intermountain West Joint Venture and the Colorado All-bird Conservation Working Group.
- CDOW. 2005. Gunnison sage-grouse rangewide conservation plan (updated in 2008). Available at <http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/Birds/GunnisonConsPlan.htm>. Denver: Colorado Division of Wildlife.
- Chase, J. 1995. The factors affecting the reproductive success of the solitary vireo (*Vireo solitarius plumbeus*) in Colorado. Master of Science Thesis, Univ. of Colorado, Boulder.
- Craig, G. R. 2002. Recommended buffer zones and seasonal restrictions for Colorado raptors: Colorado Division of Wildlife. December 19.

- Crawford, J. A., R. A. Olson, N. E. West, J. C. Mosley, M. A. Schroeder, T. D. Whitson, R. F. Miller, M. A. Gregg, and C. S. Boyd. 2004. Synthesis paper: ecology and management of sage-grouse and sage-grouse habitat. *Journal of Range Management* 57:2-19.
- Curson, D., C. Goguen, and N. Mathews. 2000. Long-distance commuting by brown-headed cowbirds in New Mexico. *The Auk* 117 (3):795-799.
- Dechant, J. A., M. F. Dinkins, D. H. Johnson, L. D. Igl, C. M. Goldade, and B. R. Euliss. 2000. Effects of management practices on grassland birds: vesper sparrow (revised 2002). Jamestown, North Dakota: Northern Prairie Wildlife Research Center.
- Dobkin, D. S., and J. D. Sauder. 2004. Shrubsteppe landscapes in jeopardy: distributions, abundances, and the uncertain future of birds and small mammals in the intermountain west. Bend, Oregon: High Desert Ecological Research Institute.
- Erritzoe, J., T. Mazgajski, and L. Rejt. 2003. Bird casualties on European roads – a review. *Acta Ornithologica* 38 (2):78-92.
- Francis, C. D., C. P. Ortega, and A. Cruz. 2009. Noise pollution changes avian communities and species interactions. *Current Biology* 19 (16):1415-1419.
- Franzreb, K. E., and R. D. Ohmart. 1978. The effects of timber harvesting on breeding birds in a mixed-coniferous forest. *Condor* 80:431-441.
- Freddy, D. J., W. M. Bronaugh, and M. C. Fowler. 1986. Responses of mule deer to disturbance by persons afoot and snowmobiles. *Wildlife Society Bulletin* 14:63-68.
- Fuller, T. K., W. E. Berg, G. L. Radde, M. S. Lenarz, and G. B. Joselyn. 1992. A history and current estimate of wolf distribution and numbers in Minnesota. *Wildlife Society Bulletin* 20:42-55.
- Gehring, J., P. Kerlinger, and A. M. Manville II. 2009. Communication towers, lights, and birds: successful methods of reducing the frequency of avian collisions. *Ecological Applications* 19 (2):505-514.
- Gillihan, S. W. 2006. Sharing the land with pinyon-juniper birds. Salt Lake City, UT: Partners in Flight Western Working Group. Accessed at:
<http://www.rmbo.org/dataentry/postingArticle/dataBox/PJ%20manual%20Nov%2008%20low-res.pdf>.
- Grzybowski, J. A. 1995. Black-capped vireo (*Vireo atricapilla*). In *The Birds of North America Online*, edited by A. Poole. Ithaca: Cornell Lab of Ornithology. Accessed at:
<http://bna.birds.cornell.edu/bna/species/181>.
- GuSGRSC. 2005. Gunnison sage-grouse rangewide conservation plan. Gunnison Sage-Grouse Rangewide Steering Committee. Available at
<http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/Birds/GunnisonConsPlan.htm>. Denver, Colorado: Colorado Division of Wildlife.
- Hammond, F. M. 2002. The effects of resort and residential development on black bears in Vermont: Vermont Agency of Natural Resources.

- Hemstrom, M. A., M. J. Wisdom, W. J. Hann, M. M. Rowland, B. C. Wales, and R. A. Gravenmier. 2002. Sagebrush-steppe vegetation dynamics and restoration potential in the interior Columbia Basin, U.S.A. *Conservation Biology* 16 (5):1243-1255.
- Hightower, D. A. 2001. Fine scale movements and habitat use of black bears in south central Louisiana, Louisiana State University, Master of Science Thesis.
- Hutchings, S. W. Unpublished. Nesting ecology of the sage thrasher in north central Colorado. Brighton: Colorado Bird Observatory.
- Ingelfinger, F. 2001. The effects of natural gas development on sagebrush steppe Passerines in Sublette County, Wyoming. Master of Science Thesis, Univ. of Wyoming, Laramie.
- Ingelfinger, F., and S. Anderson. 2004. Passerine response to roads associated with natural gas extraction in a sagebrush steppe habitat. *Western North American Naturalist* 63 (3):385-395.
- Kantrud, H. A., and R. L. Kologiski. 1982. Effects of soils and grazing on breeding birds on uncultivated native upland grasslands and shrubsteppe in the northern Great Plains: U. S. Fish & Wildlife Service.
- Kingery, H. E., ed. 1998. Colorado Breeding Bird Atlas. Denver: Colorado Bird Atlas Partnership & Colorado Div. of Wildlife.
- Knick, S. T., D. S. Dobkin, J. T. Rotenberry, M. A. Schroeder, W. M. Vander Haegen, and C. Van Riper III. 2003. Teetering on the edge or too late? Conservation and research issues for avifauna of sagebrush habitats. *Condor* 105:611-634.
- Knick, S. T., and J. T. Rotenberry. 1995. Landscape characteristics of fragmented shrubsteppe habitats and breeding passerine birds. *Conservation Biology* 9:1059-1071.
- Knick, S. T., and J. T. Rotenberry. 1999. Spatial distribution of breeding passerine bird habitats in a shrubsteppe region of southwestern Idaho. *Studies in Avian Biology* 19:104-111.
- Knick, S. T., and J. T. Rotenberry. 2000. Ghosts of habitats past: contribution of landscape change to current habitats used by shrubland birds. *Ecology* 81:220-227.
- Knick, S. T., and J. T. Rotenberry. 2002. Effects of habitat fragmentation on passerine birds breeding in intermountain shrubsteppe. *Studies in Avian Biology* 25:130-140.
- Knopf, F. L. 1994. Avian assemblages on altered grasslands. *Studies in Avian Biology* 15:247-257.
- Knopf, F. L., J. A. Sedgwick, and D. B. Inkley. 1990. Regional correspondence among shrubsteppe bird habitats. *Condor* 92:45-53.
- Kushlan, J. A., M. J. Steinkamp, K. C. Parsons, J. Capp, M. Acosta Cruz, M. Coulter, I. Davidson, L. Dickson, N. Edelson, R. Elliot, R. M. Erwin, S. Hatch, S. Kress, R. Milko, S. Miller, K. Mills, R. Paul, R. Phillips, J. E. Saliva, B. Sydeman, J. Trapp, J. Wheeler, and K. Wohl. 2002. Waterbird Conservation for the Americas: the North American waterbird conservation plan, Version 1. Washington, DC: Waterbird Conservation for the Americas. Accessed at: <http://www.waterbirdconservation.org/nawcp.html>.

- Lalo, J. 1987. The problem of road kill. *American Forests* September-October.
- Leukering, T., M. F. Carter, A. Panjabi, D. Faulkner, and R. Leivad. 2000. Monitoring Colorado's birds: the plan for count-based monitoring. Brighton, Colorado: Rocky Mountain Bird Observatory in cooperation with U. S. Forest Service, Colorado Division of Wildlife, and Bureau of Land Management (updated 2004).
- Lovette, I. 2008. Extortion rackets and egg farming by cowbirds. *Birdscope* 2 (2).
- Mech, L. D. 1989. Wolf population survival in an area of high road density. *American Midland Naturalist* 121:387-389.
- Mech, L. D., S. H. Fritts, G. L. Radde, and W. J. Paul. 1988. Wolf distribution and road density in Minnesota. *Wildlife Society Bulletin* 16:85-87.
- Miller, R. F., and Rose J. A. 1999. Fire history and western juniper encroachment in sagebrush steppe. *Journal of Range Management* 52:550-559.
- Miller, S. G., R. L. Knight, and C. K. Miller. 1998. Influence of recreational trails on breeding bird communities. *Ecological Applications* 8:162-169.
- Miller, S., R. Knight, and C. Miller. 2001. Wildlife responses to pedestrians and dogs. *Wildlife Society Bulletin* 29 (1):124-132.
- Mills, S. G., J. B. Jr. Dunning, and J. M. Bates. 1989. Effects of urbanization on breeding bird community structure in southwestern desert habitats. *Condor* 91:416-428.
- Naugle, D. E., B. L. Walker, and K. E. Doherty. 2006. Sage-grouse population response to coal-bed natural gas development in the Powder River Basin: Interim Progress Report on Region-wide Lek-count Analysis. Bozeman: Univ. of Montana.
- Onorato, D., P. Hellgren, F. S. Mitchell, and J. R. Skiles. 2003. Home range and habitat use of American black bears on a desert montane island in Texas. *Ursus* 14:2.
- Ortega, C. J., and B. D. Peer. 2005. Research directions and cowbird (*Molothrus* spp.) management. *Ornithological Monographs* 2005 (57):1-5.
- Ortega, C. P., and M. E. Mermoz, eds. 2005. Issues and controversies of cowbird management. Edited by C. P. Ortega, J. Chase and B. D. Peer. Vol. 57, *Ornithological Monographs*.
- Ortega, Y. K., and D. E. Capen. 1999. Effects of forest roads on habitat quality for ovenbirds in a forested landscape. *The Auk* 116 (4):937-946.
- Oyler-McCance, S. J., K. P. Burnham, and C. E. Braun. 2001. Influence of changes in sagebrush on Gunnison sage grouse in southwestern Colorado. *The Southwestern Naturalist* 46 (3):323-331.
- Paige, C., M. Koenen, D. Kwan, and D. W. Mehlman. 1999. Species management abstract: Brewer's sparrow (*Spizella breweri*). Arlington: The Nature Conservancy.

- Paige, C., and S. A. Ritter. 1999. Birds in a sagebrush sea: managing sagebrush habitats for bird communities. Boise, Idaho: Partners in Flight Western Working Group. Accessed at: <http://www.partnersinflight.org/wwg/sagebrush.pdf>.
- Panjabi, A. O., E. H. Dunn, P. J. Blancher, W. C. Hunter, B. Altman, J. Bart, C. J. Beardmore, H. Berlanga, G. S. Butcher, S. K. Davis, D. W. Demarest, R. Dettmers, W. Easton, H. Gomez de Silva Garza, E. E. Inigo-Elias, D. N. Pashley, C. J. Ralph, T. D. Rich, K. V. Rosenberg, C. M. Rustay, J. M. Ruth, J. S. Wendt, and T. C. Will. 2005. The Partners in Flight handbook on species assessment. Version 2005. Partners in Flight Technical Series No. 3. Accessed at Rocky Mountain Bird Observatory: <http://www.rmbo.org/pubs/downloads/Handbook2005.pdf>.
- Peer, B. D., S. K. Robinson, and J. R. Herkert. 2000. Egg rejection by cowbird hosts in grasslands. *Auk* 117:892-901.
- PIF. 2000. Colorado Land Bird Conservation Plan. Colorado Partners In Flight. Available at <http://www.rmbo.org/pif/bcp/intro/exsum.htm>.
- PIF. 2009. Partners in Flight Species Assessment Database. Accessed at: <http://www.rmbo.org/pif/pifdb.html>.
- Reed, J. M. 1986. Vegetation structure and vesper sparrow territory location. *The Wilson Bulletin* 98 (1):144-147.
- Reijnen, R., R. Foppen, C. Ter Braak, and J. Thissen. 1995. The effects of car traffic on breeding bird populations in woodlands: reduction of density in relation to the proximity of main roads. *Journal of Applied Ecology* 32:187-202.
- Reynolds, T. D. 1981. Nesting of the sage thrasher, sage sparrow, and Brewer's sparrow in southeastern Idaho. *Condor* 83:61-64.
- Reynolds, T. R., and B. D. Linkhart. 1992. Flammulated owls in ponderosa pine: evidence of preference for old growth. Paper read at Old-growth forests in the Southwest and Rocky Mountain regions (U.S. Forest Service General Technical Report RM-213).
- Rich, T. D., C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D. W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Inigo-Elias, J. A. Kennedy, A. M. Martell, A. O. Panjabi, D. N. Pashley, K. V. Rosenberg, C. M. Rustay, J. S. Wendt, and T. C. Will. 2004. Partners in Flight North American Landbird Conservation Plan. Ithaca, NY: Cornell Lab of Ornithology. Accessed at: http://www.partnersinflight.org/cont_plan/. (VERSION: March 2005).
- Richardson, C. T., and C. K. Miller. 1997. Recommendations for protecting raptors from human disturbance: a review. *Wildlife Society Bulletin* (25):634-638.
- Rosenberg, K. V., J. D. Lowe, and A. A. Dhondt. 1999. Effects of forest fragmentation on breeding tanagers: a continental perspective. *Conservation Biology* 13:568-583.
- Rotenberry, J. T., and J. A. Wiens. 1980a. Temporal variation in habitat structure and shrubsteppe bird dynamics. *Oecologia* 47:1-9.

- Rotenberry, J. T., and S. T. Knick. 1999. Multiscale habitat associations of the sage sparrow: implications for conservation biology. *Studies in Avian Biology* 19:95-103.
- Rotenberry, J. T., and J. A. Wiens. 1980b. Habitat structure, patchiness, and avian communities in North American steppe vegetation: a multivariate analysis. *Ecology* 61 (5):1228-1250.
- Rothstein, S. I. 1994. The cowbird's invasion of the far west: history, causes and consequences experienced by host species. *Studies in Avian Biology* 15:301-315.
- Saab, V. A., C. E. Bock, T. D. Rich, and D. S. Dobkin. 1995. Livestock grazing effects in western North America. In *Ecology and management of neotropical migratory birds*, edited by T. E. Martin and D. M. Finch. New York: Oxford University Press.
- Schaid, T. A., D. W. Uresk, W. L. Tucker, and R. L. Linder. 1983. Effects of surface mining on the vesper sparrow in the northern Great Plains. *Journal of Range Management* 36:500-503.
- Schroeder, M. A., and D. L. Sturges. 1975. The effect on the Brewer's sparrow of spraying big sagebrush. *Journal of Range Management* 28 (4):294-297.
- Sedgwick, James A. 1987. Avian habitat relationships in pinyon-juniper woodland, northwest Colorado. *The Wilson Bulletin* 99 (3):413-431.
- USFWS. 2008. Birds of conservation concern 2008. Arlington, Virginia: U. S. Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management.
- USFWS, and Environment-Canada. 1986 [as updated]. North American Waterfowl Management Plan: A Strategy for Cooperation: U.S. Fish & Wildlife Service and Environment Canada. Available at <http://www.fws.gov/birdhabitat/NAWMP/files/NAWMP.pdf>.
- Vickery, P. D., and J. R. Herkert, eds. 1999. Ecology and conservation of grassland birds of the western hemisphere. Edited by J. T. Rotenberry. Vol. 19, *Studies in Avian Biology*. Camarillo, California: Cooper Ornithological Society.
- Wiens, J. A. 1977. On competition and variable environments. *American Scientist* 65:590-597.
- Wiens, J. A., and J. T. Rotenberry. 1981. Habitat associations and community structure of birds in shrubsteppe environments. *Ecological Monographs* 51 (1):21-41.
- Wiens, J. A., and J. T. Rotenberry. 1985. Response of breeding passerine birds to rangeland alteration in a North American shrubsteppe locality. *Journal of Applied Ecology* 22:655-668.
- Wilbert, M., J. Thompson, and N. W. Culver. 2008. Analysis of habitat fragmentation from oil and gas development and its impact on wildlife: a framework for public land management planning: The Wilderness Society.
- Winter, B. M., and L. B. Best. 1985. Effect of prescribed burning on placement of sage sparrow nests. *Condor* 87:294-295.
- Winternitz, B. L. 1976. Temporal change and habitat preference of some montane breeding birds. *Condor* 78:383-393.

- Wisdom, M. J., M. M. Rowland, B. C. Wales, M. A. Hemstrom, W. J. Hann, M. G. Raphael, R. S. Holthausen, R. A. Gravenmier, and T. D. Rich. 2002a. Modeled effects of sagebrush-steppe restoration on greater sage-grouse in the interior Columbia Basin, USA. *Conservation Biology* 16 (5):1223-1231.
- Wray, T., and R. C. Whitmore. 1979. Effects of vegetation on nesting success of vesper sparrows. *Auk* 96:802-805.

Map 6-1
Breeding Bird Survey (BBS) routes touching the study area.

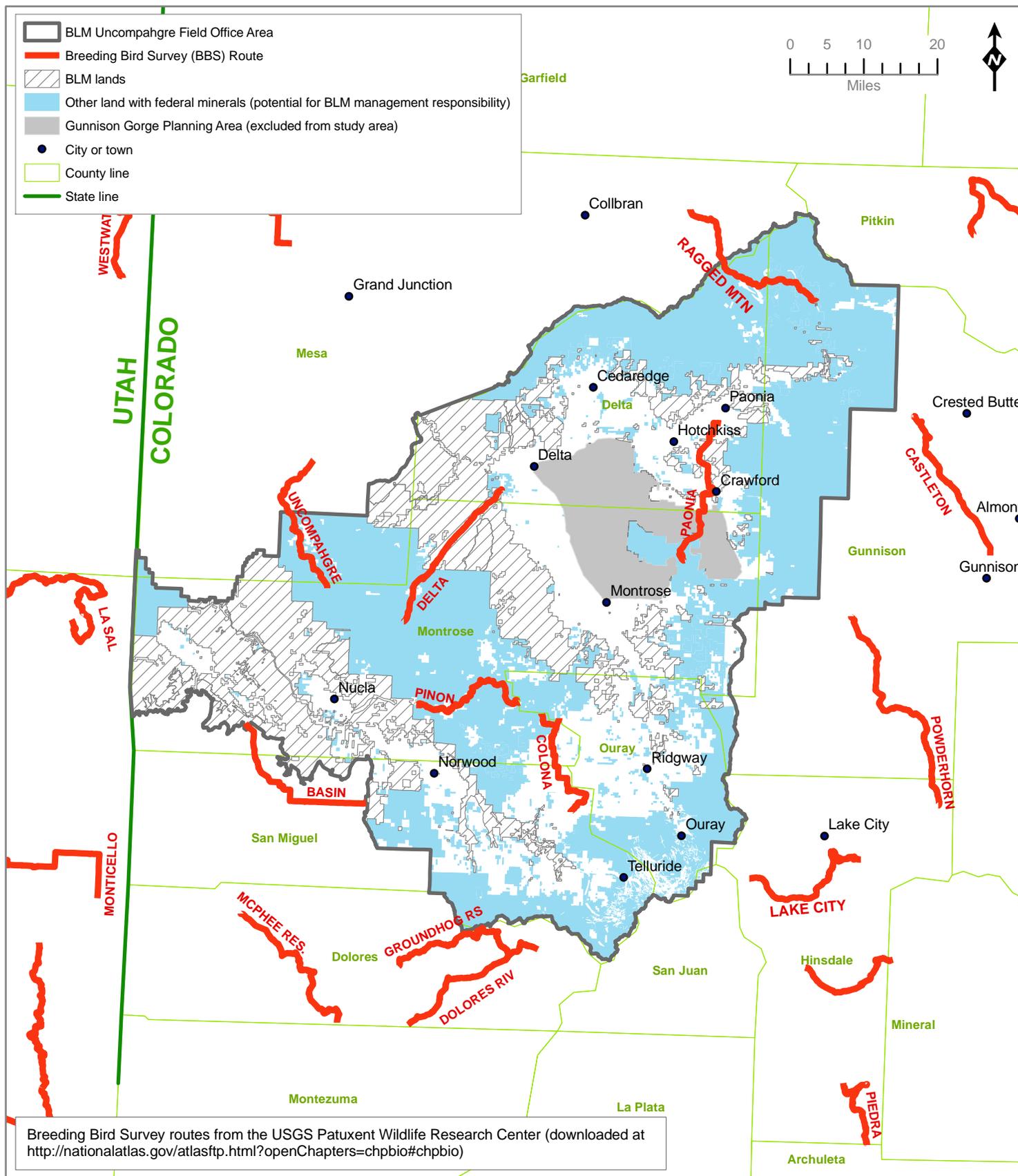


Table 6-1. Summary of conservation status,^a selected conservation priority rankings,^b and population trend estimates for all birds of the study area.

Common Name ^c	CO	BLM	BCR16		State		CHNP	CLBP	WF	SB	WB	CCWCP	PIF Continent Rankings					PIF BCR 16 Rankings							
	Game	SS	List	ESA	T&E	MBTA	Track	Priority	Priority	CC	Rule	Tier	PS-g	BD-g	ND-g	TB-c	TN-c	PT-c	CS-c	RD-b	TB-r	PT-r	CS-r	%Pop	
Ducks, Geese and Swans																									
Greater White-fronted Goose	x					x							3	1	2	2	3	2	10						
Snow Goose	x					x							3	3	3	2	2	1	9						
Ross's Goose	x					x							3	5	4	2	3	1	12						
Cackling Goose	x					x							3	3	2	3	1	3	12						
Canada Goose	x					x			ML				2	1	1	1	2	1	6	3	1	2	9	0	
Trumpeter Swan	o					x			H				5	3	5	4	4	1	15						
Tundra Swan	o					x			ML				4	3	4	2	3	1	12						
Wood Duck	x					x							3	1	1	3	3	1	8	1	3	3	11	0	
Gadwall	x					x			M				3	1	1	3	2	1	8	2	3	3	12	0	
Eurasian Widgeon	x					x							3	1	1	2	2	3	9						
American Widgeon	x					x			MH				3	1	1	3	2	2	9	2	3	3	12	0	
Mallard	x					x			H				2	1	1	2	2	7	2	2	2	9	0		
Blue-winged Teal	x					x			MH				2	1	1	3	2	2	8	1	3	3	10	0	
Cinnamon Teal	x					x			MH				4	1	1	3	3	2	10	3	3	3	14	0	
Northern Shoveler	x					x			M				2	1	1	3	2	1	7	2	3	3	11	0	
Northern Pintail	x					x			H		2		2	1	1	3	2	5	11	2	3	3	11	0	
Green-winged Teal	x					x			M				2	1	1	2	2	1	6	1	2	3	9	0	
Canvasback	o					x			MH				3	1	1	4	3	2	10	1	4	3	12	0	
Redhead	x					x			MH				3	1	1	4	3	2	10	2	4	3	13	0	
Ring-necked Duck	x					x			M				3	1	1	3	3	1	8	4	3	3	14	0	
Greater Scaup	x					x							3	2	2	2	3	2	10						
Lesser Scaup	x					x			H		2		3	1	1	2	3	5	12	3	2	3	12	0	
Surf Scoter	x					x							3	2	2	2	3	5	13						
White-winged Scoter	x					x							3	1	2	2	3	5	13						
Black Scoter	x					x							3	1	1	2	3	5	12						
Long-tailed Duck	x					x							2	1	1	3	3	5	11						
Bufflehead	x					x			M				3	1	1	3	3	1	8	1	3	3	11	0	
Common Goldeneye	x					x			MH				3	1	1	3	2	2	9						
Barrow's Goldeneye	x	x				x	Full				2		4	3	3	3	2	2	12	1	3	3	14	0	
Hooded Merganser	x					x							4	1	1	3	2	1	9	P	3	3	11	0	
Common Merganser	x					x			ML				3	1	1	2	2	1	7	3	2	3	12	0	
Red-breasted Merganser	x					x							3	1	2	2	2	1	8						
Ruddy Duck	x					x							3	1	1	3	3	1	8	2	3	3	12	0	
Chicken-like Birds																									
Chukar	x												2	1	1	1	1	3	7	2	1	3	9	3	
Ring-necked Pheasant	x												2	1	1	1	1	4	8	2	2	3	10	0	
Gunnison Sage-grouse	o	x	x		SC		Full	SA				1	5	5	5	5	5	20	5	5	5	25	100		
White-tailed Ptarmigan							Partial	AT				2	3	2	2	3	3	3	11	3	2	3	13	2	
Dusky Grouse	x							MC				2	4	2	2	3	3	3	12	2	3	3	14	1	
Sharp-tailed Grouse	o	x			SC		Full					1	3	2	2	3	2	2	10	1	4	3	13	0	
Wild Turkey	x												2	2	2	2	2	1	7	2	3	3	12	2	
Gambel's Quail	x												2	3	3	2	2	2	9	2	2	4	13	2	
Loons and Grebes																									
Red-throated Loon						x					2a		3	1	1	3	3	4	11						
Pacific Loon						x					3c		3	1	3	3	3	2	11						

Table 6-1. Summary of conservation status,^a selected conservation priority rankings,^b and population trend estimates for all birds of the study area.

Common Name ^c	CO	BLM	BCR16		State		CHNP	CLBP	WF	SB	WB	CCWCP	PIF Continent Rankings					PIF BCR 16 Rankings								
	Game	SS	List	ESA	T&E	MBTA	Track	Priority	Priority	CC	Rule	Tier	PS-g	BD-g	ND-g	TB-c	TN-c	PT-c	CS-c	RD-b	TB-r	PT-r	CS-r	%Pop		
Common Loon						x							3c	3	1	2	3	3	1	9						
Pied-billed Grebe						x							2a	3	1	1	3	2	2	9	2	3	3	12	0	
Horned Grebe						x							2a	3	1	1	3	3	5	12						
Red-necked Grebe						x							3c	4	1	2	3	3	2	11						
Eared Grebe						x							3c	2	3	1	2	3	3	1	9	3	3	3	13	0
Western Grebe						x							3b	2	4	1	2	3	2	2	11	2	3	3	13	0
Clark's Grebe						x							4a	5	2	4	3	2	3	15	1	3	3	14	0	
Pelicans and Cormorants																										
American White Pelican		x				x	Full						3c	2	4	3	2	3	3	2	12	2	3	3	15	0
Brown Pelican						x							3c	4	3	3	3	2	1	11						
Double-crested Cormorant						x							5	3	2	2	2	2	1	8	1	2	3	11	0	
Neotropic Cormorant						x							3c	2	1	1	3	2	2	8						
Bitterns, Herons, and Ibises																										
American Bittern			x			x							2a	1	3	1	2	3	3	4	12	2	4	3	13	0
Great Blue Heron						x							5	3	1	1	2	2	1	7	2	2	2	10	0	
Great Egret						x							5	3	1	1	2	2	1	7	1	2	3	10	0	
Snowy Egret						x	Full						2a	2	3	1	1	3	2	1	8	1	3	3	11	0
Little Blue Heron						x							2a	3	1	1	4	3	5	13	P	3	3	10	0	
Cattle Egret						x							5	2	1	1	1	1	2	6	1	2	3	9	0	
Green Heron						x							4c	3	1	1	3	3	4	11	1	3	3	11	0	
Black-crowned Night Heron						x							3b	3	1	1	3	2	3	10	2	3	4	13	0	
Glossy Ibis						x						2	4c	3	1	1	2	2	1	7						
White-faced Ibis		x				x	Full						4b	2	3	1	1	3	3	1	8	1	3	3	11	0
New World Vultures																										
Turkey Vulture						x								2	1	1	1	1	1	5	2	2	2	9	1	
Eagles, Hawks, and Falcons																										
Osprey						x							2	3	1	1	2	2	1	7	1	2	3	10	0	
Mississippi Kite						x								4	2	2	2	3	2	11	P	3	3	12	0	
Bald Eagle		x	x	del	T	x	Full						1	4	1	1	3	3	1	9	1	4	3	13	0	
Northern Harrier						x		WE					2	3	1	1	3	3	4	11	2	4	3	13	0	
Sharp-shinned Hawk						x								3	1	1	2	2	1	7	5	3	3	15	2	
Coopers Hawk						x								3	1	1	2	3	1	8	4	3	2	13	6	
Northern Goshawk		x				x	Full						1	4	1	1	3	3	3	11	4	3	3	15	3	
Common Black-hawk														3	3	3	3	3	2	11			3		0	
Broad-winged Hawk						x							1	3	1	1	3	3	1	8						
Swainson's Hawk						x								3	1	3	3	4	2	12	2	4	3	13	2	
Red-tailed Hawk						x							1	3	1	1	1	1	6	3	2	1	10	3		
Ferruginous Hawk		x	x		SC	x	Full							4	2	2	4	3	1	11	3	4	3	16	3	
Rough-legged Hawk						x							1	4	1	1	2	2	3	10						
Golden Eagle						x								4	1	1	3	3	2	10	5	4	4	18	3	
American Kestrel						x								3	1	1	3	2	4	11	5	2	2	13	4	
Merlin						x							1	3	1	1	2	2	1	7						
Peregrine Falcon			x	del	SC	x	Full	C/R					1	4	1	1	3	3	1	9	2	3	3	13	0	
Prairie Falcon			x			x	Watch L							4	2	1	3	3	1	10	4	4	3	17	12	
Rails, Coots, and Cranes																										

Table 6-1. Summary of conservation status,^a selected conservation priority rankings,^b and population trend estimates for all birds of the study area.

Common Name ^c	CO	BLM	BCR16		State		CHNP	CLBP	WF	SB	WB	CCWCP	PIF Continent Rankings					PIF BCR 16 Rankings							
	Game	SS	List	ESA	T&E	MBTA	Track	Priority	Priority	CC	Rule	Tier	PS-g	BD-g	ND-g	TB-c	TN-c	PT-c	CS-c	RD-b	TB-r	PT-r	CS-r	%Pop	
Virginia Rail	x					x					3c		4	1	2	3	2	1	10	3	3	3	14	0	
Sora	x					x					2a		3	1	1	3	2	3	10	2	3	4	13	0	
American Coot	x					x					4b		3	1	1	3	3	4	11	2	3	3	12	0	
Sandhill Crane	o				SC	x	Full				4b	1	3	1	3	3	3	1	10	2	3	3	12	0	
Plovers																									
Black-bellied Plover						x							3	2	1	3	2	4	12						
American Golden Plover						x							4	2	3	3	4	4	15						
Snowy Plover		x	x		SC	x	Full					4	1	1	4	4	5	14	1	4	3	13	0		
Semipalmated Plover						x						2	4	1	1	3	2	2	10						
Piping Plover				T	T	x						5	3	5	5	4	5	20							
Killdeer						x						3	2	1	1	2	2	4	9	2	2	5	12	0	
Mountain Plover		x	x	w04	SC	x	Full					5	4	4	4	4	5	18	2	4	3	18	0		
Stilts and Avocets																									
Black-necked Stilt						x	Full					3	4	1	2	3	2	2	11	1	3	3	12	0	
American Avocet						x						3	4	2	3	3	2	12	2	3	3	14	0		
Sandpipers																									
Spotted Sandpiper						x						2	3	1	1	2	2	3	9	3	2	3	12	0	
Solitary Sandpiper						x						4	4	1	1	3	2	4	12						
Greater Yellowlegs						x						3	4	1	1	2	2	3	10						
Willet						x	Full					3	4	3	3	3	3	4	14						
Lesser Yellowlegs						x						3	4	1	1	2	3	4	12						
Whimbrel						x						5	3	3	2	3	3	4	13						
Long-billed Curlew		x	x		SC	x	Full					5	4	3	3	4	4	15	2	3	4	16	0		
Marbled Godwit						x						4	4	3	2	4	4	15							
Sanderling						x						4	3	3	1	3	3	5	14						
Semipalmated Sandpiper						x						3	3	2	3	3	5	14							
Western Sandpiper						x						4	3	5	2	3	3	4	15						
Least Sandpiper						x						3	3	1	1	3	2	4	11						
White-rumped Sandpiper						x						2	3	3	4	3	2	4	14						
Baird's Sandpiper						x						2	4	2	2	3	2	3	12						
Pectoral Sandpiper						x						2	3	2	1	3	2	4	12						
Dunlin						x						3	2	1	1	3	3	4	10						
Stilt Sandpiper						x						3	3	5	2	3	4	3	15						
Short-billed Dowitcher						x						4	4	3	1	2	3	3	13						
Long-billed Dowitcher						x						2	4	3	2	3	3	2	12						
Wilson's Snipe	x					x						3	3	1	1	3	2	4	11	2	2	3	11	0	
Wilson's Phalarope						x	Full					4	3	2	1	3	4	2	11	2	3	3	13	0	
Red-necked Phalarope						x						3	3	1	1	3	3	4	11						
Red Phalarope						x						3	3	2	2	3	3	4	12						
Gulls and Terns																									
Sabine's Gull						x						4b	3	2	2	2	3	2	10						
Bonaparte's Gull						x						*	4	1	1	2	2	3	10						
Franklin's Gull						x						3b	3	3	3	3	3	2	11						
Ring-billed Gull						x						5	3	1	1	1	1	6	1	1	3	9	0		
California Gull						x						3b	4	3	3	3	1	2	12	3	3	2	15	0	

Table 6-1. Summary of conservation status,^a selected conservation priority rankings,^b and population trend estimates for all birds of the study area.

Common Name ^c	CO	BLM	BCR16		State		CHNP	CLBP	WF	SB	WB	CCWCP	PIF Continent Rankings					PIF BCR 16 Rankings								
	Game	SS	List	ESA	T&E	MBTA	Track	Priority	Priority	CC	Rule	Tier	PS-g	BD-g	ND-g	TB-c	TN-c	PT-c	CS-c	RD-b	TB-r	PT-r	CS-r	%Pop		
Herring Gull						x							4a	3	1	1	2	1	5	11						
Thayer's Gull						x							3c	5	5	4	2	1	3	15						
Lesser Black-backed Gull						x							3c	4	3	1	2	1	1	10						
Least Tern				E	E	x	Full						2a	1	4	3	4	4	3	4	16					
Caspian Tern						x							4b	4	2	1	3	2	1	10						
Black Tern		x				x							3b	4	1	1	3	2	4	12	1	4	5	15	0	
Common Tern						x							4b	3	1	1	3	3	5	12						
Forster's Tern						x	Full						3b	2	4	3	2	3	2	12	1	3	4	15	0	
Pigeons and Doves																										
Rock Pigeon														1	1	1	1	1	3	6	2	1	2	7	1	
Band-tailed Pigeon	x					x		PP					1	3	2	2	3	3	4	12	2	3	3	13	1	
Eurasian Collared Dove														2	1	1	1	1	1	5						
White-winged Dove		o				x								2	2	2	2	2	2	8	1	1	3	9	0	
Mourning Dove	x					x								1	1	1	1	1	2	5	3	1	4	10	2	
Cuckoos																										
Yellow-billed Cuckoo		x	x	C3	SC	x	Full						1	2	1	2	3	3	5	12	1	5	3	12	0	
Black-billed Cuckoo						x								3	1	2	3	3	5	12	1	3	3	12	0	
Owls																										
Barn Owl						x								3	1	1	2	2	3	9	2	3	3	12	0	
Flammulated Owl			x			x		PP					1	5	2	4	3	3	3	15	5	3	3	18	25	
Western Screech-Owl						x								4	2	2	3	2	3	12	3	3	3	15	0	
Great Horned Owl						x								2	1	1	1	1	2	6	2	1	3	9	1	
Northern Pygmy-Owl						x	Watch L							4	2	2	3	3	2	11	2	3	3	14	5	
Burrowing Owl			x		T	x	Watch L	DS					1	3	1	1	4	3	4	12	2	4	3	13	1	
Spotted Owl				T	T	x	Full	PP					1	5	2	2	4	4	4	15	3	4	3	17	20	
Long-eared Owl						x								4	1	1	3	3	4	12	3	3	3	14	1	
Short-eared Owl						x							1	3	1	1	3	3	5	12	1	4	3	12	0	
Boreal Owl						x	Partial	SF					1	3	1	1	3	2	3	10	3	3	3	13	1	
Northern Saw-whet Owl						x								3	1	1	2	2	3	9	3	3	3	13	4	
Nightjars																										
Lesser Nighthawk						x								2	2	1	2	2	2	8	1	2	3	10	0	
Common Nighthawk						x								2	1	1	3	3	5	11	3	3	5	14	7	
Common Poorwill						x		MS						3	1	2	3	2	2	10	4	2	3	13	12	
Swifts																										
Black Swift						x	Full	C/R					2	4	2	2	4	2	5	15	1	3	3	13	0	
Chimney Swift						x								2	1	2	3	3	5	12						
White-throated Swift						x		C/R					2	3	2	2	2	2	4	11	5	2	3	15	24	
Hummingbirds																										
Broad-tailed Hummingbird						x		AS					2	2	2	4	2	2	2	10	5	2	4	15	59	
Blue-throated Hummingbird						x								3	3	3	3	3	3	12						
Magnificent Hummingbird						x								3	3	3	3	3	3	12	P	3	3	12	0	
Ruby-throated Hummingbird						x								2	1	3	2	2	1	8						
Black-chinned Hummingbird						x		PJ					2	3	2	4	2	2	2	11	3	3	2	13	16	
Anna's Hummingbird						x								3	3	2	1	1	1	8						
Calliope Hummingbird						x								3	2	4	3	2	2	12	2	3	3	13	0	

Table 6-1. Summary of conservation status,^a selected conservation priority rankings,^b and population trend estimates for all birds of the study area.

Common Name ^c	CO	BLM	BCR16	State			CHNP	CLBP	WF	SB	WB	CCWCP	PIF Continent Rankings					PIF BCR 16 Rankings						
	Game	SS	List	ESA	T&E	MBTA	Track	Priority	Priority	CC	Rule	Tier	PS-g	BD-g	ND-g	TB-c	TN-c	PT-c	CS-c	RD-b	TB-r	PT-r	CS-r	%Pop
Rufous Hummingbird						x						2	2	2	4	2	2	5	13					
Kingfishers																								
Belted Kingfisher						x							3	1	1	2	2	5	11	3	2	3	12	1
Woodpeckers																								
Lewis's Woodpecker			x			x	Full	LR				1	4	2	3	4	3	3	14	5	4	3	18	38
Red-headed Woodpecker						x							3	1	2	3	3	5	13	1	4	3	12	0
Williamson's Sapsucker						x		MC				1	4	3	3	3	3	3	13	5	3	2	17	43
Yellow-bellied Sapsucker						x							2	1	1	2	2	2	7					
Red-naped Sapsucker						x		AS				1	3	2	2	3	3	2	10	3	3	3	14	9
Downy Woodpecker						x							2	1	1	2	1	3	8	2	3	2	10	0
Hairy Woodpecker						x							2	1	1	2	2	1	6	4	3	3	13	3
American Three-toed Woodpecker						x						2	3	1	1	3	3	3	10	2	3	3	12	1
Northern Flicker						x							2	1	1	2	2	5	10	5	2	4	14	4
Tyrant Flycatchers																								
Olive-sided Flycatcher						x		SF				1	3	1	1	3	4	5	13	3	3	3	13	3
Western Wood Pewee						x							2	1	2	3	3	4	11	3	2	4	12	10
Willow Flycatcher			x			x	Watch L						2	1	2	3	2	4	11	2	4	4	13	1
Least Flycatcher						x							2	1	2	2	2	4	10					
Hammond's Flycatcher						x		SF					2	2	3	3	2	2	10	2	3	3	12	2
Gray Flycatcher						x		PJ				2	3	2	3	3	2	1	10	3	3	3	14	12
Dusky Flycatcher						x						2	2	2	3	2	2	4	11	3	3	2	12	7
Cordilleran Flycatcher						x		HR				2	3	2	3	3	2	3	12	4	3	2	14	29
Black Phoebe						x							2	2	2	3	2	2	9	2	3	3	12	1
Eastern Phoebe						x							2	1	2	2	2	2	8	1	2	3	9	0
Say's Phoebe						x							3	1	2	2	2	1	8	5	2	4	15	24
Ash-throated Flycatcher						x							2	2	3	2	2	2	9	3	2	3	12	10
Cassin's Kingbird						x		PJ					2	2	3	2	2	2	9	4	2	3	13	15
Western Kingbird						x		LR					2	1	3	2	2	2	9	2	2	3	10	3
Eastern Kingbird						x							2	1	2	3	2	4	11	1	2	3	9	0
Scissor-tailed Flycatcher						x							2	2	3	2	2	4	11					
Shrikes and Vireos																								
Loggerhead Shrike						x		DS				1	2	1	1	3	3	5	11	2	3	5	13	3
Northern Shrike						x							3	1	1	2	2	3	9					
Gray Vireo			x			x	Full	PJ				1	4	3	4	4	4	2	14	5	4	3	19	68
Plumbeous Vireo						x							3	2	3	3	2	2	11	4	3	3	15	32
Cassin's Vireo						x							3	3	3	3	2	2	11					
Warbling Vireo						x							1	1	3	3	2	2	9	5	3	3	13	8
Red-eyed Vireo						x							1	1	1	2	2	1	5					
Jays, Magpies, and Crows																								
Gray Jay						x							2	1	1	2	2	3	8	2	2	2	9	0
Steller's Jay						x							3	2	2	2	2	2	9	3	2	3	13	12
Blue Jay						x							2	1	1	1	1	4	8	1	1	3	8	1
Western Scrub Jay						x							3	2	2	2	2	2	9	2	3	3	13	10
Pinyon Jay			x			x		PJ				1	3	2	2	4	3	5	14	5	4	5	19	48
Clark's Nutcracker						x							4	2	2	3	2	1	10	5	2	3	16	42

Table 6-1. Summary of conservation status,^a selected conservation priority rankings,^b and population trend estimates for all birds of the study area.

Common Name ^c	CO	BLM	BCR16	State			CHNP	CLBP	WF	SB	WB	CCWCP	PIF Continent Rankings					PIF BCR 16 Rankings							
	Game	SS	List	ESA	T&E	MBTA	Track	Priority	Priority	CC	Rule	Tier	PS-g	BD-g	ND-g	TB-c	TN-c	PT-c	CS-c	RD-b	TB-r	PT-r	CS-r	%Pop	
Black-billed Magpie						x							2	1	1	2	2	2	7	5	2	2	12	9	
American Crow	x					x							2	1	1	1	1	2	6	2	1	1	7	1	
Common Raven						x							2	1	1	2	1	1	6	4	1	1	9	1	
Larks																									
Horned Lark						x		DS					1	1	1	2	2	5	9	4	1	5	12	4	
Swallows																									
Purple Martin						x		AS				1	2	1	1	2	3	2	8	1	3	3	10	0	
Tree Swallow						x							2	1	2	2	2	2	8	3	3	3	12	2	
Violet-green Swallow						x		AS					2	1	2	2	2	2	8	5	2	4	14	17	
N. Rough-winged Swallow						x							2	1	2	2	2	3	9	4	2	2	11	1	
Bank Swallow						x							2	1	1	2	2	5	10	2	2	3	10	0	
Cliff Swallow						x							2	1	1	1	2	2	7	3	2	3	11	3	
Barn Swallow						x							1	1	1	2	2	4	8	3	2	3	10	0	
Tits																									
Black-capped Chickadee						x							2	1	1	2	1	1	6	2	3	3	11	1	
Mountain Chickadee						x							2	2	2	2	2	4	10	3	3	3	13	22	
Juniper Titmouse			x			x		PJ				1	4	2	2	3	3	3	12	5	3	5	19	50	
Bushtit						x							3	2	2	2	2	4	11	2	2	2	11	6	
Nuthatches and Creepers																									
Red-breasted Nuthatch						x							2	1	1	2	2	1	6	2	3	3	11	2	
White-breasted Nuthatch						x							2	1	1	2	2	1	6	3	2	3	11	7	
Pygmy Nuthatch						x					2		3	2	2	3	3	2	10	3	3	5	16	15	
Brown Creeper						x							2	1	1	3	2	2	8	2	3	1	9	2	
Wrens and Water Ousels																									
Rock Wren						x							3	1	2	2	2	5	12	5	2	5	16	21	
Canyon Wren						x							4	1	1	2	2	4	11	4	3	4	16	10	
Bewick's Wren						x							2	2	2	3	3	3	10	2	3	1	10	7	
House Wren						x							1	1	1	1	1	2	5	3	2	3	10	3	
Winter Wren						x							2	1	1	3	2	1	7						
Marsh Wren						x							2	1	1	3	3	1	7	2	4	3	12	1	
American Dipper						x		HR				2	4	1	1	3	3	2	10	4	3	3	15	13	
Kinglets and Gnatcatchers																									
Golden-crowned Kinglet						x							1	1	1	2	2	4	8	2	3	3	10	0	
Ruby-crowned Kinglet						x							1	1	1	2	2	2	6	4	3	3	12	3	
Blue-gray Gnatcatcher						x							1	1	2	2	2	2	7	3	2	3	10	4	
Thrushes																									
Eastern Bluebird						x							2	1	2	2	2	1	7						
Western Bluebird						x		PP					2	2	2	3	2	2	9	4	3	3	14	27	
Mountain Bluebird						x							3	1	2	3	2	1	9	5	3	4	16	32	
Townsend's Solitaire						x							3	2	2	3	2	4	12	4	3	2	14	12	
Swainson's Thrush						x							1	1	2	3	3	4	10	1	3	3	9	0	
Hermit Thrush						x							2	1	1	2	2	1	6	3	3	3	12	2	
American Robin						x							1	1	1	1	1	2	5	4	2	4	12	3	
Varied Thrush						x							2	2	3	3	2	4	12						

Table 6-1. Summary of conservation status,^a selected conservation priority rankings,^b and population trend estimates for all birds of the study area.

Common Name ^c	CO	BLM	BCR16	State			CHNP	CLBP	WF	SB	WB	CCWCP	PIF Continent Rankings					PIF BCR 16 Rankings						
	Game	SS	List	ESA	T&E	MBTA	Track	Priority	Priority	CC	Rule	Tier	PS-g	BD-g	ND-g	TB-c	TN-c	PT-c	CS-c	RD-b	TB-r	PT-r	CS-r	%Pop
Mockingbirds and Thrashers																								
Gray Catbird						x							2	1	2	2	2	2	8	1	2	2	8	0
Northern Mockingbird						x							2	1	1	1	1	4	8	3	2	3	11	4
Sage Thrasher						x							2	2	2	3	2	4	11	3	2	3	12	6
Brown Thrasher						x							3	1	2	3	2	4	12	1	3	3	11	0
Starlings																								
European Starling						x							1	1	1	1	1	4	7	2	1	4	9	1
Pitpits and Wagtails																								
American Pipit						x		AT					2	1	1	2	2	4	9	2	2	3	10	2
Waxwings																								
Bohemian Waxwing						x							3	1	1	2	2	3	9					
Cedar Waxwing						x							1	1	1	2	2	2	6	1	2	3	8	0
Wood Warblers																								
Blue-winged Warbler						x							4	3	4	3	3	4	15					
Tennessee Warbler						x							1	1	2	3	2	3	9					
Orange-crowned Warbler						x							1	1	2	2	2	4	9	2	3	1	8	0
Nashville Warbler						x							2	2	3	2	2	2	9					
Virginia's Warbler						x		MS			2		3	3	4	3	3	4	14	4	3	4	17	59
Northern Parula						x							2	2	3	2	2	2	9					
Yellow Warbler						x							1	1	1	2	2	2	6	3	3	2	10	2
Chestnut-sided Warbler						x							2	2	3	2	3	4	12	P	2	3	9	0
Magnolia Warbler						x							2	2	2	2	2	1	7					
Black-throated Blue Warbler						x							3	2	2	3	3	2	10					
Yellow-rumped Warbler						x							1	1	1	2	2	2	6	3	3	3	11	3
Black-throated Gray Warbler						x		PJ			1		3	2	3	3	3	2	11	3	3	4	15	10
Townsend's Warbler						x							2	2	3	4	3	2	11					
Hermit Warbler						x							3	3	3	4	3	2	12					
Blackburnian Warbler						x							2	2	2	3	3	2	9					
Graces's Warbler			x			x	Full	PP			2		3	2	3	3	3	4	13	3	3	4	15	14
Palm Warbler						x							2	2	3	2	2	1	8					
Black-and-white Warbler						x							2	1	2	2	2	4	10					
American Redstart						x							2	1	2	2	2	4	10	1	2	3	9	0
Ovenbird						x	Full						2	1	2	2	3	2	9	1	2	3	9	0
Northern Waterthrush						x							2	1	2	2	2	4	10	1	2	3	9	0
Kentucky Warbler						x							3	2	3	3	4	4	14					
MacGillivray's Warbler						x		HR					2	2	3	2	2	4	11	3	2	3	10	4
Common Yellowthroat						x							1	1	2	2	2	4	9	1	3	3	9	0
Hooded Warbler						x							3	2	3	3	3	2	11	P	3	3	11	0
Wilson's Warbler						x		HR					1	1	2	3	2	5	11	2	3	5	12	1
Painted Redstart						x							3	2	3	3	3	4	13					
Yellow-breasted Chat						x							2	1	3	3	2	2	10	2	3	3	11	1
Tanagers																								
Summer Tanager						x							2	2	1	3	3	2	9	1	3	3	11	0
Western Tanager						x							2	2	3	2	2	1	8	3	3	3	13	11
Sparrows																								

Table 6-1. Summary of conservation status,^a selected conservation priority rankings,^b and population trend estimates for all birds of the study area.

Common Name ^c	CO	BLM	BCR16	State			CHNP	CLBP	WF	SB	WB	CCWCP	PIF Continent Rankings					PIF BCR 16 Rankings						
	Game	SS	List	ESA	T&E	MBTA	Track	Priority	Priority	CC	Rule	Tier	PS-g	BD-g	ND-g	TB-c	TN-c	PT-c	CS-c	RD-b	TB-r	PT-r	CS-r	%Pop
Green-tailed Towhee						x		MS					3	2	2	3	2	2	10	5	3	3	16	44
Spotted Towhee						x							2	2	2	2	2	2	8	4	2	3	13	15
Am. Tree Sparrow						x							2	1	1	2	2	4	9					
Chipping Sparrow						x							1	1	2	1	2	3	8	4	3	4	13	2
Clay-colored Sparrow						x							1	2	2	2	3	4	10	1	2	3	9	0
Brewer's Sparrow			x			x		SA				1	2	2	2	3	3	5	12	3	3	5	15	11
Field Sparrow						x							2	2	2	3	3	5	12	1	3	3	11	0
Vesper Sparrow						x						2	2	1	2	3	3	4	11	4	3	3	13	7
Lark Sparrow						x							2	1	2	2	2	4	10	3	3	4	13	9
Black-throated Sparrow						x							1	2	2	2	2	4	9	3	3	5	14	5
Sage Sparrow						x	Partial	SA				1	3	2	2	4	3	2	11	4	4	3	16	14
Lark Bunting						x						1	2	2	2	3	3	5	12	1	4	3	12	0
Savannah Sparrow						x							1	1	1	2	2	4	8	2	3	3	10	0
Grasshopper Sparrow			x			x							2	1	2	3	3	5	12					
Fox Sparrow						x							2	1	2	2	2	2	8	2	2	2	9	0
Song Sparrow						x							1	1	1	2	2	4	8	2	3	2	9	1
Lincoln's Sparrow						x							1	1	2	2	2	2	7	2	3	1	8	1
Swamp Sparrow						x							2	1	1	2	2	1	6					
White-throated Sparrow						x							1	1	2	2	2	3	8					
Harris's Sparrow						x						2	3	2	3	2	2	5	13					
White-crowned Sparrow						x							1	1	1	2	2	3	7	3	2	5	12	1
Golden-crowned Sparrow						x							3	2	3	2	2	2	10					
Dark-eyed Junco						x							1	1	1	2	2	2	6	2	3	3	10	0
Lapland Longspur						x							1	1	1	2	2	2	6					
Snow Bunting						x							2	1	1	2	2	5	10					
Grosbeaks and Buntings																								
Rose-breasted Grosbeak						x							3	2	2	2	2	4	11					
Black-headed Grosbeak						x							3	2	2	2	2	2	9	3	3	3	14	10
Blue Grosbeak						x							2	1	2	2	2	2	8	2	2	3	10	2
Lazuli Bunting						x		LB				2	2	2	3	3	2	2	10	4	2	4	14	11
Indigo Bunting						x							1	1	2	2	2	4	9	1	3	3	9	0
Dickcissel						x							2	2	2	3	4	2	10	1	2	3	10	0
Blackbirds and Orioles																								
Bobolink						x	Watch L					1	2	2	3	3	3	5	13	1	4	3	12	0
Red-winged Blackbird						x							1	1	1	2	2	4	8	2	2	3	9	1
Western Meadowlark						x							1	1	2	3	3	4	10	3	3	4	12	3
Yellow-headed Blackbird						x							2	1	2	3	3	2	9	2	4	3	12	2
Rusty Blackbird						x							2	1	2	3	3	5	12					
Brewer's Blackbird						x							2	1	1	2	1	4	9	3	2	3	11	6
Common Grackle						x							1	1	2	1	1	4	8	1	1	3	7	0
Great-tailed Grackle						x							2	1	1	1	1	1	5	1	1	3	8	0
Brown-headed Cowbird						x							1	1	1	1	1	4	7	2	1	3	8	1
Orchard Oriole						x							2	1	2	3	2	3	10					
Bullock's Oriole						x							2	2	3	3	2	4	12	2	3	3	12	4
Scott's Oriole						x		PJ					3	2	3	3	3	2	11	2	3	2	12	3
Finches																								

Table 6-1. Summary of conservation status,^a selected conservation priority rankings,^b and population trend estimates for all birds of the study area.

Common Name ^c	CO	BLM	BCR16	State			CHNP	CLBP	WF	SB	WB	CCWCP	PIF Continent Rankings					PIF BCR 16 Rankings									
	Game	SS	List	ESA	T&E	MBTA	Track	Priority	Priority	CC	Rule	Tier	PS-g	BD-g	ND-g	TB-c	TN-c	PT-c	CS-c	RD-b	TB-r	PT-r	CS-r	%Pop			
Gray-crowned Rosy Finch						x							4	2	2	3	2	3	12								
Black Rosy Finch			x			x						2	5	4	3	4	2	3	16	3	3	3	18	10			
Brown-capped Rosy Finch			x			x		AT				1	5	5	4	4	2	3	17	5	3	3	21	100			
Pine Grosbeak						x							2	1	1	3	2	3	9	3	3	3	12	1			
Purple Finch						x							2	1	1	2	2	4	9								
Cassin's Finch				x		x						2	3	2	2	3	2	5	13	4	3	5	17	14			
House Finch						x							2	1	1	1	1	2	6	2	2	2	9	4			
Red Crossbill						x						2	2	1	1	3	3	4	10	3	3	3	12	2			
White-winged Crossbill						x	Watch L						2	1	1	3	2	3	9	1	2	3	9	0			
Common Redpoll						x							1	1	1	2	2	3	7								
Pine Siskin						x							2	1	1	2	2	5	10	5	3	5	16	9			
Lesser Goldfinch						x							2	2	2	2	2	8	8	2	2	3	11	5			
American Goldfinch						x							2	1	1	1	1	2	6	2	2	3	10	1			
Evening Grosbeak						x						2	3	2	1	3	2	4	12	3	3	3	14	2			
Old World Sparrows																											
House Sparrow													1	1	1	1	1	5	8	2	1	3	8	1			

Notes

a. Conservation status explanation

- CO Game = Colorado game species (x indicates hunting season in Colorado; o indicates no hunting season in Colorado)
- BLM SS = BLM Sensitive Species (BLM 2000)
- BCR16 List = species identified as bird of conservation concern (USFWS 2008)
- ESA = Endangered Species Act status (del-delisted; T-threatened; C-candidate, w04-withdrawn as candidate in 2004)
- State T&E = State protection status (E-endangered; T-threatened; SC-species of concern [not a legal status])
- MBTA = Migratory Bird Treaty Act protected species

b. Conservation priority ranking explanation

- CNHP Track = Colorado Natural Heritage Program tracking status (Full-fully tracked; Watch L-Watchlisted; partial-partially tracked)
- CLBP Priority = Colorado Landbird Conservation Plan (PIF 2000), habitat for which species is a priority: AS=aspen, AT=alpine tundra, C/R=cliff/rock, DS=semi-desert shrub, HR=high elevation riparian, LR=low elevation riparian, MC=mixed conifer, MS=mountain shrubland, PJ=pinyon-juniper woodland, PP=ponderosa pine, SA=sagebrush shrubland, SF=spruce-fir, WE=wetlands
- WF Priority = management priority of species in Waterfowl Conservation Region 16 (BCR16) as found in the North American Waterfowl Management Plan's Implementation Framework, where H=high, MH=moderately high; M= moderate, ML=moderately low
- SB CC = conservation category in United States Shorebird Conservation Plan, 2nd ed. (Brown et al. 2001).
- WB Rule = rankings explained in the North American Waterbird Conservation Plan (Kushlan et al. 2002).
- CWCP Tier = tier of species as prioritized by the Colorado Comprehensive Wildlife Conservation Strategy (CDOW 2006).
- PIF Continent Rankings and PIF BCR16 Rankings explained at Panjabi et al. 2005 and RMBO 2009 and Chapter 6 of this report.

c. Nomenclature and taxonomic arrangement of this list follows that of the American Ornithologists' Union (AOU 2009).

d. PT-c (continental population trend score) and PT-r (BCR 16 population trend score) are color coded as follows: 5-red (significant decline), 4-orange (declining), 3-yellow (variable or uncertain trend);

Table 6-2. Explanation of Partners In Flight (PIF) population trend scores presented in Table 6-1.

Trend Score (Pt-c or Pt-r)	Percent Change over 30 Years	Equivalent % annual change	Qualitative Interpretation
1	≥ 50% increase	≥1.36%	Large population increase
2	15 to 49% increase	0.47 to 1.36% increase	Possible or moderate population increase
	OR <15% change	OR -0.54 to 0.47% change	OR Population stable
3	Highly variable	N/A	Uncertain population trend
	OR Unknown		
4	15 to 49% decrease	>0.54 to 2.28% decrease	Possible or moderate population decrease
5	≥ 50% decrease	>2.28% decrease	Large population decrease

Table 6-3. Sensitivities or stressors^a of selected birds of the study area.

Common Name ^b	Human Disturbance	Livestock Grazing	Habitat Fragmentation	Water Development	Herbaceous Weeds	Vegetation Treatment	Aerial Obstacles	Forestry
Canada Goose					neg		x	
American Widgeon					neg			
Mallard							x	
Common Merganser							x	
Chukar				pos	pos	pos		
Gunnison Sage-grouse	x	neg	neg			neg	x	
Sharp-tailed Grouse		neg						
Gambel's Quail				pos				
American Bittern			neg					
Great Blue Heron							x	
Turkey Vulture							x	
Bald Eagle	x							
Northern Harrier		neg						
Sharp-shinned Hawk	x							neg
Coopers Hawk	x							neg
Northern Goshawk	x							neg
Swainson's Hawk	x	neg						pos
Red-tailed Hawk	x	neg					x	pos
Ferruginous Hawk	x	neg						
Golden Eagle	x	pos					x	pos
American Kestrel		neg						neg
Peregrine Falcon	x							
Prairie Falcon	x							
American Coot							x	
Sandhill Crane							x	
Snowy Plover					neg			
Semipalmated Plover					neg			
Killdeer		pos						
Mountain Plover		pos						
Greater Yellowlegs					neg			
Willet			neg		neg			
Lesser Yellowlegs					neg			
Long-billed Curlew		neg			neg			
Marbled Godwit					neg			
Semipalmated Sandpiper					neg			
Western Sandpiper					neg			
Least Sandpiper					neg			
Baird's Sandpiper					neg			
Pectoral Sandpiper					neg			
Dunlin					neg			

Table 6-3. Sensitivities or stressors^a of selected birds of the study area.

Common Name ^b	Human Disturbance	Livestock Grazing	Habitat Fragmentation	Water Development	Herbaceous Weeds	Vegetation Treatment	Aerial Obstacles	Forestry
Stilt Sandpiper					neg			
Long-billed Dowitcher					neg			
Wilson's Snipe								
Wilson's Phalarope								
Band-tailed Pigeon				pos				pos/neg
Yellow-billed Cuckoo					neg			
Barn Owl								
Flammulated Owl								neg
Northern Pygmy-Owl								neg
Burrowing Owl		pos						
Spotted Owl								neg
Long-eared Owl								neg
Short-eared Owl		neg						
Boreal Owl								neg
Northern Saw-whet Owl								neg
Common Nighthawk		neg		pos		neg		neg
Common Poorwill						neg		pos/neg
Broad-tailed Hummingbird					pos/neg	neg	x	pos
Black-chinned Hummingbird					pos/neg	neg	x	
Calliope Hummingbird		neg			pos/neg	neg		
Rufous Hummingbird					pos/neg	neg	x	
Lewis's Woodpecker		pos				neg		
Williamson's Sapsucker								neg
Red-naped Sapsucker								neg
Downy Woodpecker								neg
Hairy Woodpecker						neg		neg
American Three-toed Woodpecker								neg
Northern Flicker						neg		neg
Olive-sided Flycatcher								neg
Western Wood Pewee								neg
Willow Flycatcher		pos/neg	neg		neg	pos		
Hammond's Flycatcher								neg
Gray Flycatcher						neg		neg
Dusky Flycatcher								pos
Ash-throated Flycatcher						neg		neg
Eastern Kingbird				pos				
Gray Vireo				neg			x	
Plumbeous Vireo						neg	x	neg
Warbling Vireo							x	neg
Gray Jay			neg					neg

Table 6-3. Sensitivities or stressors^a of selected birds of the study area.

Common Name ^b	Human Disturbance	Livestock Grazing	Habitat Fragmentation	Water Development	Herbaceous Weeds	Vegetation Treatment	Aerial Obstacles	Forestry
Steller's Jay						neg		neg
Western Scrub Jay						neg		neg
Pinyon Jay						neg		neg
Clark's Nutcracker						neg		neg
Black-billed Magpie				pos				
Horned Lark		pos		neg	pos			
Purple Martin								neg
Tree Swallow								neg
Violet-green Swallow								neg
N. Rough-winged Swallow							x	
Bank Swallow							x	
Cliff Swallow							x	
Black-capped Chickadee						neg		
Mountain Chickadee								neg
Juniper Titmouse						neg		neg
Bushtit						neg		neg
Red-breasted Nuthatch								neg
White-breasted Nuthatch						neg		neg
Pygmy Nuthatch								neg
Brown Creeper								neg
Bewick's Wren						neg		neg
House Wren		pos						
Winter Wren								
Marsh Wren			neg					
Golden-crowned Kinglet			neg					neg
Ruby-crowned Kinglet								neg
Blue-gray Gnatcatcher						neg		
Western Bluebird								neg
Mountain Bluebird		pos				neg		neg
Townsend's Solitaire								neg
Swainson's Thrush							x	
Hermit Thrush							x	
American Robin		pos						
Northern Mockingbird		pos		neg				
Sage Thrasher				neg		neg		
Cedar Waxwing		neg						
Orange-crowned Warbler							x	
Virginia's Warbler		pos/neg				neg	x	
Yellow Warbler							x	
Yellow-rumped Warbler							x	

Table 6-3. Sensitivities or stressors^a of selected birds of the study area.

Common Name ^b	Human Disturbance	Livestock Grazing	Habitat Fragmentation	Water Development	Herbaceous Weeds	Vegetation Treatment	Aerial Obstacles	Forestry
Black-throated Gray Warbler						neg	x	neg
Graces's Warbler							x	neg
MacGillivray's Warbler		neg					x	
Common Yellowthroat		neg					x	
Wilson's Warbler		neg					x	
Yellow-breasted Chat					neg	pos	x	pos
Western Tanager							x	neg
Green-tailed Towhee								pos
Spotted Towhee								pos
Chipping Sparrow		neg						
Brewer's Sparrow		pos/neg		neg		neg		
Vesper Sparrow		pos/neg			neg			
Lark Sparrow		pos/neg						
Black-throated Sparrow		pos						
Sage Sparrow		pos	neg	neg		neg		
Lark Bunting		pos/neg						
Savannah Sparrow		neg						
Grasshopper Sparrow		pos/neg						
Lincoln's Sparrow		neg						
White-crowned Sparrow		neg						
Dark-eyed Junco		neg						
Lapland Longspur					pos			
Black-headed Grosbeak							x	
Lazuli Bunting							x	
Red-winged Blackbird		neg						
Western Meadowlark		neg			neg			
Brewer's Blackbird		pos/neg						
Brown-headed Cowbird		pos						
Scott's Oriole				neg				
Gray-crowned Rosy Finch					pos			
Black Rosy Finch					pos			
Brown-capped Rosy Finch					pos			
Cassin's Finch		neg						neg
House Finch								neg
Red Crossbill								neg
White-winged Crossbill								neg
Pine Siskin		pos			pos			neg
Lesser Goldfinch				pos	pos			neg
American Goldfinch		neg		pos	pos			neg
Evening Grosbeak								neg

Table 6-3. Sensitivities or stressors^a of selected birds of the study area.

Common Name ^b	Human Disturbance	Livestock Grazing	Habitat Fragmentation	Water Development	Herbaceous Weeds	Vegetation Treatment	Aerial Obstacles	Forestry
TOTALS								
Negative impact	11	24	8	7	22	29	34	56
Positive impact		14		8	9	3		8
Mixed impacts		8			4			2

Notes

- a. Compiled from resources listed under "Threats to Birds in the Study Area" in Chapter 6. Some items may be qualitative or anecdotal in nature, or based on small sample sizes.
- a. Birds listed in taxonomic order according to the the American Ornithologists' Union (AOU 2009).

Table 6-4. Selected wildlife sensitivity and indicator thresholds^a.

Species	Threshold or Other Indicator Value	Impact / Observation / Recommendation	Reference
American robin	31 feet and 49 feet (32 feet and 68 feet)	Mean distance at which species was disturbed by pedestrian on a trail in	Miller et al. 2001
	45 feet and 57 feet (53 feet and 77 feet)	Mean distance at which species was disturbed by pedestrian off trail in forested	Miller et al. 2001
Brewer's sparrow	100 acres	Threshold size of sagebrush patch below which this species was not detected when no other sagebrush patches were within 0.12 mile (study location was northern Utah)	Wilson et al. In prep
Greater sage-grouse	< 5 producing wells within 1.9 miles of lek	No impact on lek attendance by males observed	Holloran 2005
	5-15 producing wells within 1.9 miles of lek	Medium impact on lek attendance by males observed	Holloran 2005
	> 15 producing wells within 1.9 miles of lek	Heavy impact on lek attendance by males observed	Holloran 2005
	2 mile radius around a lek	Well density within this distance of a lek was observed to be 1/3 lower for active leks than inactive leks	Naugle et al. 2006
	3.4 mile radius around a lek	No surface occupancy (NSO), no new road construction, & seasonal closure of existing roads recommended within this distance	Braun 2006
	4 mile radius around a lek	Minimum disturbance recommended within this distance of a lek	NWCGSGWG 2006
	4 mile radius around a lek	NSO designation for areas within this distance of leks is scientifically supported when nesting & brood rearing maps are not available.	CDOW et al. 2008
	1 well pad/mi ² pad density	Measurable negative impacts on breeding populations observed at this density	CDOW et al. 2008
Northern goshawk	30 to 60 acres (85 to 200 acres)	Minimum habitat patch size required for nesting (preferred habitat patch size shown in parentheses)	Woodbridge and Detrich 1994
Sagebrush-obligate Bird	328 feet to nearest road	Within this distance the density of sagebrush-obligate birds drops by 50 percent regardless of the amount of activity on the road.	Ingelfinger 2001
Sage sparrow	250 acres or greater	In the face of the lack of quantitative data on habitat patch size, "bigger is better" remains a conservation axiom for this species and other sagebrush obligates.	Knick 2004
Vesper sparrow	30 feet and 141 feet (33 feet and 129 feet)	Mean distance at which species was disturbed by pedestrian on a trail in meadow habitat and mean distance moved upon disturbance (parenthetical values indicate response to pedestrian with leashed dog)	Miller et al. 2001
	56 feet and 169 feet (50 feet and 171 feet)	Mean distance at which species was disturbed by pedestrian off trail in meadow habitat and mean distance moved upon disturbance (parenthetical values indicate response to pedestrian with leashed dog)	Miller et al. 2001
Western meadowlark	100 feet and 247 feet (92 feet and 215 feet)	Mean distance at which species was disturbed by pedestrian on a trail in meadow habitat and mean distance moved upon disturbance (parenthetical values indicate response to pedestrian with leashed dog)	Miller et al. 2001
	124 feet and 315 feet (120 feet and 336 feet)	Mean distance at which species was disturbed by pedestrian off trail in meadow habitat and mean distance moved upon disturbance (parenthetical values indicate response to pedestrian with leashed dog)	Miller et al. 2001
Elk	1 mi/mi ² road density	Road density above which habitat effectiveness is eliminated in non-forested landscapes	Lyon 1979
Mule deer	328 feet to nearest road	Distance from a road at which deer observed to exhibit avoidance in shrub landscape	Rost and Bailey 1979
	436 feet to nearest road	Female deer on winter range move away from humans on snowmobiles.	Freddy et al. 1986
	627 feet to nearest road	Female deer on winter range move away from humans on foot.	Freddy et al. 1986
	1,096 feet to nearest road	Female deer on winter range alert to humans on foot	Freddy et al. 1986

Table 6-4. Selected wildlife sensitivity and indicator thresholds^a.

Species	Threshold or Other Indicator Value	Impact / Observation / Recommendation	Reference
	1,542 feet to nearest road	Female deer on winter range alert to humans on snowmobiles	Freddy et al. 1986
	1.6, 1.9, and 2.3 miles from well pads	Minimum distances from well pads at which deer are most likely to occur over three years of progressive oil and gas development	Sawyer et al. 2006
	110 feet and 103 feet (159 feet and 117 feet)	Mean distance at which species was disturbed by pedestrian on a trail in meadow habitat and mean distance moved upon disturbance (parenthetical values indicated response to pedestrian with leashed dog)	Miller et al. 2001
	113 feet and 252 feet (268 feet and > 249 feet)	Mean distance at which species was disturbed by pedestrian off trail in meadow habitat and mean distance moved upon disturbance (parenthetical values indicated response to pedestrian with leashed dog)	Miller et al. 2001
Pronghorn	0.6 mile distance to nearest road 1 mi/m ² road density	Distance from a maintained road at which pronghorn exhibit avoidance Road density at which negative impacts were reported to occur	Ockenfels et al. 1994 BLM 1999
Bighorn sheep	433 ft distance to nearest road 1,191 ft distance to nearest road	Sheep flee from human activity on roads at this distance. Sheep alert to human activity on roads at this distance	Papouchis et al. 2001 Papouchis et al. 2001
Black bear	Road traffic of 1,400 vehicles/day	Female bears precluded from crossing, barrier to male bears also	Hammond 2002
	328 feet from nearest road	Bears exhibited avoidance behavior within this distance	Hammond 2002, Onorato 2003
	1.41 mi/mi ² road density, all road types	No bear home ranges within this distance	Hammond 2002
	0.46 mi/mi ² paved road density	No bear home ranges within this distance	Hammond 2002
	0.25 mi/mi ² road density	Advised that road density should not exceed this distance in black bear home ranges	Hillman and Yow 1986
Wolf	< 1.12 mi/mi ² road density with human population density < 10/mi ² and < 0.8 mi/mi ² road density with human population density < 20/mi ²	Road density and human disturbance thresholds at which 88 percent and 81 percent of wolf observations were recorded in Minnesota in 1988 and 1989	Fuller et al. 1992

Notes

a. This table is based on (and expanded from) Table 1 in Wilbert et al. 2008.

b. Specific line item references:

- BLM. 1999. Draft EIS for the Pinedale Anticline Oil and Gas Exploration and Development Project, Sublette County, Wyoming. Pinedale, Wyo.: U. S. Bureau of Land Management.
- Braun, C. E. 2006. Sage-grouse habitat conservation strategies: a blueprint for conservation and recovery. Tucson, Ariz.: Grouse, Inc.
- CDOW, Montana Department of Fish, Wildlife and Parks, North Dakota Game and Fish, Utah Division of Wildlife Resources, and Wyoming Game and Fish Department. 2008. Using the Best Available Science to Coordinate Conservation Actions that Benefit Greater Sage-Grouse Across States Affected by Oil & Gas Development in Management Zones I-II (Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming). Unpublished report available at http://www.ourpubliclands.org/files/upload/BestScience_2008_sagegrouse_energy.pdf.
- Freddy, D. J., W. M. Bronaugh, and M. C. Fowler. 1986. Responses of mule deer to disturbance by persons afoot and snowmobiles. *Wildlife Society Bulletin* 14:63-68.
- Fuller, T. K., W. E. Berg, G. L. Radde, M. S. Lenarz, and G. B. Joselyn. 1992. A history and current estimate of wolf distribution and numbers in Minnesota. *Wildlife Society Bulletin* 20:42-55.
- Hammond, F. M. 2002. The effects of resort and residential development on black bears in Vermont: Vermont Agency of Natural Resources.
- Hillman, L. L., and D. L. Yow. 1986. Timber management for black bear. Paper read at East. Workshop. Black Bear Manage. and Res.
- Holloran, M. J. 2005. Greater sage-grouse (*Centrocercus urophasianus*) population response to natural gas field development in western Wyoming. Doctoral Dissertation, Univ. of Wyoming, Laramie.
- Ingelfinger, F. 2001. The effects of natural gas development on sagebrush steppe Passerines in Sublette County, Wyoming. Master of Science Thesis, Univ. of Wyoming, Laramie.
- Knick, S. T. 2004. Personal communication with D. Reeder. U. S. Geological Survey, Sanke River Field Station, Boise, Idaho. August 11.
- Lyon, L. J. 1979. Habitat effectiveness for elk as influenced by roads and cover. *Journal of Forestry* 77:658-660.

Table 6-4. Selected wildlife sensitivity and indicator thresholds^a.

Species	Threshold or Other Indicator Value	Impact / Observation / Recommendation	Reference
			Miller, S., R. Knight, and C. Miller. 2001. Wildlife responses to pedestrians and dogs. <i>Wildlife Society Bulletin</i> 29 (1):124-132.
			Naugle, D. E., B. L. Walker, and K. E. Doherty. 2006. Sage-grouse population response to coal-bed natural gas development in the Powder River Basin: Interim Progress Report on Region-wide Lek-count Analysis. Bozeman: Univ. of Montana.
			NWCGSGWG. 2006. Northwest Colorado greater sage-grouse conservation plan. Northwest Colorado Greater Sage-grouse working Group. Denver, Colorado: Colorado Division of Wildlife.
			Ockenfels, R. A., A. Alexander, C. L. Dorothy Ticer, and W. K. Carrel. 1994. Home range movement patterns and habitat selection of pronghorn in central Arizona. Technical Report 13. Phoenix: Arizona Game and Fish Dept.
			Onorato, D., P. Hellgren, F. S. Mitchell, and J. R. Skiles. 2003. Home range and habitat use of American black bears on a desert montane island in Texas. <i>Ursus</i> 14:2.
			Rost, G. R., and J. A. Bailey. 1979. Distribution of mule deer and elk in relation to roads. <i>J. Wildl. Manage.</i> 43 (3):634-641.
			Sawyer, H., R. Nielson, F. Lindzey, and L. McDonald. 2006. Winter habitat selection of mule deer before and during development of a natural gas field. <i>J. Wildl. Manage.</i> 70:396-403.
			Wilson, T. L., E. J. Johnson, and J. A. Bissonette. In prep. Landscape supplementation and shrub-steppe associated bird species in a patchy, mountainous landscape.

Chapter 7

MANAGEMENT SPECIES

This chapter identifies and recommends three types of management species in the study area: 66 “status species,” 23 “key watch species,” and from two to 15 “management focus species” for each land cover type in the study area.

Status species (Table 7-1) are birds recognized by a government agency, a conservation entity, or other expert organization, which warrant priority consideration during the UFO’s planning, decision-making, and land management activities in the study area, and generally include only species that have, or potentially have, a significant presence on lands managed by the UFO.

Key watch species (Table 7-2) are bird species perceived to be in decline or with unknown status in the study area that could reasonably be monitored on BLM lands. Key watch species may or may not be recognized by other entities as a species of conservation priority (i.e., they may not be status species in the study area).

Management focus species (Table 7-3) are representative species (some would make appropriate “flagship” species) for each land cover type in the study area whose habitat requirements should inform the UFO’s planning, decision-making, and land management activities in the study area. Management focus species may or may not be status species or key watch species (i.e., they may not be in decline), but they are often obligates of the land cover type they were chosen to represent.

We selected these three categories of management species based on the criteria described below. We also mapped summer richness for status species in their primary habitats across the study area (Map 7-1). This mapping will help managers identify areas of management importance for birds in the UFO on a coarse scale. Mapping methodology followed that of the species richness mapping explained in Chapter 4.

Selection and Discussion of “Status Species”

We first applied a coarse filter to Table 6-1 to select birds of the study area that have been identified as species of conservation concern by BLM and/or other agencies, organizations, or conservation working groups. The coarse filter selected species meeting the following criteria:

- The species is “BLM sensitive” in Colorado (BLM 2000).
- The species is listed on the U.S. Fish & Wildlife Service’s (USFWS’) 2008 Birds of Conservation Concern list for BCR 16 (USFWS 2008).
- The species is currently listed, is a candidate for listing, was recently de-listed, or was recently removed from candidate status under the federal Endangered Species Act.
- The species is listed as threatened or endangered under Colorado State statute, or recognized by CDOW as a species of special concern (CDOW 2009a).
- The species is “fully tracked” by the Colorado Natural Heritage Program (CNHP 2009).

- The species is in a priority habitat designated by the Colorado Land Bird Conservation Plan (PIF 2000).
- The species is designated a priority species in the Southern Rocky Mountain Physiographic Region (Area 62) or Colorado Plateau Physiographic Region (Area 87) habitats by the Colorado Land Bird Conservation Plan (PIF 2000).
- The species received a regional combined score (either breeding or non-breeding) higher than 16 in Partners In Flight's assessments for BCR 16 (PIF 2009), indicating a significant level of concern for the security of the species in the region.
- The species is a raptor.

Each species returned by the initial coarse filter (a total of 90) was considered individually for designation as a status species. Those meeting the following exclusion criteria (from [Table 3-1](#)) have relatively low conservation potential in the study and were eliminated from the status species list:

- The species is accidental in the study area.
- The species is extirpated from the study area.
- The species is an extremely rare, rare, or uncommon migrant, winter visitor, or non-breeding summer visitor in the study area. (While the rarity of a species is often a reason to consider it a management responsibility, the rationale of "rare" as an exclusion criteria in this case implies that not only is the species rare within the study area, but that it is significantly more common elsewhere, or at the edge of its ecological range.)
- The locally nesting species is not known to nest on BLM land or federal minerals land in the study area.

A list of 66 birds meeting the status species requirements along with the fulfilled criteria, are presented in [Table 7-1](#). We also mapped summer richness for the 66 status species in their primary habitats across the study area ([Map 7-1](#)). Mapping methodology followed that of the species richness mapping explained in [Chapter 4](#). This mapping will help managers identify areas of management importance for birds in the UFO on a coarse scale.

Most of the 66 status species ([Table 7-1](#)) in the study area have had their status acknowledged by BLM in some manner. BLM's Colorado State Director has designated 13 Sensitive Species (BLM 2000), five of which occur significantly on BLM lands in the study area and are therefore included on our status species list. BLM's sensitive species list for Colorado is currently being revised under the new BLM Manual 6840 (BLM 2008a), and although some adjustments may be made to species status, management concerns and recommendations discussed in this document are based on known bird biology and land cover ecology and should remain consistent. With the exception of the fairly common (winter, locally) raptor rough-legged hawk, all status species breed in the study area.

BLM must consider species listed under federal law as threatened or endangered in any of its undertakings. The current BLM Manual 6840 revision relieves BLM from responding to state law regarding species listed as endangered, threatened, or of concern on State lists. Those species would only receive special treatment if successfully qualifying to be on BLM's Sensitive Species List. All

federal candidate, proposed, and delisted species in the five years following delisting are to be conserved as BLM sensitive species. Stated policy in BLM Manual 6840 requires BLM to initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species to minimize the likelihood of, and need for, listing of these species under ESA. No bird species listed under the federal Endangered Species Act (ESA) regularly occurs within the study area. Two recently delisted species, bald eagle (in 2007) and American peregrine falcon (in 1999), merit continued special attention to prevent their relapse in status. Both bald eagle and peregrine falcon appear on the status list ([Table 7-1](#)). The western population of the yellow-billed cuckoo is a candidate for federal listing and as such, is included on the status list. Since cuckoos were once considered to be “uncommon in deciduous woods, more often heard than seen” (Davis 1969) they likely were found at one time on BLM land in the study area. Potential habitat and recent sightings on private land in the study area exist.

The federally-listed threatened spotted owl (Mexican subspecies) is not included on the status list ([Table 7-1](#)). It currently has “accidental” status in the study area ([Table 3-1](#)); an immature bird was reported at Buckeye Reservoir, northwest of Paradox, in the 1990s (Righter et al. 2004). Because spotted owls nest near the study area (in Canyonlands National Park and possibly in the west-facing canyons of the La Sal Mountains in Utah), the UFO should make periodic inquiry into a possible colonization. Other species not included on the status list could require reconsideration in the future: if conditions change such as long-billed curlews are found nesting in Paradox Valley, or if surface management agreements change at Fruitgrowers Reservoir making American bittern and willet habitat a BLM management responsibility, or the State of Colorado pursues reintroduction of sharp-tailed grouse to the study area, these species should become status species in the study area.

Since the January 2001 publication of Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, BLM has paid greater attention to nongame birds. Currently the U.S. Fish & Wildlife Service’s “Birds of Conservation Concern” (USFWS 2008) for Bird Conservation Region 16 (BCR 16, Southern Rocky Mountains) are specifically considered in each environmental assessment.

Selection and Discussion of “Key Watch Species”

To select key watch species, we first applied a coarse filter to [Table 6-1](#) to select birds of the study area that have a PIF combined regional score (CS-r) of 15 or higher for BCR 16, or birds with a PIF continental population trend score (PT-c) of 5. The PIF combined regional score is the sum of several PIF ranking factors with a possible range of 5 to 25, from which PIF identifies species of conservation concern (Panjabi et al. 2005). A continental population trend score of 5 indicates a significant declining population trend (see [Chapter 6](#)). From the initial coarse filter selection, we chose birds for the key watch species list if their BBS trend data (Sauer et al. 2008) fit any of six criteria described below and the species could reasonably be monitored on BLM lands. The six BBS trend criteria are as follows:

1. Species’ BBS data show long-term downward trends in two or more relevant strata exhibiting consistency (strata are equivalent to sample areas, and strata were considered relevant if they were close to or included the study area).
2. Species’ BBS data show a long-term downward trend maintaining from 1980 to 2006.
3. Species’ BBS data show a downward trend significant to the 95 percent probability.
4. Species’ BBS data show a downward trend that meets the “most credible” threshold set by the U.S. Geological Survey Biological Research Division (species occurs on at least 14 routes in the sample area with at least an average of 1 detection per run of the route, and subinterval trends

are reasonably consistent with each other, and the ability to detect a three percent or less change over time is possible).

5. Species' BBS data show a downward trend and the species is a status species.
6. The species is not monitored by the BBS or it was not detected suitably for data generation.

Key watch species (a total of 23), along with their selection criteria, are presented on [Table 7-2](#). The key watch species warrant additional observation to determine as early as possible the need for intervention. Three key watch species make sagebrush communities their primary habitat (Gunnison sage-grouse, sage sparrow, and Brewer's sparrow). Two key watch species are primarily associated with pinyon-juniper land cover types (pinyon jay and juniper titmouse). Four key watch species are associated with riparian or willow (mesic) land cover types (yellow-billed cuckoo, belted kingfisher, bank swallow, and Wilson's warbler). Two are associated with cliff, rock, or talus in various vegetation types (prairie falcon and rock wren). The common night hawk is found in sagebrush and pinyon-juniper land cover types. The brown-capped rosy finch occurs in alpine tundra, as does the horned lark, which is also associated with herbaceous rangelands and semi-desert shrublands. The loggerhead shrike nests in semi-desert and sagebrush shrublands, and Virginia's warbler is associated with mountain shrub and ponderosa pine land cover types. The remaining key watch species are associated with montane and subalpine forest land cover types (flammulated owl, Lewis's woodpecker, Williamson's sapsucker, olive-sided flycatcher, Cassin's finch, and pine siskin).

On March 19, 2009, the U.S. Secretary of the Interior Salazar announced the findings of the first "State of the Birds" report issued by the federal government (<http://www.stateofthebirds.org/habitats>), a call for the nation to stanch the continuing loss of birds. The report indicates that state of waterbirds has improved over the last 40 years. Of land birds (and second only to Hawaiian birds), the birds of "Aridlands" reporting area have shown the greatest population declines. Aridlands include the lower elevation rangelands of the study area, which are expressed primarily in the short semi-desert shrublands, tall semi-desert shrublands, sagebrush community, and herbaceous rangeland land cover types in the study area. Seven key watch species (Gunnison sage-grouse, sage sparrow, Brewer's sparrow, common nighthawk, loggerhead shrike, horned lark, and rock wren) are birds of the Aridlands.

Selection and Discussion of "Management Focus Species"

To select management focus species, we first assigned representative species to each land cover type in the study area. Each land cover type was assigned from two to as many as 15 representatives. To make these assignments, we consulted the habitat matrix tables in [Chapter 3](#) and used professional judgment. Generally, representative birds tend to be more numerous than others in their assigned land cover type, or they find important elements for nesting success. Accidental, peripheral, and habitat generalist species were excluded from consideration. Duplicating species in more than one land cover type was avoided unless determining a species land cover type preference was too difficult or the land cover type would be devoid of a representative without the duplicate species. Representative species of each land cover type in the study area are presented on [Table 7-3](#).

Next, we scored each species using the following factors (see [Table 7-3](#)). The status rankings column ([Table 7-3](#)) contains the tally of initiatives registering the species to be of high concern (the same criteria used in the initial coarse filter to select status species, using [Table 6-1](#)). The key watch rankings column contains the tally of criteria the species met to be considered a key watch species (from [Table 7-2](#)). The species was assigned one point in the obligate column if it is an obligate to the land cover type. The score in the obligate column is modified with a vegetation notation if the species is also

obligated to related land cover types. The score in the obligate column is modified with a non-vegetation notation (e.g., “dirt banks”) to suggest the species is obligated to a subset of that land cover class.

Among the representative bird species for each land cover type, there is generally a high scoring species that stands out as a potential “flagship” species for the management of that land cover type. Nevertheless, we recommend that the total score for the management focus species be viewed with a discriminating eye. For example, the high scoring juniper titmouse achieved its score due to many parties in the conservation community noting its declining population. Other species may be more deserving of management attention yet have not aroused as much concern in the conservation community. Also, other species will continue to be important in environmental assessments regardless of their absence on [Table 7-3](#), such as the U.S. Fish & Wildlife’s Birds of Conservation Concern, the BLM State Director’s Sensitive Species List, and the Candidate Species under the federal Endangered Species Act (see [Table 6-1](#)).

The UFO may decide that the management focus species (or a subset thereof) presented in [Table 7-3](#) may be suitable as “indicator species.” Following their 1982 planning regulations, every National Forest has in place a Management Indicator Species (MIS) program, which uses a single species or suit of species to represent all of the species within a specified habitat. Usually the species most obligated to the specified habitat are chosen. A management indicator species should also be inexpensive to monitor. As a taxonomic group, birds are especially suited to be management indicator species (Mauer 1992).

The drawbacks of adopting an MIS approach on BLM land are several. There is a risk taken by the MIS process that the species chosen will not be the one or ones sensitive to the particular habitat changes that by chance or design happen. Almost as a rule, MIS are not adequate for measuring individual project effects. The scale of single projects and local wildlife populations usually do not correspond. Additionally, an MIS may be responding to off-site impacts (for instance, on its wintering grounds). Migratory birds are susceptible to this confounding factor.

Despite the drawbacks of implementing an MIS program in the study area, there is argument for doing so. It is a fact that land management decisions do result in habitat changes that affect wildlife. Even before action on the ground occurs, the USFS has found that an MIS can win an argument for a project concession. For example, snags will be reserved from a timber sale, not simply because the agency biologist wants them for cavity-nesting birds, but because the forest plan identifies the hairy woodpecker as an MIS. This means that the project will be measured against the retention of hairy woodpeckers on the site. To view an example of how management indicator species have been used to evaluate a proposed project see Buell (2003).

Literature Cited

- BLM. 2000. Colorado BLM State Director's sensitive species list (animals and plants) June, 2000: U. S. Bureau of Land Management.
- BLM. 2008. Manual 6840 - Special Species Status Management: U. S. Department of the Interior, Bureau of Land Management. Available at http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/im_attachments/2009.Par.13736.File.dat/IM2009-039_att1.pdf.

- Buell, K. H. 2003. Management indicator species report: soil, watershed and fisheries conservation treatments on the Rio Grande National Forest, Alamosa, Conejos, Costilla, Mineral, Rio Grande, Saguache, Hinsdale, Custer, San Juan and Archuleta Counties, Colorado. Prepared by Habitat Concepts, Inc. for the Rio Grande National Forest.
http://www.fs.fed.us/r2/riogrande/projects/decisions/watershed_treatment/mis_report_2003.pdf.
- CDOW. 2009. Colorado State threatened and endangered species list. Available at <http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/ThreatenedEndangeredList/ListOfThreatenedAndEndangeredSpecies.htm>).
- CNHP. 2009. State-wide list of tracked species and communities, August 6, 2009. Accessed at <http://www.cnhp.colostate.edu/download/list/birds.asp>.
- Davis, W. 1969. Birds of western Colorado: Colorado Field Ornithologists.
- Mauer, B. A. 1992. Biological diversity, ecological integrity, and neotropical migrants: new perspectives for wildlife management. In Status and management of neotropical migratory birds: 1992 September 21-25; Estes Park, CO. Gen. Tech. Rep. RM-229, edited by D. M. Finch and P. W. Stangel. Fort Collins, Co: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. Accessed at:
http://www.fs.fed.us/rm/pubs_rm/rm_gtr229/rm_gtr229_024_031.pdf.
- Panjabi, A. O., E. H. Dunn, P. J. Blancher, W. C. Hunter, B. Altman, J. Bart, C. J. Beardmore, H. Berlanga, G. S. Butcher, S. K. Davis, D. W. Demarest, R. Dettmers, W. Easton, H. Gomez de Silva Garza, E. E. Inigo-Elias, D. N. Pashley, C. J. Ralph, T. D. Rich, K. V. Rosenberg, C. M. Rustay, J. M. Ruth, J. S. Wendt, and T. C. Will. 2005. The Partners in Flight handbook on species assessment. Version 2005. Partners in Flight Technical Series No. 3. Accessed at Rocky Mountain Bird Observatory: <http://www.rmbo.org/pubs/downloads/Handbook2005.pdf>.
- PIF. 2000. Colorado Land Bird Conservation Plan. Colorado Partners In Flight. Available at <http://www.rmbo.org/pif/bcp/intro/exsum.htm>.
- PIF. 2009. Partners in Flight Species Assessment Database. Accessed at:
<http://www.rmbo.org/pif/pifdb.html>.
- Righter, R., R. Leivad, C. Dexter, and K. Potter. 2004. Birds of western Colorado plateau and mesa country. Grand Junction: Grand Valley Audubon Society.
- Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 - 2007: USGS Patuxent Wildlife Research Center, Laurel, MD.
- USFWS. 2008. Birds of conservation concern 2008. Arlington, Virginia: U. S. Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management.

Map 7-1
Status species richness in primary habitats for each season.

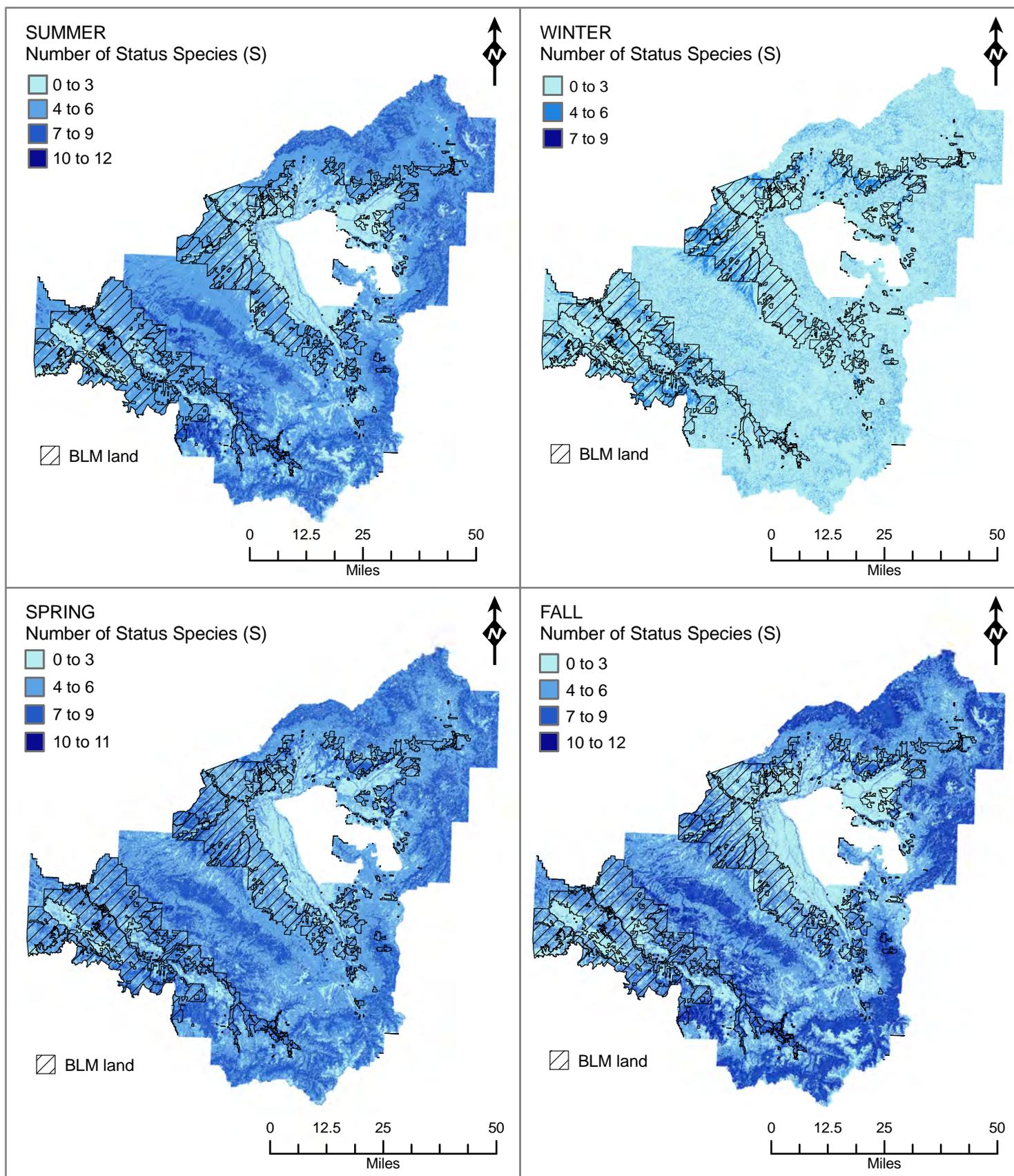


Table 7-1. Status species (total of 66) in the study area.

Common Name ^a	Recorded on BLM	Periferal Species	Stenotopic Species	%Pop in BCR16	Seasonal Occurrence ^b				Selection Criteria ^c							
					Spring	Summer	Winter	Fall	BLM SS ^c	BCR16 List	Fed ESA	State T&E	CHNP Track	CLBP Priority	PIF CS-r	Raptor
					Gunnison Sage-grouse	x		x	100	r	r	r	r	x	x	
White-tailed Ptarmigan	x			2	u	u	u	u					Partial	AT	13	
Dusky Grouse	x			1		f	f							MC	14	
Bald Eagle	x			0	u	u,r nester	f	u	x	x	del	T	Full		13	x
Northern Harrier	x	x		0	u	u	f	u						WE	13	x
Sharp-shinned Hawk	x			2	f	f	f	f							15	x
Coopers Hawk	x			6	f	f	u	f							13	x
Northern Goshawk	x			3	u	u	u	u	x				Full		15	x
Swainson's Hawk	x	x		2	u	u		u							13	x
Red-tailed Hawk	x			3	c	c	c	c							10	x
Ferruginous Hawk	x			3	r	r	u	r	x	x		SC	Full		16	x
Rough-legged Hawk	x						f local									x
Golden Eagle	x			3	f	f	f	f		x					18	x
American Kestrel	x			4	c	c	c	c							13	x
Peregrine Falcon	x			0	r	r	r	r		x	del	SC	Full	C/R	13	x
Prairie Falcon	x			12	u	u	u	u		x			Watch L		17	x
Sandhill Crane	x	x		0	f	r	u	f				SC	Full		12	
Wilson's Phalarope	x			0	c	u		c					Full		13	
Band-tailed Pigeon	x		x	1	r	u		r						PP	13	
Yellow-billed Cuckoo			x	0		r			x	x	C3	SC	Full		12	
Barn Owl		x	x	0	u	u	u	u							12	x
Flammulated Owl	x			25	u	f		u		x				PP	18	x
Western Screech-Owl	x			0	f	f	f	f							15	x
Great Horned Owl	x			1	f	f	f	f							9	x
Northern Pygmy-Owl	x			5	u	u	u	u					Watch L		14	x
Burrowing Owl	x		x	1	u	u		u		x		T	Watch L	DS	13	x
Long-eared Owl	x			1	u	u	u	u							14	x
Boreal Owl				1	r	r	r	r					Partial	SF	13	x
Northern Saw-whet Owl	x			4	f	f	u	f							13	x
Common Poorwill	x			12	f	f		f						MS	13	
Black Swift				0	r	r local		r					Full	C/R	13	
White-throated Swift	x			24	c	c		c						C/R	15	
Broad-tailed Hummingbird	x			59	c	c		c						AS	15	
Black-chinned Hummingbird	x			16	c	c		c						PJ	13	
Lewis's Woodpecker	x		x	38	u	u	u	u		x			Full	LR	18	
Williamson's Sapsucker	x			43	r	u		r						MC	17	
Red-naped Sapsucker	x			9	u	f		u						AS	14	
Olive-sided Flycatcher	x			3	u	u		u						SF	13	
Willow Flycatcher	x		x	1	r	r local		r		x			Watch L		13	
Hammond's Flycatcher	x		x	2	r	u								SF	12	
Gray Flycatcher	x			12	u	c		u						PJ	14	
Cordilleran Flycatcher	x			29	u	f		u						HR	14	
Cassin's Kingbird	x	x	x	15		u local		r						PJ	13	

Table 7-1. Status species (total of 66) in the study area.

Common Name ^a	Recorded on BLM	Periferal Species	Stenotopic Species	%Pop in BCR16	Seasonal Occurrence ^b				Selection Criteria ^c							
					Spring	Summer	Winter	Fall	BLM SS ^c	BCR16 List	Fed ESA	State T&E	CHNP Track	CLBP Priority	PIF CS-r	Raptor
					Western Kingbird	x			3		a					
Loggerhead Shrike	x			3	u	u	r	u					DS	13		
Gray Vireo	x	x		68	r	f		r		x			Full	PJ	19	
Pinyon Jay	x			48	f	f	f	f		x				PJ	19	
Horned Lark	x			4	a	a	a	a						DS	12	
Purple Martin			x	0	r	u local		r						AS	10	
Violet-green Swallow	x			17	c	c		c						AS	14	
Juniper Titmouse	x			50	f	f	f	f		x				PJ	19	
American Dipper	x			13	f	f	f	f						HR	15	
Western Bluebird	x			27	u	f	u	u						PP	14	
American Pipit	x			2	u	u local	u	u						AT	10	
Virginia's Warbler	x			59	u	f		f						MS	17	
Black-throated Gray Warbler	x			10	c	c		c						PJ	15	
Graces's Warbler	x	x		14		u				x			Full	PP	15	
MacGillivray's Warbler	x			4	u	f		u						HR	10	
Wilson's Warbler	x			1	f	f		c						HR	12	
Green-tailed Towhee	x			44	u	c		u						MS	16	
Brewer's Sparrow	x			11	f	c		f		x				SA	15	
Sage Sparrow	x		x	14	u	u		u				Partial		SA	16	
Lazuli Bunting	x			11	f	f		f						LR	14	
Scott's Oriole	x	x	x	3		e local								PJ	12	
Brown-capped Rosy Finch	x			100	u erratic	u local	u erratic	u erratic		x				AT	21	
Cassin's Finch	x			14	u	f	u	u		x					17	
Totals	61	8	12		59	65	33	59	5	18	3	7	19	44	12	22

Notes

a. Nomenclature and taxonomic arrangement of this list follows that of the American Ornithologists' Union

b. Explanation of seasonal occurrence codes in Table 3-1

c. Selection criteria explanation (shaded cell indicates criteria met)

BLM SS = BLM Sensitive Species (BLM 2000)

BCR16 List = species identified as bird of conservation concern (USFWS 2008)

ESA = Endangered Species Act status (del-delisted; T-threatened; C-candidate, w04-withdrawn as candidate in 2004)

State T&E = State protection status (E-endangered; T-threatened; SC-species of concern [not a legal status])

CNHP Track = Colorado Natural Heritage Program tracking status (Full-fully tracked; Watch L-Watchlisted; partial-partially tracked)

CLBP Priority = Colorado Landbird Conservation Plan (Beidleman 2000), habitat for which species is a priority: AS=aspen, AT=alpine tundra, C/R=cliff/rock, DS=semi-desert shrub, HR=high elevation ripa

LR=low elevation riparian, MC=mixed conifer, MS=mountain shrubland, PJ=pinyon-juniper woodland, PP=ponderosa pine, SA=sagebrush shrubland, SF=spruce-fir, WE=wetlands

PIF CS-r = Partners In Flight Combined regional score (PIF 2009) indicating level of concern for security of breeding birds in BCR16 [explained in Panjabi et al. 2005 and PIF 2009],

possible score between 5 and 25

Table 7-2. Key watch species (total of 23) for the study area.

Common Name	PIF CS-r ^a	PIF PT-c ^b	BBS Trend Criteria Met ^c						Comment
			1	2	3	4	5	6	
Gunnison Sage-grouse	25	5						x	According to lek counts the San Miguel Basin population appears to have declined for the fourth year in a row. The San Miguel Basin population is the larger of the two populations touching the study area; larger populations are considered more capable of sustaining themselves. The Gunnison Basin population appears to be sustaining itself the last few years.
Prairie Falcon	17	1						x	BBS long-term data from the Colorado, Southern Rockies, and North America strata are all positive, yet the data are non-statistically significant have low credibility. Between 1980 and 2006, the data suggest a 2.3% per year decline.
Yellow-billed Cuckoo	12	5						? x	There are no BBS data in local sample areas (Colorado strata data are from populations in the east part of the state and suggest a decline of 22.5% per year between 1980 and 2006). However, these data are non-significant and of low credibility.
Flammulated Owl	18	3						x	We found no credible monitoring data on this species. Population trend is unknown. RMBO has yet to obtain significant trend data under its special species monitoring program.
Common Nighthawk	14	5		x	x	x			BBS data in both the pinyon-juniper woodlands and the Southern Rockies strata show significant and highly credible declines (-3.4 and -3.8% per year, respectively). A 0.9% increase estimated across Colorado is only moderately credible and the 95% confidence interval is -1.5 to +3.2.
Belted Kingfisher	12	5		x	x				BBS long-term trend estimate from the Southern Rockies stratum is an average +7.9% increase per year, however, the data are non-significant and of low credibility. The trend estimate for North America is -1.8% per year, and is highly significant and highly credible, with 2,064 transects recording the species.
Lewis's Woodpecker	18	3						x	BBS long-term population trends were +0.9% per year from the Colorado stratum and -0.9% per year from the North American stratum. The estimates of population change were non-significant and only moderately credible. The case for considering this a key watch species in the study area is bolstered by its being a PIF Watch List and a Stewardship Species.
Williamson's Sapsucker	17	3						x	BBS data from the Colorado and North American strata are non-significant and only moderately credible. The long-term trend estimates are +1.0 and -0.2% per year. The data from more recent years suggest steeper population declines. This is a PIF Stewardship Species, meaning that the Intermountain West has a disproportionate obligation to monitor and care for this species.
Olive-sided Flycatcher	13	5	x	x	x	x			The BBS data show a highly credible slight negative trend from the Colorado sample area (-0.1 per year). In the North America stratum, the estimated decline of -3.5% per year is highly significant.
Loggerhead Shrike	13	5	x	x	x	x			BBS data for the pinyon-juniper woodland stratum (includes southwest Colorado) suggests a medium-credible, non-significant 2.3% estimated annual decrease. The highly credible and highly significant 1966 to 2006 (long-term) estimate across North America was -3.7% per year.
Pinyon Jay	19	5	x	x	x	x	x		This species had the greatest consistency in data of all the species listed. Although BBS data from the Colorado stratum were only moderately credible, the long-term trend estimate of -5.0% per year was statistically significant. The long-term trend estimates for the pinyon-juniper woodlands and the West strata were both highly credible and significant, at -5.9% and -3.7% per year, respectively.

Table 7-2. Key watch species (total of 23) for the study area.

Common Name	PIF CS-r ^a	PIF PT-c ^b	BBS Trend Criteria Met ^c						Comment
			1	2	3	4	5	6	
Horned Lark	12	5		x	x	x			BBS estimates +1.3% long-term annual increase in the Southern Rockies stratum of low credibility , but a significant and highly credible -2.4% decrease for the 691 routes across the West.
Bank Swallow	10	5		x			x		BBS long-term trend data for the West shows a non-significant, but highly credible 1.2% decrease per year, and a continent-wide 1.1% increase. However, for both sample areas the data show dec;omes in the years between 1980 and 2006.
Juniper Titmouse	19	3	x	x	x	x	x		BBS long-term trend data from the pinyon-juniper woodland stratum are highly credible and significant, suggesting a decline of -2.1% per year. A -4.5% per year long-term trend estimate for the Colorado stratum was significant, but only moderately credible (an average of only 0.23 birds were detected on the transect routes).
Rock Wren	16	5	x	x			x		BBS long-term trend estimates from the pinyon-juniper woodland and Colorado strata show a -2.7 and -1.7% decrease per year. These data are highly credible, yet non-significant at the 95% confidence level.
Virginia's Warbler	17	4	x	x	x	x	x		BBS data from the Colorado and North America strata gave long-term population trend estimates of -2.6 and -1.2% per year. Both estimates were significant and highly credible.
Wilson's Warbler	12	5	x	x	x	x			The BBS long-term trend estimates for Colorado and North American strata are -3.4 and -2.1% (statistically significant) per year, respectively.
Green-tailed Towhee	16	2	x	x	x	x	x		BBS data from the Colorado and North America strata suggest long-term highly credible but non-significant trend estimates of -1.1 and -0.3% per year, respectively.
Brewer's Sparrow	15	5	x	x	x	x			BBS data suggest highly credible and statistically significant per annum downward trends in both the Colorado and pinyon-juniper woodland strata of -3.6 and -4.0% per year, respectively.
Sage Sparrow	16	2		x	x			x	BBS data have low credibility in both the Colorado and the Southern Rockies strata. For the Colorado strata, the trend estimate is a non-significant +0.8% per year, and for the Southern Rockies it is -38.6% per year. While this latter figure is statistically significant, it was achieved with only six transects and thus is not highly credible.
Brown-capped Rosy Finch	21	3						x	Christmas Bird Count data suggest a steady decline over the last 30 years with average annual total counts of over a thousand in the 1970s compared to about 500 in the 1990s, but more detailed analysis is needed.
Cassin's Finch	17	5	x	x	x	x	x		BBS data trend estimate of -5.2% per year in the Colorado stratum is moderately credible and highly significant. For the West strata, the estimated trend is -2.8% per year and is also highly significant.

Table 7-2. Key watch species (total of 23) for the study area.

Common Name	PIF CS-r ^a	PIF PT-c ^b	BBS Trend Criteria Met ^c						Comment
			1	2	3	4	5	6	
Pine Siskin	16	5	x	x	x				BBS long-term trend data from the Colorado and Southern Rockies strata are highly significant, yet only moderately credible: -4.8 and -4.4% per year, respectively.

Notes

- a. PIF Combined Regional (BCR16) Score explained in Panjabi et al. 2005 (red highlight indicates this coarse filter criteria was met).
- b. PIF Continental Population Trend Score explained in Chapter 6 and Panjabi et al. 2005 (red highlight indicates this coarse filter criteria was met).
- c. BBS Trend Criteria explained in Chapter 7 of this report.

Table 7-3. Recommended management focus species for each land cover type in the study area.

Land Cover Type	Representative Species	Status Rankings	Key Watch Rankings	Obligate or nearly	Total
Developed (Dev)	House Finch				0
	House Sparrow		3	1	4
Agriculture land (Agri)	Ring-necked Pheasant				0
	Bank Swallow				0
	Cliff Swallow				0
	Barn Swallow			1	1
	Savannah Sparrow				0
Tall semi-desert shrub (TDS)	Loggerhead Shrike	1	4	1	6
	Northern Mockingbird			1	1
	Black-throated Sparrow			1	1
	Western Meadowlark				0
Herbaceous rangeland (Herb)	Burrowing Owl	4			4
	Western Meadowlark				0
Sagebrush community (SagC)	Brewer's Sparrow	2		1 (sagebrush)	3
	Sage Sparrow	1	3	1 (sagebrush)	5
Short semi-desert shrub (SDS)	Burrowing Owl	4			4
	Horned Lark	1	3		4
Sagebrush/mountain shrub (SaMS)	Common Poorwill	1			1
	Green-tailed Towhee	1	5		6
Mountain shrub (MS)	Common Poorwill	1			1
	Broad-tailed Hummingbird	1			1
	Dusky Flycatcher	1		1	2
	Orange-crowned Warbler				0
	Virginia's Warbler	2	5	1	8
	MacGillivray's Warbler	1			1
	Spotted Towhee				0
	Black-headed Grosbeak				0
Sagebrush shrub-steppe (MStp)	Gunnison Sage-grouse	6	1	1 (sagebrush)	8
	Sage Thrasher			1 (sagebrush)	1
	Brewer's Sparrow	2	4	1 (sagebrush)	7
	Vesper Sparrow				0
Pinon-Juniper (PJ)	Cooper's Hawk	1			1
	Ash-throated Flycatcher			1 (PJ or juniper)	1
	Juniper Titmouse	3	5	1 (PJ or juniper)	9
	Bewick's Wren			1 (PJ)	1
	Mountain Bluebird				0
	Chipping Sparrow				0
	Bushtit			1 (PJ)	1
Juniper (Juni)	Lesser Goldfinch				0
	Ferruginous Hawk	5		1	6
	Gray Vireo	4		1	5
	Lark Sparrow				0
Alpine/subalpine shrub community (AlpS)	Scott's Oriole	1		1	2
	White-tailed Ptarmigan	1		1 (winter)	2
PJ-Mtn Shrub Mix (PJMS)	White-crowned Sparrow			1	1
	Plumbeous Vireo				0
	Western Scrub Jay				0
	Pinyon Jay	3	5	1 (PJ or juniper)	9
PJ-Sagebrush Mix (PJSa)	Black-throated Gray Warbler	1		1 (PJ)	2
	Common Nighthawk		3		3
	Black-chinned Hummingbird	1			1
PJ-Sagebrush Mix (PJSa)	Gray Flycatcher	1		1 (PJ)	2
	Cassin's Kingbird	1		1 (PJ or juniper)	2
	Blue-gray Gnatcatcher				0

Table 7-3. Recommended management focus species for each land cover type in the study area.

Land Cover Type	Representative Species	Status Rankings	Key Watch Rankings	Obligate or nearly	Total
Aspen (Asp)	Red-naped Sapsucker	1			1
	Western Wood Pewee				0
	Warbling Vireo				0
	Purple Martin	1		1	2
	Tree Swallow				0
	House Wren				0
Ponderosa Pine (PP)	Williamson's Sapsucker	2	1		3
	Pygmy Nuthatch			1 (ponderosa pine)	1
	Western Bluebird	1		1 (ponderosa pine)	2
	Townsend's Solitaire				0
	Grace's Warbler	3		1 (ponderosa pine)	4
	Red Crossbill				0
Englemann Spruce/Fir Mix (SF)	Sharp-shinned Hawk	1			1
	Boreal Owl	2		1	3
	Three-toed Woodpecker			1	1
	Olive-sided Flycatcher	1	4		5
	Gray Jay			1	1
	Clark's Nutcracker				0
	Mountain Chickadee				0
	Brown Creeper				0
	Golden-crowned Kinglet			1	1
	Dark-eyed Junco				0
	Pine Grosbeak			1	1
	Red Crossbill				0
	White-winged Crossbill			1	1
Pine Siskin			3	3	
Douglas Fir (DF)	Dusky Grouse	1		1 (Douglas fir, winter)	2
	Northern Saw-whet Owl	1			1
	Red-breasted Nuthatch				0
	Hermit Thrush				0
	Western Tanager				0
	Evening Grosbeak				0
Conifer Riparian (CRip)	Hammond's Flycatcher	1			1
	Cordilleran Flycatcher	1			1
	Lazuli Bunting				0
Mixed Conifer/Aspen (MCAs)	Dusky Grouse	1		1 (Douglas fir, winter)	2
	Northern Goshawk	3			3
	Band-tailed Pigeon	1			1
	Flammulated Owl	4	1		5
	Northern Pygmy Owl				0
	Williamson's Sapsucker	2	1		3
	Hairy Woodpecker				0
	Steller's Jay				0
Ruby-crowned Kinglet				0	
P. Pine/Gambel Oak Mix (PPO)	Wild Turkey				0
	Plumbeous Vireo				0
	White-breasted Nuthatch				0
	Pygmy Nuthatch				0
	Grace's Warbler	3		1 (ponderosa pine)	4
	Black-headed Grosbeak				0

Table 7-3. Recommended management focus species for each land cover type in the study area.

Land Cover Type	Representative Species	Status Rankings	Key Watch Rankings	Obligate or nearly	Total
P. Pine/Aspen/Gambel Oak Mix (PPOA)	Sharp-shinned Hawk	1			1
	Flammulated Owl	4	1		5
	Northern Pygmy Owl	1			1
	Lewis's Woodpecker	4	1		5
	Hairy Woodpecker				0
	Steller's Jay				0
	Violet-green Swallow	1			1
	Pygmy Nuthatch			1 (ponderosa pine)	1
	Yellow-rumped Warbler				0
	Cassin's Finch	2			2
Bare Soil (BrSo)	Chukar				0
	Rock Wren		3		3
Cliff, Rock, Talus (CRT)	Common Merganser				0
	Golden Eagle	3			3
	Black Swift	2	2	1 (cool, moist)	4
	White-throated Swift	1			1
	Rock Wren		3		3
	Canyon Wren			1	1
	Peregrine Falcon	6		1	7
	Prairie Falcon	3	1	1	5
Alpine/Subalpine Meadow (AlpH)	White-tailed Ptarmigan	1		1	2
	American Pipit	1		1	2
	Brown-capped Rosy Finch	3	1	1	5
	Rufous Hummingbird		3	1 (fall migration)	4
Snow (Snow)	Horned Lark	1			1
	Mountain Bluebird				0
	American Pipit	1			1
Riparian Mix (RipX)	Black-crowned Night Heron				0
	Swainson's Hawk	1			1
	Northern Flicker				0
	Northern Rough-winged Swallow			1 (dirt banks)	1
	Lazuli Bunting				0
	Bullock's Oriole				0
	American Goldfinch				0
Cottonwood (Cotw)	Wood Duck				0
	Double-crested Cormorant				0
	Great Blue Heron				0
	Red-tailed Hawk	1			1
	American Kestrel	1			1
	Yellow-billed Cuckoo	5	1	1	7
	Downy Woodpecker				0
	Western Kingbird	1			1
	American Crow				0
	Black-capped Chickadee				0
	European Starling				0
	Yellow Warbler				0
	Common Grackle				0
Shrub Riparian (SRip)	Gambel's Quail				0
	Green Heron				0
	Long-eared Owl	1			1
	Black-billed Magpie				0
	Yellow-breasted Chat			1	1
Blue Grosbeak				0	

Table 7-3. Recommended management focus species for each land cover type in the study area.

Land Cover Type	Representative Species	Status Rankings	Key Watch Rankings	Obligate or nearly	Total
Willow (Willo)	Hammond's Flycatcher	1	1		2
	Gray Catbird				0
	Wilson's Warbler		4	1	5
	Fox Sparrow				0
	Song Sparrow				0
Water (Water)	Canada Goose			1	1
	Mallard			1	1
	Northern Pintail			1	1
	Lesser Scaup			1	1
	Ring-necked Duck			1	1
	Common Golden-eye			1	1
	Bald Eagle	6	1		7
	Sandhill Crane	2	1		3
	Wilson's Phalarope	1	1		2
	Belted Kingfisher		2	1 (dirt banks)	3
	Black Phoebe			1	1
	Bank Swallow		2	1 (dirt banks)	3
	Cliff Swallow			1	1
Barn Swallow			1	1	
American Dipper			1	1	
Water with marshland (subtype of "Water")	Northern Harrier	2	1		3
	Pied-billed Grebe		1		1
	Eared Grebe		1		1
	Western Grebe		1		1
	Clark's Grebe		1		1
	Virginia rail		1		1
	Sora		1		1
	American Coot		1		1
	Wilson's Snipe		1		1
	Marsh Wren		1		1
	Common Yellowthroat		1		1
	Red-winged Blackbird		1		1
Yellow-headed Blackbird		1		1	

Notes

- a. The tally of initiatives registering the species to be of high concern (see Table 6-1).
- b. The tally of criteria the species met to be considered a key watch species (see Table 7-2).
- c. Species receives a point in this column if obligate or nearly obligate to the land cover type (see Table 3-7).

Chapter 8

MANAGEMENT RECOMMENDATIONS

This chapter summarizes management practices compatible with the maintenance of bird populations and recommendations to specifically benefit birds, organized first by BLM activity or permitted activity and secondly by land cover type (habitat). We place the highest priority on land cover types for which BLM has the greatest management responsibility in the study area, namely, the pinyon-juniper woodland types, the sagebrush types, the riparian and water types, and the semi-desert shrubland types, which collectively make up over 90 percent of BLM lands (surface ownership) in the study area, and 43 percent of all lands with BLM management potential (BLM lands and federal minerals lands) in the study area. Likewise, we emphasize management recommendations regarding livestock grazing, right-of-way (ROW) and energy development, and recreation—activities on BLM lands with the greatest potential effects on birds and their habitats. The following management recommendations are synthesized from a review of published conservation plans and literature, as cited.

BLM Activity-Specific Recommendations

1. Livestock Grazing

Domestic livestock grazing is the most ubiquitous economic use of BLM lands across the study area. Grazing impacts on migratory birds can be short-term, including physical disturbance of nests and selective removal of important understory cover by livestock, or long-term, influencing structural and/or floristic shifts in plant communities that potentially create nesting or foraging conditions less favorable for some species and more favorable for others (Bock et al. 1984; Bock et al. 1992). In general, the bird species most influenced by grazing are those dependent on herbaceous ground cover and litter for foraging and nesting. Aerial, bark, and canopy feeding birds are less affected by grazing than birds feeding in herbaceous understory vegetation on nectar, insects, or seeds. Tree and cavity-nesting birds are less affected by grazing than low shrub or ground-nesting birds. Species dependent on lush groundcover are most at risk of negative effects, whereas species preferring short ground cover are usually benefited by grazing. Nest parasitism by brown-headed cowbirds is a potentially significant indirect negative effect of grazing on the reproductive success of migratory birds (see [Chapter 6](#)). In general, conclusions about the impacts of grazing on birds must be both species-specific and habitat-specific (Bock et al. 1992; Dechant et al. 2000; Dechant et al. 1999b; Dechant et al. 1999a). Below, we offer general recommendations relevant to livestock grazing. We provide habitat-specific recommendations for land cover types later in this chapter. Bird species responsive to livestock grazing (either positively or negatively) and livestock water developments (stock ponds, stock tanks) are listed in [Table 6-3](#).

- a) Regarding Land Health Standards (BLM 1997), consider incorporating breeding bird point count surveys as measures of land health (Bock and Webb 1984; Mauer 1992). Birds are relatively easy to survey, and since they are the most numerous among vertebrates, bird surveys may yield the best discrimination in land conditions. Perhaps BLM staffing will be too low for surveying birds everywhere that land health is assessed, yet pilot surveys on a few critical sites would be revealing. With BLM funding and study objective guidance, RMBO's Monitoring Colorado's Birds project could enhance its survey efforts to help assess effects on birds of land management actions such as grazing.

- b) The UFO is committed to meeting Rangeland Health Standards (BLM 1997). If it can do this by incorporating a spring and early summer grazing use deferment requirement into allotment management plans where appropriate, it could, in effect, help manage brown-headed cowbird parasitism (Ortega and Peer 2005). Although no bird species in the study appears to be unable to maintain itself due to brown-headed cowbird nest parasitism (willow flycatchers may be an exception), human assisted cowbird nest parasitism should be minimized (see discussion of cowbird parasitism in [Chapter 6](#)).

2. Realty & Rights-of-Way

Habitat fragmentation, habitat alteration, road-kill mortalities, animal behavior modification, increased disturbance, and introduction of weed vectors as a result of construction and maintenance of linear right-of-way (ROW) projects are major concerns in the study area (see [Chapter 6](#)), especially in sagebrush, semi-desert shrubland, and pinyon-juniper woodland land cover types. The effects linear ROW projects on birds and other wildlife are discussed in [Chapter 6](#), and several recommendations below are derived from that discussion. Habitat fragmentation concerns are also addressed in land cover type-specific recommendations later in this chapter. Land tenure (realty) adjustment is a possible mechanism by which the UFO may slow or mitigate the effects of habitat fragmentation in the study area.

Power transmission companies have generally accepted the guidelines for preventing raptor electrocutions. Power outages do not always occur when a raptor causes electricity to arc through its body. Thus companies often are unaware of where there is a problem with electrocutions. Wire spacing and method of passing wire around or over poles or towers is at issue. When wiring designs are not corrected, methods of discouraging raptor perching can be employed. BLM Manual 2851 provides guidance. As energy transmission technology evolves, the Avian Power Line Interaction Committee (APLIC) reviews and updates guidance for avian protection (APLIC 2006).

Other realty activities affecting birds include communications towers, which currently kill an estimated 4 to 5 million nocturnal migrating birds in the U.S. annually through collisions (Gehring et al. 2009; Longcore et al. 2008). BLM should be prepared to incorporate the best known practices listed below for approving sites and designing towers to minimize hazards to migratory birds.

- a) Identify acceptable net limits to ROW development (e.g., miles of road/mi² and utility corridor miles/mi²) for every planning subunit based on conservative analyses or understanding of impacts to birds (and other wildlife). Target intact landscapes with land cover types in good to excellent condition that support high bird diversity ([Chapter 4](#)), high richness of area-sensitive obligate species ([Figure 4-4](#)), and key watch species ([Chapter 7](#)) for establishment of the lowest possible acceptable ROW densities.
- b) Identify during the Uncompahgre RMP drafting process where No Surface Occupancy (NSO) designations would be beneficial to important bird habitats and, in-house, rank them in importance. Then designate as many NSO areas as possible.
- c) Designate utility corridors to concentrate or cluster ROWs. Develop policy to minimize the construction of separate routes or sites with duplicating competitive services. If field offices do not “develop policy,” then develop proposal review procedures that provide enough rationale to allow a manager to reject superfluous projects or relocate them to designated corridors or previously disturbed sites.

- d) Avoid locating roads in borders between habitats (Erritzoe et al. 2003).
- e) Avoid elevation of road beds and fruit-bearing road-side vegetation to minimize attractiveness to birds (Erritzoe et al. 2003).
- f) Where roads lie in or near sage-grouse habitat, encourage the appropriate authorities to post 35 mile-per-hour speed limit (GuSGRSC 2005) or construct speed bumps (Erritzoe et al. 2003).
- g) Observe Migratory Bird Treaty Act restrictions on soil-disturbing activities during nesting periods (nesting periods are given in [Table 3-1](#)). Prefer buried electric transmission lines over pole and tower held lines through non-wooded and non-forested habitats.
- h) Continually update the UFO's requirements for consistency with APLIC recommendations (APLIC 2006) for avian protection on power lines.
- i) Provide a process for the capture of land tenure opportunities in the Uncompahgre RMP, so that the UFO can pursue appropriate land tenure adjustments when opportunities arise. Develop general goals for acquiring sensitive or important bird habitat in a Land Tenure Adjustment Plan. The bird diversity mapping provided in this document ([Chapter 4](#)) as well as review of Colorado Natural Heritage Program's Potential Conservation Areas (PCAs) in the study area ([Map 8-1](#)) may serve to help UFO identify and loosely target private lands that represent important areas and bird diverse land cover types in the study area (also see the ACEC comments under Special Status Species recommendations, below).
- j) To minimize hazards to birds from communications towers, review literature (which is quickly evolving) to address each new proposal. Some current relevant hazard mitigation guidelines are as follows:
 - 1. Require communications tower heights be as low as practical; the higher the tower the greater the collision hazard (Longcore et al. 2008).
 - 2. If a communications tower must be lit (the Federal Communications Commission does not require towers less than 200 feet tall to carry warning lights), require blinking lights of minimum intensity and appropriate color. Steady, high-intensity lights cause more collisions and mortalities than low-intensity blinking lights; blue, green and white lights cause more collisions and mortalities than red lights (Evans et al. 2007).
 - 3. Require free-standing (un-guyed) communications towers, which are documented to kill fewer birds (Longcore et al. 2008).
 - 4. Avoid frequent fog zones and mountain passes for communications tower sites (USFWS 2000).

3. Energy Development

Energy development is expected to be an increasing economic land use in the study area. The most extensive energy industry in the assessment area is oil and gas (including coal-bed methane), and site-disturbing actions include exploratory drilling and seismic operations, waste water disposal, well drilling and operations, and construction and operation of pipelines, roads, and other infrastructure. Coal mining is less extensive but occurs in several locations in the study area. Site-disturbing actions include

exploration drilling, surface mining and reclamation, underground mining, waste rock and water disposal, mine reclamation, and construction and operation of roads, ore conveyors, transmission lines, and other infrastructure. Uranium-vanadium mining occurs in limited areas, and site-disturbing actions are similar to coal mining except that no surface mining for uranium-vanadium currently occurs in the study area. Other energy development including geothermal energy and wind turbines are of limited extent in the study area. Some potential impacts of energy development include removal, fragmentation, and perforation of natural habitat, disturbance by human presence and noise, increased roadkill or poaching, increased predation by human-associated predators, increased avian predation by providing raptor hunting perches, changes in water availability or quality, and increased risk of introduced weeds (BLM 1991; GSRSC 2005).

A minimum set of potential measures to reduce or eliminate impacts to birds from energy development activities include the following:

- a) For maximum acceptability, all feasible innovative techniques of reducing adverse effects on wildlife from minerals activity should be institutionalized (Jankowitz and Gruber 2007) in the Uncompahgre RMP.
- b) Determine the locations of important or sensitive sites (see [Map 3-1](#), [3-2](#), and [3-3](#) and bird diversity mapping in [Chapter 4](#)) as far ahead of an Application for a Permit to Drill (APD) process as possible. This process is in place for Gunnison sage-grouse. Protecting riparian areas and consistent raptor nest sites is already institutionalized. To further the process, consider the important sites of the stenotopic species ([Table 3-7](#)).
- c) Identify during the Uncompahgre RMP drafting process where NSO designations would be beneficial to important bird habitats and, in-house, rank them in importance. Then designate as many NSO areas as possible.
- d) Regarding protective stipulations, keep in mind that what cannot be required can often be negotiated with (recommended to) the applicant, lessee, or claimant. For example, oil and gas regulations limit redirecting a proposed drill site more than 200 feet or delaying oil and gas drilling activity more than 60 days if there is no stipulation in place in the lease. Yet at an onsite evaluation, if it is discovered that a long-billed curlew pair are exhibiting territorial behavior at the proposed drill site (e.g., something not anticipated in any decision document), the applicant may quite easily agree to relocate the proposed pad 1,000 feet away from the originally intended site.
- e) Observe Migratory Bird Treaty Act restrictions on soil-disturbing activities during nesting periods (nesting periods are given in [Table 3-1](#)).
- f) Require installation of cones over heater-treater exhaust pipes, require 3:1 slopes on reserve pits, require bird deterrents such as reflecting tape/wire (nets tend to sag) over reserve pits, prefer reserve tanks instead of reserve pits, and require all the disturbance minimizing, water controlling, noise abatement techniques other stakeholders request (USDI and USDA 2007).
- g) Apply raptor buffers (see general guidelines for selected raptors in [Table 8-2](#)), with the understanding that case-by-case adjustments by the BLM biologist to buffer distance, buffer shape, and timing may be appropriate depending on the nature of the disturbance and the presence of visual barriers, etc. Consult with adjacent BLM field offices to ensure consistency in application of buffers region-wide.

- h) To minimize hazards to birds from large electricity-generating wind turbines, review literature (which is evolving) to address each new proposal. Some current relevant hazard mitigation guidelines summarized from USFWS (2003) are as follows:
1. "Group turbines instead of distributing them widely, and orient rows of turbines parallel to known bird movements;"
 2. "Implement appropriate storm water management practices that do not create attractions for birds;"
 3. "Where practical, place turbines on lands already altered or cultivated, and away from areas of intact and healthy native habitats. If not practical, select fragmented or degraded habitats over relatively intact areas;"
 4. "...avoid attracting high densities of prey animals (rodents, rabbits, etc.) used by raptors. Reduce availability of carrion by practicing responsible animal husbandry (removing carcasses, fencing out cattle, etc.) to avoid attracting golden eagles and other raptors."
 5. Review turbine tower design advice to reduce risk to birds.

4. Recreation

Concerns common to other resource activities (ground disturbance and visible human activity) are present in recreation infrastructure. Recreation fixtures tend to have no sunset. Instead, the tendency is toward more accommodation of human use of lands and ever more land under pressure. There are good opportunities for the wildlife program to effectively direct and educate the recreation program and its clientele to encourage more passive, less invasive forms of recreation. The effects of trails on wildlife are discussed in [Chapter 6](#), from which the following recommendations were derived.

- a) Encourage wildlife staff to interface regularly with BLM recreation staff. A day of leading BLM recreation staff to prime recreation sites to introduce them to the birdlife is popular and effective. Involving the recreation staff in the development of a wildlife brochure or design of a kiosk message is helpful also. Watchable Wildlife as a recreation program is yet to catch on with recreation specialists. Their days are largely consumed with providing for and controlling the use of popular recreation sites. With small, but regular assistance from the wildlife staff, a well rounded recreation program can emerge (a program that emphasizes passive, less invasive forms of recreation along with motorized, trail, and campsite-oriented recreation forms).
- b) Incorporate into the Travel Management Plan the regular practice of publishing net changes in road density (miles/square mile) and trail density by planning unit. Periodically assess whether road or trail densities are trending toward unacceptable levels in each land cover type by planning unit.
- c) When planning for trails or roads in a linear land cover type (such as a riparian corridor), include route deviations that leave sections of the linear land cover type undisturbed.

5. Fire Management

Hazardous fuels programs of the National Fire Plan should not include vegetation types where long fire-free periods are normal (for example, old growth spruce/fir forests, old growth pinyon-juniper

woodlands, sagebrush shrublands, and semi-desert shrublands). Fire at a non-catastrophic scale is beneficial to bird habitat in the ponderosa pine and mixed mountain shrub cover types. Fire-management recommendations to benefit birds are presented in the specific land cover type recommendations later in this chapter.

6. Special Status Species (SSS) Program

BLM Manual 6840 (BLM 2008a) provides policy and guidance, consistent with appropriate laws, for the conservation of special status species and their habitats. BLM Manual 6840 requires BLM to initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species (Table 6-1) to minimize the likelihood of, and the need for, listing of these species under the federal Endangered Species Act. As such, the SSS program is typically involved in developing strategies for guarding areas of high or sensitive biological value. The following recommendations propose conservation related activities for the SSS program.

- a) Examine the list of recommended key watch species (Table 7-2) to set bird inventory and monitoring priorities in the study area. Gunnison sage-grouse (high CDOW responsibility), spotted owl, burrowing owl, black swift, and yellow-billed cuckoo are among the species with uncertain population status in the study area, or with populations potentially in decline. See Chapter 9 for further recommendations.
- b) Establish a raptor migration observatory (or observatories) in the study area. Storm King Mountain is at the northern head of a significant north-south trending ridgeline (Cimarron Ridge; Map 3-1). Sites such as this have proven valuable as raptor migration observatories. Periodic visits by a knowledgeable observer to Storm King Mountain top between mid September and early November may reveal this to be a useful raptor monitoring site. The number of raptors per hour required for a site to be useful, of course, depends upon the patience of the observers. However, HawkWatch International's slowest site last year was Chelan Ridge, Washington and that site's average was 3.65 birds per hour (<http://www.hawkwatch.org/home/>). The best observation point may be 0.25 mile to a mile south of the peak.
- c) The Uncompahgre RMP could open the possibility of bird species reintroduction or population augmentation projects in cooperation with state and federal wildlife agencies. There is a chance that the Uncompahgre RMP will provide for the eventual reintroduction of black-footed ferrets. Reintroduction and augmentation is already a viable concept with Gunnison sage-grouse (GuSGRSC 2005) and wild turkeys. Over the last three years, CDOW has translocated Gunnison sage-grouse from the Gunnison Basin to the Dry Creek Basin (not in the study area) in an attempt keep that population viable (Garner 2009). Hacking young burrowing owls or yellow-billed cuckoos may at some time be viewed a reasonable alternative to the loss of them in a great part of the Intermountain West.
- d) As part of a strategy to protect key migratory bird sites in the study area, examine opportunities to designate Areas of Critical Environmental Concern (ACECs). Consider Potential Conservation Areas (PCAs) designated by the Colorado Natural Heritage Program (CNHP) where they intersect BLM lands with good breeding bird diversity (Map 8-1), or important intact habitat for key watch species or obligates. PCAs were designated without regard to land status and may also assist the UFO in determining where tenure adjustments may be desirable (see land tenure adjustment recommendation in Realty & Rights-of-Way). A complete list of PCAs, their biodiversity significance, and important elements they encompass are found CNHP

inventories covering the study area (Lyon and Sovell 2000; Lyon et al. 1999; Lyon and Williams 1998; Rocchio et al. 2003; Stevens et al. 1999). Some of these may warrant ACEC protection.

7. Pest Control

Pest control activities on BLM lands may include noxious weed control, control of rodent pests, and control of insect pests that threaten to harm the proper function and condition of public rangelands or private rangelands or croplands. Predator damage control (control of coyotes, bears, mountain lions) is not discussed in this document.

- a) Prevent the broad use of pesticides (insecticides, herbicides, and rodenticides) on BLM lands. Generally, pesticide use should be limited to hand application around facilities such as campgrounds or mine sites. Limit use of rodenticides on BLM lands to shelter facilities (campers, cabins, utility sheds, etc.) where deemed necessary for human safety.
- a) Attempt to find alternatives to broad applications of pesticides if unusual demand for pest control arises.
- b) For maximum benefit to birds, strive to maintain native invertebrates and rodent populations (tolerating natural cyclic population spikes of pests to the greatest extent possible) on BLM lands.
- c) For the maximum benefit to birds, allow prairie dog and beaver populations to thrive on BLM lands. Burrowing owls, and several other raptors to a lesser extent, depend on active prairie dog colonies for survival (see specific recommendations for semi-desert shrubland land cover types later in this chapter). Beavers create and sustain habitat for wetland-dependent and water-dependent birds.

8. Public Outreach & Education

- a) Use the Master List of Birds of BLM's Uncompahgre Planning Area (companion database to this document) to develop a UFO bird checklist, develop a Watchable Wildlife Guide, or a "where-to-go guide" for birding on BLM lands in the UFO. Most birders do not assume that a BLM office would be a useful source for information for good birding opportunities. The UFO is an exception. For instance, while not a recognized sensitive species, the newcomer, black phoebe, has considerable birding recreation interest. Black phoebes are an ACEC feature of the San Miguel River below Naturita ([Map 3-1](#)) and fairly common in Escalante Canyon in or near the Dominguez-Escalante NCA ([Map 1-1](#)). For public information and education purposes, the UFO can be ready to inform citizens on where to go. Make a checklist or guide available at BLM land kiosks.
- b) Collaborate (and initiate) with local organizations in nest box projects. Such projects are popular with Eagle Scout project. Sites where nest boxes can benefit wood ducks, or small owls, even barn owls, are abundant in the study area. Common mergansers are large cavity-nesting ducks, and the challenge of providing for them a nest box would be worthy of an Eagle Scout project. Boxes have been developed that have proven attractive to dippers (Bourichius 2009). These are placed where streams do not pass rock walls and other choice substrates for nest building.

- c) Join the “No Child Left Inside” initiative (<http://www.watchablewildlife.org>, <http://www.parks.wa.gov/NoChildLeftInside>, <http://www.childrenandnature.org>, and <http://www.sdqfp.info/Wildlife/Education/NoChild.htm>).
- d) Volunteer with CDOW's Project Wild program (<http://www.projectwild.org/>).
- e) Become familiar with the public school districts' “Teaching to Standards” in order to be welcomed into schools with BLM's outdoor message. Do not neglect the parochial schools and alternative schools.
- f) Become involved in International Migratory Bird Day the 2nd Saturday of each May (<http://www.birdday.org/>). County “Spring Bird Counts” are conducted this day as well as “Dawn Chorus” invitationals, where the public is invited to a site and listening to birds and quietly commenting is the activity. Additional activities for children are planned.
- g) Continue BLM support of the Montrose, Delta, and Paonia Christmas Bird Counts.
- h) Establish a ‘BLM Christmas Bird Count’ circle. With such a title or alternate title, there might be a significant draw from among BLM staff. For good participation from the public, we suggest that the circle include Nucla. Much public land surrounds Nucla and at least two excellent birders live there.
- i) Commit the UFO to being a visible local leader in exhibiting energy conservation and pollution reduction (Price 2002; Price and Glick 2002) in an effort to slow global climate change (and the loss of reduction of the alpine and perennial snowfield land cover types in the study area). For example, BLM fleet vehicles should exhibit the consideration of fuel economy, and BLM office buildings can be equipped with and display energy capture and conservation technology.

Land Cover-Specific Recommendations

The following land cover-specific management recommendations are presented for 11 land cover type groups (the land cover types comprising each group follow the group's name in the chapter sub-heading heading). The land cover type management groups are listed on [Table 8-2](#), along with each group's acreage and percentage on BLM lands and federal mineral lands in the study area.

The cover type management groups appear below roughly in suggested order of management priority for the benefit of birds. The higher the percentage of a land cover type in the study area occurring on BLM land, the more *management responsibility* BLM has for that land cover type. Similarly, when a land cover type occupies a relatively high percentage of BLM lands in the study area, the higher the *capability* or *opportunity* BLM has for management of the land cover type. The higher BLM's management responsibility and capability, and the higher the estimated relative bird diversity is for a land cover type ([Table 4-2](#)), the higher its assigned priority for management.

1. Pinyon-Juniper Woodland Cover Type Group (PJ, PJSa, PJMS, Juni)

PRIORITY FOR MANAGEMENT TO BENEFIT BIRDS = HIGH

- Management responsibility = HIGH (BLM lands contain 60 percent of the total combined pinyon-juniper land cover types in the study area)

- Capability/opportunity to manage = HIGH (52 percent of BLM lands in the study area support combined pinyon-juniper land cover types)
- Estimated relative bird diversity = HIGH

The pinyon-juniper woodland cover types in the study area include pinyon-juniper woodland [PJ] (245,237 acres on BLM land representing 65 percent of this land cover type in the study area), pinyon-juniper sagebrush mix [PJSa] (103,515 acres representing 67 percent of this type in the study area), pinyon-juniper mountain shrub mix [PJMS] (54,057 acres and 38 percent, respectively), and juniper [Juni] woodland (39 acres and 1 percent, respectively) (Table 2-2). Collectively, these four pinyon-juniper woodland cover types comprise nearly 52 percent of lands managed by BLM in the UFO (Table 8-2), support the greatest number of upland habitat obligates during breeding season (Table 3-8), and have the highest estimated overall bird diversity of any upland cover type in the study area during winter and spring (Table 4-1, Map 4-3). More than any other land cover type in the study area, pinyon-juniper types rely heavily on birds for seed dispersal (Gillihan 2006). The Coordinated Implementation Plan for Bird Conservation in Western Colorado (CACWG and IWJV 2005) identifies pinyon-juniper woodlands as one of seven "Priority A" habitats for conservation action. For these reasons, BLM should give pinyon-juniper land cover types a high priority with regard to birds in the study area.

Characteristic birds occupying pinyon-juniper woodland types in the study area include black-throated hummingbird, mountain bluebird, blue-gray gnatcatcher, gray flycatcher, ash-throated flycatcher, black-throated gray warbler, chipping sparrow, pinyon jay, juniper titmouse, common bushtit, Bewick's wren, and wintering Townsend's solitaire (primarily in PJ type); mountain chickadee, house wren, Western bluebird, western tanager, Virginia's warbler, spotted towhee, plumbeous vireo, blue-gray gnatcatchers, and hermit thrush (in PJMS type); Cooper's hawk, common nighthawk, green-tailed towhee, juniper titmouse, gray flycatcher, and Cassin's kingbird (in PJSa type); and ferruginous hawk, gray vireo, Scott's oriole, lark sparrow, loggerhead shrike, and northern mockingbird (special preference for Juni type, especially open canopy savannah stands).

Key watch species (Table 7-2) associated with these land cover types are common nighthawk, pinyon jay, juniper titmouse, and green-tailed towhee. The highest ranked management focus species (Table 7-3) for these land cover types are juniper titmouse (PJ), ferruginous hawk and gray vireo (Juni), pinyon jay (PJMS), and common nighthawk (PJSa).

The following landscape scale and local scale management recommendations to conserve birds (especially the associated key watch species and management focus species) in pinyon-juniper land cover types are synthesized primarily from Gillihan (2006) and Sedgwick (1978):

- a) Manage for no net loss of old growth stands or prioritize old growth stands and trees for protection (Gillihan 2006). Most of the pinyon-juniper cover type obligate species are tied to stands of mature trees and the numbers of individual birds and bird species is believed to be positively correlated with the age of stands.
- b) Complete a pinyon-juniper woodland inventory that will allow the forestry program to set sustainable harvest or conversion rates or to maintain no-net-loss of the best quality old growth stands and produced balanced amounts of each woodland age class.
- c) On the landscape scale, maintain a diversity of age classes in pinyon-juniper type stands, from very young, to very old. Any 100 square-mile (64,000 acre) patch of pinyon-juniper type land cover should encompass the full range of seral stages, as well as openings (preferably less than

60 feet in diameter with irregular outlines to benefit birds (Sedgwick 1987). Preferentially achieve diversity by actions in younger age class stands, rather than reductions of old growth stands. Miller et al. (2008) produce evidence that PJ age structure is greatly skewed to younger classes at the expense of shrub steppe habitats. This suggests that to restore PJ age structure to the pristine pre-settlement state, old growth should be retained and that there is ample latitude for land cover conversion treatments in the younger age classes of PJ woodlands.

- d) To benefit species sensitive to habitat fragmentation, maintain unroaded stands or patches no less than 1.2 square miles (768 acres) in size (Pavlacky 2000 in Gillihan 2006).
- e) Maintain connectivity between stands of pinyon-juniper land cover types by preserving corridors of similar vegetation.
- f) At lowest elevation savannah juniper communities, manage for open stands with no more than 60 trees per acre to benefit Scott's oriole (PIF 2000).
- g) If land management prescriptions require or allow removal of pinyon-juniper land cover types to release the herbaceous understory for wildlife or livestock grazing, choose removal sites with younger or intermediate aged woodland stands with the best potential for herbaceous productivity. Create irregular borders when clearing, leave small stands of trees within cleared areas, and retain large mature trees, snags near the edges of clearings. Leaving trees with snags near the edges of clearings rather than in the interior of stands is thought to help reduce cowbird parasitism in the interior of pinyon-juniper patches, because cowbirds use snags and dead limbs as nest searching and courtship posts (Robbins et al. 1992). Cowbird parasitism is a normal occurrence in bird ecology, but parasitism rates can increase and nest success rates of their host birds can decrease when livestock are present (Chace and Cruz 1996; Ortega and Peer 2005). However, retain tree cavities wherever they are found.
- h) If land management prescriptions require or allow woodland thinning or harvest, retain at least some beetle-killed pinyons, large trees (trunk diameter greater than 12 inches), trees with twisted trunks, standing dead trees (at least 2 per acre), partially dead trees (at least 2 per acre), large downed trees (at least 2 per acre), trees with cavities, and trees with significant mistletoe infestations (at least 2 per acre). Limit firewood and fencepost cutting to young and intermediate aged stands.
- i) Include the low country Utah juniper (usually savannah) land in full fire suppression management. Prescribed fire (including low-intensity) is inappropriate in this type, because the use of fire is to eliminate excessive/competing woody vegetation, which is not an issue in low country Utah juniper stands. Experiment with planting fire breaks. After wildfire, revegetate with the most adaptive understory species available, with preference for local native species whenever possible.
- j) Limit tree harvesting, thinning, seed crop harvesting, minerals exploration and development, and recreational activities within 0.5 mile of an active raptor nest (especially ferruginous hawk nests) and pinyon jay breeding colonies. Apply this limitation seasonally or year-round, depending on the potential of the activity to threaten continued use of the area by these species.
- k) Prior to establishing hiking, biking or jeep routes, survey for old ferruginous hawk stick nests and use the recommended raptor buffer guidelines in [Table 8-2](#) in these route locations (Olendorff et al. 1989; Richardson and Miller 1997). Close routes for the season where active

ferruginous hawk, red-tailed hawk, Swainson's hawk, or long-eared owl nests are found if tolerance for the route use has not been demonstrated or vandalism has a reasonable likelihood.

- l) At least once per four years, provide pastures and whole allotments relief from livestock presence during the nesting season (roughly April through July) to protect native cool season understory grasses, protect ground nests, and to reduce nest parasitism by cowbirds. The four-year interval is based on a typical lifespan of a Passerine bird, many of which exhibit high fidelity to breeding grounds and territories. The intent of this recommendation is to provide relief during at least one breeding season during a bird's lifespan from the effects of grazing.

2. Sagebrush Cover Type Group (SagC, MStp, SaMS)

PRIORITY FOR MANAGEMENT TO BENEFIT BIRDS = HIGH

- Management responsibility = HIGH (BLM lands contain 39 percent of the combined sagebrush land cover types in the study area)
- Capability/opportunity to manage = HIGH (18 percent of BLM lands in the study area are in sagebrush land cover types)
- Estimated relative bird diversity = MODERATE

The sagebrush cover types in the study area include sagebrush community [SagC] (72,456 acres on BLM land representing 50 percent of this land cover type in the study area), sagebrush shrub-steppe [MStp] (65,573 acres on BLM land representing 38 percent of this type in the study area), and sagebrush/mountain shrub mix [SaMS] (4,752 acres on BLM land representing 11 percent of the study area) (Table 2-2). Collectively, these three sagebrush cover types comprise 18 percent of lands managed by BLM in the study area (Table 8-2), support six upland habitat obligates during breeding season (Table 3-8), and have moderate to high estimated bird diversity in the study area (Table 4-2, Map 4-3). The Coordinated Implementation Plan for Bird Conservation in Western Colorado (CACWG and IWJV 2005) designates sagebrush shrub-steppe as "Priority A" status (CACWG and IWJV 2005) and CDOW designates sagebrush as "high priority" for conservation (CDOW 2006). For these reasons, BLM should give sagebrush land cover types a high priority with regard to birds in the study area.

Ecologists distinguish between two broad sagebrush community types: sagebrush shrub-steppe [MStp] and sagebrush shrublands [SagC]. In undisturbed sagebrush shrubsteppe, tall sagebrush species are typically co-dominant with native perennial bunchgrasses. In undisturbed sagebrush shrublands, tall sagebrush species are typically dominant, native forbs and bunchgrasses are relatively sparse, and patches of bare ground or biological soil crusts are common throughout. Usually, only one species of tall sagebrush is present or dominant in any given sagebrush stand in either community type, but stands can differ extensively in their composition of understory plants. The percent cover of the sagebrush canopy and composition and cover of understory vegetation in sagebrush shrubsteppe, sagebrush shrublands, and other shrublands with a strong sagebrush component varies locally depending on the seral stage of the stand, the effects of management actions, the effects of drought or grazing, or the cumulative impacts of a combination of factors. To benefit sagebrush birds, conservation entities have suggested that sagebrush habitats be managed for structure and composition similar to native or undisturbed conditions. Yet, some controversy has surrounded the question of what sagebrush ecosystems under pristine conditions or pre-European settlement times looked like (Boyle and Reeder 2005).

Grazing has left only an estimated 1 percent of sagebrush ecosystems across western North America untouched, and 30 percent of all sagebrush ecosystems have been grazed heavily historically (West 1996, cited in Paige and Ritter 1999). Overgrazing is a major source of non-native plant incursions into sagebrush habitat, especially cheatgrass (Saab et al. 1995). Grazing is also associated with increased abundances of brood parasitic brown-headed cowbirds, which negatively affect the nesting success of sagebrush-obligate passerine birds (Rich 1978). Understory encroachment by non-native herbaceous plants such as cheatgrass is a serious concern (S. Monsen, pers. comm.). Drought and sagebrush disease are also major concerns in lower elevation sagebrush community, especially where sagebrush habitats are under the pressure of heavy livestock and/or wild ungulate use and where sagebrush recruitment has been inadequate (Wenger et al. 2003; Winward 2004).

Eradication and treatments of sagebrush on public lands to benefit livestock grazing have decelerated due to concern over the decline of sage-grouse and other sagebrush dependent species, and an increasing awareness of the intrinsic value of sagebrush ecosystems. Yet, questions remain about how to best balance management of sagebrush habitats for livestock grazing and wildlife benefit. A growing body of evidence indicates that range treatments aimed at eradicating or reducing / thinning sagebrush cover do not improve range conditions for big game or cattle, especially in the low-elevation sagebrush community cover type (Welch 2005; Welch and Criddle 2003), and such practices are usually detrimental to sagebrush obligate birds.

Not only does sagebrush provide forage directly to many species of birds, mammals and invertebrates, it functions as a nurse plant for other plant species (including important livestock forage plants) in its understory. The following information was synthesized from literature reviewed by Welch (2005): 1) the number of plant species found directly under or near the canopy of sagebrush plants exceeds that found in the canopy interspaces; 2) the sagebrush canopy reduces solar radiation to the ground, positively influencing soil moisture retention, and extending conditions for forb and grass seedling establishment for up to 28 days longer than conditions in the canopy interspaces; 3) and soil nutrient content is higher directly under the canopies of sagebrush shrubs than in the canopy interspaces. At least 133 plants and 24 species of lichens are associated with sagebrush (Welch 2005; Wisdom et al. 2003a), varying with geographic location, topography, soil, elevation, and climate. Sagebrush hosts 16 species of paintbrushes and 7 species of owlclovers—all facultative root hemiparasites (Welch 2005). Biological soil crusts are an important component of healthy semi-arid sagebrush ecosystems. Made up of lichens, fungi, bacteria, cyanobacteria, algae, and moss, these fragile micro-communities bind and stabilize surface soil, recycle nutrients and makes them available to plants, and provide micro-topography and moisture retention to aid seed germination (Belnap 1994).

Birds that characterize sagebrush land cover types in the study area are sage sparrow and sage thrasher in the lower elevation sagebrush community (SagC); Gunnison sage-grouse, sage thrasher, vesper sparrow, and Brewer's sparrow in sagebrush shrub-steppe (MStp), and green-tailed towhee, spotted towhee, and sage thrasher in mixed sagebrush/mountain shrub habitat (SaMS). Gunnison sage-grouse tolerate a percentage of mixed mountain shrub in their habitat. Sage sparrows avoid high country sagebrush and tolerate sparser understory vegetation than the other sagebrush obligates. Brewer's sparrows will nest from low country to high in sagebrush with suitable characteristics (Kingery 1998). The same is true of sage thrashers, yet their numbers are greater in the mid to upper elevations of sagebrush. Each of these passerines selects significantly taller sagebrush plants in a stand for nest locations.

All of the sagebrush obligate bird species (sage-grouse, sage sparrow, Brewer's sparrow, and sage thrasher) are sensitive to patch size (Knick et al. 2003; Knick and Rotenberry 2002). Sage sparrows require a patch of 150 acres or more, while sage-grouse may require patch sizes of several hundred

acres. For Brewer's sparrows, patches of 20 or 30 acres may be adequate, especially if other patches are nearby (Rotenberry and Knick 1999). Sage sparrow, vesper sparrow, and sage thrasher may be found in lower abundances in sagebrush land cover types with dense annual weed understories, which may be unsuited to their foraging activities (Dobkin and Sauder 2004; Rotenberry and Wiens 1980b).

Key watch species (Table 7-2) associated with sagebrush land cover types are Gunnison sage-grouse, Brewer's sparrow, and sage sparrow. The highest ranked management focus species (Table 7-3) for sagebrush land cover types are Gunnison sage-grouse (MStp), sage sparrow (SagC), and green-tailed towhee (SaMS).

Boyle and Reeder (2005) found that sagebrush land cover types in the study area are at a relatively moderate to high level of risk of pinyon-juniper encroachment; high level of risk of invasion by herbaceous plants (especially in sage sparrow range; Map 3-4); high to moderate risk of energy development; and at low risk of residential development. Management of sagebrush land cover types in the study area for the maximum benefit to birds (especially the associated key watch species and management focus species) should focus on no net loss of sagebrush shrublands, minimization of shrubland fragmentation and perforation, and prevention of understory weed and pinyon-juniper encroachment. The following management recommendations are based on Boyle and Reeder (2005) and Paige and Ritter (1999), and other sources, as cited.

- a) When sagebrush habitat conservation to benefit birds is the goal, make maintaining rangeland health an equal or greater priority than restoring rangeland health.
- b) To provide for "no net loss" of sagebrush on BLM lands in the study area, develop a GIS-based method of monitoring acreage of sagebrush in the study area to be able establish a baseline from which to recognize net loss or gain. Include a patch size and quality analysis (see methodology in Boyle and Reeder 2005) to provide for monitoring of fragmentation and to help prioritize the most intact patches for protection. Also see Wilbert et al. (2008) for guidance.
- c) Using habitat guidelines in the Gunnison Sage-grouse Rangewide Conservation Plan (GuSGRSC 2005), inventory sagebrush habitat characteristics and quality across the study area (to develop a baseline for future comparison). Identify the best examples of intact contiguous patches with native understory vegetation, and prioritize such patches for protection from weed encroachment and fragmentation.
- d) On the landscape scale, prioritize protection of large (>150 acres) intact patches of sagebrush in the study area from fragmentation, conversion to other land cover types, wildfire, herbaceous non-native weed invasion and pinyon-juniper woodland encroachment. First priority should be given to sagebrush land cover types in mapped sage sparrow range, and within and adjacent to mapped Gunnison sage-grouse range (Map 3-2).
- e) To the extent possible, move proposed land transforming projects or proposed road alignments out of large sagebrush tracts (>150 acres). Gunnison sage-grouse likely are the most sensitive species to fragmenting transformations. Power lines and fences appear to have a smaller effect on sparrows than on the grouse.
- f) Maintain connectivity between sagebrush land cover types by preserving corridors of similar vegetation.

- g) Place high requirements for justifying creation or retention of roads (or other linear features that fragment the habitat) in sagebrush and promptly reclaim unused or undesired roadbeds in sagebrush land cover types (Paige & Ritter 1999).
- h) At least once per four years, provide pastures and whole allotments relief from livestock presence during the nesting season (roughly April through July) to protect native cool season understory grasses, protect ground nests, and to reduce nest parasitism by cowbirds. The four-year interval is based on a typical lifespan of a Passerine bird, many of which exhibit high fidelity to breeding grounds and territories. The intent of this recommendation is to provide relief during at least one breeding season during a bird's lifespan from the effects of grazing.
- i) During drought years, assure that some pastures retain the maximum herb cover (even standing dead material) possible for ground-nesting birds.
- j) If sagebrush communities are disproportionately grazed when there is a mixture of pinyon-juniper and sagebrush in a unit; consider a reduction of stocking rates or other measures to protect integrity of sagebrush range.
- k) If management prescriptions require reduction of pinyon-juniper (to control encroachment on sagebrush), focus reduction treatments where the largest patches of sagebrush would most quickly result (pinyon-juniper stands younger than 75 years on relatively deep, level soils, with sagebrush nearby). Only attempt pinyon-juniper removal where sagebrush is already a prominent plant community component. The sagebrush land cover types in the study area are predicted to be at relatively moderate to high level of risk to pinyon-juniper encroachment (Boyle and Reeder 2005).
- l) Follow the vegetation structure guidelines in Appendix H of the Gunnison Sage-grouse Rangewide Conservation Plan (GuSGRSC 2005) to achieve good habitat potential on BLM lands near and in mapped grouse range.
- m) For the benefit of sagebrush-dependent Passerine birds, avoid sagebrush eradication and treatment projects that reduce sagebrush canopy cover in a patch to below 20 percent on average.
- n) If management prescriptions require thinning of sagebrush canopy, protect several of the taller shrubs in each stand, and protect native herbaceous understories by selective removal of shrubs (rather than wholesale removal). Minimize ground disturbance, justifying it only to facilitate planted seed contact with soil. Monitor how key watch species or management focus species respond to treatments using controlled experiments designed directly into the treatment regime (Boyle and Reeder 2005).
- o) Map sagebrush land cover types for full fire suppression, especially low-elevation stands at risk of cheatgrass encroachment (Knick and Rotenberry 1995).
- p) After wildfire or intensive disturbance, priority should be in seeding with native grasses and forbs. Avoid seeding with monocultures or non-native grasses and forbs. Reseed with local genetic seed stock if available, or use non-native herbaceous species that do not compete well with native species.

3. Riparian and Water Cover Type Group (CRip, RipX, Cotw, SRip, Willo, and Water)

PRIORITY FOR MANAGEMENT TO BENEFIT BIRDS = HIGH

- Management responsibility = HIGH (BLM lands contain 15 percent of the combined riparian and water cover types in the study area)
- Capability/opportunity to manage = MODERATE (1 percent of BLM lands in the study area are in the riparian and water cover types, which are largely linear or consolidated across BLM lands; also opportunities for involvement on federal mineral lands)
- Estimated relative bird diversity = HIGH

Due to similarities in appropriate management strategies for the benefit of birds, the combined riparian and water land cover type includes all the major riparian and water land cover types mapped in the study area (CRip, RipX, Cotw, SRip, Willo, and Water), as well as important water bird sites shown on [Map 3-1](#). Conifer riparian cover type (CRip is not mapped on BLM lands in the study area, but a high potential for BLM involvement exists on federal mineral lands). Altogether, ten obligate species occupy this habitat or a component of this habitat in the study area ([Table 3-8](#)). Rivers that have BLM shoreline are the most important habitat for riparian and wetland birds in the study area; these riverbanks have high management opportunity.

The majority of the riparian mix (RipX) land cover type fits the definition of “Lowland Riparian,” which is identified by the Coordinated Implementation Plan for Bird Conservation in Western Colorado (CACWG and IWJV 2005) as one of seven “Priority A” habitats for conservation action. Fink et al. (2007), using CVCP and biological data, determined that the many small drainages on both sides of the Uncompahgre Plateau are rich in forest bird species. Their work constitutes a highly recommended reference source for the UFO.

The coniferous riparian land cover type (CRip) is perhaps the best place to find cordilleran flycatchers and Swainson’s thrushes. The usual presence of surface water increases the attractiveness of this habitat to many birds. In the cottonwood land cover type (Cotw), bird abundance ranges widely from place to place and seasonally. Lowlands, dominated by Fremont cottonwood, have the longer species list. Mid elevations, dominated by narrowleaf cottonwood, with a species list almost as long, are more consistently well populated by birds. Bullock’s orioles and western kingbirds are more evident in the lowlands, yellow warblers and house wrens are more evident in the mid-elevation cottonwoods. Yellow-billed cuckoos were present in low and mid-elevations historically, but were probably never very common (Hughes 1999). In the last few years they have more often been reported in the mid-elevations. Great blue heron colonial nest sites (heronries) occur sparingly, but throughout the cottonwood type. Some birds move down from higher elevations into lowland cottonwoods for the winter, either appearing only then or swelling their population. Mourning doves, downy and hairy woodpeckers, northern flickers, bushtits, white-breasted nuthatches, brown creepers, and American robins are some of these. Lewis’s woodpeckers have disappeared from many cottonwood stands in the last 50 years (Davis 1969; Muhr 1997). European starlings join large flocks and become especially conspicuous with the advent of late fall. In the low-elevation shrub riparian land cover type (SRip), yellow-breasted chats, blue grosbeaks, black-billed magpies, and long-eared owls are some of the more characteristic species. Gambel’s quail are attracted to the cover value of tamarisk and the food and cover value of three-leaf sumac. In September, Wilson’s warblers become one of the common birds as fall migrants.

The Coordinated Implementation Plan for Bird Conservation in Western Colorado (CACWG and IWJV 2005) identifies high elevation riparian as one of seven "Priority A" habitats for conservation action. Coyote willow occurs in the low country shrub riparian type, yet as mapped for the study area, willow habitat is predominantly the high elevation riparian form. Even this high elevation form has an elevation gradient, where song sparrows, and MacGillivray's and yellow warblers are common at the lower elevations and Lincoln sparrows and Wilson's warblers characterize the higher end. Willow flycatchers in the study area (no longer considered the endangered Southwest race), remain a species that is sensitive to large ungulate grazing effects.

The Coordinated Implementation Plan for Bird Conservation in Western Colorado (CACWG and IWJV 2005) identifies wetlands (included in the water land cover type) as one of seven "Priority A" habitats for conservation action. Open water habitats are identified as a "Priority B" habitat. Its statewide objective for wetlands is to "Protect, maintain, enhance, and/or restore 100,000 acres or more of wetland habitat and associated uplands..." The plan's statewide objective for open water habitats is to "Support efforts to protect, maintain, enhance, and/or restore the 30,000 acres of existing priority open water habitats..."

Key watch species (Table 7-2) associated with riparian and water land cover types are yellow-billed cuckoo, bank swallow, belted kingfisher, and Lewis's woodpecker. The highest ranked management focus species (Table 7-3) for riparian and water land cover types are Hammond's flycatcher and cordilleran flycatcher (CRip), northern rough-winged swallow (RipX), yellow-billed cuckoo (Cotw), long-eared owl (SRip), Wilson's warbler (Willo), bald eagle (Water), and northern harrier (Water subtype [marsh]).

Management recommendations for these land cover types in the study area for the maximum benefit to birds (especially the associated key watch species and management focus species) are based on Walker (2006), Bock et al. (1992), Helmers (1992), and other sources, as cited.

- a) Buffer riparian and wetland areas amply from road and trail placement and other activities.
- b) Anthropogenic fires (e.g., campfire or fireworks accidents) commonly destroy riparian forested habitat. Sparks from railroads and escaped campfires are usually hard to stop before the damage is done. Periodically move large woody downfall away from trees near popular campsites and tree stands along railroad tracks.
- c) Give high priority to removal of tamarisk and other noxious weeds under native riparian trees and consider revegetation with large forms of willows, such as Goodding's willow or peachleaf willow. The return of large understory willows may be key in restoring yellow-billed cuckoos (Hughes 1999).
- d) For the benefit of riparian shrub birds, place at lowest priority eradication of tamarisk stands with the largest basal stems, while there are younger stands to treat (Walker 2006). Select a site or sites to replace removed tamarisk with native shrubs such as three-leaf sumac, golden currant, and silver buffaloberry. Also consider planting small native trees such as box elder and Goodding's or peachleaf willows. An aggressive follow-up with planting appropriate herbaceous ground cover can retard the return or advance of noxious weeds such as Russian knapweed.
- e) Before implementing a tamarisk removal project, survey for long-eared owls, which have been observed nesting on old magpie stick nests in tamarisks in the study area and are known to communally roost in winter in western Colorado (Levad 1991). If use by long-eared owls is

detected, delay treatment until suitable native tall shrubs nearby can replace the habitat. As with all shrub eradication treatments, avoid the nesting season of all birds in the habitat.

- f) Confirm whether black swifts nest on BLM lands at the waterfalls of Escalante Canyon ([Map 3-1](#)) and consider protective measures and/or public education measures to ensure these sites remain suitable nesting habitat.
- g) Consider planting riparian plant fire breaks (alkali sacaton may be a good choice in low-elevation riparian areas). Try to interest the partners in the Uncompahgre Plateau Project in seed banking local fire break plant species.
- h) Use current state-of-the art practices to preserve high-quality or selected willow stands from intensive ungulate pressure (exclosures, seasonal closures, game regulations etc.). Birds that nest within 4 feet of the ground can have their nest contents dislodged by the movements of cattle or wild ungulates. Willow stands with basal stems clearly visible to a distant observer indicate stands likely to be unacceptable to willow flycatchers (Fritz Knopf, pers comm.).
- i) Exclude riparian areas on BLM lands from livestock grazing whenever possible; few breeding bird species are documented to benefit from grazing in riparian habitats, and those that do benefit are not restricted to riparian habitats (Bock et al. 1992; Taylor 1986).
- j) Investigate the economic value for the waterfowl, waterbirds, shorebirds and land birds that would use stock ponds and reservoirs on BLM land if their dams were restored, such as Roatcap Reservoir ([Map 3-1](#)), west of Olathe. This may help to create a positive cost-benefit ratio for the pond restoration. The Shorebird Management Manual (Helmers 1992) is a basic primer in shorebird management for such endeavors.

4. Semi-desert Cover Type Group (SDS, TDS, Herb, BrSo)

PRIORITY FOR MANAGEMENT TO BENEFIT BIRDS = MODERATE

- Management responsibility = HIGH (BLM lands contain 46 percent of the combined semi-desert land cover types in the study area)
- Capability/opportunity to manage = MODERATE (21 percent of BLM lands in the study area are in semi-desert land cover types)
- Estimated relative bird diversity = LOW

The semi-desert cover types in the study area include herbaceous rangeland [Herb] (96,553 acres on BLM land representing 42 percent of this land cover type in the study area), short semi-desert shrub [SDS] (50,662 acres on BLM land representing 60 percent of this type in the study area), tall semi-desert shrub [TDS] (7,145 acres on BLM land representing 32 percent of this type in the study area), and barren land [BrSo] (7,185 acres on BLM land representing 59 percent of this type in the study area) ([Table 2-2](#)). Collectively, these four semi-desert cover types comprise 21 percent of lands managed by BLM in the study area ([Table 8-2](#)), support two upland habitat obligates during breeding season ([Table 3-8](#)), and have relatively low estimated bird diversity in the study area ([Table 4-1](#), [Map 4-3](#)). These land cover types typically adjoin each other on the landscape ([Map 2-2](#)) and their management issues for birds are similar.

Most of the herbaceous rangeland type is dominated by annual weeds on deeper soils intermixed with the other desert vegetation types. The highest occurrences of white-tailed prairie dog colonies in the study area are likely to be found in the herbaceous rangeland type. Burrowing owls, are obligates of prairie dog colonies and the burrows of other fossorial mammals. Horned larks and western meadowlarks nest here. Long-billed curlews forage in this vegetation type in migration and a very few will remain to nest. In the rare eruption year of lark buntings, this will be the preferred habitat if there are a few tall shrubs nearby. At higher elevations vesper sparrows not only forage pre- and post-nesting, but remain to nest in herbaceous rangelands.

The short semi-desert shrub type typically exhibits the best rangeland health of the desert types. Its vegetation is likely too sparse to hold livestock and wild ungulate attention long enough for them to cause damage. Horned larks nest in the short semi-desert shrub cover type almost to the exclusion of all other species. The Colorado Land Bird Conservation Plan (PIF 2000) recognizes the horned lark as an indicator species for short semi-desert shrublands. Indicating the value of vegetative vertical structure to birds, tall semi-desert shrub is where most non-riparian desert birds nest. Loggerhead shrikes, sage thrashers, northern mockingbird, black-throated sparrows, and western meadowlarks along with the nearly ubiquitous mourning doves characterize this nesting habitat. Several other species join mountain bluebirds and house sparrows in foraging through this desert cover throughout the year. Few birds nest on extensive barren ground. However, the barren land cover type not only includes the “adobe” badlands in Delta and Montrose counties, but also sparsely vegetated ground and rock-filled lands too dispersed for satellite imagery to detect as cliff or boulder or talus slides. The rock wren characterizes the birds of this cover type. Prairie dogs and the burrowing owls are species of special interest here.

Much of this land cover type is in a degraded condition across the study area. The spread of weedy annual understories (Dechant et al. 2000; Dechant et al. 1999b; Dechant et al. 1999a) and the subsequent spread of wildfire and loss of the shrub component of the habitat, the loss of cryptobiotic crusts, the proliferation of unauthorized travel routes, and the decline of prairie dog colonies, are the major management issues relating to birds in this land cover group.

Key watch species (Table 7-2) associated with semi-desert land cover types are loggerhead shrike, horned lark, and rock wren. Each of these species is also the highest ranked management focus species (Table 7-3) for TDS, SDS, and BrSo, respectively. Burrowing owl is the highest ranked management focus species for the Herb land cover type.

Management recommendations for these land cover types in the study area for the maximum benefit to birds (especially the associated key watch species and management focus species) are based on Dechant et al. (2000), (CDOW 2009b), Knick and Rotenberry (1995), and other sources, as cited.

Fire management should map this land cover type for full fire suppression (Knick and Rotenberry 1995) to curtail the spread of exotic annuals and subsequent wildfire destroying native vegetation, particularly the shrubs (PIF 2000). Preventing the loss of native understory in greasewood and other tall desert shrub is key, since natural recovery in normal human lifetimes is almost impossible. Although greasewood, the most common tall desert shrub, resprouts after fire, fire in this vegetation type readily spreads to adjacent desert shrub species that are destroyed by fire.

- b) Post-fire rehabilitation should involve reseeding with warm season native grasses (e.g., galleta). Although rehabilitation projects in the desert are difficult; the herbaceous rangeland cover type is the most suited to it of the types in this group. The soils are deeper, more level, and large tracts of dense weed cover are available for reseeding with desirable species.

- c) Weed management should place high priority on preventing the entrance of new flammable species such as medusahead.
- d) Track the presence of active prairie dog colonies and the presence of burrowing owls on BLM lands. The presence of burrowing owls in a colony would be an important condition to record. Records of prairie dog colonies, especially with associated burrowing owls, will improve management's ability to adjust land uses, respond to changes, and inform stakeholders and initiatives (Heffner et al. 1994). White-tailed prairie dogs are a keystone species of the community and an important ally to several semi-desert bird species.
- e) Designate prairie dog colonies with burrowing owls as "no shooting zones."
- f) Set aside prairie dog release areas on BLM lands where private interest groups could be permitted to relocate prairie dogs from areas threatened by development on private lands.
- g) Allotment management plans should provide credible assurance that herbivory is not causing cheatgrass and annual wheatgrass to spread into semi-desert shrublands in good condition. To the extent possible, custodial allotment management should incorporate this concern also.
- h) To help control user-proliferated vehicle routes, combine directional signage with wildlife message signing, giving BLM land users added incentive to protect their land. Many public land visitors may not stop to read a message board, but a picture or cut-out silhouette of an animal with the directional sign could give an instant message. Invite all-terrain vehicle clubs to participate in protecting prairie dog colonies.

5. Ponderosa Pine Cover Type Group (PP, PPO, PPOA)

PRIORITY FOR MANAGEMENT TO BENEFIT BIRDS = MODERATE

- Management responsibility = MODERATE (BLM lands contain 11 percent of the combined ponderosa pine cover types in the study area)
- Capability/opportunity to manage = LOW (2 percent of BLM lands in the study area are in the ponderosa pine cover types)
- Estimated relative bird diversity = HIGH

This cover type group consists of the ponderosa pine (PP) type, the ponderosa pine/Gambel oak mix type (PPO), and the ponderosa pine/Gambel oak/aspen mix type (PPOA). Two ponderosa pine obligate bird species, pygmy nuthatch and Grace's warbler, occur in the study area in the PP land cover type (Table 3-7). Other species are at peak numbers in PP, Williamson's sapsucker and western tanager being notable. Increasing density in trees and understory biomass has resulted in catastrophic fires in old PP stands in the Intermountain West (Finch et al. 1997; Hutto 1995). Timber sales create competition for the trees best for ponderosa pine birds.

In PPO, the PP birds will be present. Gambel oak and other fruiting woody plants make the habitat more attractive to wild turkeys, band-tailed pigeons, dusky grouse, and Lewis's woodpeckers, plus smaller birds. The issues and recommendations for the mountain shrub land cover type may also apply in PPO. The PPOA type will have the ponderosa pine birds, and most of the mountain shrub and aspen birds. The presence of aspen suggests that there is more moisture available, and the winter season

may be harsher. The birds will generally respond positively to the moisture and negatively to longer winters. The issues and recommendations for the mountain shrub and aspen land cover types may apply to some stands of PPOA.

Colorado's Comprehensive Wildlife Conservation Strategy declares ponderosa pine habitats high priority for conservation action (CDOW 2006). The Coordinated Implementation Plan for Bird Conservation in Western Colorado (CACWG and IWJV 2005) identifies ponderosa pine habitats as one of seven "Priority A" habitats for conservation action. Its statewide goal is to "prevent significant loss and enhance natural ecological functions...to maintain or increase populations of avian species that use ponderosa pine habitats."

Key watch species (Table 7-2) associated with ponderosa pine land cover types are Williamson's sapsucker, Lewis's woodpecker, flammulated owl, and Cassin's finch. The highest ranked management focus species (Table 7-3) for ponderosa pine land cover types are Grace's warbler (PP and PPO), and Lewis's woodpecker (PPOA).

Management recommendations for these land cover types in the study area for the maximum benefit to birds (especially the associated key watch species and management focus species) are based on Dechant et al. (2000), (CDOW 2009b), Knick and Rotenberry (1995), and other sources, as cited.

- a) Inventory to determine the existence, size and location of ponderosa pine stands that can/should be maintained as open stands with minimal woody plant understory. Explore whether the Ponderosa Pine Forest Partnership centered in the San Juan National Forest can provide project advice or assistance in hazardous fuels reduction to create ponderosa pines secure from destructive fires.
- b) To retain old growth characteristics, institutionalize (create a standard operating procedure) for the preservation of a functional percentage of the largest trees in all timber sales. No set functional percentage is recommended, but retaining as much as can be negotiated with the forester / timber seller is the goal. One large live tree and one large snag or large green snag per acre is worthwhile.
- c) Keep a biology-coached compliance officer on site to assure best operating practices including harvest time, snag retention (closely review safety tradeoffs), damage-minimizing falling techniques, and yard siting. Retain slash onsite for dead-and-down-wood insect habitat, if it can be justified considering forest pathologies.
- d) Design into planning periodic spot check surveys for spotted owls. We suggest night visits or calling transects to cover all the apparent potential sites each decade or until redundancy becomes apparent. Coordinate this effort with the U.S. Fish & Wildlife Service.
- e) Develop a ponderosa pine management policy/plan that incorporates retention of productive fruit shrubs into hazardous fuels reduction projects.

6. Mountain Shrub Cover Type (MS)

PRIORITY FOR MANAGEMENT TO BENEFIT BIRDS = LOW

- Management responsibility = LOW (BLM lands contain 6 percent of the mountain shrub cover types in the study area)

- Capability/opportunity to manage = MODERATE (4 percent of BLM lands in the study area are in mountain shrub land cover types)
- Estimated relative bird diversity = MODERATE

Virginia's warbler is the poster bird of this vegetation type. At night the common poorwill becomes the most conspicuous bird. Black-headed grosbeaks seem to recognize this as an expression of the deciduous woodlands it prefers. Since this type comes in different forms, its bird species composition varies. Orange-crowned warblers and especially MacGillivray's warblers are in the lush and densest patches. Green-tailed towhees prefer areas with variety in shrub density and heights. Spotted towhees prefer taller shrubs with dense bases. Warbling vireos prefer the largest Gambel oaks. House wrens are common throughout, even in the lowest snowberry stands. The Crawford area population of Gunnison sage-grouse use mountain shrub habitat (and sagebrush/mountain shrub mix [SaMS]) during brooding rearing (this population occurs mostly outside the study area). Overall bird productivity is usually high in mountain shrub cover types.

Management interest in this vegetation zone is low, possibly resulting in some missed opportunities to benefit birds. This is due to its usual good range condition, low fuelwood attractiveness, difficulty in treating it with fire or achieving lasting results with mechanical and herbicidal treatments. The two most common motives for treating mountain shrub is to open up dense stands to facilitate livestock movement and to create young palatable shoots for deer and elk.

Key watch species (Table 7-2) associated with mixed mountain shrub land cover are Virginia's warbler and common nighthawk. The highest ranked management focus species (Table 7-3) for mixed mountain shrublands is Virginia's warbler, followed by dusky flycatcher.

Management recommendations for the maximum benefit to birds (especially the associated key watch species and management focus species) for this land cover type in the study area are based on (1998; Crawford et al. 2004; Keppie and Braun 2000).

- a) When designing mountain shrub treatment projects avoid Gambel oak stands with stem diameters greater than 4 inches, and avoid sites with high percentages of squawapple or chokecherry (Keppie and Braun 2000).
- b) When designing mountain shrub treatment projects, consider whether Gunnison sage-grouse are utilizing the area. If Gunnison sage-grouse are utilizing the area, schedule treatments between October 1 and April 30. Maintain the sagebrush component of the habitat at 20 to 50 percent canopy cover if possible. Attempt to restore native forbs where possible.

7. Montane and Subalpine Forest Cover Type Group (SF, Asp, MCAs, DF)

PRIORITY FOR MANAGEMENT TO BENEFIT BIRDS = LOW

- Management responsibility = LOW (BLM lands contain 2 percent of the combined montane and subalpine forest cover types in the study area)
- Capability/opportunity to manage = LOW (2 percent of BLM lands in the study area are in montane and subalpine forest cover types)
- Estimated relative bird diversity = HIGH

The montane and subalpine forest cover types in the study area include aspen (Asp), mixed conifer/aspen (MCAs), Douglas fir (DF), and Engelmann spruce/fir mix (SF), collectively representing 16,617 acres on BLM land and only 2 percent of this type in the study area (Table 8-2). Collectively, these four forest cover types support seven upland habitat obligates during breeding season (Table 3-8), and have relatively high estimated bird diversity in the UFO (Table 4-1, Map 4-3). These land cover types typically adjoin each other on the landscape (Map 2-2) and their management issues for birds are similar.

The Coordinated Implementation Plan for Bird Conservation in Western Colorado (CACWG and IWJV 2005) identifies aspen as one of seven Priority A habitats for conservation action. Aspen is bird-rich in summer and early fall and bird-poor during its leafless time. Warbling vireos are the most ubiquitous and abundant species within aspen. Other nesting birds reach their peaks in this type also, violet-green swallow being a conspicuous one. Purple martins in the study area only nest in old growth aspen, usually near a stream, spring, or pond between 8,000 and 9,000 feet (Gillihan and Levad 2002; Levad 1998). Two more species, broad-tailed hummingbird and red-naped sapsucker, are named for priority attention in aspen woodlands by the Colorado Land Bird Conservation Plan (PIF 2000). Dusky grouse winter in Douglas fir eating the needles and buds. While other conifers are used, Douglas fir is a clear favorite. Fortunately the tree can be found in forests dominated by other species providing winter sites for the grouse where one bird may spend the entire winter in one tree. The bird community in Douglas fir forests resembles that of other conifer forests between ponderosa pine and spruce/fir. Birds characteristic of lower elevations may end their uphill occupation here, such as Cooper's hawks. It is less true that birds characteristic of higher elevations may end their downslope movement here. Most nest guilds of birds occur in aspen, e.g., ground nesters, cavity nesters, low and high canopy cup nesters, tree bole and branch tip nesters.

Flammulated owls are well-known ponderosa pine species (Mccallum 1994); however, they may be just as abundant in mixed conifer/aspen since both aspen and other tall conifers, particularly Douglas fir, provide cavities and the moth food supply that the owls need (Grube et al. in prep.; Linkhart et al. 1998). While the spruce/fir cover type is not as bird species diverse as other tall conifer types, it is rich in species strongly allied to it. Boreal owls, gray jays, pine grosbeaks, and white-winged crossbills rarely, if ever, are found elsewhere. This can be nearly said for northern three-toed woodpeckers and olive-sided flycatchers. Species common in other forest types are the most common ones in spruce/fir, such as mountain chickadee and gray-headed junco.

Key watch species (Table 7-2) associated with forested montane and subalpine land cover types are olive-sided flycatcher, flammulated owl, pine siskin, and Williamson's sapsucker. The highest ranked management focus species (Table 7-3) for these cover types is olive-sided flycatcher (SF), purple martin (Asp), dusky grouse (DF), and flammulated owl (MCAs).

The following management recommendations for these land cover types in the study area for the maximum benefit to birds (especially the associated key watch species and management focus species) are based on (Kingery 1998; Reynolds and Linkhart 1992).

- a) At the project scoping stage of aspen restoration/rejuvenation projects (to stop subalpine fir encroachment, to support the excelsior and wood industry, or to gain perceived visual improvement), identify a genuine danger of conifer encroachment and consider selectively removing the conifers rather than clear cutting. Consider the relatively small amount of BLM aspen woodlands as to whether it is worth participating in logging this woodland type.
- b) Emphasize the importance of decadent aspen to cavity-nesting birds in planning documents.

- c) Plan for a balance between protecting living forests and allowing natural epidemics in conifer forests. Generally, salvage sales remove quality habitat for birds, especially cavity nesters.
- d) Because the conifer forests of the montane and subalpine forest cover type on BLM lands in the study area do not grow rapidly enough to fit the forestry definition of “commercial forest,” let wildlife purposes carry greater weight in management decisions regarding commercial timber sales (Reynolds and Linkhart 1992). Annual increment of wood growth is less than common interest rates long before trees are harvestable.
- e) Specifically guard spruce/fir habitat in travel management planning. Recovery from excessive traffic on the forest floor is slow at subalpine elevations.

8. Alpine/Subalpine Shrub and Meadow Cover Group (AlpS, AlpH)

PRIORITY FOR MANAGEMENT TO BENEFIT BIRDS = LOW

- Management responsibility = LOW (BLM lands contain 1 percent of the combined alpine cover types in the study area)
- Capability/opportunity to manage = LOW (0.1 percent of BLM lands in the study area are in the alpine cover types)
- Estimated relative bird diversity = LOW

In winter, white-tailed ptarmigan are most likely to be found in alpine shrub vegetation. White-crowned sparrows summer in land cover types with Krumholz formation (Kingery 1998), which we view as part of this land cover type. The brown-capped rosy finch would have made a reasonable state bird since almost 90 percent of its range lies within Colorado. Its nesting habitat is in rock crevices surrounded by the alpine meadow cover type (AlpH). The nesting habitat of brown-capped rosy finch is probably as secure as any bird's in Colorado (Nelson 1998). This would be almost as true for the American pipits and horned larks nesting in this habitat. The combined alpine land cover types are generally secure in the short term; however, climate change models suggest that all top elevation habitats are in jeopardy of being critically reduced within the century (Price 2002; Price and Glick 2002).

The alpine land cover types are a low priority for BLM management, although BLM involvement could potentially be required for mining activities on non-BLM federal mineral lands, which encompass about 81 percent of this land cover type in the study area (Table 8-2). Locatable minerals mining claim work can destroy alpine habitat before BLM is notified before 3802 and 3809 mining regulation protections can be applied. Mining is suspected of accelerating cadmium uptake in willows resulting in increased poisonings (biomagnifications) in white-tailed ptarmigan (Larison and Floyd 2000).

Key watch species (Table 7-2) associated with subalpine shrublands and meadows are black-capped rosy finch and horned lark. The highest ranked management focus species (Table 7-3) for these cover types is white-tailed ptarmigan (AlpS) and black-capped rosy finch (AlpH).

Management recommendations for these land cover types in the study area are as follows:

- a) Evaluate the mineral potential of the small parcel(s) of alpine land on BLM land and be prepared to challenge non-viable claims.

- b) Consider withdrawal of the study area alpine lands from mineral entry due to the difficulty of reclaiming alpine lands to pre-mining conditions.

9. Cliff/Rock/Talus Cover Type (CRT)

PRIORITY FOR MANAGEMENT TO BENEFIT BIRDS = LOW

- Management responsibility = LOW (BLM lands contain 2 percent of cliff/rock/talus cover types in the study area)
- Capability/opportunity to manage = LOW (0.2 percent of BLM lands in the study area are in the cliff/rock/talus cover types)
- Estimated relative bird diversity = LOW

The need for cliff habitat protection for raptors is well established (Richardson and Miller 1997). From golden eagles to American kestrels, cliffs provide these raptors nesting habitat. White-throated swifts also nest in cliff cracks. The PIF population trend assessment for the swifts is a score of 4. That is an estimated population decrease between 1969 and 1999 of greater than 15 percent. As such, it is a priority species in the Colorado Land Bird Conservation Plan (PIF 2000). Canyon wrens, rock wrens, and cliff swallows are other frequently observed rock, talus, and cliff nesters.

The key watch species ([Table 7-2](#)) associated with this land cover type are prairie falcon and rock wren. The highest ranked management focus species ([Table 7-3](#)) for this land cover type is peregrine falcon.

The following recommendations were synthesized from comprehensive literature reviews (Craig 2002; Richardson and Miller 1997).

- a) Incorporate into buffer distances and seasonal limitations on potentially disturbing activities several variables (flushing distances, prior disturbance history of individual raptors, site-specific information) (Richardson and Miller 1997). Inform decisions with the understanding that case-by-case adjustments by the BLM biologist to buffer distance, buffer shape, and timing may be appropriate depending on the nature of the disturbance and the presence of visual barriers, etc.
- b) Recognize that human activity over an eyrie is more disturbing than below it. Recognize that vertical height to nest matters. A trail directly under an eyrie that is 200 feet above is not likely to cause significant disturbance; however, a trail directly above an eyrie 200 feet below is likely to cause a disturbance. Raptor nesting near the level of proposed human activity requires horizontal buffer widths; 0.5 mile is commonly proposed for the most sensitive raptor species ([Table 8-2](#)). Screening by intervening trees and rock can allow narrower buffer widths. Require full buffer widths for activities that produce sharp loud noises. Consider use of GIS viewshed analysis around nest site to justify buffer modification for appropriate activities.
- c) Craft messages for popular boat launches upstream of potential cliff swallow nest colony habitat to encourage appreciation of the wildlife of the area and discourage vandalism to cliff swallow colonies.
- d) Prohibit rock climbing within 0.5 mile ([Table 8-2](#)) of known peregrine falcon or prairie falcon sites (seasonal closures are not likely to be successful because of monitoring impracticalities, and

BLM is generally not alerted prior to rock climbing events). The two falcon species are mentioned because the peregrine's delisting was based partly upon continued protection promised by the landed agencies and the prairie falcon, among cliff-nesting raptors, is deemed particularly worthy of elevated protection. All nesting raptors are protected by the Migratory Bird Treaty Act and the BLM raptor management policy (BLM Manual 2851, 6840, and 6844).

- e) A raptor cliff stewardship program may be effective where climbing is popular and falcons are nesting. Investigate enrolling a climbing club such as The Access Fund (<http://www.accessfund.org/site/c.tml5KhNWLrH/b.4861253/k.BDBB/Home.htm>) to help plan how climbing in the study area can minimize disturbance of raptor eyries.

10. Snow Cover Type (Snow)

PRIORITY FOR MANAGEMENT TO BENEFIT BIRDS = LOW

- Management responsibility = LOW (BLM lands contain 0 percent of the snow cover type in the study area)
- Capability/opportunity to manage = LOW (0 percent of BLM lands in the study area are in the snow land cover type)
- Estimated relative bird diversity = LOW

Snow fields that persist through summer and fall become attractive to birds when insects or seeds blow onto them and become highly visible (Price 2002; Price and Glick 2002). American pipits, horned larks, and brown-capped rosy finches nesting in the vicinity quickly discover this resource. Mountain bluebirds among other species soon find this opportunity too. Only 65 acres of the snow cover type are mapped in the study area; all of this acreage exists on lands with federal minerals.

The key watch species (Table 7-2) associated with this land cover type horned lark, and the management focus species (Table 7-3) are horned lark, mountain bluebird, and American pipit. Because so little opportunity for management of this land cover type exists for BLM, no land cover-specific recommendations are offered. Because climate change poses a threat to perennial snow fields and alpine habitats in the study area, BLM should consider becoming a visible local leader in exhibiting energy conservation and pollution reduction (see Public Outreach & Education recommendations earlier in this chapter).

11. Developed and Agriculture Cover Group (Dev. Agri)

PRIORITY FOR MANAGEMENT TO BENEFIT BIRDS = LOW

- Management responsibility = LOW (BLM lands contain 1 percent of the combined agriculture and developed cover types in the study area)
- Capability/opportunity to manage = LOW (0.3 percent of BLM lands in the study area are in the developed and agriculture cover types)
- Estimated relative bird diversity = MODERATE

In the study area, BLM has very little role in the management of these lands. If the BLM has an approval function on a project that touches private land and the BLM is aware of certain values such as a species listed or candidate for listing under the federal Endangered Species Act on that property, it could be a situation where the federal agency may, in effect, make a management decision on private land. On the small amount of split-estate in the developed or agriculture cover types, BLM may exercise more discretion, yet, in the case of wildlife, if any measures are taken, BLM will prefer recommendation over stipulation. This is true for any of the other habitats that are on private land. Standard BLM stipulations in private-public land projects will address soil, weed, and contaminant concerns, which have positive effects for birds.

Literature Cited

- APLIC. 2006. Suggested practices for avian protection on power lines: the state of the art in 2006. Washington, D.C. and Sacramento, California: Avian Power Line Interaction Committee and the California Energy Commission.
- Belnap, J. 1994. Potential role of cryptobiotic crusts in semiarid rangelands. In Ecology and management of annual rangelands, edited by S. B. Monsen and S. G. Kitchen: USDA Forest Service Technical Report INT-GTR-313. Intermountain Research Station, Ogden, UT.
- BLM. 1991. Colorado oil and gas leasing and development: Final Environmental Impact Statement. Lakewood, CO: USDI Bureau of Land Management, Colorado State Office.
- BLM. 1997. Colorado Standards and Guidelines for Grazing and Rangeland Management: U. S. Bureau of Land Management. Available at http://www.blm.gov/co/st/en/BLM_Programs/grazing/rm_stds_guidelines.html.
- BLM. 2008. Manual 6840 - Special Species Status Management: U. S. Department of the Interior, Bureau of Land Management. Available at http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/im_attachments/2009.Par.13736.File.dat/IM2009-039_att1.pdf.
- Bock, C. E., J. H. Bock, W. R. Kenney, and V. M. Hawthorne. 1984. Responses of birds, rodents, and vegetation to livestock enclosure in a semidesert grasslands site. *Journal of Range Management* 37:239-242.
- Bock, C. E., V. A. Saab, T. D. Rich, and D. S. Dobkin. 1992. Effects of livestock grazing on neotropical migratory landbirds in western North America. In Status and management of neotropical migratory birds, edited by D. M. Finch and P. W. Stangel: USDA Forest Service, General Technical Report RM-229.
- Bock, C. E., and B. Webb. 1984. Birds as grazing indicator species in southeastern Arizona. *Journal of Wildlife Management* 48 (3):1045-1049.
- Bourichius, S. 2009. A successful next box for dippers. July 8, Post to the Western Slope Birding News Group.
- Boyle, S. A., and D. R. Reeder. 2005. Colorado sagebrush: a conservation assessment and strategy. Accessed at: <http://wildlife.state.co.us/WildlifeSpecies/SagebrushConservation/>. Grand Junction: Colorado Division of Wildlife.

- CACWG, and IWJV. 2005. Coordinated implementation plan for bird conservation in western Colorado. Denver: Colorado Steering Committee - Intermountain West Joint Venture and the Colorado All-bird Conservation Working Group.
- CDOW. 2006. Colorado's Comprehensive Wildlife Conservation Strategy and Wildlife Conservation Plans. Denver: Colorado Division of Wildlife.
- CDOW. 2009. Gunnison's & white-tailed prairie dog conservation strategy, public review draft, available at <http://wildlife.state.co.us/WildlifeSpecies/GunnisonsWhitetailPrairieDogConsStrategy.htm>.
- Chace, J. F., and A. Cruz. 1996. Knowledge of the Colorado host relations of the parasitic brown-headed cowbird (*Molothrus ater*). *Journal of Colorado Field Ornithology* 30:67-81.
- Craig, G. R. 2002. Recommended buffer zones and seasonal restrictions for Colorado raptors: Colorado Division of Wildlife. December 19.
- Crawford Area GSG, Local Working Group. 1998. Gunnison sage grouse conservation plan - Crawford area, Colorado. Accessed at: http://wildlife.state.co.us/NR/rdonlyres/72278533-3174-4DC4-94E1-04AD72CF421E/0/GunnisonSageGrouseLocalPlan_Crawford.pdf.
- Crawford, J. A., R. A. Olson, N. E. West, J. C. Mosley, M. A. Schroeder, T. D. Whitson, R. F. Miller, M. A. Gregg, and C. S. Boyd. 2004. Synthesis paper: ecology and management of sage-grouse and sage-grouse habitat. *Journal of Range Management* 57:2-19.
- Davis, W. 1969. *Birds of western Colorado: Colorado Field Ornithologists*.
- Dechant, J. A., M. F. Dinkins, D. H. Johnson, L. D. Igl, C. M. Goldade, and B. R. Euliss. 2000. Effects of management practices on grassland birds: vesper sparrow (revised 2002). Jamestown, North Dakota: Northern Prairie Wildlife Research Center.
- Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, M. P. Nenneman, and B. R. Euliss. 1999b. Effects of management practices on grassland birds: northern harrier (revised 2003). Jamestown, North Dakota: Northern Prairie Wildlife Research Center Online. <http://www.npwr.usgs.gov/resource/literatr/grasbird/noha/noha.htm>.
- Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, B. D. Parkin, and B. R. Euliss. 1999a. Effects of management practices on grassland birds: lark sparrow (revised 2002). Jamestown, North Dakota: Northern Prairie Wildlife Research Center.
- Dobkin, D. S., and J. D. Sauder. 2004. Shrubsteppe landscapes in jeopardy: distributions, abundances, and the uncertain future of birds and small mammals in the intermountain west. Bend, Oregon: High Desert Ecological Research Institute.
- Erritzoe, J., T. Mazgajski, and L. Rejt. 2003. Bird casualties on European roads – a review. *Acta Ornithologica* 38 (2):78-92.
- Evans, W., Y. Akashi, N. S. Altman, and A. M. Manville II. 2007. Response of night-migrating songbirds in cloud to colored and flashing light. *North American Birds* 60:476-478.

- Finch, D., J. Ganey, W. Yong, R. Kimball, and Sallabanks. R. 1997. Effects and interactions of fire, logging, and grazing. In Songbird ecology in southwestern ponderosa pine forests: literature review (Gen.Tech.Rep.RM-GTR-292), edited by W. Block and D. Finch. Fort Collins: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station.
- Fink, M., D. Hanni, D. Klute, J. Sovell, and R. Rondeau. 2007. A conservation blueprint for neotropical migratory birds in western Colorado. Accessed at:
http://www.cnhp.colostate.edu/download/documents/2007/Neotrop_Birds_in_W_CO.pdf.
- Gehring, J., P. Kerlinger, and A. M. Manville II. 2009. Communication towers, lights, and birds: successful methods of reducing the frequency of avian collisions. *Ecological Applications* 19 (2):505-514.
- Gillihan, S., and R. Levad. 2002. Tree-nesting purple martins in the Colorado Rockies. *Purple Martin Update* (11):4-7.
- Gillihan, S. W. 2006. Sharing the land with pinyon-juniper birds. Salt Lake City, UT: Partners in Flight Western Working Group. Accessed at:
<http://www.rmbo.org/dataentry/postingArticle/dataBox/PJ%20manual%20Nov%2008%20low-res.pdf>.
- Grube, R., J. Stanek, and K. Gray. in prep. Flammulated owl use of douglas-fir habitat in Gunnison County, Colorado: Department of Natural and Environmental Sciences, Western State College Gunnison.
- GSRSC. 2005. Gunnison sage-grouse rangewide conservation plan. Denver, CO: Gunnison Sage-grouse Rangewide Steering Committee, Colorado Division of Wildlife.
- GuSGRSC. 2005. Gunnison sage-grouse rangewide conservation plan. Gunnison Sage-Grouse Rangewide Steering Committee. Available at
<http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/Birds/GunnisonConsPlan.htm>. Denver, Colorado: Colorado Division of Wildlife.
- Heffner, R. S., H. E. Heffner, and C. Contos. 1994. Hearing in prairie dogs: transition between surface and subterranean rodents. *Hearing Research* (73):185-189.
- Helmets, D. 1992. Shorebird management manual. Manomet, MA: Western Hemisphere Shorebird Reserve Network.
- Hughes, J. M. 1999. Yellow-billed cuckoo (*Coccyzus americanus*). In *The Birds of North America Online*, edited by A. Poole. Ithaca: Cornell Lab of Ornithology. Accessed at:
<http://bna.birds.cornell.edu/bna/species/418doi:10.2173/bna.418>.
- Hutto, R. 1995. Composition of bird communities following stand-replacement fires in Northern Rocky Mountain (USA) conifer forests. *Conservation Biology* 9:1041-1058.
- Jankowitz, R., and M. Gruber. 2007. Oil and gas development guidelines: conserving New Mexico's wildlife habitats and wildlife: New Mexico Dept. of Fish and Game.

- Keppie, D., and C. Braun. 2000. Band-tailed pigeon (*Patagionenas fasciata*). Edited by A. Poole, *Birds of North America Online*. Ithaca: Cornell Lab of Ornithology. Accessed at: <http://bna.birds.cornell.edu/bna/species/530>.
- Kingery, H. E., ed. 1998. *Colorado Breeding Bird Atlas*. Denver: Colorado Bird Atlas Partnership & Colorado Div. of Wildlife.
- Knick, S. T., D. S. Dobkin, J. T. Rotenberry, M. A. Schroeder, W. M. Vander Haegen, and C. Van Riper III. 2003. Teetering on the edge or too late? Conservation and research issues for avifauna of sagebrush habitats. *Condor* 105:611-634.
- Knick, S. T., and J. T. Rotenberry. 2002. Effects of habitat fragmentation on passerine birds breeding in intermountain shrubsteppe. *Studies in Avian Biology* 25:130-140.
- Larison, J., and M. Floyd. 2000. Cadmium toxicity threatening wildlife in Rocky Mountains. *Oregon State University News*.
- Levad, R. 1991. Personal communication between R. Levad and R. E. Lambeth; Levad guided Lambeth to a site on the east branch of Big Salt Wash in Mesa County where at least eight long-eared owles were roosting on January 13.
- Levad, R. 1998. Purple martin (*Progne subis*). In *Colorado Breeding Bird Atlas*, edited by H. E. Kingery. Denver: Colorado Bird Atlas Partnership & Colorado Div. of Wildlife.
- Linkhart, B. D., T.R. Reynolds, and R. A. Ryder. 1998. Home range and habitat of breeding flammulated owls in. *Wilson Bulletin* 110 (3):342-351.
- Longcore, T., C. Rich, and S. A. Gauthreaux. 2008. Height, guy wires, and steady-burning lights increase hazard of communication towers to nocturnal migrants: a review and meta-analysis. *The Auk* 125 (2):485-492.
- Lyon, P., and S. Sovell. 2000. *A natural assessment: San Miguel and western Montrose counties, Colorado*. Fort Collins, CO: Colorado Natural Heritage Program. Accessed at: http://www.cnhp.colostate.edu/download/documents/2000/San_Miguel_and_Western_Montrose.pdf.
- Lyon, P., T. Stephens, J. Siemers, D. Culver, P. Pineda, and J. Zoerner. 1999. *The Uncompahgre River Basin: a natural heritage assessment, volume 1*. Fort Collins, CO: Colorado Natural Heritage Program. Accessed at: http://www.cnhp.colostate.edu/download/documents/1999/Uncompahgre_River_Basin_Natural_Heritage_Assessment.pdf.
- Lyon, P., and E. Williams. 1998. *Natural heritage biological survey of Delta County, Colorado*. Fort Collins, CO: Colorado Natural Heritage Program. Accessed at: http://www.cnhp.colostate.edu/download/documents/1998/Natural_Heritage_Biological_Survey_of_Delta_County_Colorado.pdf.
- Mauer, B. A. 1992. Biological diversity, ecological integrity, and neotropical migrants: new perspectives for wildlife management. In *Status and management of neotropical migratory birds: 1992* September 21-25; Estes Park, CO. Gen. Tech. Rep. RM-229, edited by D. M. Finch and P. W.

- Stangel. Fort Collins, Co: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. Accessed at:
http://www.fs.fed.us/rm/pubs_rm/rm_gtr229/rm_gtr229_024_031.pdf.
- Mccallum, D. A. 1994. Flammulated Owl (*Otus flammeolus*). In *The Birds of North America Online*, edited by A. Poole. Ithaca: Cornell Lab of Ornithology.
- Muhr, Ed. 1997. Mesa County spring bird count, May 1997: personal communication between long-time Fruita, Colorado resident and R. E. Lambeth.
- Nelson, D. L. 1998. Brown-capped rosy finch (*Leucosticte australis*). In *Colorado Breeding Bird Atlas*, edited by H. E. Kingery. Denver: Colorado Bird Atlas Partnership & Colorado Div. of Wildlife.
- Olendorff, R., D. Bibles, M. T. Dean, J. Haugh, and M. Kochert. 1989. Raptor habitat management under the U.S. Bureau of Land Management multiple-use mandate. The Raptor Research Foundation, Inc.: Raptor Research Report No. 8.
- Ortega, C. J., and B. D. Peer. 2005. Research directions and cowbird (*Molothrus* spp.) management. *Ornithological Monographs* 2005 (57):1-5.
- PIF. 2000. Colorado Land Bird Conservation Plan. Colorado Partners In Flight. Available at
<http://www.rmbo.org/pif/bcp/intro/exsum.htm>.
- Price, J. 2002. Global warming and songbirds: Colorado. American Bird Conservancy and National Wildlife Federation. Accessed at:
<http://www.abcbirds.org/newsandreports/globalwarming/Colorado.pdf>.
- Price, J., and M. S. Glick. 2002. The Birdwatcher's guide to global warming. American Bird Conservancy and National Wildlife Federation. Accessed at:
<http://www.abcbirds.org/newsandreports/globalwarming/birdwatchersguide.pdf>.
- Reynolds, T. R., and B. D. Linkhart. 1992. Flammulated owls in ponderosa pine: evidence of preference for old growth. Paper read at Old-growth forests in the Southwest and Rocky Mountain regions (U.S. Forest Service General Technical Report RM-213).
- Rich, T. D. 1978. Cowbird parasitism of sage and Brewer's sparrows. *Condor* 80:343.
- Richardson, C. T., and C. K. Miller. 1997. Recommendations for protecting raptors from human disturbance: a review. *Wildlife Society Bulletin* (25):634–638.
- Robbins, C., J. R. Sauer, and B. G. Peterjohn. 1992. Population trends and management opportunities for neotropical migrants. In *Status and management of neotropical migratory birds: 1992 September 21-25; Estes Park, CO. Gen. Tech. Rep. RM-229*, edited by D. M. Finch and P. W. Stangel. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. Accessed at:
http://www.fs.fed.us/rm/pubs_rm/rm_gtr229/rm_gtr229_017_023.pdf.
- Rocchio, J., G. Doyle, and R. Rondeau. 2003. Survey of critical wetlands and riparian areas in Gunnison County.

- Rotenberry, J. T., and S. T. Knick. 1999. Multiscale habitat associations of the sage sparrow: implications for conservation biology. *Studies in Avian Biology* 19:95-103.
- Rotenberry, J. T., and J. A. Wiens. 1980. Habitat structure, patchiness, and avian communities in North American steppe vegetation: a multivariate analysis. *Ecology* 61 (5):1228-1250.
- Saab, V. A., C. E. Bock, T. D. Rich, and D. S. Dobkin. 1995. Livestock grazing effects in western North America. In *Ecology and management of neotropical migratory birds*, edited by T. E. Martin and D. M. Finch. New York: Oxford University Press.
- Sedgwick, James A. 1987. Avian habitat relationships in pinyon-juniper woodland, northwest Colorado. *The Wilson Bulletin* 99 (3):413-431.
- Stevens, T., D. Culver, J. Zoemer, and P. Lyon. 1999. A natural heritage assessment of wetlands and riparian areas in the Uncompahgre River Basin, Eastern Montrose and Ouray counties, Vol. II. Accessed at: http://www.cnhp.colostate.edu/download/documents/1999/Uncompahgre_River_Basin_wetlands.pdf.
- Taylor, D. M. 1986. Effects of cattle grazing on passerine birds nesting in riparian habitat. *Journal of Range Management* 39 (3):254-258.
- USDI, and USDA. 2007. Surface operating standards and guidelines for oil and gas exploration and development: the gold book. 4th ed. Vol. BLM/WO/ST-06/021+3071/REV-07: U.S. Department of the Interior Bureau of Land Management and U.S. Department of Agriculture Forest Service.
- USFWS. 2000. Memorandum: service guidance on the siting, construction, operation and decommissioning of communications towers (http://www.fws.gov/habitatconservation/com_tow_guidelines.pdf). Washington, D.C.: U.S. Fish and Wildlife Service.
- Walker, H. A. 2006. Southwestern avian community organization in exotic Tamarix: current patterns and future needs. Paper read at Monitoring Science and Technology Symposium: Unifying Knowledge for Sustainability in the Western Hemisphere, September 20-24, at Denver, CO.
- Welch, B. L. 2005. Big sagebrush: a sea fragmented into lakes, ponds, and puddles. Vol. General Technical Report RMRS-GTR-144. Fort Collins, CO: U. S. Department of Agriculture Forest Service, Rocky Mountain Research Station. Accessed at: http://www.fs.fed.us/rm/pubs/rmrs_gtr144.pdf.
- Welch, B. L., and C. Criddle. 2003. Countering misinformation concerning big sagebrush. Research Paper RMRS-RP-40: USFS Rocky Mountain Research Station.
- Wenger, S. R., M. R. Grode, and A. D. Apa. 2003. Inventory of sagebrush defoliation and mortality in Gunnison and Dry Creek Basins 2003, Final Report: Colorado Division of Wildlife.
- Wilbert, M., J. Thompson, and N. W. Culver. 2008. Analysis of habitat fragmentation from oil and gas development and its impact on wildlife: a framework for public land management planning: The Wilderness Society.

Winward, A. H. 2004. Sagebrush of Colorado: taxonomy, distribution, ecology, and management. Denver: Colorado Division of Wildlife.

Wisdom, M. J., M. M. Rowland, L. H. Suring, L. Schueck, C. W. Meinke, B. C. Wales, and S. T. Knick. 2003a. Procedures for regional assessment of habitats for species of conservation concern in the sagebrush ecosystem. Version 1, March. La Grande, Oregon: U. S. Forest Service, Pacific Northwest Research Station.

Map 8-1
PCAs and ACECs overlaid on summer relative bird diversity mapping in the study area.

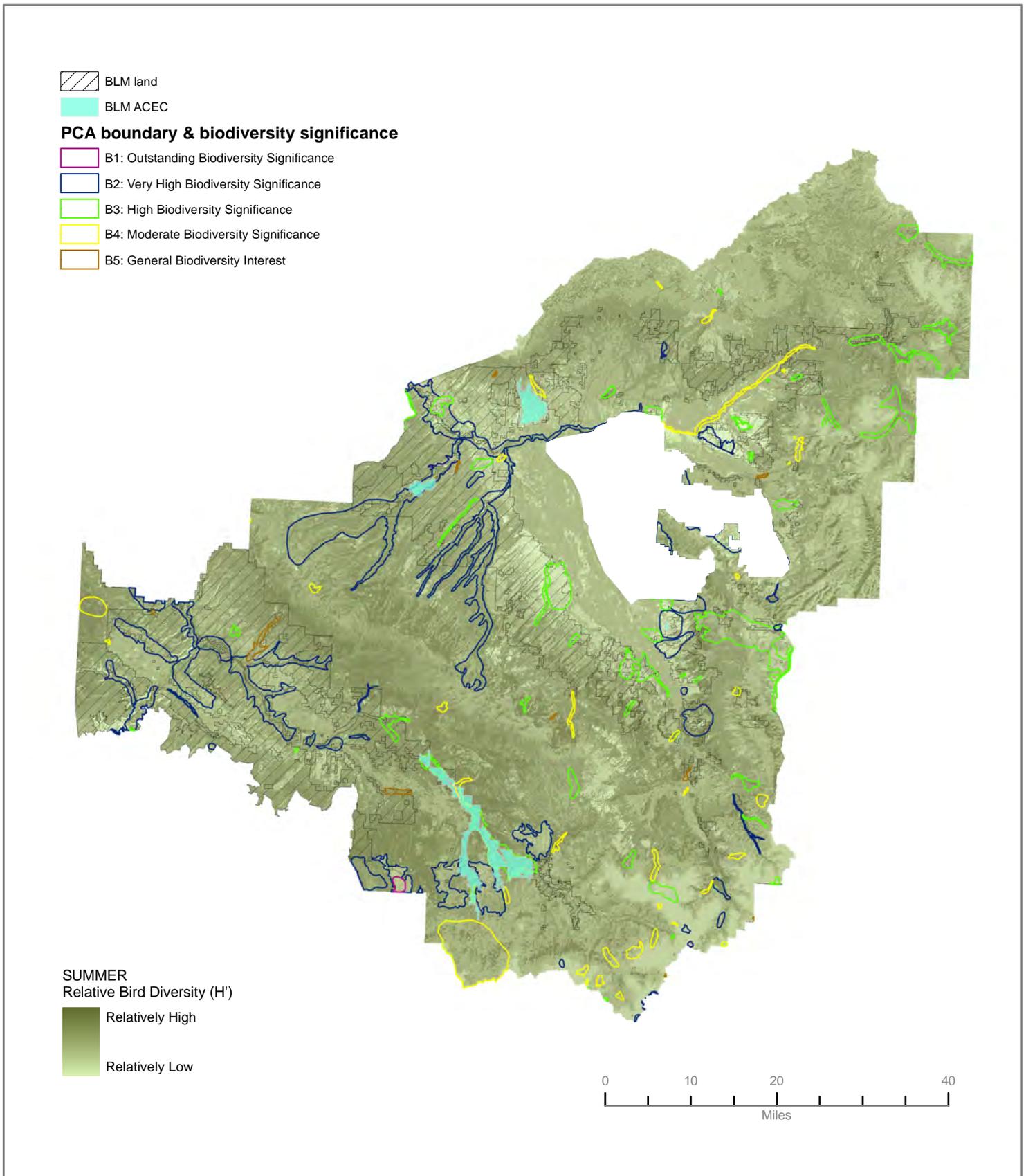


Table 8-1. Areas and percentages of eleven land cover type management groups on BLM land and other land with federal minerals.

Land Cover Type Management Group ^a	Study Area	On BLM Land ^b			On Federal Minerals Lands ^c			Total on BLM and Federal Minerals Lands ^d		
	Total Acres	Acres	% ^e of BLM Lands	% ^f of Group	Acres	% ^e of Fed Min Lands	% ^f of Group	Acres	% ^e of Lands	% ^f of Group
Pinyon-juniper group (PJ, PJSa, PJMS, Juni)	675,133	402,848	51.6	60	137,981	8.8	20	540,829	23	80
Semi-desert group (SDS, TDS, Herb, BrSo)	351,283	161,545	21	46	61,240	4	17	222,785	9	63
Sagebrush group (SagC, MStp, SaMS)	362,257	142,781	18	39	112,081	7	31	254,862	11	70
Mountain shrub	512,479	31,393	4	6	345,713	22	67	377,106	16	74
Montane and subalpine forest group (SF, Asp, MCAs, DF)	741,933	16,617	2	2	636,965	40	86	653,582	28	88
Ponderosa pine group (PP, PPO, PPOA)	128,501	14,390	2	11	91,187	6	71	105,577	4	82
Riparian and water group (RipX, Cotw, Water, SRip, Willo, CRip)	49,745	7,504	1	15	10,205	1	21	17,709	1	36
Ag and developed group (Agri, Dev)	190,070	2,061	0.3	1	6,308	0.4	3	8,369	0.4	4
Rock, cliff, talus (CRT)	91,917	1,396	0.2	2	79,618	5	87	81,014	3	88
Alpine group (AlpS, AlpH)	113,046	679	0.1	1	91,555	6	81	92,235	4	82
<Blank pixels>unclassified	367	224	0.03	61	83	0.01	23	307	0.01	84
Snow	65	-			65	0.004	100	65	0.003	100
Totals	3,216,795	781,439	100		1,573,002	100		2,354,441	100	

Notes

- a. Land cover types (in parentheses) grouped for management purposes; a key to land cover type codes is provided in Table 2-2.
- b. Land managed by BLM (both the surface and subsurface estates are managed by BLM).
- c. Land where the subsurface estate is administered by the federal government (BLM) but the surface estate is owned by a different entity.
- d. All lands described in notes b and c, above (e.g., all lands with BLM management potential).
- e. Percent of lands of a particular ownership status in the land cover type management group (e.g., 18% of BLM lands in the study area are in the sagebrush land cover type management group).
- f. Percent of the land cover type management group by land status across the entire study area (e.g., 39% of the sagebrush group in the study area is on BLM Land).

Table 8-2. Recommended raptor buffers.^a

Species	Timing	Distance	Activity ^b
Bald Eagle		Within 1/4 mile around active nest	No surface occupancy
	11/15 - 8/30	Within 1/3 mile of occupied nest	No human activity
	Between the 1000 hour and the 1400 hour	Within a buffer zone	Oil and gas inspection visits
		Within 1/4 mile of winter roost (1/2 mile if no visual obstruction exists)	No human activity
		Within 1/8 to 1/4 mile of favored diurnal hunting perches	No human activity
Golden Eagle	12/15 - 8/30	Within 1/4 mile around occupied nest	No human activity
		Within 1/4 mile around active nest and associated alternate nests	No surface occupancy
Northern Harrier	4/1 - 8/15	Within 1/2 mile of occupied nest	No human activity
Sharp-shinned Hawk	3/15 - 8/31	Within 1/2 mile of occupied nest	No human activity
Cooper's Hawk	3/15 - 8/31	Within 1/2 mile of occupied nest	No human activity
Northern Goshawk	3/1 - 9/30	Within 1/2 mile of occupied nest	No human activity
Ferruginous Hawk	2/1 - 7/31	Within 1/4 mile of occupied nest	No human activity
		Within 1/2 mile of active nest and associated alternate nests	No surface occupancy
Red-tailed Hawk	2/15 - 7/15	Near occupied nest	No human activity
		Within 1/3 mile of active nest and associated alternate nests	No surface occupancy
Swainson's Hawk	4/1 - 8/30	Within 1/4 mile of occupied nest	No human activity
		Within 1/4 mile of active nest and associated alternate nests	No surface occupancy
Peregrine Falcon	3/15 - 8/15	Within 1/2 mile of eyrie cliff system	No human activity
Prairie Falcon	3/10 - 7/25	Within 1/2 mile of eyrie cliff system	No surface occupancy
American Kestrel	N/A		
Barn Owl	N/A		
Boreal Owl	2/1 - 8/31	Within 1/4 mile of occupied nest	No human activity
Flammulated Owl	4/1 - 9/30	Within 1/4 mile of occupied nest	No human activity
Great Horned Owl	12/1 - 9/31	Within 1/4 mile of occupied nest	No human activity
Long-eared Owl	2/1 - 8/15	Within 1/4 mile of occupied nest	No human activity

Table 8-2. Recommended raptor buffers.^a

Northern Saw-whet Owl	2/1 - 8/1	Within 1/4 mile of occupied nest	No human activity
Northern Pygmy Owl	2/1 - 8/1	Within 1/4 mile of occupied nest	No human activity
Western Screech Owl	2/1 - 8/31	Within 1/4 mile of occupied nest	No human activity
Burrowing Owl	3/1 - 10/31	Area of nest burrows (perimeter of colony)	No ground disturbance or prairie dog eradication
	4/1 - 8/15	Within 150 feet of active colony perimeter	No human activity

Notes

a. Compiled from Craig, G. 2002. Recommended buffer zones and seasonal restrictions for Colorado raptors. Colorado Division of Wildlife, Fort Collins and BLM Richmond Field Office, Utah, Proposed RMP/Final EIS, Appendix 10 (the more conservative buffer appears in this table). Buffer timing expanded for some species based on documented nesting periods in Colorado (see Table 3-1 of this document).

b. "Surface occupancy" includes human habitation as well as non-human occupancy, examples of which would be oil and gas wells, tanks, roads, trails, etc., but excludes that which has historically occurred in the area.

N/A. American kestrel and barn owl buffers not deemed necessary by BLM Richmond Field Office due to apparent high population densities or apparent ability to adapt to human activity.

Chapter 9

DATA GAPS AND POTENTIAL RESEARCH QUESTIONS

As human demands on natural resources continue to grow, managers of lands with competing interests need to know the limits of acceptable change in managed landscapes. Because biological systems are complex and dynamic, biologists shrink from the risky business of specifying limits (Finch and Patton-Mallory 1992). Stakeholders should be encouraged to demand science-based justification for BLM actions (Marzluff and Sallabanks 1998). How many acres of sagebrush are needed to sustain the species obligated to it? What percent of pinyon-juniper woodland must we keep as old growth? At what density of oil and gas well sites will we begin to lose the species in the area? What is the road density threshold for our most sensitive species? This information feed will come from inventory, research and monitoring. The following is a listing of research proposals that will address some land management questions that relate to avian requirements.

1. Monitor Selected Species to Determine Population Status in the Study Area

Periodically monitor or continue monitoring for the presence of nesting spotted owls, black swifts, burrowing owls, and yellow-billed cuckoos on BLM lands in the study area. Consider monitoring or enhancing monitoring in the study area for species such as ferruginous hawk, sage sparrow, and key watch species (Table 7-2) as necessary. Consider establishing a HawkWatch raptor migration observatory site on BLM land (see [Table 3-1](#) for recommended location).

2. Habitat Characteristics in the Study Area of Certain Habitat Obligate Birds

While there is objective data and subjective observation allowing some land management conclusions now, a study area-wide description of occupied and unoccupied habitats for pinyon-juniper and sagebrush-dependent species, and for yellow-billed cuckoo, should significantly boost management's ability to provide for these species. The three sagebrush obligate species (Gunnison sage-grouse, sage sparrow, and Brewer's sparrow) are among the most well studied species in the intermountain west, yet further research is needed in the study area. Of the sagebrush obligates, BLM is better positioned than any other public entity to have a positive effect on sage sparrow, because most of the sage sparrow range in the study area is mapped on BLM lands ([Map 3-4](#)). The following sage sparrow habitat research proposals are from Boyle and Reeder (2005):

- Further research is needed on the life history and ecology of the sage sparrow in the assessment area. Experts suggest that low returns to breeding grounds during some years by this highly philopatric species indicates that overwintering habitat or conditions may not be adequate, but more investigation is needed.
- The acceptable range of habitat requirements (physiognomic and floristic) is not well defined at either the regional or spatial scale in the study area. Because bird abundances do not necessarily imply favorability of habitat conditions or correlation with bird productivity, studies should couple population trend and demographics monitoring with investigation of nest success (including brood parasitism and predation) under alternate rangeland management regimes, over a spectrum of habitat conditions and geographic areas in the study area.

- The mechanisms by which fragmentation of sagebrush ecosystems influence the density of breeding birds or their productivity are not understood. Research is needed to determine why sage sparrows are absent from large blocks of apparently suitable habitat in the study area. Sage sparrows respond to breeding habitat variables at multiple spatial scales; projections of population dynamics based on simple organism-habitat correlations may overlook important details of the patch responses of sage sparrows. This carries important implications for how this species and its habitat should be managed and monitored (Knick and Rotenberry 2002; Wiens et al. 1985). It is very important to note that breeding sage sparrows show high site tenacity (philopatry) and return to previous breeding locations even after the habitat has been manipulated, which can lead researchers and managers to biased conclusions regarding habitat preferences and effects of management activities (Wiens and Rotenberry 1985).

Similar research questions could be designed to address deficiencies in knowledge regarding specific habitat requirements of pinyon jay and juniper titmouse, two species perceived to be in decline in the region. Yellow-billed cuckoos have been recently documented in the study area, but breeding has not been confirmed (Beason 2009). An inventory of breeding yellow-billed cuckoo habitat may help managers better provide for this species.

3. The Effects on Wildlife of Oil and Gas Well Spacing and Linear Rights-of-Way Density

It is reasonable to hypothesize that oil and gas fields with a dense well spacing have a greater effect on wildlife, including birds, than fields where well spacing is less dense. Linear rights-of-way, especially roads, are widely recognized as having a range of effects on wildlife and their habitat. No studies specific to the Uncompahgre Planning Area and its sagebrush or pinyon-juniper obligate bird species exist. A wildlife status comparison of affected sites and reference sites in the study area should reduce the speculation about effects that biologists must provide in environmental assessments or at least increase the quality of that speculation. Evaluate seasonal effects to the extent possible. This study or an additional one should also address questions surrounding reclamation of well sites, such as the value of post work-over reclamation, the successes of final reclamation, likely effects of residual roads, efficacy of gate closures, predictable long-term and permanent effects.

4. The Trend of Old Growth Woodlands & Forests in the Study Area

Timbered landscapes are undergoing change, but are the changes at rates where desirable old growth acreages (percentages) are sustained? Are natural and human-caused fire, forest pathologies, and land treatments causing change that exceeds prehistoric rates or sustainability? An inventory of woodland and forest successional stages and a determination of average annual seral setback acreage should permit improved wildfire management and land treatment planning. Prioritize pinyon-juniper woodland types in the study area for this research.

5. Effectiveness of Interseeding Techniques to Improve or Restore Degraded Big Sagebrush Stands

Native herbaceous plants persist under big sagebrush stands where grazing history has generally been light. However, most big sagebrush rangelands with historic heavy or severe grazing have lost the native understory, have not recovered, and show little sign of recovering. Often the solution has been to disk out the sagebrush and plant exotic grasses, usually crested wheatgrass. Neither the degraded sagebrush understory nor the replanted ground has been desirable for sagebrush obligate wildlife species. Brush beating, reducing the height of sagebrush by top-mowing, thinning sagebrush with roller chopping and herbicides have temporarily taken the treated ground out of usefulness to sagebrush

wildlife and yielded questionable results (Welch 2005; Welch and Criddle 2003; Wiens and Rotenberry 1985). Interseeding may hold the key. The BLM within the UFO can experiment with methods of interseeding in sagebrush demonstration areas (Monsen 2004a; Monsen 2004b). More reliable and rapid progress might be possible by requesting and possibly funding an experiment station to conduct this research.

6. Safe Wind Farm Sites on BLM Lands of the Study Area

Identify sites that might be economical for wind farms and that present the least hazard to raptors, migrant birds, and bats. Contrast these sites with high hazard sites.

Literature Cited

- Beason, J. 2009. Common black-hawk sighting in Hotchkiss, Colorado, and important bird sites in the region: personal communication with R. E. Lambeth. June 22.
- Boyle, S. A., and D. R. Reeder. 2005. Colorado sagebrush: a conservation assessment and strategy. Accessed at: <http://wildlife.state.co.us/WildlifeSpecies/SagebrushConservation/>. Grand Junction: Colorado Division of Wildlife.
- Finch, D. M., and M. Patton-Mallory. 1992. Closing the gap between research and management. In Status and management of neotropical migratory birds: 1992 September 21-25; Estes Park, CO. Gen. Tech. Rep. RM-229, edited by D. M. Finch and P. W. Stangel. Fort Collins, CO: U. S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. Accessed at: http://www.fs.fed.us/rm/pubs_rm/rm_gtr229/rm_gtr229_012_016.pdf.
- Knick, S. T., and J. T. Rotenberry. 2002. Effects of habitat fragmentation on passerine birds breeding in intermountain shrubsteppe. *Studies in Avian Biology* 25:130-140.
- Marzluff, J. M., and R. Sallabanks, eds. 1998. Avian conservation: research and management. Washington, D. C.: Island Press.
- Monsen, S. B. 2004a. Restoration manual for Colorado sagebrush and associated shrubland communities: attributes and features of select grasses, broadleaf forbs, and selected shrubs. 2 vols. Vol. 1: Colorado Division of Wildlife.
- Monsen, S. B. 2004b. Restoration manual for Colorado sagebrush and associated shrubland communities: developing objectives to manage and improve plant communities and wildlife habitats. 2 vols. Vol. 2: Colorado Division of Wildlife.
- Welch, B. L. 2005. Big sagebrush: a sea fragmented into lakes, ponds, and puddles. Vol. General Technical Report RMRS-GTR-144. Fort Collins, CO: U. S. Department of Agriculture Forest Service, Rocky Mountain Research Station. Accessed at: http://www.fs.fed.us/rm/pubs/rmrs_gtr144.pdf.
- Welch, B. L., and C. Criddle. 2003. Countering misinformation concerning big sagebrush. Research Paper RMRS-RP-40: USFS Rocky Mountain Research Station.
- Wiens, J. A., and J. T. Rotenberry. 1985. Response of breeding passerine birds to rangeland alteration in a North American shrubsteppe locality. *Journal of Applied Ecology* 22:655-668.

Chapter 10

CONCLUSIONS

This review produced the following significant findings:

- The most abundant land cover types in the study area on BLM lands are the collective pinyon-juniper woodland types (0.4 million acres), followed by semi-desert shrubland land cover types (0.16 million acres) and sagebrush land cover types (0.14 million acres). These land cover types together account for over 90 percent of all BLM lands in the study area (see [Table 2-2](#) and [Table 8-1](#)).
- Of the 336 documented bird species in the study area, more than 240 are considered annual residents or visitors (see [Table 3-1](#)). One hundred and ninety-six (196) of the bird species in the study area have been observed on BLM land, and the bulk of at least 30 species in the study area are produced (i.e., the species nest and rear young) on BLM land.
- An estimated 29 species recorded in the study area are peripheral (at the edge of their range in the study area), 22 species are stenotopic, 43 are habitat obligates, 39 are cavity nesters, and 41 prefer or require old growth woodlands or forests (see [Table 3-7](#)).
- Ongoing periodic surveys are needed to determine or confirm the nesting presence on BLM lands of black swifts, burrowing owls, spotted owls, and yellow-billed cuckoos.
- Thirty-three of the habitat obligates (greater than 75 percent) are associated with the two of the most abundant land cover types (pinyon-juniper and sagebrush cover types) on BLM lands) and with riparian habitat in the study area (see [Table 3-7](#)).
- In winter, pinyon-juniper land cover types and low-elevation shrubland land cover types support the highest upland bird species richness across the study area. BLM lands are therefore relatively more species rich during winter than other lands in the study area (see [Map 4-1](#)).
- Obligate species richness mapping across the study area for summer illustrates the relative importance of BLM lands to the breeding success of obligate birds of the study area (see [Map 4-4](#)).
- BLM lands are relatively more species rich during fall and winter than during summer and spring (see [Map 4-1](#)).
- The spatial pattern of bird diversity across the study area suggests that BLM lands are relatively more bird diverse during spring and winter than during summer and fall, and that BLM lands are have significantly higher bird diversity during winter and spring than other lands in the study area (see [Map 4-3](#)).
- Examination of the PIF species assessment database revealed that 164 birds of the study area are experiencing increasing continental population trends, 47 have highly variable or uncertain trends, and 124 species are in continental decline. Regionally (in BCR 16), 31 species are experiencing increasing population trends, 165 species have highly variable or uncertain trends,

and 40 species are in decline (100 species in the study area are not considered regular breeders in BCR 16 and therefore are not regionally scored by PIF). (See [Table 6-1](#)).

- Notable species with declining population trend estimates are Gunnison sage-grouse (estimated decrease of 50 percent or more over a period of 30 years, with 100 percent of its population in BCR 16), pinyon jay (estimated continental and regional decrease of 50 percent or more over a period of 30 years, with 48 percent of its population in BCR 16), juniper titmouse (estimated continental population trend uncertain, and regional decrease of 50 percent or more over a period of 30 years, with 50 percent of its population in BCR 16), and Virginia's warbler (estimated continental and regional decrease of 15 to 49 percent over a period of 30 years, with 59 percent of its population in BCR 16). (See [Table 6-1](#)).
- Our analysis identified 66 "status species" (see [Table 7-1](#)) Status species are birds recognized by a government agency, a conservation entity, or other expert organization, which warrant priority consideration during the UFO's planning, decision-making, and land management activities in the study area, and generally include only species that have, or potentially have, a significant presence on lands managed by the UFO.
- Our analysis identified 23 "key watch species" (see [Table 7-2](#)). Key watch species are bird species perceived to be in decline or with unknown status in the study area that could reasonably be monitored on BLM lands. Key watch species may or may not be recognized by other entities as a species of conservation priority (i.e., they may not be status species in the study area).
- Our analysis identified between 2 to 15 "management focus species" for each land cover type in the study area (see [Table 7-4](#)). Management focus species are representative species for each land cover type in the study area (some would make appropriate "flagship" species) whose habitat requirements should inform the UFO's planning, decision-making, and land management activities in the study area. Management focus species may or may not be status species or key watch species (i.e., they may not be in decline), but they are often obligates of the land cover type they were chosen to represent.
- BLM has the greatest management responsibility in the study area for the pinyon-juniper woodland types, the sagebrush types, and the semi-desert shrubland types, which collectively make up more than 90 percent of BLM lands (surface ownership) in the study area, and 43 percent of all lands with BLM management potential (BLM lands and federal minerals lands) in the study area (see [Table 8-1](#)). A high proportion of the study area's obligate birds are dependent on pinyon-juniper woodland and sagebrush land cover types, implying that BLM has high management responsibility (and opportunity) for these species in the region.
- For the greatest benefit to birds, management provisions in the Uncompahgre RMP should give priority to conservation and stewardship of pinyon-juniper, sagebrush, and semi-desert shrubland habitats and their associated recommended management species, with special consideration for the needs of habitat obligates, and in areas where species richness of breeding habitat obligates is highest (see [Map 4-4](#)).
- Research is needed on the habitat characteristics and requirements in the study area of pinyon-juniper and sagebrush obligate birds, especially for those with declining population trends. BLM

is better positioned than any other public entity to have a positive effect on pinyon-juniper and sagebrush birds in the study area.