Rare Species and Riparian Vegetation of the Snake River Basin in Wyoming

Prepared for the U.S. Bureau of Reclamation

By

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Introduction

This report is a summary/assessment of the biological resources in the Snake River Basin in Wyoming. The information presented here is part of the U.S. Bureau of Reclamation's Snake River Resources Review (SR^3) and compliments similar work produced by the Idaho Conservation Data Center for biological resources in the Idaho portion of the Snake River Basin.

Report

This work should be used to inform resource managers on the status of rare plant and animal species and riparian vegetation in the Snake River watershed. All species on WYNDD's Species of Special Concern List (as well as the species on the Watch List*) present in the Snake River Basin are included. Target communities were selected based on available element occurrence records for riparian vegetation. Eighteen biologically important sites were identified and described in detail in the body of this report. These sites may be used as a guide, within the context of the Wyoming portion of the Snake River Basin, to target high priority conservation areas.

Relevant biological information is provided in the biological abstracts on the 25 target communities, 114 plant species** and 44 animal species in the watershed.

Spatial Data

The spatial data accompanying the written report are provided as ArcView shape files. The files are projected in UTM Zone 12, North American Datum 1927. Digital US Geological Survey 1:100,000 quad maps are available free from the Wyoming Geographic Information Advisory Counsel (WGIAC) at http://wgiac.state.wy.us/. Metadata files are included with each shape file, and users are strongly encouraged to consult them.

Shape files include:
Riparian vegetation element occurrence locations (riparian_veg_z12.shp)
Animal element occurrence locations (animal_eo_z12_nonsen.shp)
Plant element occurrence locations (plant_eo_z12.shp)
Animal point observations (animal_pod_z12.shp)
Biologically important site boundaries (sites_z12.shp)
Wetlands, from the WY GAP Analysis project (wetlands_gap_z12.shp)

Additionally, there is a Microsoft Excel file with locations of ***sensitive*** element occurrence records to a spatial scale of township/range (animal_eo_z12_sens.xls).

* The Watch List is defined on page 10.
** Some plant species do not have species abstracts due to a lack of available information.

Conservation Ranks

Conservation ranks are assigned to taxa based on their degree of vulnerability to extirpation at the global or state level due to inherent rarity (restricted geographic range, small population size, low population density, or specialized habitat requirements), significant loss of habitat, or sensitivity to human-caused mortality or habitat disturbances. The conservation priority of any species needs to be assessed on a case-by-case basis, taking into account threats, population trends, biological significance, and rarity. The ranks are intended to provide decision makers and the public with sufficient background information to determine which species are the highest priority for scarce conservation attention and dollars.

STATUS CODES USED IN THE REPORT

Heritage Ranks: WYNDD uses a standardized ranking system developed by The Nature Conservancy's Natural Heritage Network to assess the global and statewide conservation status of each plant and animal species, subspecies, and variety. Each taxon is ranked on a scale of 1-5, from highest conservation concern to lowest. Codes are as follows:

G Global rank: rank refers to the rangewide status of a species.

T Trinomial rank: rank refers to the rangewide status of a subspecies or variety.

S State rank: rank refers to the status of the taxon (species or subspecies) in Wyoming. State ranks differ from state to state.

1 Critically imperiled because of extreme rarity (often known from 5 or fewer extant occurrences or very few remaining individuals) or because some factor of a species' life history makes it vulnerable to extinction.

2 Imperiled because of rarity (often known from 6-20 occurrences) or because of factors demonstrably making a species vulnerable to extinction.

3 Rare or local throughout its range or found locally in a restricted range (usually known from 21-100 occurrences).

4 Apparently secure, although the species may be quite rare in parts of its range, especially at the periphery.

5 Demonstrably secure, although the species may be rare in parts of its range, especially at the periphery.

H Known only from historical records. 1950 is the cutoff for plants; 1970 is the cutoff date for animals.

X Believed to be extinct.

A Accidental or vagrant: a taxon that is not known to regularly breed in the state or which appears very infrequently (typically refers to birds and bats).

B Breeding rank: a state rank modifier indicating the status of a migratory species during the breeding season (used mostly for migratory birds and bats)

N Nonbreeding rank: a state rank modifier indicating the status of a migratory species during the non-breeding season (used mostly for migratory birds and bats)

ZN or ZB Taxa that are not of significant concern in Wyoming during breeding (ZB) or non-breeding (ZN) seasons. Such taxa often are not encountered in the same locations from year to year.

U Possibly in peril, but status uncertain; more information is needed.

Q Questions exist regarding the taxonomic validity of a species, subspecies, or variety.

? Questions exist regarding the assigned G, T, or S rank of a taxon.

Range Notes: The conservation priority of a species is strongly influenced by geographic distribution patterns. The following types can be recognized in Wyoming:

State endemic: taxon only occurs within the borders of the state.

Regional endemic: a taxon with a global range restricted to a portion of Wyoming and portions of 1-2 (plants) or 1-5 (vertebrates) adjacent states. For plants, the entire range of the taxon is usually less than the total area of the state of Wyoming.

Disjunct: Wyoming occurrences of a taxon are widely separated from the main contiguous portion of its range.

Peripheral: Wyoming occurrences of a taxon are at the edge of its contiguous range. For vertebrates, Wyoming's position relative to the taxon's main range is noted (e.g., "E periph." indicates that Wyoming is on the E periphery of the taxon's main range).

Sparse: Wide-ranging within the state but always numerically uncommon and restricted to small areas of specialized habitat (applies to plants only).

Federal Status

US Fish and Wildlife Service (USFWS): The USFWS is directed by the Endangered Species Act (ESA) to identify and protect Threatened and Endangered animal and plant species. USFWS revised its candidate system in 1996, eliminating the old categories of C2 and 3C. The following categories are now being used to rank listed and candidate species:

Endangered: defined in the ESA as a species, subspecies, or variety in danger of extinction throughout all or a significant portion of its range.

Threatened: defined in the ESA as a species, subspecies, or variety likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

E/SA: treated as endangered due to similarity of appearance with a listed species.

Proposed: taxa formally proposed for listing as Endangered or Threatened (a proposal has been published in the Federal Register, but not a final rule).

Candidate (formerly C1): taxa for which substantial biological information exists on file to support a proposal to list as Endangered or Threatened, but no proposal has yet been published in the Federal Register.

Other Federal Status: The US Forest Service (USFS) and Bureau of Land Management (BLM) have adopted policies to ensure that agency actions do not result in species being driven towards endangerment and subsequent listing as Threatened or Endangered by the USFWS. USFS Region 2 (Rocky Mountain Region) and 4 (Intermountain Region) have developed official Sensitive species lists to track organisms warranting special attention on USFS lands. Sensitive species are defined as “those plant and animal species identified by the Regional Forester for which population viability is a concern as evidenced by: (a) significant current or predicted downward trends in population numbers or density, and/or (b) significant current or predicted downward trends in habitat capability that would reduce a species’ existing distribution.” Sensitive species are usually designated for an entire region, but individual “Forest Sensitive” lists are maintained by the Bridger-Teton and Targhee National Forests.

The BLM Wyoming State Office does not currently have an official Sensitive list. The former BLM Rock Springs District (which includes the Kemmerer, Pinedale, and Rock Springs Field Offices) maintains a list of “Special Status” plant species within the district.

The following codes are used for other federal status:

- USFS R2 Sensitive: designated Sensitive in US Forest Service Region 2 (includes Bighorn, Black Hills, Medicine Bow, and Shoshone National Forests and Thunder Basin National Grassland).

- USFS R4 Sensitive: designated Sensitive in US Forest Service Region 4 (includes Ashley, Bridger-Teton, Caribou, Targhee, and Wasatch-Cache National Forests). Flaming Gorge National Recreation Area is included under Ashley NF.

State Status

Wyoming Game and Fish Department (WYGF): The WYGF has developed a matrix of habitat and population variables to determine the conservation priority of all native, breeding bird and mammal species in the state. Six classes of Species of Special Concern (SSC) are recognized, of which classes 1, 2, and 3 are considered to be high priorities for conservation attention. These classes can be defined as follows:

SSCI: Includes species with on-going significant loss of habitat and with populations that are greatly restricted or declining (extirpation appears possible).

SSC2: Species in which (1) habitat is restricted or vulnerable (but no recent or significant loss has occurred) and populations are greatly restricted or declining; or (2) species with on-going significant loss of habitat and populations that are declining or restricted in numbers and distribution (but extirpation is not imminent).

SSC3: Species in which (1) habitat is not restricted, but populations are greatly restricted or declining (extirpation appears possible); or (2) habitat is restricted or vulnerable (but no recent or significant loss has occurred) and populations are declining or restricted in numbers or distribution (but extirpation is not imminent); or (3) significant habitat loss is on-going but the species is widely distributed and population trends are thought to be stable.

Watch List: This list includes species which may be locally abundant and only moderately threatened under current management. Due to limited geographic ranges or sensitive life-history traits, however, these species could become species of concern if habitat loss or other threats increase. Although a lower priority, WYNDD continues to maintain information on these species (from Fertig and Beauvais 1999).

Riparian Vegetation Types
In The Wyoming Portion Of The Snake River Basin

INTRODUCTION

WYNDD is providing information about the riparian vegetation types whose presence in Wyoming's portion of the Snake River Basin can be documented by element occurrence records entered into the Biological and Conservation Data System (BCD). Other riparian types have been described from the basin, but we were unable to obtain information on specific occurrences of those types, and therefore are unable to provide any information beyond that available in published reports. These reports and other sources of information are reviewed below.

As additional specific information becomes available to us, we will enter more occurrence records and community descriptions into the BCD, to provide a more complete picture of the nature of riparian vegetation in the basin.

INFORMATION IN THE BCD

SOURCES

The records that we entered into the BCD came from the following sources.

1. Unpublished USDA Forest Service data.

The staff of the Bridger-Teton National Forest's Jackson Ranger District provided us with a set of plot data that they have collected as part of the ecological unit inventory of the Jackson and Blackrock Ranger Districts. That inventory will identify existing and potential vegetation types (both riparian and upland) on those districts, and eventually create spatial databases showing the distribution of each. Of the 57 occurrence records we entered, 49 came from this data set.

2. USDA Forest Service habitat type classification (Steele et al. 1983).

We obtained copies of the plot forms upon which this classification was based, and entered 4 element occurrence records from them. The habitat type classification describes forested habitat types, most of which are upland types. Of the small number of riparian plots, only 4 were located in the Snake River Basin.

3. WYNDD surveys

Surveys by WYNDD staff yielded 3 element occurrence records. We have conducted vegetation surveys in a few locations within the Snake River Basin, mostly in potential research natural areas on National Forest System lands.

4. USDA Forest Service classification of aspen communities (Youngblood and Mueggler 1981).

We had hoped that the plot data set upon which this classification was built would yield a substantial number of useful plot records, but most of this work was done in uplands and only 1 of the few riparian plots was located in the Snake River Basin.

ELEMENT OCCURRENCE RECORDS

For each of the 57 plots in the data sets, information on location, habitat, and vegetation was entered into an element occurrence record in the BCD. Some of that information was then extracted from each record and inserted into an ArcViev *.dbf, which was then converted into the accompanying ArcView shape file showing the locations of the element occurrence records.

Most of these records fall within the Jackson and Black Rock Ranger Districts on the Bridger-Teton National Forest, which include the Snake River Basin upstream from the mouth of the Hoback River. Consequently, this set of BCD records provides an incomplete picture of the distributions of the riparian vegetation types in the entire basin. We believe, though, that it indicates which riparian types are most common in the upper part of the basin. Other data sets (described below) will augment that picture if they can be incorporated into the BCD.

COMMUNITY CHARACTERIZATION ABSTRACTS

The 57 element occurrence records in the BCD represent 25 riparian vegetation types (Table V-1). For each type, we wrote a community characterization abstract that summarizes the information on the geographic distribution, habitat, and vegetation composition and dynamics of the type in Wyoming. These abstracts were written in the

community characterization abstract (state) database in BCD, and each was then exported to a Microsoft Word file. Those Word files are included in this report. Each contains the information about the vegetation type that we thought most relevant to the Snake River Basin.

Many of these vegetation types occur outside Wyoming, and for some of those, global community characterization abstracts are available on the NatureServe website, an on-line encyclopedia maintained by the Association for Biodiversity Information (*http://www.natureserve.org/*). Each vegetation type has a 10-character element code assigned to it, and the appropriate global characterization abstract can be found by searching the NatureServe encyclopedia by that element code. Only those vegetation types with element codes beginning "CEGL" have global characterization abstracts. The types with codes beginning "CTWY" have been described only from Wyoming and no global characterization abstracts are available for them.

SOURCES OF ADDITIONAL INFORMATION

We have listed here some sources of additional information on the riparian and upland vegetation of the Snake River Basin in Wyoming. Although they do not provide information of sufficient detail for us to complete element occurrence records for riparian vegetation types, they may be of use to BOR. We are exploring the possibility that data sets associated with some of them may contain sufficient information for element occurrence records in our BCD. If so, we will enter those records as opportunities arise.

USDA FOREST SERVICE ECOLOGICAL UNIT INVENTORY

As noted above, the USDA Forest Service is completing an ecological unit inventory of the Jackson and Blackrock Ranger Districts on the Bridger-Teton National Forest. The plot data set from this project, which the Forest Service staff generously shared with us, provided the bulk of the information in this report. Data from roughly a dozen additional riparian plots were incomplete, and we were unable to include them in our element occurrence record database. As the Forest Service completes more work on the inventory, we may be able to enter these (and perhaps additional) records for riparian types.

The ecological unit inventory includes all of the lands within the two districts, and the great majority of the data are from sample plots in upland vegetation. When the inventory is finished, the Forest Service staff intend to make it available on a web site in a form suitable for use by other agencies and individuals in their geographic information systems. The inventory is being directed by Jim Ozenberger of the Jackson Ranger District, and he can provide more information on the nature of the inventory and the schedule for its completion. He may be contacted at:

Bridger-Teton Nat'l Forest, P.O. Box 1689, Jackson, WY 83001
(307) 739-5431
jozenberger@fs.fed.us

This ecological unit inventory covers only the lands within the basins of the Snake River proper and the Gros Ventre River. We are unsure if similar inventories are planned for the Grey's River and Hoback River Basins and other parts of the Snake River Basin in Wyoming.

USDA FOREST SERVICE RIPARIAN COMMUNITY CLASSIFICATION

In 1985, the Forest Service published the results of a classification of riparian plant communities in eastern Idaho and western Wyoming (Youngblood et al. 1985), including the Grey's River, Salt River, and Hoback River Basins. This report describes the riparian vegetation types encountered during the project but it contains insufficient information for us to complete element occurrence records that document the location and vegetation of particular stands. The Forest Service Region 4 office in Ogden, Utah apparently has a copy of the plot data set on which this classification was based, but to date we have been unable to obtain a copy. If we are able to do so, though, we will complete BCD occurrence records and characterization abstracts for those data.

NATIONAL PARK SERVICE

Maps of general vegetation types within Grand Teton National Park and the John D. Rockefeller Parkway are available from the National Park Service in digital form. These maps were produced from satellite imagery or aerial photographs as part of a study of grizzly bear habitat. During our inquiries about these maps, we learned of no plot data sets that might yield detailed information about riparian vegetation types in the parks. The digital data layers are available from:

Dave Hammond email: dave_hammond@nps.gov
GIS Specialist phone: (307) 739-3493
Grand Teton National Park
P.O.Box 170
Moose, WY 83012

Our inquiries about vegetation data for Yellowstone National Park also turned up no information that we could use to complete BCD records for the Snake River Basin.

NATIONAL WETLANDS INVENTORY

The U.S. Fish and Wildlife Service has mapped wetlands in the Snake River Basin as part of their National Wetlands Inventory. Digital data layers produced from 7.5-minute topographic maps are available both on the National Wetlands Inventory web site (*http://wetlands.fws.gov/*) and on the web site of the University of Wyoming's Spatial Data and Visualization Center (*http://www.sdvc.uwyo.edu/24k/nwi.html*). These maps show wetland types from the classification system of Cowardin et al. (1979), which are more general than the riparian vegetation types described in WYNDD's BCD databases. They show, in considerable detail, where riparian vegetation likely grows in the Snake River Basin, and give some idea of the type of vegetation at particular locations.

WYOMING GAP ANALYSIS PROJECT

In 1995, the Wyoming Gap Analysis Project released a vegetation data layer for Wyoming, showing some 30 cover-types, including 4 riparian and wetland types. This data layer was produced from Landsat imagery at an effective scale of 1:100,000, with a minimum mapping unit of 40 hectares (ca. 100 acres) for riparian and wetland types. Although this map is not intended to show in detail the vegetation of small areas, it can be used to locate large stands of riparian forest, riparian shrubland, and riparian or wetland herbaceous vegetation in the Snake River Basin. The land cover-type layer is available from the University of Wyoming's Spatial Data and Visualization Center at *http://www.sdvc.uwyo.edu/wbn/gap.html*.

REFERENCES

Cowardin, L.M., V. Carter, F. Golet, and E. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service. FWS/OBS-79/31. 103 pp. (Available on the NWI website at *http://wetlands.fws.gov/reports.htm*)

Merrill, Evelyn H., Thomas W. Kohley, Margo E. Herdendorf, William A. Reiners, Kenneth L. Driese, Ronald W. Marrs, and Stanley H. Anderson. 1996. The Wyoming gap analysis project final report. University of Wyoming, Laramie WY. 109 pp. + appendices.

Steele, Robert, Stephen V. Cooper, David M. Ondov, David W. Roberts, and Robert D. Pfister. 1983. Forest habitat types of eastern Idaho - western Wyoming. USDA Forest Service General Technical Report INT-144. Intermountain Forest and Range Experiment Station, Ogden UT. 122 pp.

Youngblood, Andrew and Walter F. Mueggler. 1981. Aspen community types on the Bridger-Teton National Forest in western Wyoming. USDA Forest Service Research Paper INT-272. Intermountain Forest and Range Experiment Station, Ogden UT. 34 pp.

Youngblood, Andrew P., Wayne G. Padgett, and Alma H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service, Intermountain Region, R4-Ecol-85-01. 78 pp.

Table 1. Vegetation Types Represented by Community Element Occurrence Records in the Wyoming Portion of the Snake River Basin.

Forest-dominated riparian	
Picea engelmannii / Calamagrostis canadensis Forest	Populus angustifolia Woodland
Picea engelmannii / Equisetum arvense Forest	Populus tremuloides / Equisetum arvense Forest
Picea engelmannii / Galium triflorum Forest	
Picea pungens Riparian Forest	
Shrub-dominated riparian	
Alnus incana Riparian Shrubland	Salix exigua Riparian Shrubland
Artemisia cana ssp. viscidula / Festuca idahoensis Shrubland	Salix geyeriana / Mesic Forbs Shrubland
Cornus sericea / Heracleum maximum Shrubland	Salix wolfii Riparian Shrubland
Salix bebbiana Shrubland	Salix wolfii / Carex aquatilis Shrubland
Salix boothii / Calamagrostis canadensis Shrubland	Salix wolfii / Deschampsia cespitosa Shrubland
Salix boothii / Carex rostrata Shrubland	Salix wolfii / Mesic Forbs Shrubland
Salix boothii / Equisetum arvense Shrubland	Salix wolfii Riparian Shrubland
Salix boothii / Mesic Forbs Shrubland	
Salix boothii / Mesic Graminoids Shrubland	
Salix boothii / Poa pratensis Shrubland	
Grass-dominated wetland	
Carex utriculata Herbaceous Vegetation	
Grass-dominated riparian	
Heracleum maximum - Rudbeckia occidentalis Herbaceous Vegetation	Mertensia ciliata Herbaceous Vegetation

Characterization Abstract for the
Picea engelmannii / *Calamagrostis canadensis* Forest
(Engelmann Spruce / Bluejoint Reedgrass Forest)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS
The diagnostic features for this community are (1) a tree overstory dominated by *Picea engelmannii* and (2) an undergrowth dominated by *Calamagrostis canadensis*. Other species may be present in smaller amounts.

VEGETATION DESCRIPTION
This community is a closed forest with a dense undergrowth. The overstory is dominated by *Picea engelmannii*, but may include *Abies lasiocarpa*. The undergrowth is dominated by *Calamagrostis canadensis*, but scattered shrubs may be present on hummocks, including *Lonicera involucrata*, *Ribes lacustre*, and *Salix* spp. (Youngblood et al. 1985).

ENVIRONMENT
This community is found on stream terraces, the edges of ponds, and moist toeslopes (Steele et al. 1983, Youngblood et al. 1985).

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS
Stands of this association may be succeeded by *Abies lasiocarpa* forest (Youngblood et al. 1985).

DISTRIBUTION AND STATUS

GENERAL
This community is found in riparian areas along the mountain ranges of the far western part of the Wyoming (Steele et al. 1983, Youngblood et al. 1985, Padgett et al. 1989). No occurrences are known from ranges farther east, such as the Bighorn, Wind River, or Absaroka Mountains (Girard et al. 1997, Walford et al. 1997).

COUNTIES OF OCCURRENCE
This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Teton	C	Youngblood et al. 1985, Steele et al. 1983
Lincoln	C	Youngblood et al. 1985
Park	P	Steele et al. 1983

STATUS
This vegetation is a minor type in western Wyoming drainages (Youngblood et al. 1985). It could be threatened by timber harvesting or excessive recreational activity because soils are wet and easily compacted.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL000356

NATIONAL VEGETATION CLASSIFICATION FORMATION
Temporarily flooded temperate or subpolar needle-leaved evergreen forest

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Conifer / *Calamagrostis canadensis* community type	Padgett et al. 1989
Picea / *Calamagrostis canadensis* community type	Youngblood et al. 1985
Abies lasiocarpa / *Calamagrostis canadensis* habitat type	Steele et al. 1983
Picea / *Calamagrostis canadensis* community type	Hansen et al. 1995

CLASSIFICATION COMMENTS
This association has been superceded in the National Vegetation Classification by the *Picea (engelmann x glauca, engelmannii)* / *Calamagrostis canadensis* association, CEGL002676, because in much of the northern part of the range of *P. engelmannii*, the species hybridizes with *P. glauca*. We are maintaining this association in Wyoming, though, because hybrid spruces apparently are common only in the far northern part of the state, and we want to recognize stands with *P. engelmannii* instead of the hybrids.

DOCUMENTATION

REFERENCES

Girard, M., D. L. Wheeler, and S. B. Mills. 1997. Classification of riparian communities on the Bighorn National Forest. R2-RR-97-02. USDA Forest Service, Rocky Mountain Region, Lakewood CO. iv + 306 pp. + appendixes.

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Characterization Abstract for the
Picea engelmannii / *Equisetum arvense* Forest
(Engelmann's Spruce / Field Horsetail Forest)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic features for this vegetation are (1) an overstory dominated by *Picea engelmannii*, and (2) a herbaceous undergrowth in which *Equisetum arvense* or *Carex disperma* contribute as much canopy cover as does any other species.

VEGETATION DESCRIPTION

This community is a riparian forest with a dense undergrowth of predominantly herbaceous plants. The overstory is dominated by *Picea engelmannii*, and may contain *Pinus contorta* and *Abies lasiocarpa*. The understory is typically dominated by *Equisetum arvense*, but also contains a variety of associates, including *Carex aquatilis*, *Senecio triangularis*, and *Parnassia fimbriata*. Shrubs may be present in small amounts, especially *Amelanchier alnifolia*, *Rosa woodsii*, *Lonicera involucrata*, *Ribes inerme*, and *Symphoricarpos albus*, but contribute little canopy cover.

ENVIRONMENT

This community is found on saturuated soils of riparian areas bordering streams, seeps, bogs, and fens (Norton et al. 1981, Steele et al. 1983, Youngblood et al. 1985). Soils are alluvial with high organic matter content, (usually) a deep muck horizon, variable texture, and a water table near the surface (Norton et al. 1981, Steele et al. 1983, Youngblood et al. 1985). The high water table and soil organic matter lead to reducing conditions (Cooper 1975). The ground surface has a considerable amount of microrelief with well-developed hummocks (Cooper 1975).

LANDSCAPE POSITION AND ADJACENT VEGETATION

Adjacent communities include *Picea engelmannii* / *Galium trifolium* forests (CEGL000365), *Abies lasiocarpa* / *Maianthemum stellatum* forests (not in classification), and *Abies lasiocarpa* / *Vaccinium globulare* forests (CEGL000341) (Steele et al. 1983). In addition, neighboring stands may be dominated by *Pseudotsuga menziesii*, *Carex utriculata*, or *Salix exigua* (Youngblood et al. 1985).

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Stands of this association seem to be stable in vegetation structure and composition. *Populus tremuloides* / *Equisteum arvense* stands in western Wyoming may be seral to this type.Timber harvesting is difficult in this vegetation due to the wet soil conditions and potential for excessive erosion following cutting (Cooper 1975, Steele et al. 1983, Youngblood et al. 1985, Hansen et al. 1995).

DISTRIBUTION AND STATUS

GENERAL

This community is a minor cover type but is widespread across Wyoming, with occurrences known from the Wyoming and Salt River Mountains (Norton et al. 1981, Steele et al. 1983, Youngblood et al. 1985), Absaroka Mountains (Cooper 1975, Steele et al. 1983, Jones and Fertig 1999), Wind River Mountains (Steele et al. 1983, Walford et al. 1997), Bighorn Mountains (Jones and Fertig 1998), and the Sierra Madre (Jones and Fertig 1996).

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Sheridan	C	Jones and Fertig 1998
Park	C	Youngblood et al. 1983, Jones and Fertig 1999, Cooper 1975
Carbon	C	Jones and Fertig 1996

Lincoln	C	Steele et al. 1983, Youngblood et al. 1985
Teton	C	Steele et al. 1983, Youngblood et al. 1985
Fremont	C	Steele et al. 1983
Sublette	C	Steele et al. 1983

STATUS
This community is a minor type in western Wyoming (Cooper 1975, Steele et al. 1983, Youngblood et al. 1985), but is fairly widespread. Timber harvesting or excessive recreational activity could pose a threat to this community because the soils are wet and easily compacted.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S2

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL000363

NATIONAL VEGETATION CLASSIFICATION FORMATION
Seasonally flooded temperate or subpolar needle-leaved evergreen forest

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Picea pungens - Picea engelmannii / Equisetum arvense Plant Association	Johnston 1987
Picea engelmannii / Equisetum arvense Habitat Type	Steele et al. 1983
Picea engelmannii / Carex disperma Habitat Type	Steele et al. 1983
Picea / Equisetum arvense Habitat Type	Cooper 1975, Hansen et al. 1995
Engelmann spruce / field horsetail community	Jones and Fertig 1996, Jones and Fertig 1998, Jones and Fertig 1999
Conifer / *Equisetum arvense* community type	Padgett et al. 1989
Picea / Equisetum arvense community type	Norton et al. 1981

CLASSIFICATION COMMENTS
We are including the *Picea engelmannii* / *Carex disperma* association (CEGL000358) in this association because Steele et al. (1983) describe similar soils for their *P. engelmannii* / *Equisetum arvense* and *P. engelmannii* / *Carex disperma* habitat types.

DOCUMENTATION

REFERENCES

COOPER, S.V. 1975. FOREST HABITAT TYPES OF NORTHWESTERN WY AND CONTIGUOUS PORTIONS OF MONTANA & IDAHO THESIS

Hansen, Paul L., Robert D. Pfister, Keith Boggs, Bradley J. Cook, John Joy, and Dan K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous publication no. 54, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula MT. xvi + 646 p.

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Norton, B.E., J. Tuhy, and S. Jensen. 1981. Riparian community classification for the Grey's River, Wyoming. Unpublished report prepared for the U.S. Forest Service, Region IV, by the Department of Range Science, Utah State University, Logan, UT.

Padgett, Wayne G., Andrew P. Youngblood, and Alma H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. USDA Forest Service, Intermountain Region, R4-ECOL-89-01. Ogden UT. 191 pp.

Steele, Robert, Stephen V. Cooper, David M. Ondov, David W. Roberts, & Robert D. Pfister. 1983. Forest habitat types of eastern Idaho-western Wyoming. USDA Forest Service, Inter mountain Forest and Range Experiment Station, General Technical Report INT-144

Walford, Gillian, George Jones, Walt Fertig, and Kent Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Unpublished report, Shoshone National Forest, Cody WY. 227 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

EDITION: 00-08-22
AUTHOR: Stephen M. Ogle
UPDATE: 01-03-30

Characterization Abstract for the
Picea engelmannii / *Galium triflorum* Forest
(Engelmann Spruce / Sweet-scented Bedstraw Community)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic features for this vegetation are (1) a tree overstory in which *Picea engelmannii* contributes as much canopy cover as does any other species and (2) a forb-dominated undergrowth in which *Galium triflorum* contributes as much cover as does any other forb.

VEGETATION DESCRIPTION

This community is a riparian forest with a dense undergrowth dominated by forbs, along with some graminoids and shrubs. The overstory is dominated by *Picea engelmannii*. Other tree species may be found scattered throughout the canopy, including *Abies lasiocarpa*, *Pinus contorta*, and *Pseudotsuga menziesii* (Steele et al. 1983, Youngblood et al. 1985). The undergrowth contains shrubs, forbs, and graminoids, with considerable variability in composition (Steele et al. 1983). Shrubs provide little cover but are common, including *Ribes lacustre*, *Amelanchier alnifolia*, *Ribes inerme*, *Lonicera involucrata*, and *Symphoricarpos albus* (Youngblood et al. 1985). Besides *Galium triflorum*, other common forbs include *Actaea rubra*, *Maianthemum stellatum*, *Geranium richardsonii*, *Fragaria virginiana*, *Aster foliaceus*, and *Galium boreale* (Steele et al. 1983, Youngblood et al. 1985). In addition, wet sites support *Streptopus amplexifolius* and *Senecio triangularis* (Steele et al. 1983). Common graminoids are *Calamagrostis canadensis* and *Elymus glaucus*.

ENVIRONMENT

This community is found in riparian zones of mountain valleys, growing along streams or (rarely) around seeps (Steele et al. 1983, Youngblood et al. 1985). The water table tends to be high in the soil profile (Youngblood et al. 1985, Hansen et al. 1995, Walford et al. 1997). Stands may occur at any distance from a stream, within the riparian zone (Norton et al. 1981). Soils are Mollisols or well-drained Entisols (Norton et al. 1981, Youngblood et al. 1985, Hansen et al. 1995) and may have a thick organic horizon.

LANDSCAPE POSITION AND ADJACENT VEGETATION

Adjacent upland communities are typically dominated by *Abies lasiocarpa*, while the neighboring riparian communities are dominated by *Salix boothii*, *Salix wolfii*, *Alnus incana*, or *Cornus sericea* (Norton et al. 1981, Youngblood et al. 1985).

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Youngblood et al. (1985) concluded that vegetation structure and composition are stable in stands of this community.Some grazing does occur in these stands (Norton et al. 1981), but excessive use has not been reported. Steele et al. (1983) report that stands in Yellowstone and Grand Teton National Parks and in the Gros Ventre Mountains showed signs of heavy browsing by moose. Timber harvesting and recreational use may compact the wet soils.

DISTRIBUTION AND STATUS

GENERAL
This community is a major type in the Salt River Range, but only a minor type in the Absaroka, Teton, Gros Ventre, and Wind River Mountains (Steele et al. 1983). Stands are found in valley bottoms from 5,900 to 8,200 feet elevation. A similar community has been described from the Medicine Bow Mountains (Jones 1992).

COUNTIES OF OCCURRENCE
This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Lincoln	C	Steele et al. 1983, Youngblood et al. 1985, Fertig and Jones 1994 (Swift Creek)
Teton	C	Steele et al. 1983, Youngblood et al. 1985, Fertig and Jones 1994 (Gros Ventre)
Park	C	Steele et al. 1983

STATUS
This is a common type in the lower portion of the Greys River drainage (Youngblood et al. 1985) and a minor type in the Absaroka and Owl Creek Mountains (Steele et al. 1983). Timber harvesting and recreational activity may compact the wet soils that support stands of this type.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL000365

NATIONAL VEGETATION CLASSIFICATION FORMATION
Temporarily flooded temperate or subpolar needle-leaved evergreen forest

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Picea / Galium triflorum community type	Youngblood et al. 1985, Norton et al. 1981
Picea engelmannii / Galium triflorum habitat type	Steele et al. 1983
Picea-Abies lasiocarpa / Galium triflorum habitat type	Cooper 1975

CLASSIFICATION COMMENTS
A similar type to the *Picea engelmannii* / *Galium triflorum* association has been described from the Medicine Bow Mountains, but it does not contain *Galium triflorum* (Jones 1992).

DOCUMENTATION

REFERENCES

COOPER, S.V. 1975. FOREST HABITAT TYPES OF NORTHWESTERN WY AND CONTIGUOUS PORTIONS OF MONTANA & IDAHO THESIS

Fertig, W. and G. Jones. 1994. Establishment record for Swift Creek Research Natural Area within Bridger-Teton National Forest, Lincoln County, Wyoming. Unpublished report prepared for the US Forest Service, Region 4, by the Wyoming Natural Diversity Database, Laramie, Wyoming, 2 September 1994.

Jones, G. 1992. A preliminary classification of riparian vegetation types of the Medicine Bow Range and the Sierra Madre. A report prepared in fulfillment of cost-share agreement number 0206-90-01 between the Medicine Bow National Forest and The Nature Conservancy. Wyoming Natural Diversity Database (The Nature Conservancy), Laramie, WY.

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Steele, Robert, Stephen V. Cooper, David M. Ondov, David W. Roberts, & Robert D. Pfister. 1983. Forest habitat types of eastern Idaho-western Wyoming. USDA Forest Service, Inter mountain Forest and Range Experiment Station, General Technical Report INT-144

Walford, Gillian, George Jones, Walt Fertig, and Kent Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Unpublished report, Shoshone National Forest, Cody WY. 227 pp.

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EDITION: 00-08-19
AUTHOR: Stephen M. Ogle
UPDATE: 01-03-30

Characterization Abstract for the
Picea pungens Riparian Forest
(Blue Spruce Riparian Forest)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS
The diagnostic feature of this vegetation type is a tree overstory in which *Picea pungens* contributes more canopy cover than does any other tree.

VEGETATION DESCRIPTION
This is a riparian woodland or forest community with a tree overstory dominated or co-dominated by *Picea pungens*. The overstory may be dense or open, and other common trees therein are *Populus angustifolia*, *Populus balsamifera*, *Abies lasiocarpa*, and *Pinus contorta*. Some stands have dense tall shrub layers, and a variety of shrubs may be present, including *Cornus sericea*, *Alnus* sp., *Salix* spp., *Rosa* sp., *Lonicera involucrata*, and *Pentaphylloides floribunda*. Forbs dominate the herbaceous undergrowth, and common species are *Equisetum arvense*, *Geranium richardsonii*, *Maianthemum stellatum*, and *Senecio triangularis*. Graminoids generally contribute little cover. In species composition and vegetation structure, *Picea pungens* forest apparently is very similar to *Picea engelmannii* forest.

ENVIRONMENT
Picea pungens stands grow in moist or wet soils along streams.

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS
Steele et al. (1983) concluded that *Picea pungens* is seral to *Picea engelmannii* where the two species grow together.

DISTRIBUTION AND STATUS

GENERAL
Stands of *Picea pungens* are known from the Sunlight Basin in the northern Absaroka Mountains (Olson and Gerhart 1982), the Wind River Mountains (Steele et al. 1983), the Grey's River and Snake River Basins (Youngblood et al. 1985), and the Sierra Madre (Jones 1992). The elevation range for this type seems to be 6,000 to 8,500 feet.

COUNTIES OF OCCURRENCE
This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Carbon	C	Jones 1992
Lincoln	P	Youngblood et al. 1985
Park	C	Olson and Gerhart 1982
Teton	P	Youngblood et al. 1985

STATUS
It seems that stands of this type can be found in the mountain ranges throughout the western half of the state, but vegetation surveys have failed to find it in the Black Hills (Marriott and Faber-Langendoen 2000) or the Bighorn Mountains (Girard et al. 1997). It apparently is uncommon throughout its range and grows in small stands.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3?Q

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CTWY000017

NATIONAL VEGETATION CLASSIFICATION FORMATION

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Picea engelmannii Series	Steele et al. 1983
Picea Community Types	Youngblood et al. 1985
Picea pungens Series	Jones 1992
Picea pungens Series	Johnston 1987
Picea pungens – Pinus contorta – Abies concolor Type	Olson and Gerhart 1982

CLASSIFICATION COMMENTS
Picea pungens stands have been included with *P. engelmannii* stands in most vegetation classifications, and they seem to differ only in the amount of each spruce in the overstory. More complete information on these woodlands may show that *P. pungens* should continue to be treated as a component of *P. engelmannii* riparian forests.

DOCUMENTATION

REFERENCES

Girard, M., D. L. Wheeler, and S. B. Mills. 1997. Classification of riparian communities on the Bighorn National Forest. R2-RR-97-02. USDA Forest Service, Rocky Mountain Region, Lakewood CO. iv + 306 pp. + appendixes.

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Steele, Robert, Stephen V. Cooper, David M. Ondov, David W. Roberts, & Robert D. Pfister. 1983. Forest habitat types of eastern Idaho-western Wyoming. USDA Forest Service, Inter mountain Forest and Range Experiment Station, General Technical Report INT-144.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

EDITION: 01-03-14
AUTHOR: G. Jones
UPDATE: 01-03-30

Characterization Abstract for the
Populus angustifolia Riparian Woodland
(Narrowleaf Cottonwood Riparian Woodland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic feature of this type is a tree overstory with at least 10% canopy cover, in which *Populus angustifolia* contributes more canopy cover than does any other species.

VEGETATION DESCRIPTION

The structure and composition of these woodlands is highly variable, but all have a tree overstory dominated by *Populus angustifolia*. Other trees often found in the overstory are *Picea engelmannii* and *Populus balsamifera* at higher elevation (the latter in the northwestern part of the state), and *Pinus ponderosa*, *Acer negundo*, and *Populus deltoides* at lower elevations. Along meandering streams in wide valleys, *Populus angustifolia* woodlands typically consist of groves of trees, each grove composed of trees of about the same size and age, and the woodland containing a mix of seedlings patches, saplings groves, stands of young trees, and groves of old trees. On small streams in narrow valleys, in contrast, the woodlands generally do not exhibit this patchy structure (Knight 1994). A tall shrub layer (> 2 m) may be present, usually consisting of *Betula occidentalis* and various *Salix* spp. Shorter shrubs also are present in many stands, especially *Rosa* spp., *Ribes* spp., *Rhus trilobata*, *Prunus virginiana*, *Symphoricarpos* spp., and (in northwestern Wyoming) *Elaeagnus commutatus*. Hansen et al. (1995), writing about *Populus angustifolia* woodlands in Montana, attribute some of the differences in the shrub layers to browsing and grazing. In undisturbed or lightly-disturbed stands, the shrub layer is dense and composed of *Salix* spp., *Amelanchier alnifolia*, *Ribes* spp., *Cornus sericea*, and *Prunus virginiana*. With heavier disturbance, *Cornus*, *Amelanchier*, *Salix*, and some *Ribes* decrease, and the shrub layer contains mainly *Rosa* and *Symphoricarpos*. Heavy, long-term grazing and browsing removes the shrub layer altogether and leaves a tree overstory above a herbaceous undergrowth. In the undergrowth, common species are *Equisetum arvense*, *Elymus trachycaulus*, *Maianthemum stellatum*, *Galium* spp., *Poa pratensis*, and *Agrostis stolonifera*. The vine *Clematis ligusticifolia* often climbs through the shrub layers.

ENVIRONMENT

Stands of this woodland are found on stream floodplains and terraces. Soils range from sandy loams to silty clays and have a large proportion of rock fragments. In fact, the substrate may consist mainly of gravel and cobbles.

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Populus angustifolia is an early-seral species that becomes established on barren sediment bars laid down by meandering or braided streams. All of the seedlings on a bar become established within a year or two of one another, and as they grow, they form the grove of trees of nearly uniform size and age seen in many woodlands. As the channel migrates away from a stand of trees, and as floodwaters deposit sediments on the ground surface in successive years and thereby elevate it above the water table, the understory composition changes (Hansen et al. 1995). In many stands, no new cottonwoods become established after the first year or two, although on wet sites new stems may sprout from the roots, modifying the even-sized structure of the stand. Given enough time, the cottonwood woodland will be replaced by shrub vegetation or meadow as the mature trees die (Knight 1994).

DISTRIBUTION AND STATUS

GENERAL

Stands of this type are found along streams in the foothills of all Wyoming's mountain ranges, and in the higher-elevation parts of the Green River, Wind River, and North Platte River Basins. Large stands are found along those large rivers, while stands along small streams are small and often patchy. At lower elevations, *Populus angustifolia* woodland gives way to *Populus deltoides* woodland, and at upper elevations, to conifer woodlands.

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these

counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Not available		

STATUS
Populus angustifolia woodlands are widespread in the state but they are susceptible to serious impacts from flood control and from grazing.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CTWY000012

NATIONAL VEGETATION CLASSIFICATION FORMATION

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Not available	

DOCUMENTATION

REFERENCES

Hansen, Paul L., Robert D. Pfister, Keith Boggs, Bradley J. Cook, John Joy, and Dan K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous publication no. 54, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula MT. xvi + 646 p.

Knight, Dennis H. 1994. Mountains and plains: the ecology of Wyoming landscapes. Yale University Press. 338 pp.

EDITION: 01-04-02
AUTHOR: G. Jones
UPDATE: 01-04-02

Characterization Abstract for the
Populus tremuloides / *Equisetum arvense* Forest
(Quaking Aspen / Field Horsetail Forest)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS
The diagnostic features for this community are a tree overstory dominated by *Populus tremuloides* and a dense herbaceous undergrowth dominated by *Equisetum arvense* (Youngblood and Mueggler 1981).

VEGETATION DESCRIPTION
This community is a riparian forest, with an overstory dominated by *Populus tremuloides* and an understory dominated by *Equisetum arvense*. *Abies lasiocarpa* and *Pinus contorta* are possible associates in the tree canopy, while the undergrowth may contain a wide variety of forbs and graminoids (Youngblood and Mueggler 1981). According to Youngblood and Mueggler (1981), undergrowth diversity depends largely on the amount of microrelief. Presumably, this increases heterogeneity in soil conditions and allows stands to support a wider variety of species. In fact, one of the overstory trees, *Abies lasiocarpa*, is found mostly on the raised hummocks in these sites.

ENVIRONMENT
Stands of this type are found on terraces and alluvial benches, along streams and around springs (Youngblood and Mueggler 1981).

LANDSCAPE POSITION AND ADJACENT VEGETATION
Adjacent communities are dominated by *Salix* spp. or conifers (Youngblood and Mueggler 1981).

DYNAMICS AND MANAGEMENT CONSIDERATIONS

DISTRIBUTION AND STATUS

GENERAL
This type is found in the middle and upper elevations of the *Abies lasiocarpa* zone in the Wyoming Range and on the western slope of the Wind River mountains, and may also be present throughout other mountain ranges of western Wyoming and eastern Idaho (Youngblood and Mueggler 1981).

COUNTIES OF OCCURRENCE
This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Lincoln	C	Youngblood, no date
Sublette	C	Youngblood, no date

STATUS
This vegetation is a minor type in Wyoming. It may have been negatively affected by fire suppression because *Populus tremuloides* requires fire for regeneration (Barbour and Billings 2000).

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S2?

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL000584

NATIONAL VEGETATION CLASSIFICATION FORMATION
Seasonally flooded cold-deciduous forest

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Populus tremuloides / Equisetum arvense Community Type	Youngblood and Mueggler 1981

CLASSIFICATION COMMENTS

DOCUMENTATION

REFERENCES

Barbour, Michael G. and William Dwight Billings (editors). 2000. North American terrestrial vegetation. Second edition. Cambridge University Press. 708 pp.

Youngblood, A.P. No Date. Raw data to supplement the Aspen Community Type Classification for the Bridger-Teton National Forest in Western Wyoming (N81YOU01WYUS).

Youngblood, A.P. and W.F. Mueggler. 1981. Aspen community types on the Bridger-Teton NF in western Wyoming. USDA Forest Service Research Paper INT-272. Intermountain Forest and Range Experiment Station, Ogden UT. 34 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

EDITION: 00-08-22
AUTHOR: Stephen M. Ogle
UPDATE: 01-03-30

Characterization Abstract for the
Alnus incana Riparian Shrubland
(Speckled Alder Riparian Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic features of this type are (1) a tall shrub layer with at least 25% canopy cover, in which (2) *Salix boothii* and *Salix drummondiana* each contribute < 25% canopy cover and (3) *Alnus incana* contributes at least as much cover as does any other species.

VEGETATION DESCRIPTION

Stands of this type have a tall shrub layer (ca. 2 m tall) dominated or co-dominated by *Alnus incana*. Other species that may contribute substantial cover are *Betula occidentalis*, *Cornus sericea*, and *Salix* spp. A shorter shrub layer of *Rosa* sp. and *Ribes* sp. may be present. Common species in the herbaceous undergrowth include *Equisetum arvense*, *Calamagrostis canadensis*, *Carex utriculata*, *Glyceria* sp., *Eleocharis* sp., *Juncus balticus*, *Maianthemum stellatum*, and *Mentha arvensis*.

ENVIRONMENT

Stands of this type are found on sediment bars and floodplains, generally along fast-flowing streams. The alluvial soils are coarse-textured with a high proportion of rock fragments, and are well-oxygenated even when the water table is high, due to the rapid lateral flow of groundwater.

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Young stands are flooded frequently, but they trap sediment as the vegetation becomes thicker, thereby raising the soil surface above the stream and decreasing the frequency of flooding and allowing development of a denser undergrowth (Hansen et al. 1995). Hansen et al. (1995) consider this a long-lived seral type that may be replaced by willow vegetation.

DISTRIBUTION AND STATUS

GENERAL

This seems to be a widespread type, having been described from the Wyoming Range and Teton Mountains (Youngblood et al. 1985), the eastern Absaroka Mountains (Fertig and Jones 1992, Walford et al. 1997, Jones and Fertig 1996 [both references]), the Medicine Bow Mountains (Jones 1992, Jankovsky-Jones et al. 1995 [both references], Jones and Fertig 1996 [Cedar Pass]), and the Sierra Madre (Jones 1992, Jones and Fertig 1996 [Deep Creek]). Stands are found in the foothills of mountains and in the montane zone, usually forming a fringe along fast-moving streams.

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Albany	C	Jankovsky-Jones et al. 1995 (Threemile), Jankovsky-Jones et al. 1996
Carbon	C	Jones 1992, Jankovsky-Jones et al. 1995 (Platte Ridge), Jones and Fertig 1996 (Cedar Pass, Deep Creek)
Lincoln	C	Youngblood et al. 1985
Park	C	Fertig and Jones 1992, Walford et al. 1997, Jones and Fertig 1999 (Grizzly Creek, Sheep Mesa)
Teton	C	Youngblood et al. 1985

STATUS
This shrub type is restricted to riparian zones, mostly in the foothills and the montane zone, and it usually forms small stands. It is, however, widespread in the state.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3S4

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CTWY000023

NATIONAL VEGETATION CLASSIFICATION FORMATION

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Alnus incana Community Type	Hansen et al. 1995

CLASSIFICATION COMMENTS

DOCUMENTATION

REFERENCES

Fertig, W. and G. Jones. 1992. Plant communities and rare plants of the Swamp Lake Botanical Area, Clarks Fork Ranger District, Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database.

Hansen, Paul L., Robert D. Pfister, Keith Boggs, Bradley J. Cook, John Joy, and Dan K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous publication no. 54, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula MT. xvi + 646 p.

Jankovsky-Jones, M, G. Jones, and W. Fertig. 1995. Ecological evaluation for the potential Platte Ridge and North Platte River Canyon Research Natural Area within the Medicine Bow National Forest, Carbon County, Wyoming. Unpublished report prepared by the Wyoming Natural Diversity Database, Laramie, WY. 85 pp.

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Jones, G.P. and W. Fertig. 1996. Ecological evaluation of the potential Cedar Pass Research Natural Area within the Medicine Bow National Forest, Carbon County, Wyoming. Unpublished report prepared for the Medicine Bow National Forest by George P. Jones and Walter Fertig, Wyoming Natural Diversity Database, The Nature Conservancy, Laramie, Wyoming. 42 pp.

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Walford, Gillian, George Jones, Walt Fertig, and Kent Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Unpublished report, Shoshone National Forest, Cody WY. 227 pp.

EDITION: 01-03-31
AUTHOR: G. Jones
UPDATE: 01-04-02

Characterization Abstract for the
Artemisia cana ssp. *viscidula* Shrubland
(Mountain Silver Sagebrush Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS
The diagnostic features of this type are a short-shrub layer in which (1) *Salix* spp. contribute < 25% of the canopy cover and (2) *Artemisia cana* ssp. *viscidula* contributes as much cover as does any other species, and (3) a herbaceous undergrowth in which a variety of native graminoids contribute more cover than do forbs or exotic graminoids.

VEGETATION DESCRIPTION
Artemisia cana ssp. *viscidula* dominates the shrub layer or co-dominate with *Pentaphylloides floribunda*. *Artemisia tridentata* ssp. *vaseyana* is present in drier stands. The herbaceous undergrowth contains an assortment of species, the most common of which are *Festuca idahoensis*, *Carex microptera*, *Elymus trachycaulus*, and *Juncus balticus* among the graminoids, and *Achillea millefolium*, *Helenium hoopesii*, *Geum triflorum*, *Fragaria virginiana*, *Potentilla gracilis*, and *Valeriana occidentalis* among the forbs. Forbs may contribute as much cover as do the graminoids. Grazing seems to increase the cover of forbs and decrease that of the native graminoids, and heavy grazing may shift the undergrowth to strong dominance by forbs and *Poa pratensis* (Youngblood et al. 1985).

ENVIRONMENT
Stands of this type are found on gently sloping alluvial benches and toeslopes, sometimes around seeps. Soils usually have developed in alluvium, usually have a thick mollic epipedon, and are moist, but not wet, much of the year. The water table may be high, though, during parts of the year. This vegetation occupies the driest parts of the riparian zone and often grades into upland *Artemisia tridentata* ssp. *vaseyana* vegetation.

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS
Youngblood et al. (1985) concluded that stands of this type are stable in composition and structure in the absence of heavy grazing, which shifts the undergrowth to dominance by *Poa pratensis* and forbs.

DISTRIBUTION AND STATUS

GENERAL
This is a common type in the mountains of far western Wyoming, where it occurs in valley bottoms and on valley sides up to ca. 8,400 feet elevation.

COUNTIES OF OCCURRENCE
This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Lincoln	C	Youngblood et al. 1985
Sublette	C	Mutz and Graham 1982, Youngblood et al. 1985
Teton	C	Bramble-Brodahl 1978

STATUS
Stands of this type are common in the far western part of the state. They are susceptible to heavy grazing because soils are dry much of the season and grazing animals have easy access.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001075

NATIONAL VEGETATION CLASSIFICATION FORMATION
Microphyllous evergreen shrubland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Artemisia cana / Festuca idahoensis Community Type	Youngblood et al. 1985
Artemisia cana / Festuca idahoensis Community Type	Mutz and Graham 1982
Artemisia cana ssp. *viscidula / Festuca idahoensis* Habitat Type	Bramble-Brodahl 1978

CLASSIFICATION COMMENTS
In Utah, Padgett et al. (1989) distinguish this vegetation from *A. cana* ssp. *viscidula* / *Deschampsia cespitosa* vegetation, which grows on wetter sites. It's unclear if that split should also be made in Wyoming.

DOCUMENTATION

REFERENCES

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EDITION: 01-04-01
AUTHOR: G. Jones
UPDATE: 01-04-01

Characterization Abstract for the
Cornus sericea / *Heracleum sphondylium* Shrubland
(Red-osier Dogwood / Cow Parsnip Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

Identifying characteristics of this association are: (1) a shrub layer in which *Cornus sericea* contributes at least as much cover as does any other species; (2) absence of a taller shrub or low tree layer above the *C. sericea* layer (*Alnus incana* and *Betula occidentalis* may be present, but they contribute <10% canopy cover; tall trees may also be present, as scattered individuals or clumps, but they, too, contribute <10% canopy cover); (3) presence of *Heracleum sphondylium* or *Galium triflorum* in the herbaceous undergrowth.

VEGETATION DESCRIPTION

Cornus sericea dominates a dense tall shrub layer, which often includes *Salix boothii*, *S. exigua*, *S lutea*, and *S. drummondiana*. Other shrubs often present in the stand, usually in a lower shrub layer, are *Ribes* spp. and *Rosa woodsii. Taller shrubs (or low trees), especially Alnus incana*, *Betula occidentalis*, and *Crataegus douglasii*, may grow above the *Cornus* stratum, but they are scattered and contribute little canopy cover. The herbaceous undergrowth is variable in density and composition: stands near the channel (that flood nearly every year) have sparse herbaceous undergrowths, while stands higher above the channel (that escape annual flooding) have more canopy cover of herbaceous species. *Heracleum sphondylium* or *Galium triflorum* (or both) are present, and other common species include *Mertensia ciliata*, *Maianthemum stellatum*, *Urtica dioica*, *Elymus glaucus*, Actaea rubra, and *Poa pratensis*.

ENVIRONMENT

Stands of this association occur on alluvial terraces along high-gradient streams and on lower parts of the adjacent valley sides, generally below 6600 feet elevation. Soils contain a large volume of coarse fragments and have a high water table; they classifiy to Cryofluvent and Cryoboroll Great Groups.

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS

The community is a relatively stable, early successional type that colonizes stream bars and terraces (Padgett et al. 1989). Stands near the stream channel are flooded frequently and consequently have poorly-developed soils and sparse herbaceous undergrowths, but stands on terraces and slopes higher above the channel may escape annual flooding and so have soils with mollic epipedons and denser herbaceous undergrowths. Youngblood et al. (1985) tentatively suggest that the *Cornus sericea* stands are seral to the *Picea* spp. / *Cornus sericea* stands. Dense shrubs and an accumulation of organic matter on the soil surface may prevent seedling establishment, but conifer seedlings may become established in sediments deposited by floods (Williams 1995).*Cornus sericea* stabilizes stream banks effectively. The shurb is palatable to wildlife (especially moose) and livestock, and may be heavily browsed (although the dense shrub layer may inhibit use by large animals). Small mammals and birds use the dense shrub stands for hiding and nesting (Hansen et al. 1995).

DISTRIBUTION AND STATUS

GENERAL
This community has been documented from the lower elevations in the mountains of far western Wyoming (Youngblood et al. 1985, Norton et al. 1981), and from the western slope of the Bighorn Mountains (Marriott and Jones 1989). It may occur in other mountain ranges in the state as well.

COUNTIES OF OCCURRENCE
This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Lincoln	C	Youngblood et al. 1985
Teton	P	Youngblood et al. 1985
Washakie	C	Marriott and Jones (1989)

STATUS
The occurrence of this association in the mountains of western Wyoming (Youngblood et al. 1985) and in the Bighorn Mountains (Marriott and Jones 1989) shows that it is widespread. The habitat in which it is found, riparian areas along steep streams in the lower mountains, is common, suggesting that it could be a relatively common vegetation type. The condition of most Wyoming stands is unknown.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001167

NATIONAL VEGETATION CLASSIFICATION FORMATION
Temporarily flooded cold-deciduous shrubland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Cornus stolonifera / Heracleum lanatum Community Type	Youngblood et al. (1985)
Cornus sericea / Heracleum lanatum Community Type	Padgett et al. (1989)
Cornus stolonifera / Galium triflorum Community Type	Norton et al. (1981)
Swida sericea / Heracleum sphondylium Plant Association	Johnston (1987)
Cornus sericea Community Type	Hansen et al. 1995

CLASSIFICATION COMMENTS
In Wyoming, this association is interpreted to include the *Cornus stolonifera* / *Heracleum lanatum* community type and the *C. stolonifera* / *Galium triflorum* community type described by Youngblood et al. (1985) from western Wyoming. Those two types are so similar in vegetation and environment that distinguishing between them is difficult and impractical. Our treatment follows those of Padgett et al. (1989) in Utah, Kittel et al. (1998) in Colorado, and (apparently) Norton et al. (1981) in western Wyoming.

DOCUMENTATION

REFERENCES

Hansen, Paul L., Robert D. Pfister, Keith Boggs, Bradley J. Cook, John Joy, and Dan K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous publication no. 54, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula MT. xvi + 646 p.

Kittel, G., E. VanWie, and M. Damm. Cornus sericea plant association. Characterization abstract. In: Osborn, R., G. Kittel, and M. Reid. 1998. Colorado Riparian Plant Associations and Western States Vegetation Classification. CDROM. U.S. Geological Survey, Mid-Continent Ecology Research Center, Fort Collins, CO.

Marriott, H. and G.P. Jones. 1989. Special status plant surveys and plant community surveys in the Trapper Creek and Medicine Lodge Wilderness Study Areas and the Spanish Point Karst ACEC. Prepared for the Worland District Office of the Bureau of Land Management by the Wyoming Natural Diversity Database.

Norton, B.E., J. Tuhy, and S. Jensen. 1981. Riparian community classification for the Grey's River, Wyoming. Unpublished report prepared for the U.S. Forest Service, Region IV, by the Department of Range Science, Utah State University, Logan, UT.

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EDITION: 98-11-30
AUTHOR: LAURA WELP
UPDATE: 01-04-02

Characterization Abstract for the
Salix bebbiana Riparian Shrubland
(Bebb Willow Riparian Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic features of this type are (1) a tall shrub layer (> 2m) in which *Cornus sericea*, *Alnus* sp., and *Betula occidentalis* each contribute less than 25% canopy cover, and (2) *Salix bebbiana* contributes more cover than does any other species.

VEGETATION DESCRIPTION

Salix bebbiana is the most common species in a tall shrub layer that often consists of scattered shrubs or groups of shrubs. This layer often contains *Betula occidentalis*, *Cornus sericea*, *Salix exigua*, and other willows as well. A shorter shrub layer of *Symphoricarpos* sp. and *Pentaphylloides floribunda* may be present. The composition of the herbaceous undergrowth depends on soil moisture, with *Carex nebrascensis*, *Carex aquatilis*, *Carex utriculata* (syn. *C. rostratat*), and *Calamagrostis canadensis* being common on wet sites, while *Poa pratensis*, *Agrostis stolonifera*, *Solidago* sp., and *Rudbeckia laciniata* are common on drier sites.

ENVIRONMENT

Stands of *Salix bebbiana* are found on floodplains and terraces along low- to moderate-gradient streams, and around springs. Marriott et al. (2000) report that it is not found on sediment bars that are regularly flooded. Soils along streams are fine- to medium-textured, developed in alluvium, and moist throughout the growing season.

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Hansen et al. (1995), writing about *Salix bebbiana* vegetation in Montana, described it as a grazing disclimax that replaces shrub stands dominated by *Salix lutea*, *Salix geyeriana*, or *Salix drummondiana*. Girard et al. (1997) and Marriott et al. (2000), though, concluded that this is not necessarily the case in the Bighorn Mountains and the Black Hills, respectively. Marriott et al. (2000) suggest that *Salix bebbiana* may replace *Salix exigua* as the dominant shrub on sediment bars when flood-deposited sediments raise the soil surface, and that *Salix bebbiana* stands may be replaced by meadow vegetation as the willows die.

DISTRIBUTION AND STATUS

GENERAL

Stands of this type have been documented from lower elevations in the Bighorn Mountains (Girard et al. 1997) and from the higher elevations in the Black Hills (Marriott et al. 2000). It may also be present in other areas of the state, in the higher basins and the foothills of mountains. *Salix bebbiana* is uncommon in the mountains, so this vegetation type has not been documented in studies on the other national forests.

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Crook	P	Marriott et al. 2000
Johnson	C	Girard et al. 1997
Weston	P	Marriott et al. 1997

STATUS

This seems to be an uncommon or even rare type, having been described only from the Black Hills (Marriott et al. 2000) and the lower elevations on the eastern side of the Bighorn Mountains (Girard et al. 1997). It has not been

encountered during field work for classification projects in the Bighorn Basin (Walford 1996), eastern Wyoming (Jones and Walford 1995), eastern and southern Absaroka Mountains and northern Wind Rivers (Walford et al. 1997), Medicine Bow Mountains and Sierra Madre (Jones 1992), and far western Wyoming (Youngblood et al. 1985), suggesting that it is rare in those areas.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3?

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001173

NATIONAL VEGETATION CLASSIFICATION FORMATION
Temporarily flooded cold-deciduous shrubland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix bebbiana Shrubland	Marriott et al. 2000
Salix bebbiana / Wet *Carex* Ecological Type	Girard et al. 1997
Salix bebbiana / *Poa pratensis* Community Type	Girard et al. 1997

CLASSIFICATION COMMENTS

DOCUMENTATION

REFERENCES

Girard, M., D. L. Wheeler, and S. B. Mills. 1997. Classification of riparian communities on the Bighorn National Forest. R2-RR-97-02. USDA Forest Service, Rocky Mountain Region, Lakewood CO. iv + 306 pp. + appendixes.

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Walford, Gillian M. 1996. Statewide classification of riparian and wetland dominance types and plant communities - Bighorn Basin segment. A report submitted to the Wyoming Department of Environmental Quality, Water Quality Division. Cooperative Agreement #WET04, Grant #CD998066-01-0. Wyoming Natural Diversity Database, Laramie WY. 185 pp.

Walford, Gillian, George Jones, Walt Fertig, and Kent Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Unpublished report, Shoshone National Forest, Cody WY. 227 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

EDITION: 01-03-31
AUTHOR: G. Jones
UPDATE: 01-04-02

Characterization Abstract for the
Salix boothii / *Calamagrostis canadensis* Shrubland
(Booth Willow / Bluejoint Reedgrass Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS
Diagnostic features for this vegetation are (1) a tall shrub layer with at least 25% canopy cover of *Salix boothii* or *Salix drummondiana*, and (2) a herbaceous layer dominated by *Calamagrostis canadensis* (Youngblood et al. 1985).

VEGETATION DESCRIPTION
This community is a tall riparian shrubland, with a closed canopy and dense understory. The overstory usually is dominated by *Salix boothii* or less often *Salix drummondiana*. Both shrubs are often present . The undergrowth is dominated by *Calamagrostis canadensis*. Stands have a distinct low-growing shrub component in the understory that includes *Lonicera involucrata*, *Ribes lacustre*, and *Salix wolfii*. Other common associates are graminoids and forbs, such as *Carex utriculata*, *Geum macrophyllum*, *Maianthemum stellatum*, and *Equisetum arvense* (Youngblood et al. 1985).

ENVIRONMENT
This vegetation type grows on benches or gentle slopes along streams. Soils have a fine-loamy to clayey texture, and water tables are high, flunctuating between 15 cm and 1 m below the surface. The ground surface shows distinctive microtopographical patterns (Youngblood et al. 1985).

LANDSCAPE POSITION AND ADJACENT VEGETATION
Adjacent communities typically have overstories dominated by *Salix boothii* or *Salix geyeriana*. Notably, surrounding communities often have *Carex urticulata* in the understory (Youngblood et al. 1985).

DYNAMICS AND MANAGEMENT CONSIDERATIONS
Based on soil characteristics, Youngblood et al. (1985) assumed that stands of this vegetation are stable in the absence of disturbance. Padgett et al. (1989), working in nearby Utah, concluded that deposition of substantial amounts of sediment would raise and thereby effectively dry the soil surface, and convert stands of this association to the slightly drier *S. boothii* / Mesic Graminoid Association. If the new sediment was thin enough, then *Calamagrostis canadensis* would again dominate the undergrowth.

DISTRIBUTION AND STATUS

GENERAL
This community has been described from the Greys River drainage (Youngblood et al. 1985), and has also been found in adjacent eastern Idaho (Youngblood et al. 1985) and northeastern Utah (Padgett et al. 1989).

COUNTIES OF OCCURRENCE
This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Teton	C	Youngblood et al. 1985
Lincoln	C	Youngblood et al. 1985
Park	C	Walford et al. 1997

STATUS
This is a minor type in Wyoming (Youngblood et al. 1985), which suggest a conservation concern based on rarity. However, no threats to this community have been described or suggested in the literature.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S2?

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001175

NATIONAL VEGETATION CLASSIFICATION FORMATION
Seasonally flooded cold-deciduous shrubland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix boothii - Salix spp. / *Calamagrostis canadensis* association	Johnston 1987
Salix drummondiana / Calamagrostis canadensis habitat type	Hansen et al. 1995
Salix boothii / Calamagrostis canadensis Community Type	Youngblood et al. 1985
Salix boothii / Calamagrostis canadensis Community Type	Padgett et al. 1989
Salix geyeriana / Calamagrostis canadensis Community Type	Walford et al. 1997

CLASSIFICATION COMMENTS
This vegetation type has been distinguished from a *S. boothii* / *Carex utriculata* type in western Wyoming and eastern Idaho by Youngblood et al. (1985) and in Utah by Padgett et al. (1989), but from their descriptions of these types it's unclear if the two represent different habitats; they seem to differ just in the amounts of *Calamagrostis canadensis* and *Carex utriculata* present. Hansen et al. (1995) suggest that, in Montana, *Carex utriculata* dominates the undergrowth on slightly wetter sites than does *Calamagrostis canadensis*, but this difference is difficult to infer from Youngblood's et al. (1985) summaries. Consequently, this *S. boothii* / *Calamagrostis canadensis* association and the *S. boothii* / *Carex utriculata* association may be better considered part of a broader *S. boothii* / Wet Graminoid association. Stands dominated by *Salix geyeriana* but with 25% canopy cover of *S. boothii* will be placed in this association even though they have previously been considered *S. geyeriana* / *Calamagrostis canadensis* stands.

DOCUMENTATION

REFERENCES

Hansen, Paul L., Robert D. Pfister, Keith Boggs, Bradley J. Cook, John Joy, and Dan K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous publication no. 54, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula MT. xvi + 646 p.

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Padgett, Wayne G., Andrew P. Youngblood, and Alma H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. USDA Forest Service, Intermountain Region, R4-ECOL-89-01. Ogden UT. 191 pp.

Walford, Gillian, George Jones, Walt Fertig, and Kent Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Unpublished report, Shoshone National Forest, Cody WY. 227 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

EDITION: 00-08-24
AUTHOR: Stephen M. Ogle
UPDATE: 01-03-30

Characterization Abstract for the
Salix boothii / *Carex rostrata (syn. utriculata*) Shrubland
(Booth Willow / Beaked Sedge Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

Diagnostic features for this association are (1) a tall shrub layer with at least 25% canopy cover of *Salix boothii* or *Salix drummondiana*, and (2) a herbaceous layer dominated by *Carex utriculata* or *Carex aquatilis*. Trees may be present but contribute < 10% canopy cover.

VEGETATION DESCRIPTION

This community is a tall riparian shrubland, with an open or closed canopy. *Salix boothii* or *Salix drummondiana* usually dominate the tall shrub layer (the latter in far western drainages, such as the Greys River). Both shrubs are often present in the overstory (Norton et al. 1981, Youngblood et al. 1985, Walford et al. 1997). A short shrub or dwarf-shrub layer may be present, composed of some combination *Salix wolfii*, *Lonicera involucrata*, *Ribes* spp., *Pentaphylloides floribunda*, *Betula glandulosa*, and (in the Bighorn Mountains) *Salix planifolia*. In some stands, a few scattered trees may be visible above the shrub canopy, particularly *Picea engelmannii* or *Abies lasiocarpa* (Youngblood et al. 1985). The undergrowth is dominated by *Carex utriculata* or *Carex aquatilis*, but, as with the overstory, it appears the latter species only dominates in far western drainages (Youngblood et al. 1985, Walford et al. 1997). Likely associated graminoids include *Calamagrostis canadensis*, *Carex microptera*, *Carex disperma*, *Carex limosa*, and *Juncus balticus*. Forbs contribute less cover than do graminoids, but *Equisetum arvense*, *Maianthemum stellatum*, *Geum macrophyllum*, *Aster foliaceus*, *Epilobium angustifolium*, *Castilleja miniata*, *Fragaria virginiana*, and and *Galium trifidum* may be present.

ENVIRONMENT

Stands are found adjacent to streams, around seeps, and on toeslopes (Youngblood et al. 1985, Walford et al. 1997). Soils have a coarse loamy, fine loamy, or loamy skeletal texture, and water tables are high, flunctuating between the top of the profile down to a meter (Norton et al. 1981, Youngblood et al. 1985, Walford et al. 1997). Surfaces have considerable mictopographical relief, with well-developed hummocks (Walford et al. 1997). These are the wettest sites occupied by *S. boothii* vegetation.

LANDSCAPE POSITION AND ADJACENT VEGETATION

Adjacent communities may have a similar overstory or understory as this vegetation (Youngblood et al. 1985). Neighboring communities in the Greys River drainage include *Carex utriculata* herbaceous vegetation (CEGL001803?), *Salix wolfii* / *Carex utriculata* shrublands (CEGL001237), and *Salix boothii* / *Mitella pentandra* shrublands (CEGL001182) (Norton et al. 1981), while neighboring types in the Shoshone National Forest include *Salix wolfii* / *Carex aquatilis* shrublands (CEGL001234) and an unclassified type with mixed canopies dominated by *Salix geyeriana* and *Salix boothii*.

DYNAMICS AND MANAGEMENT CONSIDERATIONS

This vegetation forms in riparian zones under different conditions. Some stands may result from siltation in old beaver ponds, allowing *Salix boothii* and associated species to establish as water levels decline (Youngblood et al. 1985). In other cases, beavers may flood *Salix boothii* stands as they build dams, and *Salix urticulata* becomes the dominant undergrowth species in the wetter conditions (Padgett et al. 1989, Walford et al. 1997). Padgett et al. (1989), working in Utah, concluded that deposition of substantial amounts of sediment would raise and thereby effectively dry the soil surface, and convert stands of this association to the drier *S. boothii* / Mesic Graminoid Association. If the new sediment was thin enough, then *Carex rostrata* would again dominate the undergrowth.Livestock are known to pass through these stands (Walford et al. 1997), but foraging is probably negligible (Padgett et al. 1989).

DISTRIBUTION AND STATUS

GENERAL

This community is known to occur in the Greys River drainage (Youngblood et al. 1985, Norton et al. 1981), western Teton County (Youngblood et al. 1985), the northern Wind River Mountains and southern Absaroka Mountains (Walford et al. 1997), and the Bighorn Mountains (Girard et al. 1997).

COUNTIES OF OCCURRENCE
This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Lincoln	C	Youngblood et al. 1985
Teton	C	Youngblood et al. 1985
Sheridan	C	Girard et al. 1997
Big Horn	P	Girard et al. 1997
Washakie	C	Girard et al. 1997
Fremont	C	Walford et al. 1997

STATUS
This vegetation is considered a major type in western Wyoming (Youngblood et al. 1985), and no conservation threats are reported in the literature.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001178

NATIONAL VEGETATION CLASSIFICATION FORMATION
Temporarily flooded cold-deciduous shrubland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix boothii – Salix spp. / *Carex urticulata* association	Johnston 1987
Salix drummondiana / Carex rostrata habitat type	Hansen et al. 1995
Salix boothii / Carex rostrata community type	Padgett et al. 1989
Salix boothii / Carex rostrata community type	Youngblood et al. 1985
Salix boothii / Wet *Carex* Ecological Type	Girard et al. 1997
Salix boothii – Salx wolfii / Wet *Carex* Ecological Type	Girard et al. 1997
Salix boothii – Salix planifolia / Wet *Carex* Ecological Type	Girard et al. 1997
Salix boothii / Carex rostrata Community Type	Walford et al. 1997
Salix boothii / Carex rostrata Community Type	Norton et al. (1981)

CLASSIFICATION COMMENTS
This vegetation type has been distinguished from a *S. boothii* / *Calamagrostis canadensis* type in western Wyoming and eastern Idaho by Youngblood et al. (1985) and in Utah by Padgett et al. (1989), but from their descriptions of these types it's unclear if the two represent different habitats; they seem to differ just in the amounts of *Carex utriculata* and *Calamagrostis canadensis* present. Hansen et al. (1995) suggest that, in Montana, *Carex utriculata* dominates the undergrowth on slightly wetter sites than does *Calamagrostis canadensis*, but this difference is difficult to infer from

Youngblood's et al. (1985) summaries. Consequently, this *S. boothii* / *Carex utriculata* association and the *S. boothii* / *Calamagrostis candensis* association may be better considered part of a broader *S. boothii* / Wet Graminoid association.

DOCUMENTATION

REFERENCES

Girard, M., D. L. Wheeler, and S. B. Mills. 1997. Classification of riparian communities on the Bighorn National Forest. R2-RR-97-02. USDA Forest Service, Rocky Mountain Region, Lakewood CO. iv + 306 pp. + appendixes.

Hansen, Paul L., Robert D. Pfister, Keith Boggs, Bradley J. Cook, John Joy, and Dan K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous publication no. 54, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula MT. xvi + 646 p.

Johnston, Barry C. 1987. Plant associations of Region Two. Potential plant communities of Wyoming, South Dakota, Nebr aska, Colorado, and Kansas. Edition 4. USDA Forest Service , Rocky Mt. Region, R2-ECOL-87-2.

Norton, B.E., J. Tuhy, and S. Jensen. 1981. Riparian community classification for the Grey's River, Wyoming. Unpublished report prepared for the U.S. Forest Service, Region IV, by the Department of Range Science, Utah State University, Logan, UT.

Padgett, Wayne G., Andrew P. Youngblood, and Alma H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. USDA Forest Service, Intermountain Region, R4-ECOL-89-01. Ogden UT. 191 pp.

Walford, Gillian, George Jones, Walt Fertig, and Kent Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Unpublished report, Shoshone National Forest, Cody WY. 227 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT.

EDITION: 00-08-25
AUTHOR: Stephen M. Ogle
UPDATE: 01-03-30

Characterization Abstract for the
Salix boothii / *Equisetum arvense* Shrubland
(Booth Willow / Field Horsetail Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

Diagnostic features for this association are (1) a tall shrub layer with at least 25% canopy cover, of *Salix boothii* or *Salix drummondiana*, and (2) an undergrowth in which *Equisetum arvense* or *Saxifraga odontoloma* contribute more canopy cover than do dwarf-shrubs. Trees may be present but contribute < 10% canopy cover.

VEGETATION DESCRIPTION

This community is a tall riparian shrubland with a dense canopy. The overstory is dominated by *Salix boothii* or *Salix drummondiana*, and, regardless of dominance, both shrubs are often present. A low shrub component is common, with such species as *Ribes inerme*, *Ribes lacustre*, and *Lonicera involucrata*. *Equisetum arvense* and *Saxifraga odontoloma* contribute the highest cover in the undergrowth, and several other species are often present, such as *Carex microptera*, *Geranium richardsonii*, *Geum macrophyllum*, *Carex utriculata*, *Poa palustris*, *Poa pratensis*, *Fragaria virginiana*, *Galium triflorum*, *Geranium richardsonii*, *Geum macrophyllum*, and *Polemonium occidentale*. Trees are rare, although an occasional *Picea engelmannii* or *Abies lasiocarpa* may be found in the vegetation (Youngblood et al. 1985).

ENVIRONMENT

This vegetation is found along streams in narrow valleys and around seeps on steep toeslopes. Soils have a sandy-skeletal to clayey texture. Depth to water table seems to have no clear influence on the distribution or composition of this type, presumably because the water table fluctuates widely over the growing season (Youngblood et al. 1985).

LANDSCAPE POSITION AND ADJACENT VEGETATION

Adjacent communities include *Salix boothii* / *Mesic Forbs* shrublands (CEGL001180), *Salix wolfii* / Mesic Forbs shrublands (CEGL001240), and *Mertensia ciliata* herbaceous vegetation (CEGL001944) (Youngblood et al. 1985).

DYNAMICS AND MANAGEMENT CONSIDERATIONS

DISTRIBUTION AND STATUS

GENERAL

This community is known from the Greys River drainage and eastern Teton County (Youngblood et al. 1985). Descriptions of this type as it occurs in eastern Idaho (Youngblood et al. 1985) and Utah (Padgett et al. 1989) are relevant to Wyoming.

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Lincoln	C	Youngblood et al. 1985
Teton	C	Youngblood et al. 1985

STATUS
This type is common in western Wyoming, particularly in the Greys River drainage (Youngblood et al. 1985), and no threats have been identified in the literature for this community.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S2

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL002671

NATIONAL VEGETATION CLASSIFICATION FORMATION
Seasonally flooded cold-deciduous shrubland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix boothii / Mitella pentandra Community Type	Norton et al. 1981
Salix boothii / Equisetum arvense Community Type	Youngblood et al. 1985

CLASSIFICATION COMMENTS
This association may include stands that have heretofore been considered *Salix boothii* / *Mitella pentandra* shrublands (CEGL001187) because the two are very similar in species composition, including the dominance or sub-dominance by *Saxifraga odontoloma* in the undergrowth.

DOCUMENTATION

REFERENCES

Norton, B.E., J. Tuhy, and S. Jensen. 1981. Riparian community classification for the Grey's River, Wyoming. Unpublished report prepared for the U.S. Forest Service, Region IV, by the Department of Range Science, Utah State University, Logan, UT.

Padgett, Wayne G., Andrew P. Youngblood, and Alma H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. USDA Forest Service, Intermountain Region, R4-ECOL-89-01. Ogden UT. 191 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

EDITION: 01-03-09
AUTHOR: G. Jones
UPDATE: 01-03-30

Characterization Abstract for the
Salix boothii / Mesic Forbs Shrubland
(Booth Willow / Mesic Forbs Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic features for this community are (1) a tall shrub layer with at least 25% canopy cover of *Salix boothii* or *Salix drummondiana*, (2) an understory dominated by forbs, and (3) the absence of a tree overstory with 10% or more canopy cover.

VEGETATION DESCRIPTION

This vegetation is a tall riparian shrubland with an undergrowth of short shrubs and forbs. *Salix boothii* is the most common dominant of the shrub overstory, but *Salix drummondiana* may also dominate in western drainages, such as the Greys River (Youngblood et al. 1985). Both shrubs are often present in the canopy. Low-growing shrubs are present, especially *Lonicera involucrata*, *Ribes* spp., and *Rosa woodsii*. A variety of forbs, some of them more typical of uplands than of riparian zones, are common in the undergrowth. *Aster foliaceus*, *Fragaria virginiana*, *Heracleum sphondylium*, and *Thalictrum fendleri* seem to be particularly common, but many other species are present and may contribute more canopy cover. Graminoids are present but contribute less cover than do forbs.

ENVIRONMENT

Stands of this type occur along streams on gently sloping benches, and around seeps on toeslopes (Youngblood et al. 1985). Soils have a coarse loamy, loamy skeletal, or fine loamy texture. Water tables are near the surface, ranging from around 30 cm to 1 m (Youngblood et al. 1985, Walford et al. 1997), and the surface is typically undulating with well-developed mounds (Walford et al. 1997).

LANDSCAPE POSITION AND ADJACENT VEGETATION

Adjacent riparian communities are typically dominated by *Salix boothii* or *Salix wolfii*, while adjacent upland communities are dominated by *Abies lasiocarpa*, *Pinus contorta*, *Picea engelmannii*, *Artemisia tridentata* ssp. *vaseyana*, and *Artemisia cana*. In addition, neighboring upland stands may be grasslands or forblands (Youngblood et al. 1985, Walford et al. 1997).

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Overgrazing can shift the undergrowth from dominance by palatable forbs to dominance by *Poa pratensis* (Padgett et al. 1989).Overgrazing can shift the undergrowth from dominance by palatable forbs to dominance by *Poa pratensis* (Padgett et al. 1989).

DISTRIBUTION AND STATUS

GENERAL

This community has been surveyed from the Greys River drainage (Youngblood et al. 1985), Teton County (Youngblood et al. 1985, Fertig and Jones 1994), Shoshone National Forest (Walford et al. 1997), and Medicine Bow National Forest (Jankovsky-Jones et al. 1995). In addition, this type is found in Idaho (Youngblood et al. 1985) and Utah (Padgett et al. 1989).

COUNTIES OF OCCURRENCE
This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Teton	C	Youngblood et al. 1985, Fertig and Jones 1994 (Horse Creek or Gros Ventre)
Lincoln	C	Youngblood et al. 1985, Fertig and Jones 1994 (Swift Creek)
Fremont	C	Walford et al. 1997
Park	C	Walford et al. 1997
Carbon	C	Jankovsky-Jones et al. 1995

STATUS
This vegetation is a major riparian type in western Wyoming (Youngblood et al. 1985, Walford et al. 1997). It does not appear threatened under current conditions, but overgrazing could present a problem if it became widespread.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3?

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001180

NATIONAL VEGETATION CLASSIFICATION FORMATION
Temporarily flooded cold-deciduous shrubland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix boothii / Smilacina stellata community type	Youngblood et al. 1985, Jones and Fertig 1994 (Swift Creek), Jones and Fertig 1994 (Horse Creek or Gros Ventre)
Salix boothii / Mesic forb community type	Walford et al. 1997
Salix boothii / Mesic forb community type	Padgett et al. 1989
Salix boothii / Wet *Carex* ecological type	Girard et al. 1997

CLASSIFICATION COMMENTS
This association includes the *S. boothii* / *Maianthemum stellatum* association (CEGL001187) formerly recognized in Wyoming.

DOCUMENTATION

REFERENCES

Fertig, W. and G. Jones. 1994. Establishment record for Horse Creek Research Natural Area within Bridger-Teton National Forest, Teton County, Wyoming. Unpublished report prepared for US Forest Service, Region 4, by the Wyoming Natural Diversity Database, 2 September 1994.

Fertig, W. and G. Jones. 1994. Establishment record for Swift Creek Research Natural Area within Bridger-Teton National Forest, Lincoln County, Wyoming. Unpublished report prepared for the US Forest Service, Region 4, by the Wyoming Natural Diversity Database, Laramie, Wyoming, 2 September 1994.
Girard, M., D. L. Wheeler, and S. B. Mills. 1997. Classification of riparian communities on the Bighorn National Forest. R2-RR-97-02. USDA Forest Service, Rocky Mountain Region, Lakewood CO. iv + 306 pp. + appendixes.

Jankovsky-Jones, M, G. Jones, and W. Fertig. 1995. Ecological evaluation for the potential Platte Ridge and North Platte River Canyon Research Natural Area within the Medicine Bow National Forest, Carbon County, Wyoming. Unpublished report prepared by the Wyoming Natural Diversity Database, Laramie, WY. 85 pp.

Padgett, Wayne G., Andrew P. Youngblood, and Alma H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. USDA Forest Service, Intermountain Region, R4-ECOL-89-01. Ogden UT. 191 pp.

Walford, Gillian, George Jones, Walt Fertig, and Kent Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Unpublished report, Shoshone National Forest, Cody WY. 227 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

EDITION: 00-08-29
AUTHOR: Stephen M. Ogle
UPDATE: 01-03-12

Characterization Abstract for the
Salix boothii / Mesic Graminoid Shrubland
(Booth willow / Mesic Graminoid Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic features of this association are (1) a tall shrub layer with at least 25% canopy cover of *Salix boothii* or *S. drummondiana*, and (2) a herbaceous layer in which native graminoids contribute more canopy cover than do forbs, and in which some graminoid contributes more canopy cover than do *Carex utriculata*, *Carex aquatilis*, or *Calamagrostis canadensis*.

VEGETATION DESCRIPTION

This community is a tall riparian shrubland, with an open or closed canopy. *Salix boothii* or *Salix drummondiana* usually dominate the tall shrub layer (the latter in far western drainages, such as the Greys River). Both shrubs are often present in the overstory (Norton et al. 1981, Youngblood et al. 1985, Walford et al. 1997). *Salix geyeriana* often is present. A short shrub or dwarf-shrub layer may be present, composed of some combination of *Salix wolfii*, *Lonicera involucrata*, *Ribes* spp., *Pentaphylloides floribunda*, *Betula glandulosa*, and (in the Bighorn Mountains) *Salix planifolia*. In some stands, a few scattered trees may be visible above the shrub canopy, particularly *Picea engelmannii* or *Abies lasiocarpa* (Youngblood et al. 1985). The undergrowth contains greater canopy cover of native graminoids than of forbs, and the major species usually are *Deschampsia cespitosa*, *Carex microptera*, *Juncus balticus*, and *Phleum alpinum*. *Poa pratensis* usually is present but contributes less cover than do the native graminoids. Common forbs are *Mertensia ciliata*, *Aster foliaceus*, *Arnica* sp., *Thalictrum venulosum*, and *Taraxacum officinale*.

ENVIRONMENT

Stands of this association grow in valley bottoms, in swales or along stream channels on floodplains or terraces, from 5,800 to 9,500 feet elevation. Most studies report that soils remain moist but unsaturated throughout the growing season, with the water table nearly a meter below the soil surface. Youngblood et al. (1985), though, suggest that the water table lies near the surface, and they report mottling in the upper soil. The soils are developed in alluvium derived from a variety of parent materials and belong to a range of particle-size classes.

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Padgett et al. (1989) considered this type in Utah to represent early-successional vegetation because many of their stands appeared to have qualified as *S. boothii* / *Carex utriculata* or *S. boothii* / *Calamagrostis canadensis* vegetation until substantial amounts of sediment were deposited on the ground surface. This sediment raised and effectively dried the soil surface, making the stand too dry to support *Carex utriculata* or *Calamagrostis canadensis*. Hansen et al. (1995) note that heavy grazing in *Salix boothii* or *S. geyeriana* stands can shift the herbaceous undergrowth to domiance by *Poa pratensis*.

DISTRIBUTION AND STATUS

GENERAL

This assocation has been described from the southern, eastern, and northern Absaroka Mountains (Walford et al. 1997) and the eastern and western slopes of the Bighorn Mountains (Girard et al. 1997). It probably also can be found in the Grey's River and other drainages of far western Wyoming (Youngblood et al. 1985).

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Park	C	Walford et al. 1997
Fremont	C	Walford et al. 1997
Washakie	C	Girard et al. 1997
Sheridan	C	Girard et al. 1997
Sublette	C	Mutz and Graham 1982
Teton	P	Youngblood et al. 1985
Lincoln	P	Youngblood et al. 1985

STATUS

This association is widespread in the mountains of the western half of Wyoming. The relatively dry soils make these stands attractive to grazing animals, and heavy grazing may convert the undergrowth to dominance by exotic plants.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3?

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE

CEGL001181

NATIONAL VEGETATION CLASSIFICATION FORMATION

Temporarily flooded cold-deciduous shrubland

OTHER NAMES

The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix boothii / Mesic Graminoid Community Type	Walford et al. 1997
Salix boothii / *Poa pratensis*	Youngblood et al. 1985
Salix boothii / *Poa pratensis* Community Type	Mutz and Graham 1982
Salix boothii / Mesic Graminoid Community Type	Padgett et al. 1989
Salix boothii – *Salix planifolia* var. *planifolia* / *Deschampsia cespitosa* Community Type	Girard et al. 1997
Salix boothii – *Salix wolfii* / *Deschampsia cespitosa* Community Type	Girard et al. 1997
Salix boothii / *Deschampsia cespitosa* Community Type	Girard et al. 1997

CLASSIFICATION COMMENTS

This association is defined broadly to include *Salix boothii* stands with native graminoids typical of mesic sites. Stands on wetter sites usually can be placed into the *S. boothii* / *Carex utriculata* or the *S. boothii* / *Calamagrostis canadensis* associations. The *S. boothii* / *Poa pratensis* association also occupies mesic sites, but the undergrowth is dominated by exotic species. Similarly, stands of the *S. boothii* / Mesic Forb association also grow on mesic sites, but their undergrowths are dominated by forbs. Our concept of this type seems to match that of Padgett et al. (1989).

DOCUMENTATION

REFERENCES

Girard, M., D. L. Wheeler, and S. B. Mills. 1997. Classification of riparian communities on the Bighorn National Forest. R2-RR-97-02. USDA Forest Service, Rocky Mountain Region, Lakewood CO. iv + 306 pp. + appendixes.

Hansen, Paul L., Robert D. Pfister, Keith Boggs, Bradley J. Cook, John Joy, and Dan K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous publication no. 54, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula MT. xvi + 646 p.

Mutz, K.M. and Graham, R. 1982. Riparian community type classification, Big Piney Ranger District, Wyoming. Prepared by Meiiji Resource Consultants, Layton, UT, for U.S. Forest Service, Region IV.

Norton, B.E., J. Tuhy, and S. Jensen. 1981. Riparian community classification for the Grey's River, Wyoming. Unpublished report prepared for the U.S. Forest Service, Region IV, by the Department of Range Science, Utah State University, Logan, UT.

Padgett, Wayne G., Andrew P. Youngblood, and Alma H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. USDA Forest Service, Intermountain Region, R4-ECOL-89-01. Ogden UT. 191 pp.

Walford, Gillian, George Jones, Walt Fertig, and Kent Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Unpublished report, Shoshone National Forest, Cody WY. 227 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

EDITION: 01-03-11
AUTHOR: G. Jones
UPDATE: 01-03-30

Characterization Abstract for the
Salix boothii / *Poa pratensis* Shrubland
(Booth Willow / Kentucky Bluegrass Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

Diagnostic features for this association are (1) a tall shrub layer with at least 25% canopy cover, (2) at least 25% of that shrub canopy cover contributed by *Salix boothii* or *Salix drummondiana*, and (3) a herbacoues layer in which exotic graminoids or forbs contribute more canopy cover than do native graminoids or forbs. Trees may be present but contribute < 10% canopy cover.

VEGETATION DESCRIPTION

This is a tall riparian shrubland, with an open or closed canopy. *Salix boothii* or *Salix drummondiana* dominate the tall shrub layer, which may contain several other species, especially *Salix exigua*, *Amelanchier alnifolia*, and *Crataegus douglasii*. A short shrub or dwarf-shrub layer may be present, composed of *Ribes lacustre*, *Lonicera involucrata*, *Symphoricarpos albus*, *Cornus sericea*, and *Rosa woodsii*. The undergrowth contains greater canopy cover of exotic graminoid or forbs than of native graminoids or forbs, and the most common species are *Poa pratensis*, *Phleum pratense*, *Agrostis stolonifera*, *Cirsium arvense*, *Trifolium* sp., and *Taraxacum officinale*. The most common native species are *Carex microptera* and *Achillea millefolium*.

ENVIRONMENT

Stands of this association occupy valley bottoms at elevations from 5800 to 8300 feet. Soils range in texture from clayey to fine-loamy to sandy-skeletal.

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Padgett et al. (1989) concluded that stands of this association in Utah were dervied by heavy grazing from stands of *Salix boothii* / Mesic Forb vegetation. In western Wyoming, Youngblood et al. (1985) noted that stands of this association are readily accessible to livestock and may have been heavily grazed in the past. They also noted that sites supporting this vegetation may be particularly susceptible to erosion.

DISTRIBUTION AND STATUS

GENERAL

This association has been named from the mountains of western Wyoming (Youngblood et al. 1985), but it probably also can be found in other mountains of Wyoming where *S. boothii* shrub stands are common.

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Lincoln	P	Youngblood et al. 1985
Teton	P	Youngblood et al. 1985
Sublette	P	Youngblood et al. 1985

STATUS

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: SE

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CTWY000014

NATIONAL VEGETATION CLASSIFICATION FORMATION
Seasonally flooded cold-deciduous shrubland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix geyeriana Community Type	Hansen et al. 1995
Salix boothii / Poa pratensis Community Type	Padgett et al. 1989
Salix boothii / Poa pratensis Community Type	Youngblood et al. 1985

CLASSIFICATION COMMENTS
This association is described to include stands of *Salix boothii* in which the undergrowth apparently has been converted by heavy grazing to dominance by exotic plants. These stands occupy mesic habitats similar to those that support stands of the *S. boothii* / Mesic Graminoid and *S. boothii* / Mesic Forb associations. This type can be said to contain poor-quality examples of other *S. boothii* associations, so efforts should be made to determine what the native vegetation might have been.

DOCUMENTATION

REFERENCES

Hansen, Paul L., Robert D. Pfister, Keith Boggs, Bradley J. Cook, John Joy, and Dan K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous publication no. 54, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula MT. xvi + 646 p.

Padgett, Wayne G., Andrew P. Youngblood, and Alma H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. USDA Forest Service, Intermountain Region, R4-ECOL-89-01. Ogden UT. 191 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

EDITION: 01-03-11
AUTHOR: G. Jones
UPDATE: 01-03-30

Characterization Abstract for the
Salix exigua Riparian Shrubland
(Sandbar Willow Riparian Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

These features are diagnostic of this type (1) trees contribute < 10% canopy cover, (2) a tall shrub layer (> 2 m tall in most cases) is present, (3) *Salix exigua* contributes as much canopy cover to the shrub layer as does any other species, (4) exotic graminoids or forbs contribute more canopy cover to the undergrowth than do native species.

VEGETATION DESCRIPTION

Salix exigua is the most common species in a shrub layer that may include other willows, *Rosa* sp., *Ribes* sp., *Cornus sericea*, and *Lonicera involucrata* (in western Wyoming). This shrub layer often is open, although some stands have a dense shrub layer. A low shrub layer of *Symphoricarpos occidentalis* may be present in eastern Wyoming stands. The herbaceous undergrowth usually is sparse and is dominated by one or more exotic graminoids or forbs, especially *Poa pratensis*, *Melilotus* sp., *Agrostis stolonifera*, *Cirsium arvense*, *Phleum pratense*, and *Taraxacum officinale*.

ENVIRONMENT

Stands of this shrub type grow along stream channels on sediment bars swept annually by floodwaters. Soils often are coarse textured and (especially in the foothills) contain a high proportion of rock fragments. These soils generally have low water-holding capacity.

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS

The rhizomatous *Salix exigua* is a pioneer species on sediment bars where annual floods deposit coarse material and frequently bury the herbaceous vegetation. The weedy herbaceous species also can tolerate the disturbance and grow well in the coarse soils, so this stands of this type are perhaps more likely to be early-seral vegetation than degraded examples of established stands.

DISTRIBUTION AND STATUS

GENERAL

Stands of this type have been described from the Grey's River drainage in western Wyoming (Norton et al. 1981, Youngblood et al. 1985), the Clark's Fork and Shoshone River drainages in northwestern Wyoming (Walford et al. 1997), the Bighorn Basin (Walford 1996), the Black Hills (Marriott et al. 2000), and the plains in eastern Wyoming (Olson and Gerhart 1982, Jones and Walford 1995). These stands all are below 7,100 feet elevation.

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Big Horn	C	Walford 1996
Campbell	C	Jones and Walford 1995
Crook	C	Marriott et al. 2000
Goshen	C	Olson and Gerhart 1982, Jones and Walford 1995
Johnson	C	Jones and Walford 1995
Laramie	C	Olson and Gerhart 1982, Jones and Walford 1995
Lincoln	C	Norton et al. 1981, Youngblood et al. 1985
Natrona	C	Jones and Walford 1995
Park	C	Walford 1996, Walford et al. 1997
Platte	C	Jones and Walford 1995
Sheridan	C	Jones and Walford 1995
Washakie	C	Walford 1996
Weston	C	Jones and Walford 1995, Marriott et al. 2000

STATUS
This is a very widespread type that seems to be common in the plains, basins, and foothills.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S4

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CTWY000022

NATIONAL VEGETATION CLASSIFICATION FORMATION

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix exigua / Poa pratensis Community Type	Norton et al. 1981
Salix exigua / Poa pratensis Community Type	Youngblood et al. 1985
Salix exigua / Poa pratensis Community Type	Walford et al. 1997
Salix spp. Subtype	Olson and Gerhart 1982
Salix exigua / Mesic Graminoid Community	Walford 1996
Unclassified Coyote Willow Stands	Jones and Walford 1995
Salix exigua Temporarily Flooded Shrubland	Marriott et al. 2000

CLASSIFICATION COMMENTS
This type seems to represent early seral vegetation in which exotics dominate the understory (which often is sparse), rather than degraded stands of other *S. exigua* stands. Thus it differs from *S. boothii* / *Poa pratensis*, which apparently consists of degraded examples of other *S. boothii* associations. Consequently, *S. exigua* stands that might fit into this type probably are better considered occurrences of the *S. exigua* Riparian Shrubland, CTWY000022.

DOCUMENTATION

REFERENCES

Jones, G.P. and G.M. Walford. 1995. Major riparian vegetation types of eastern Wyoming. A report for the Wyoming Department of Environmental Quality, Water Quality Division. May, 1995. Unpublished report prepared by Wyoming Natural Diversity Database, Laramie, WY. vii + 245 p.

Norton, B.E., J. Tuhy, and S. Jensen. 1981. Riparian community classification for the Grey's River, Wyoming. Unpublished report prepared for the U.S. Forest Service, Region IV, by the Department of Range Science, Utah State University, Logan, UT.

Olson, R. A. and W. A Gerhart. 1982. A physical and biological characterization of riparian habitat and its importance to wildlife in Wyoming. Wyoming Game and Fish Department, Cheyenne, WY.

Walford, Gillian M. 1996. Statewide classification of riparian and wetland dominance types and plant communities - Bighorn Basin segment. A report submitted to the Wyoming Department of Environmental Quality, Water Quality Division. Cooperative Agreement #WET04, Grant #CD998066-01-0. Wyoming Natural Diversity Database, Laramie WY. 185 pp.

Walford, Gillian, George Jones, Walt Fertig, and Kent Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Unpublished report, Shoshone National Forest, Cody WY. 227 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

EDITION: 01-03-30
AUTHOR: G. Jones
UPDATE: 01-03-30

Characterization Abstract for the
Salix geyeriana / Mesic Forbs Shrubland
(Geyer Willow / Mesic Forbs Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic features for this vegetation are a shrub layer in which (1) *Salix boothii* or *Salix drummondiana* contribute < 25% canopy cover and (2) *Salix geyeriana* contributes at least as much canopy cover as does any other species, and (3) a herbaceous undergrowth dominated by a variety of forbs.

VEGETATION DESCRIPTION

This community is a riparian shrubland, with an open shrub canopy that may be only 1 m tall (Walford et al. 1997). The dominant shrub is *Salix geyeriana*, but other shrubs are also associated with this vegetation. For example, stands in the Shoshone National Forest typically contain *Salix boothii* and *Pentaphylloides floribunda* (Walford et al. 1997), while stands in the Greys River often contain *Salix boothii*, *Ribes inerme*, and *Ribes lacustre* (Youngblood et al. 1985). The undergrowth is dominated by a variety of forbs that differ slightly between the survey areas. In the Greys River drainage, the common forbs include *Aster foliaceus*, *Fragaria virginiana*, *Galium boreale*, *Heracleum maximum*, *Potentilla gracilis*, and *Thalictrum occidentale* (Youngblood et al. 1985). In the Shoshone National Forest, the most common forbs are *Astragalus alpinus*, *Fragaria virginiana*, *Antennaria corymbosa*, *Aster foliaceus*, *Equisetum arvense*, and *Pedicularis groenlandica* (Walford et al. 1997). In addition, some graminoids and trees contribute minor cover, such as *Carex microptera*, *Poa pratensis*, *Elymus glaucus*, *Pinus contorta*, and *Populus tremuloides* (Youngblood et al. 1985, Walford et al. 1997).

ENVIRONMENT

Stands of this type are found on toeslopes or around streams in wide valley bottoms (Youngblood et al. 1985, Walford et al. 1997). They have uneven surfaces that are dissected by small ephemeral channels. The ground is covered with litter, gravel, moss, and cobbles (Walford et al. 1997). Soils are relatively dry for a riparian community, and the water table is lower than in other *Salix geyeriana* shrublands. Soil texture is loamy-skeletal, fine-loamy, or clayey, and coarse fragment content is around 50% (Youngblood et al. 1985, Walford et al. 1997).

LANDSCAPE POSITION AND ADJACENT VEGETATION

At least in some areas, surrounding communities are dominated by *Carex* spp. (Walford et al. 1997).

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Stands are susceptible to overgrazing, which alters understory dominance. In extreme cases, stands apparently no longer represent this community type, but rather a *Salix geyeriana* / *Poa pratensis* shrubland. Heavy-use by livestock also reduces bank stability and may enhance erosion along streams (Youngblood et al. 1985, Padgett et al. 1989, Walford et al. 1997).

DISTRIBUTION AND STATUS

GENERAL
This community is known to occur in western Wyoming (Youngblood et al. 1985, Walford et al. 1997), in addition to being found in other states, such as Utah (Padgett et al. 1989) and Idaho (Youngblood et al. 1985).

COUNTIES OF OCCURRENCE
This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Carbon	P	Jones 1992
Fremont	C	Walford et al. 1997
Lincoln	C	Youngblood et al. 1985

STATUS
Stands are minor components of riparian zones (Youngblood et al. 1985), and this type may be of conservation interest due to its rarity and the effect of overgrazing. In extreme cases, overgrazed stands are converted into *Salix geyeriana* / *Poa pratensis* shrublands (Youngblood et al. 1985, Padgett et al. 1989, Walford et al. 1997).

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S2S3

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001209

NATIONAL VEGETATION CLASSIFICATION FORMATION
Temporarily flooded cold-deciduous shrubland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix boothii / Mertensia ciliata Community Type	Norton et al. 1981
Salix geyeriana – Salix myrtillifolia / Dry corridor Community Type	Mutz and Queiroz 1983
Salix wolfii / Mesic Graminoid Community Type	Walford et al. 1997
Other *Salix geyeriana* Stand	Jones 1992

CLASSIFICATION COMMENTS

DOCUMENTATION

REFERENCES

Mutz, K.M. and J. Queiroz. 1983. Riparian community classification for the Centennial Mountains and South Fork Salmon River Idaho. Prepared by Meiiji Resource Consultants, Layton, Utah, for the U.S. Forest Service, Region IV. 96 pp. plus appendices.

Norton, B.E., J. Tuhy, and S. Jensen. 1981. Riparian community classification for the Grey's River, Wyoming. Unpublished report prepared for the U.S. Forest Service, Region IV, by the Department of Range Science, Utah State University, Logan, UT.

Padgett, Wayne G., Andrew P. Youngblood, and Alma H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. USDA Forest Service, Intermountain Region, R4-ECOL-89-01. Ogden UT. 191 pp.

Walford, Gillian, George Jones, Walt Fertig, and Kent Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Unpublished report, Shoshone National Forest, Cody WY. 227 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

EDITION: 00-08-30
AUTHOR: Stephen M. Ogle
UPDATE: 01-04-02

Characterization Abstract for the
Salix wolfii Riparian Shrubland
(Wolf Willow Riparian Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

These features are diagnostic of this vegetation type: (1) trees contribute < 10% canopy cover, (2) tall shrubs (> 2 m) contribute less than 25% canopy cover, (3) *Salix wolfii* contributes as much canopy cover as does any other shrub.

VEGETATION DESCRIPTION

Salix wolfii usually dominates or co-dominates a shrub layer rarely taller than 1 m, and which may be dense or open. Other shrubs often are present, including *Pentaphylloides floribunda*, *Salix planifolia*, *Salix boothii* (always with less than 25% canopy cover), *Salix geyeriana*, and *Betula glandulosa*. Common herbaceous species include *Carex aquatilis*, *Carex utriculata*, *Calamagrostis canadensis*, and *Caltha leptosepala* on wet sites, and *Deschampsia cespitosa*, *Carex microptera*, *Ligusticum* sp., *Fragaria virginiana*, *Geum macrophyllum*, and *Poa pratensis* on drier sites.

ENVIRONMENT

Stands of this vegetation type grow in valley bottoms on floodplains, terraces, and toeslopes, and around seeps on valley walls. The soils in valley bottoms are alluvial and may be derived from a variety of parent materials. Soils may be mineral (usually with a thick organic surface horizon) or organic. Mineral soils range in texture from fine to coarse. The soils may be saturated throughout the year or unsaturated part of the year, but even saturated soils seem to be aerobic due to lateral flow of water. Although *S. wolfii* stands may be found below 7,000 feet elevation, the largest stands (which may cover valley bottoms) are found at higher elevations.

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Salix wolfii stands apparently are stable in structure and composition in the absence of disturbance. Heavy grazing may decrease the amount of palatable species in the undergrowth, such as *Deschampsia cespitosa*, *Carex aquatilis*, and *Calamagrostis canadensis*, and increase the amount of less palatable or more resistant species such as *Poa pratensis*, *Juncus balticus*, *Taraxacum officinale*, *Fragaria virginiana*, and other forbs (Padgett et al. 1989, Girard et al. 1997, Hansen et al. 1995).

DISTRIBUTION AND STATUS

GENERAL

Stands of the vegetation type are widespread throughout the mountains of western and north-central Wyoming, and are present in south-central Wyoming. They are found in valley bottoms above ca. 6,700 feet.

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Albany	C	Jones 1992
Big Horn	C	Girard et al. 1997
Fremont	C	Walford et al. 1997
Lincoln	C	Norton et al. 1981, Youngblood et al. 1985
Park	C	Walford et al. 1997, Jones and Fertig 1999, Mattson 1984
Sheridan	C	Girard et al. 1997
Sublette	C	Youngblood et al. 1985
Teton	C	Youngblood et al. 1985
Washakie	C	Girard et al. 1997

STATUS
This is a widespread and common riparian shrub type. Stands may cover valley bottoms.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S4

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CTWY000020

NATIONAL VEGETATION CLASSIFICATION FORMATION

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix wolfii Shrubland [Provisional]	Reid et al. 2000

CLASSIFICATION COMMENTS

DOCUMENTATION

REFERENCES

Girard, M., D. L. Wheeler, and S. B. Mills. 1997. Classification of riparian communities on the Bighorn National Forest. R2-RR-97-02. USDA Forest Service, Rocky Mountain Region, Lakewood CO. iv + 306 pp. + appendixes.

Hansen, Paul L., Robert D. Pfister, Keith Boggs, Bradley J. Cook, John Joy, and Dan K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous publication no. 54, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula MT. xvi + 646 p.

Jones, G. 1992. A preliminary classification of riparian vegetation types of the Medicine Bow Range and the Sierra Madre. A report prepared in fulfillment of cost-share agreement number 0206-90-01 between the Medicine Bow National Forest and The Nature Conservancy. Wyoming Natural Diversity Database (The Nature Conservancy), Laramie, WY.

Jones, G.P. and W. Fertig. 1999. Ecological evaluation of the potential Lake Creek Research Natural Area within the Shoshone National Forest, Park County, Wyomng. Unpublished report prepared for the Shoshone National Forest, USDA Forest Service by the Wyoming Natural Diversity Database, University of Wyoming. 43 pp.

Mattson, D.J. 1984. Classification and environmental relationships of wetland vegetation in central Yellowstone National Park.

Norton, B.E., J. Tuhy, and S. Jensen. 1981. Riparian community classification for the Grey's River, Wyoming. Unpublished report prepared for the U.S. Forest Service, Region IV, by the Department of Range Science, Utah State University, Logan, UT.

Walford, Gillian, George Jones, Walt Fertig, and Kent Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Unpublished report, Shoshone National Forest, Cody WY. 227 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

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AUTHOR: G. Jones
UPDATE: 01-03-30

Characterization Abstract for the
Salix wolfii / *Carex aquatilis* Shrubland
(Wolf Willow / Water Sedge Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic features for this vegetation are (1) < 10% canopy cover of trees or tall shrubs (> 2m tall), (2) a short-shrub layer in which *Salix wolfii* contributes at least as much cover as does any other species, and (3) an undergrowth dominated by *Carex aquatilis* and/or *Carex utriculata*.

VEGETATION DESCRIPTION

This community is a riparian shrubland, with a moderately dense short-shrub layer (< 2 m tall) and a dense herbaceous undergrowth (Walford et al. 1997). The shrub layer is dominated by *Salix wolfii* and may include other shrubs, especially *Betula glandulosa* and *Pentaphylloides floribunda* (Youngblood et al. 1985, Walford et al. 1997). The undergrowth is dominated by graminoids with some forb cover. The dominant species are *Carex aquatilis* and *Carex utriculata*, and other common associates are *Deschampsia cespitosa*, *Juncus balticus*, *Poa pratensis*, *Aster foliaceus*, *Fragaria virginiana*, *Pedicularis groenlandica*, *Polemonium occidentale*, and *Potentilla gracilis* (Mattson 1984, Youngblood et al. 1985, Walford et al. 1997, Jones and Fertig 1999). Other species are common in some geographic areas, such as *Galium bifolium* and *Viola macloskeyi* in Yellowstone National Park (Mattson 1984). In the Bighorn National Forest, additional associates include *Achillea millefolium*, *Taraxacum officinale*, *Trifolium repens*, *Phleum alpinum*, and *Poa pratensis* (Girard et al. 1997). For the Shoshone National Forest, additional associates include *Poa pratensis*, *Achillea millefolium*, *Geum macrophyllum*, *Stellaria longipes*, and *Taraxacum officinale* (Walford et al. 1997).

ENVIRONMENT

Stands are found on terraces along streams, around seeps on toeslopes, and within wet meadows or depressions (Youngblood et al. 1985, Walford et al. 1997). The sites may be dissected by small channels, and the surface is typically uneven with hummocks. Soils have either a thick organic surface layer or a fine texture, leading to a high water- holding capacity (Youngblood et al. 1985). The water table is typically near the surface (Youngblood et al. 1985, Walford et al. 1997), and water flows laterally through these soils, producing aerobic conditions even though soils are flooded (Youngblood et al. 1985).

LANDSCAPE POSITION AND ADJACENT VEGETATION

Adjacent riparian communities include *Carex utriculata* herbaceous vegetation (CEGL001562), *Carex microptera* herbaceous vegetation (CEGL001792), *Salix boothii* / *Carex utriculata* shrublands (CEGL001178), *Deschampsia cespitosa* herbaceous vegetation (CEGL001599), *Carex simulata* herbaceous vegetation (CEGL001825), *Salix boothii* - *Salix geyeriana* (CEGL001184), and *Salix wolfii* / Mesic forb shrublands (CEGL001180). Adjacent upland communities are often dominated by *Pentaphylloides floribunda*, *Picea engelmannii*, *Artemisia tridentata* ssp. *vaseyana*, *Pinus contorta*, *Abies lasiocarpa*, or *Artemisia cana* (Youngblood et al. 1985, Walford et al. 1997).

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Youngblood et al. (1985) suggest that *Carex utriculata* is replaced by *Carex aquatilis* as stands develop a thick organic layer.Overgrazing can be problematic, reducing the cover of *Salix wolfii* and compacting the soil (Hansen et al. 1995).

DISTRIBUTION AND STATUS

GENERAL

This is a widespread type, with stands described from the Greys River drainage (Youngblood et al. 1985), western Teton County (Youngblood et al. 1985), Yellowstone National Park (Mattson 1984), Absaroka Mountains (Walford et al. 1997), Beartooth Plateau (Walford et al. 1997, Jones and Fertig 1999), Wind River Mountains (Walford et al. 1997), and Bighorn Mountains (Girard et al. 1997). In addition, it is found in Utah (Padgett et al. 1989), Idaho (Youngblood et al. 1985), and Montana (Hansen et al. 1995).

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Fremont	C	Walford et al. 1997
Lincoln	C	Youngblood et al. 1985
Park	C	Walford et al. 1997, Jones and Fertig 1999
Sublette	C	Youngblood et al. 1985
Teton	C	Youngblood et al. 1985

STATUS
This is a common vegetation type in riparian mosaics in western Wyoming (Youngblood et al. 1985) and the Bighorn Mountains (Girard et al. 1997), and overgrazing is the only potential threat mentioned in the literature (Hansen et al. 1985).

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3S4

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001234

NATIONAL VEGETATION CLASSIFICATION FORMATION
Seasonally flooded cold-deciduous shrubland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix wolfii / Swertia perennis Community Type	Norton et al. 1981
Salix wolfii / Carex aquatilis Community Type	Youngblood et al. 1985
Salix wolfii / Carex rostrata Community Type	Youngblood et al. 1985
Salix wolfii / Carex aquatilis Plant Association	Johnston 1987
Salix wolfii / Carex rostrata Plant Association	Johnston 1987
Salix wolfii / Wet Sedge Ecological Type	Girard et al. 1997
Salix wolfii – Betula glandulosa / Carex rostrata – Carex aquatilis Community Type	Mutz and Quieroz 1983

CLASSIFICATION COMMENTS
Youngblood et al. (1985) suggested that this community represents two types, depending on whether the understory is dominated by *Carex utriculata* or *Carex aquatilis*. For Wyoming, survey data do not support this division, but it may be re-evaluated in the future, as more data become available.

DOCUMENTATION

REFERENCES
Girard, M., D. L. Wheeler, and S. B. Mills. 1997. Classification of riparian communities on the Bighorn National Forest. R2-RR-97-02. USDA Forest Service, Rocky Mountain Region, Lakewood CO. iv + 306 pp. + appendixes.

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Padgett, Wayne G., Andrew P. Youngblood, and Alma H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. USDA Forest Service, Intermountain Region, R4-ECOL-89-01. Ogden UT. 191 pp.

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Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

EDITION: 00-08-31
AUTHOR: Stephen M. Ogle
UPDATE: 01-04-02

Characterization Abstract for the
Salix wolfii / *Deschampsia cespitosa* Shrubland
(Wolf Willow / Tufted Hairgrass Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic features for this type are (1) < 10% canopy cover by trees or tall shrubs (> 2m tall), (2) a short-shrub stratum in which *Salix wolfii* contributes as much canopy cover as does any other species, and (3) a herbaceous undergrowth dominated by native graminoids other than *Carex aquatilis* or *Carex utriculata* (syn. *Carex rostrata*).

VEGETATION DESCRIPTION

This community is a riparian shrubland, with a dense to moderately dense canopy of low-growing shrubs and a dense undergrowth of graminoids and forbs. *Salix wolfii* is the dominant shrub, but *Pentaphylloides floribunda* is often present and may co-dominate the canopy (Youngblood et al. 1985, Jones 1992, Walford et al. 1997). *Deschampsia cespitosa* dominates or co-dominates the undergrowth, and the most common associates include *Aster foliaceus*, *Fragaria virginiana*, and *Geum macrophyllum* (Youngblood et al. 1985, Walford et al. 1997). There appear to be some regional differences in species composition. In the Greys River drainage of western Wyoming, additional associates include *Helenium hoopesii*, *Solidago canadensis*, and *Polemonium occidentale*, while in the Shoshone National Forest, additional associates include *Carex microptera* and *Poa pratensis*. Jones (1992) sampled a single stand in the Medicine Bow National Forest, and found a similar overstory composition, but the understory was dominated by *Carex microptera* with high cover of *Deschampsia cespitosa* and *Phleum alpinum*. This is probably the same community, but the undergrowth differs slightly with stands from western Wyoming.

ENVIRONMENT

This vegetation is found on benches along low gradient streams (Youngblood et al. 1985, Walford et al. 1997). In addition, some stands are found on toeslopes (Youngblood et al. 1985). The surface is hummocky, and is partially covered by a litter layer (Walford et al. 1997). The soil has a coarse to fine loamy texture, and a high to moderate water-holding capacity. The water table flunctuates from the surface to around 50 cm in the profile (Youngblood et al. 1985, Walford et al. 1997).

LANDSCAPE POSITION AND ADJACENT VEGETATION

Adjacent communities are dominated by *Salix wolfii*, *Carex utriculata*, *Carex aquatilis*, *Artemisia cana*, or *Pentaphylloides floribunda* (Youngblood et al. 1985).

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Hansen et al. (1995) consider this vegetation a climax community, but Chadde (1988) suggested that it may eventually become a *Pentaphylloides floribunda* / *Deschampsia cespitosa* shrubland (CEGL001107).Since the soils are drier and more stable than in other parts of riparian zones, livestock tend to favor this vegetation for grazing (Padgett et al. 1989). Grazing can lead to shifts in dominance from *Deschampsia cespitosa* to *Poa pratensis* or to a variety of forb species, such as *Aster foliaceus*, *Trifolium* spp., and *Taraxacum officinale* (Padgett et al. 1989, Hansen et al. 1995, Walford et al. 1997).

DISTRIBUTION AND STATUS

GENERAL

This community is known to occur in the Wyoming Range (Youngblood et al. 1985), Yellowstone National Park (Chadde 1988), the Absaroka Mountains, Beartooth Plateau, and Wind River Mountains (Walford et al. 1997). It may be found on the western slope of the Bighorn Mountains (Girard et al. 1997). It is also found in Utah (Padgett et al. 1989), Montana (Hansen et al. 1995), and Idaho (Padgett et al. 1989).

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Carbon	C	Jones 1992
Fremont	C	Walford et al. 1997
Lincoln	C	Youngblood et al. 1985
Park	C	Walford et al. 1997
Sublette	?	Youngblood et al. 1985
Washakie	?	Girard et al. 1997

STATUS
This is a minor community in western Wyoming (Youngblood et al. 1985), and may be a conservation concern due its rarity. In addition, its persistence is apparently threatened by overgrazing, which can convert this community into a *Salix wolfii* / Mesic forb shrubland (CEGL001240) or *Salix wolfii* / *Poa pratensis* shrubland (not in classification) (Padgett et al. 1989).

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S2S3

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001238

NATIONAL VEGETATION CLASSIFICATION FORMATION
Temporarily flooded cold-deciduous shrubland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix wolfii / Deschampsia cespitosa Plant Association	Johnston 1987
Salix wolfii / Poa pratensis Community Type	Norton et al. 1981, Mutz and Quieroz 1983
Salix wolfii / Deschampsia cespitosa Community	Jones 1992
Salix wolfii / Deschampsia cespitosa Community Type	Walford et al. 1997
Salix wolfii – Salix planifolia var *monica* / *Carex scopulorum* Community Type	Girard et al. 1997
Salix wolfii – Salix planifolia var *monica* Community Type	Girard et al. 1997

CLASSIFICATION COMMENTS
In Wyoming, we intend that this type include *Salix wolfii* stands growing on mesic sites, in which the undergrowth is dominated by any combination of native graminoids other than *Carex aquatilis* and *Carex utriculata*, which dominate on dry sites. Thus we are including here the *Salix wolfii* / *Carex microptera* Shrubland (CEGL001235).

DOCUMENTATION

REFERENCES

Chadde, S.W., P.L. Hansen, and R.D. Pfister. 1988. Wetland plant communities of the Northern Range, Yellowstone National Park.

Hansen, Paul L., Robert D. Pfister, Keith Boggs, Bradley J. Cook, John Joy, and Dan K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous publication no. 54, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula MT. xvi + 646 p.

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AUTHOR: Stephen M. Ogle
UPDATE: 01-04-02

Characterization Abstract for the
Salix wolfii / Mesic Forbs Shrubland
(Wolf Willow / Mesic Forbs Shrubland)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic features for this community are (1) < 10% canopy cover by trees or tall shrubs (2 m or taller), (2) a short-shrub layer in which *Salix wolfii* contributes as much canopy cover as does any other species, and (3) a herbaceous undergrowth in which native forbs contribute more canopy cover than do graminoids.

VEGETATION DESCRIPTION

This vegetation has a dense overstory of short shrubs (ca. 1 m tall) and a dense herbaceous undergrowth dominated by forbs (Youngblood et al. 1985, Walford et al. 1997). The shrub stratum is dominated by *Salix wolfii*, but may contain other shrubs, such as *Betula glandulosa*, *Pentaphylloides floribunda*, *Ribes inerme*, and *Salix planifolia* (Youngblood et al. 1985, Walford et al. 1997, Girard et al. 1997). The undergrowth is dominated by forbs, but the species composition is highly variable. For the Greys River drainage in the Bridger-Teton National Forest, common forbs include *Fragaria virginiana*, *Aster foliaceus*, *Geum macrophyllum*, *Helenium hoopesii*, and *Polemonium occidentale* (Youngblood et al. 1985). For the Shoshone National Forest, survey data is only available from one stand, but based on this limited information, the most common forbs are *Aster foliaceus*, *Lupinus polyphyllus*, *Potentilla gracilis*, *Caltha leptosepala*, *Fragaria virginiana*, *Senecio sphaerocephalus*, and *Valeriana edulis* (Walford et al. 1997). For the Bighorn National Forest, the most common forbs include *Potentilla gracilis*, *Taraxacum officinale*, *Achillea millefolium*, *Aster foliaceus*, *Valeriana occidentalis*, and *Fragaria virginiana* (Girard et al. 1997). Common forbs in central portion of Yellowstone National Park include *Achillea millefolium*, *Fragaria virginiana*, *Taraxacum officinale*, *Senecio sphaerocephalus*, *Trisetum wolfii*, *Aster foliaceus*, *Barbarea orthocerus*, *Viola adunca*, and *Valeriana edulis* (Mattson 1984).

ENVIRONMENT

This vegetation occurs on benches near first and second order streams (Youngblood et al. 1985), as well as around seeps (Girard et al. 1997). Stands have uneven surfaces with hummocks, and they are sometimes dissected by small ephemeral streams (Walford et al. 1997). Soils have coarse loamy, fine loamy, or loamy skeletal texture, with a high water-holding capacity. Water tables are high in this streamside environment, ranging from 35 cm to over 1 m deep (Youngblood et al. 1985, Walford et al. 1997).

LANDSCAPE POSITION AND ADJACENT VEGETATION

Adjacent wetter portions of riparian zones are dominated by *Carex utriculata*, *Carex aquatilis*, or *Carex microptera*, while adjacent drier portions have *Salix boothii* / *Poa pratensis* shrublands (not in classification), *Salix geyeriana* / *Poa pratensis* shrublands (not in classification) *Salix boothii* / Mesic forb shrublands (CEGL001180), and *Artemisia cana* shrublands (Youngblood et al. 1985).

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Although this community does not provide much forage for grazing, livestock and wildlife are attracted to stands because of their proximity to streams. Consequently, this vegetation is repeatedly disturbed by trampling, leading to soil compaction and establishment of ruderal plants (Youngblood et al. 1985, Girard et al. 1997, Walford et al. 1997).

DISTRIBUTION AND STATUS

GENERAL

This community is known to occur in the Greys River drainage (Youngblood et al. 1985), Yellowstone National Park (Mattson 1984), Wind River Mountains (Walford et al. 1997), and Bighorn Mountains (Girard et al. 1997). It is also found in Idaho (Youngblood et al. 1985) and Utah (Padgett et al. 1989).

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Fremont	C	Walford et al. 1997
Lincoln	C	Youngblood et al. 1985
Park	C	Mattson 1984
Sublette	C	Youngblood et al. 1985
Teton	P	Mattson 1984

STATUS
This community is a major type in some parts of the state, particularly the Greys River drainage (Youngblood et al. 1985), suggesting it is not a conservation concern. However, wildlife and livestock are attracted to stands and repeated trampling damages the vegetation. This may be a conservation concern if it is widespread throughout its distribution in the state.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3S4

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001240

NATIONAL VEGETATION CLASSIFICATION FORMATION
Temporarily flooded cold-deciduous shrubland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Salix wolfii / *Poa pratensis* community type	Norton et al. 1981
Salix wolfii / Mesic herb community	Mutz and Quieroz 1983
Salix wolfii / *Poa pratensis* community type	Girard et al. 1997
Salix wolfii / *Fragaria virginiana* community type	Mattson 1984, Johnston 1987
Salix wolfii / Mesic Forb Community Type	Youngblood et al. 1985

CLASSIFICATION COMMENTS

DOCUMENTATION

REFERENCES

Girard, M., D. L. Wheeler, and S. B. Mills. 1997. Classification of riparian communities on the Bighorn National Forest. R2-RR-97-02. USDA Forest Service, Rocky Mountain Region, Lakewood CO. iv + 306 pp. + appendixes.

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Walford, Gillian, George Jones, Walt Fertig, and Kent Houston. 1997. Riparian and wetland community types of the Shoshone National Forest. Unpublished report, Shoshone National Forest, Cody WY. 227 pp.

Youngblood, A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. Intermountain Forest and Range Experiment Station, Ogden UT. 78 pp.

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AUTHOR: Stephen M. Ogle
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Characterization Abstract for the
Carex utriculata Herbaceous Vegetation
(Beaked Sedge Herbaceous Vegetation)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic features for this type are (1) , 10% canopy cover of woody plants, and (2) a herbaceous layer in which *Carex utriculata* (syn. *C. rostrata*) contributes as much canopy cover as does any other species.

VEGETATION DESCRIPTION

This vegetation is a riparian community dominated by graminoids. *Carex utriculata* is the main dominant and sometimes forms a nearly monotypic stand (Youngblood et al. 1985, Jankovsky-Jones et al. 1995 (Ribbon Forest), Walford et al. 1997). In other stands, the vegetation has substantial cover of additional species, particularly *Carex aquatilis*, which occasionally co-dominates the canopy (Walford et al. 1997, Girard et al. 1997). Remaining associates are species commonly found in other riparian communities. For example, scattered shrubs are sometimes present, including *Salix planifolia*, *Salix drummondiana*, *Salix wolfii*, *Salix geyeriana*, and *Salix boothii* (Fertig and Jones 1992, Jankovsky-Jones et al. 1995 (Big Bear), Jankovsky-Jones 1996, Walford et al. 1997). Other graminoids may be present, such as *Juncus balicus*, *Poa pratensis*, *Carex microptera*, *Carex simulata*, *Calamagrostis canadensis*, or *Deschampsia cespitosa* (Youngblood et al. 1985, Jones 1992, Jankovsky-Jones et al. 1995 (Big Bear), Jankovsky-Jones et al. 1996, Walford et al. 1997, Girard et al. 1997), and forbs may also be present, particularly mesic species such as *Geum macrophyllum*, *Polemonium occidentale*, or *Equisetum arvense* (Youngblood et al. 1985, Norton et al. 1981, Jones 1992, Jankovsky-Jones et al. 1995 (Big Bear), Girard et al. 1997, Walford et al. 1997). Trees are uncommon, but are found in a few stands (Jankovsky-Jones et al. 1995, Walford et al. 1997).

ENVIRONMENT

This community occurs in mountains and valleys, along streams, around pond margins, and on wet toeslopes with perennial seeps (Youngblood et al. 1985, Jones 1992, Walford et al. 1997). Soils are wet and often saturated, with water tables ranging from the surface to 1 m down in the profile (Youngblood et al. 1985, Walford et al. 1997), and there may be standing water on the surface (Girard et al. 1997). Soils are often wetter than adjacent *Carex aquatilis* stands. (*Carex utriculata* is thought to be more tolerant of the wetter conditions [Walford et al. 1997]). Along streams, stands are found on the first surface above the channel (Jankovsky-Jones et al. 1995 (Standard Park and Bogs), Jankovsky-Jones et al. 1996). The soils have a fine, fine loamy, coarse loamy, or loamy skeletal texture. Profiles occasionally have well-developed organic horizons, but it is thought that this community often establishes on mineral substrates (Youngblood et al. 1985).

LANDSCAPE POSITION AND ADJACENT VEGETATION

Adjacent stands are often dominated by a variety of *Salix* or *Carex* communities. Less commonly, adjacent stands are dominated by *Pentaphylloides floribunda*, *Deschampsia cespitosa*, *Poa pratensis*, or *Artemisia cana* (Youngblood et al. 1985, Walford et al. 1997).

DYNAMICS AND MANAGEMENT CONSIDERATIONS

This vegetation grows on wet substrates, often in the early stages of succession as unvegetated surfaces become exposed around stream channels or ponds (Youngblood et al. 1985, Padgett et al. 1989). In other cases, water is diverted into an area, leading to *Carex utriculata* establishment and replacement of the existing community (Youngblood et al. 1985). Flooding may damage the vegetation if the flow is abrasive. Otherwise, this community is protected by a dense sod, produced by *Carex utriculata*, which reduces erosion (Youngblood et al. 1985). Livestock and wildlife are less likely to forage in this vegetation because of wet soils and low palatability, and this limits the amount of overgrazing (Padgett et al. 1989, Walford et al. 1997).

DISTRIBUTION AND STATUS

GENERAL

This community occurs in the Bridger-Teton National Forest (Norton et al. 1981, Youngblood et al. 1985), Yellowstone National Park (Mattson 1984, Chadde et al. 1988), Shoshone National Forest (Fertig and Jones 1992, Fertig and Bynum

1992, Walford et al. 1997, Jones and Fertig 1999), Bighorn National Forest (Girard et al. 1997), and Medicine Bow National Forest (Jones 1992, Jankovksy-Jones et al. 1995, Jankovsky-Jones et al. 1996). This community or a similar community is found in other Rocky Mountain States and the Pacific Northwest (Anderson et al. 1999).

COUNTIES OF OCCURRENCE
This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Lincoln	C	Youngblood et al. 1985
Sublette	C	Youngblood et al. 1985
Fremont	C	Fertig and Bynum 1994, Walford et al. 1997
Park	C	Fertig and Jones 1992, Walford et al. 1997, Jones and Fertig 1999
Albany	C	Jankovsky-Jones et al. 1995 (Old Maids Draw), Jankovsky-Jones et al. 1995 (Big Bear), Jankovsky-Jones et al. 1996
Carbon	C	Jones 1992, Jankovsky-Jones et al. 1995 (Standard Park and Bogs), Jankovsky-Jones et al. 1995 (Ribbon Forest)

STATUS
This community is common within the state, and is probably not a conservation concern under current environmental conditions.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK:

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001562

NATIONAL VEGETATION CLASSIFICATION FORMATION
Seasonally flooded temperate or subpolar grassland

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Water sedge - beaked sedge community type	Jankovsky-Jones et al. 1995 (Big Bear, Old Maid's Draw, Standard Park Park and Bogs), Jankovsky-Jones et al. 1996
Beaked sedge community	Jankovsky-Jones et al. 1995 (Ribbon Forest)
Carex rostrata Vegetation Type	Fertig and Jones 1992
Carex rostrata Community Type	Youngblood et al. 1985, Padgett et al. 1989, Jones 1992, Fertig and Bynum 1994, Walford et al. 1997
Carex rostrata Habitat Type	Hansen et al. 1995
Carex rostrata Ecological Type	Girard et al. 1997

Carex rostrata – *C. rostrata* habitat type Mattson 1984
Carex rostrata – *Eriophorum gracile* habitat type Mattson 1984
Carex rostrata – *Eriophorum polystachion* habitat type Mattson 1984
Carex rostrata – *Juncus ensifolius* habitat type Mattson 1984
Carex rostrata – *Carex aquatilis* ecological type Girard et al. 1997

CLASSIFICATION COMMENTS
This community is a heterogeneous type in terms of species composition. In the future, this vegetation may be split into several other types, as more survey data becomes available.

DOCUMENTATION

REFERENCES

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Jankovsky-Jones, M, G. Jones, and W. Fertig. 1995. Ecological evaluation for the potential Old Maid's Draw Research Natural Area within the Medicine Bow National Forest, Albany County, Wyoming. Unpublished report prepared by the Wyoming Natural Diversity Database, Laramie, WY. 33 pp.

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Jankovsky-Jones, M., G. Jones, and W. Fertig. 1995. Ecological evaluation for the potential Ribbon Forest Research Natural Area within the Medicine Bow National Forest, Carbon County, Wyoming. Unpublished report prepared by the Wyoming Natural Diversity Database, Laramie, WY. 40 pp.

Jankovsky-Jones, M., G. P. Jones, and W. Fertig. 1996. Ecological evaluation of the potential Sheep Mountain Research Natural Area within the Medicine Bow National Forest, Albany County, Wyoming. Unpublished report prepared for the Medicine Bow National Forest by the Wyoming Natural Diversity Database, Laramie WY. 103 pp.

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Jones, G. 1992. A preliminary classification of riparian vegetation types of the Medicine Bow Range and the Sierra Madre. A report prepared in fulfillment of cost-share agreement number 0206-90-01 between the Medicine Bow National Forest and The Nature Conservancy. Wyoming Natural Diversity Database (The Nature Conservancy), Laramie, WY.

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Characterization Abstract for the
Heracleum sphondylium - Rudbeckia occidentalis Herbaceous Vegetation
(Cow-Parsnip - Western Coneflower Herbaceous Vegetation)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic features of this type are (1) < 10% canopy cover of woody plants, and (2) a dense herbaceous stratum in which forbs contribute more canopy cover than do graminoids and *Heracleum sphondylium*, *Rudbeckia occidentalis*, or *Thalictrum fendleri* contribute at least 10% canopy cover.

VEGETATION DESCRIPTION

Stands of this vegetation type consist of a dense herbaceous layer composed mainly of forbs. *Heracleum sphondylium*, *Rudbeckia occidentalis*, and *Thalictrum fendleri* are present in substantial amounts and some combination of the three species usually dominates. *Geranium viscosissimum* usually is present and may contribute more canopy cover than do the first three species. *Delphinium occidentale* also is present in most stands. The only graminoid present in substantial amounts is *Bromus carinatus*, but small amounts of *Melica spectabilis* and *Elymus trachycaulus* often are present. Gregory (1983) concluded that grazing causes *Heracleum sphondylium* to decrease in abundance and *Rudbeckia* and *Thalictrum* to increase.

ENVIRONMENT

Stands of this type are found on benches and lower slopes, in pockets where the soils are moist throughout most of the growing season. Soils contain large amounts of clay and organic matter.

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS

DISTRIBUTION AND STATUS

GENERAL

This is a common vegetation type in the mountains of far western Wyoming, where it is found from ca. 6,400 to 8,900 feet elevation. Stands are small and surrounded by *Abies lasiocarpa* forest, sagebrush shrubland, or various riparian communities.

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Lincoln	C	Gregory 1983
Sublette	C	Gregory 1983
Teton	C	Gregory

STATUS

This vegetation type is widespread in the mountains of western Wyoming. Stands apparently are small and susceptible to overgrazing.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001940

NATIONAL VEGETATION CLASSIFICATION FORMATION
Temporarily flooded temperate perennial forb vegetation

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Heracleum lanatum – Rudbeckia occidentalis Community Type	Gregory 1983

CLASSIFICATION COMMENTS

DOCUMENTATION

REFERENCES

Gregory, Shari K. 1983. M.S.U. Biology Report #36: Subalpine forb community types of the Bridger Teton National Forest, Wyoming. Biology Department, Montana State University, Bozeman, MT.

EDITION: 01-04-01
AUTHOR: G. Jones
UPDATE: 01-04-01

Characterization Abstract for the
Mertensia ciliata Herbaceous Vegetation
(Tall Fringed Bluebells Herbaceous Vegetation)
in Wyoming

DESCRIPTION AND ECOLOGY

DIAGNOSTIC CHARACTERS

The diagnostic characters of this type are (1) absence of a tree overstory or shrub layer, and (2) a forb-dominated herbaceous stratum in which *Mertensia ciliata* or *Senecio triangularis* (alone or together) contribute at least 25% of the canopy cover.

VEGETATION DESCRIPTION

This type comprises lush stands of tall forbs with minor amounts of trees, shrubs, or graminoids. *Mertensia ciliata* *Senecio triangularis*, *Heracleum sphondylium*, *Saxifrage odontoloma*, and *Geranium richardsonii* are common species. Common graminoids (which nevertheless contribute little cover) include *Poa palustris*, *Deschampsia cespitosa*, and *Carex microptera*.

ENVIRONMENT

Stands of this type are found in valley bottoms on benches or flats, and on gentle to steep toeslopes. Norton et al. (1981) describe these sites as the highest of the riparian sites, and note that some might be considered upland. Soils are loamy or sandy, often skeletal, and have developed in colluvium or alluvium. In stands near streams, the water table is near the soil surface at least part of the year, but the upper part of the profile is unsaturated much of the time. These stands apparently occur at elevations above ca. 7,900 feet.

LANDSCAPE POSITION AND ADJACENT VEGETATION

DYNAMICS AND MANAGEMENT CONSIDERATIONS

Stands of this type growing at some distance from streams are stable, but stands near stream channels may be converted to *Salix boothii* shrub stands if the water table is lowered by channel downcutting. Youngblood et al. (1985) suggest that prolonged grazing causes an increase in amounts of unpalatable or grazing-tolerant forbs such as *Rudbeckia occidentalis* and *Helenium hoopesii*.

DISTRIBUTION AND STATUS

GENERAL

This vegetation type has been described from elevations above ca. 7,900 feet in the Wyoming, Salt River, Teton, Gros Ventre, and northwestern Wind River Ranges in western Wyoming. Stands typically are small and isolated, and surrounded by upland conifer forests or riparian shrublands or meadows. Potkin and Munn (no date) noted stands above treeline on talus slopes.

COUNTIES OF OCCURRENCE

This vegetation type is known or strongly suspected to occur in these counties. Future work may show that it occurs in other counties as well.

County	Status	Reference
Lincoln	C	Youngblood et al. 1985, Norton et al. 1981
Sublette	C	Potkin and Munn, no date
Teton	C	Gregory 1983

STATUS

This type is widespread in the mountains of western Wyoming, where it occurs as small, isolated stands in mesic habitats.

GLOBAL CONSERVATION RANK:
STATE CONSERVATION RANK: S3

CLASSIFICATION

NATIONAL VEGETATION CLASSIFICATION ELEMENT CODE
CEGL001944

NATIONAL VEGETATION CLASSIFICATION FORMATION
Tall temperate or subpolar perennial forb vegetation

OTHER NAMES
The following vegetation types from other classifications correspond to this vegetation type.

Name	Reference
Mertensia ciliata Community Type	Gregory 1983
Mertensia ciliata Community Type	Norton et al. 1981
Mertensia ciliata Community Type	Padgett et al. 1989
Mertensia ciliata Community Type	Youngblood et al. 1985

CLASSIFICATION COMMENTS
Vegetation with *Mertensia ciliata* in the undergrowth and with patchy shrub layers, such as the prickly currant/mountain bluebells stands from Medicine Lodge Creek in the western Bighorn Mountains (Marriott and Jones, 1989) [U89MAR03WYUS], may be examples of this *Mertensia ciliata* type. The relationship of this type to the *Senecio triangularis - Mimulus guttatus* type (CEGL001988) needs to be clarified.

DOCUMENTATION

REFERENCES

Gregory, Shari K. 1983. M.S.U. Biology Report #36: Subalpine forb community types of the Bridger Teton National Forest, Wyoming. Biology Department, Montana State University, Bozeman, MT.

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AUTHOR: G. Jones
UPDATE: 01-03-30

Species Abstracts

The species abstracts for the plant and animal species present in the Snake River Basin follow. The reports were extracted from the Biological and Conservation Data system (BCD). Information for these reports came from various sources, which are listed at the end of each abstract.

Animal Species (by common name)

Scientific Name	Common Name
Botaurus lentiginosus	American bittern
Pelecanus erythrorhynchos	American white pelican
Haliaeetus leucocephalus	Bald eagle
Bos bison	Bison
Catostomus discobolus	Bluehead sucker
Aegolius funereus	Boreal owl
Bucephala albeola	Bufflehead
Athene cunicularia	Burrowing owl
Rana luteiventris	Columbia spotted frog
Gavia immer	Common loon
Sorex nanus	Dwarf shrew
Oncorhynchus clarki ssp 2	Fine-spotted snake river cutthroat trout
Otus flammeolus	Flammulated owl
Regulus satrapa	Golden-crowned kinglet
Canis lupus	Gray wolf
Strix nebulosa	Great gray owl
Ursus arctos	Grizzly or brown bear
Histrionicus histrionicus	Harlequin duck
Lasiurus cinereus	Hoary bat
Gila copei	Leatherside chub
Numenius americanus	Long-billed curlew
Myotis evotis	Long-eared myotis
Myotis volans	Long-legged myotis
Falco columbarius	Merlin
Lynx canadensis	North american lynx
Accipiter gentilis	Northern goshawk
Rana pipiens	Northern leopard frog
Pandion haliaetus	Osprey
Falco peregrinus anatum	Peregrine falcon
Aythya collaris	Ring-necked duck
Lutra canadensis	River otter
Charina bottae	Rubber boa
Lasionycteris noctivagans	Silver-haired bat
Picoides tridactylus	Three-toed woodpecker
Cygnus buccinator	Trumpeter swan
Bufo boreas	(northern rocky mountain population) western boreal toad
Otus kennicottii	Western screech owl
Plegadis chihi	White-faced ibis
Lagopus leucurus	White-tailed ptarmigan
Grus americana	Whooping crane
Phalaropus tricolor	Wilson's phalarope
Troglodytes troglodytes	Winter wren
Coturnicops noveboracensis	Yellow rail
Oncorhynchus clarki bouvieri	Yellowstone cutthroat trout

Plant Species (by scientific name)

Scientific name	Common name
Adiantum aleuticum	Aleutian maidenhair-fern
Agoseris lackschewitzii	Pink agoseris
Agrostis oregonensis	Oregon bentgrass
Androsace chamaejasme ssp carinata	Sweet-flowered rock jasmine
Antennaria aromatica	Aromatic pussytoes
Antennaria monocephala	Single-head pussytoes
Arabis williamsii var williamsii	William's rockcress
Arceuthobium douglasii	Douglas fir dwarf-mistletoe
Asclepias cryptoceras ssp davisii	
Aspidotis densa	Pod-fern
Asplenium trichomanes-ramosum	Green spleenwort
Aster mollis	Soft aster
Astragalus paysonii	Payson's milkvetch
Astragalus robbinsii var minor	Robbins milkvetch
Astragalus shultziorum	Shultz's milk-vetch
Astragalus terminalis	Railhead milkvetch
Athyrium distentifolium var americanum	American alpine lady fern
Botrychium virginianum	Rattlesnake fern
Braya glabella	
Calamagrostis koelerioides	Dense pine reed-grass
Carex cusickii	Cusick's sedge
Carex deweyana var bolanderi	Bolander's sedge
Carex diandra	Lesser panicled sedge
Carex laeviculmis	Smooth-stemmed sedge
Carex leptalea	Bristly-stalk sedge
Carex livida	Livid sedge
Carex luzulina var atropurpurea	Black and purple sedge
Carex preslii	Presl sedge
Carex proposita	Smoky mountain sedge
Carex scirpoidea var scirpiformis	Canadian single-spike sedge
Cicuta bulbifera	Bulb-bearing water-hemlock
Clarkia pulchella	Large-flower clarkia
Cryptogramma stelleri	Fragile rockbrake
Descurainia torulosa	Wyoming tansymustard
Dodecatheon jeffreyi	Jeffrey's shooting star
Draba borealis	Boreal draba
Draba crassa	Thick-leaf whitlow-grass
Draba globosa	Rockcress draba
Draba paysonii var paysonii	Payson's draba
Draba porsildii var porsildii	Porsild's whitlow-grass
Drosera anglica	English sundew
Dryopteris expansa	Spreading woodfern
Dulichium arundinaceum	Three-way sedge
Eleocharis bella	Delicate spikerush
Eleocharis flavescens var thermalis	Warm springs spikerush
Epipactis gigantea	Giant helleborine
Equisetum fluviatile	Water horsetail
Erigeron humilis	Low fleabane
Eriophorum gracile	Slender cotton-grass
Eriophorum viridicarinatum	Green keeled cotton-grass

Gayophytum humile	Low ground-smoke
Gentianopsis simplex	Hiker's gentian
Gymnocarpium dryopteris	Oak fern
Haplopappus macronema var linearis	Narrowleaf goldenweed
Heterocodon rariflorum	Western pearl-flower
Heterotheca depressa	Teton golden-aster
Hieracium scouleri	Scouler hawkweed
Huperzia selago	Fir clubmoss
Ipomopsis crebrifolia	Compact gilia
Juncus filiformis	Thread rush
Juncus tweedyi	Tweedy's rush
Kelloggia galioides	Milk kelloggia
Lemna valdiviana	Pale duckweed
Lesquerella carinata var carinata	Keeled bladderpod
Lesquerella multiceps	Western bladderpod
Lesquerella paysonii	Payson's bladderpod
Listera convallarioides	Broad-leaved twayblade
Luzula glabrata var hitchcockii	Smooth wood-rush
Marsilea vestita var oligospora	Pepperwort
Melica smithii	Smith melic grass
Minuartia filiorum	Thread-branch stitchwort
Monardella odoratissima var glauca	Mountain wild-mint
Muhlenbergia glomerata	Marsh muhly
Najas guadalupensis	Southern naiad
Ophioglossum vulgatum	Adder's-tongue
Orobanche corymbosa var corymbosa	Flat-top broomrape
Orobanche ludoviciana var arenosa	Louisiana broomrape
Paeonia brownii	Brown's peony
Parrya nudicaulis	Naked-stemmed parrya
Pellaea suksdorfiana	Smooth cliff-brake
Polystichum scopulinum	Mountain holly fern
Porterella carnosula	Western porterella
Potamogeton friesii	Fries pondweed
Potamogeton obtusifolius	Blunt-leaf pondweed
Potamogeton robbinsii	Flatleaf pondweed
Potamogeton zosteriformis	Flatstem pondweed
Ranunculus flabellaris	Yellow water-crowfoot
Rubus acaulis	Nagoonberry
Salix candida	Hoary willow
Salix eriocephala var mackenzieana	Mackenzie's willow
Saussurea weberi	Weber's saw-wort
Scheuchzeria palustris	Pod-grass
Scirpus rollandii	Rolland bulrush
Scirpus subterminalis	Water bulrush
Sedum stenopetalum	Narrow-petal stonecrop
Selaginella selaginoides	Low spike-moss
Senecio hydrophiloides	Sweet marsh butterweed
Senecio megacephalus	Big-headed groundsel
Silene repens var australis	Creeping campion
Sisyrinchium idahoense var idahoense	Idaho blue-eyed grass
Sparganium minimum	Small bur-reed
Spirodela polyrrhiza	Common water-flaxseed
Stellaria crispa	Crimped stitchwort
Stephanomeria fluminea	Teton wire-lettuce

Torreyochloa pallida var fernaldii	Fernald alkali-grass
Townsendia florifer	Showy easter-daisy
Townsendia leptotes	Common easter-daisy
Trautvetteria caroliniensis	Carolina tassel-rue
Triteleia grandiflora	Large-flower triteleia
Utricularia intermedia	Flatleaf baldderwort
Utricularia minor	Lesser bladderwort
Viola orbiculata	Western rough-leaved violet
Viola renifolia var brainerdii	Kidney-leaf white violet
Xerophyllum tenax	Western beargrass

Animal Species Abstracts

ACCIPITER GENTILIS
NORTHERN GOSHAWK

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:
USFWS found that listing the population in the contiguous U.S. west of the 100th meridian as threatened or endangered was not warranted (Federal Register 63:35183-35184, 29 June 1998).

Rangewide
Global Rank: G5
Comments:
Relatively abundant and widespread, Holarctic; population trends are difficult to determine; no hard evidence of a significant decline in recent decades, but probably declining in some areas primarily as a result of habitat alteration (especially logging), which can be expected to continue; effectiveness of forest management guidelines in providing adequate protection remains to be determined.

Wyoming
WYNDD State Rank: S2S3B,S4N
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Relatively uncommon species with high threat to habitat; nesting habitat preferences and population status poorly known in Wyoming.

State Status
Wyoming Game and Fish Department Native Species Status NSS4/Species of Special Concern 4/Neotropical Migrant/Species taken for falconry (Wyoming Game and Fish, 1997)^U.S. Forest Service Region 2 Sensitive Species^US Fish and Wildlife Service Category 2 species until category was abolished.

US Forest Service
Management Status: S-USFS R2

TAXONOMY
General
Contains two groups: ATRICAPILLUS of North America and GENTILIS of Eurasia (AOU 1998). See Whaley and White (1994) for information on geographic variation in North America. Validity of subspecies APACHE is questionable (see Banks 1995).

Sub-Species
American Ornithologists' Union recognized two subspecies in North America. A. GENTILIS ATRICAPILLUS is the subspecies in Wyoming.

DESCRIPTION
Largest North American accipiter. About as large as Northern Harrier but slightly longer, the banded tail long and narrow, wings short with rounded tips, the light breast vertically streaked with dense gray bars, white eye-brow prominent, adult blue-gray on back, immature brownish on back (Dorn and Dorn, 1990). Females larger than males. Flies with a rapid, steady wingbeat alternated with gliding. Darts in and around forests and openings, using the long tail and rounded wings to turn sharply or to dodge obstacles (Terres, 1991; Dorn and Dorn, 1990).^SIMILAR SPECIES: Cooper's hawks are smaller with shorter wings and longer tail; and Sharp-shinned hawks are smaller, slightly larger than a kestrel, lack a white eye stripe, and have horizontal rufous barring on breast (Dorn and Dorn, 1990). The long tail separates this hawk from the other large hawks except the Northern Harrier, which has a white rump (McCreary, 1937).

DISTRIBUTION

Rangewide
BREEDING: North America: western and central Alaska to northeastern Manitoba, Labrador, and Newfoundland, south to central California, southern Arizona, eastern foothills of Rockies, central Alberta, southern Manitoba, central Michigan, Pennsylvania, northwestern Connecticut, and in the Appalachians south to West Virginia and Maryland; locally in highlands of Mexico to Jalisco and Guerrero. Eurasia: British Isles, Scandinavia, northern Russia, and northern Siberia south to the Mediterranean, Asia Minor, Iran, the Himalayas, eastern China, and Japan (Squires and Reynolds 1997, AOU 1998). ^NON-BREEDING: throughout breeding range and irregularly southward (Squires and Reynolds 1997, AOU 1998). In some years there are large flights (irruptions) south beyond the usual wintering range. These excursions are prompted by changing conditions on the northern breeding grounds (Mueller et al. 1977). Recorded occasionally as far south as Arkansas, Louisiana, Kentucky, Alabama, and North Carolina (Adkisson 1990). ^The three subspecies in the U.S. have the following ranges: 1) ATRICAPILLUS: Alaska, Canada, eastern U.S., and the more northerly mountains of the west. 2) LAINGI: islands off the Canadian Pacific coast. 3) APACHE: southern Arizona, New Mexico, and the mountains of northwestern Mexico (Jones 1979).

Wyoming
Large breeding range spanning Canada, Alaska, and the western U.S. Resident breeder in scattered locations in mountain/ foothills throughout the state. Prefers mature lodgepole pine with little or no understory for nesting. Breeding records exist for Albany, Carbon, Johnson, Natrona, Park, Sheridan, Sublette, Sweetwater, and Teton counties. All montane and subalpine forest in the state has the potential to support goshawks (Merrill et al. 1996).

Abundance
Yearlong resident, uncommon in summer, rare in winter (Dorn and Dorn 1990).

Migration
Yearlong resident, uncommon in summer, rare in winter, with migration peaks in March and October (Dorn and Dorn, 1990). Larger than usual migratory movements occur about once per decade (Bent 1937).

HABITAT
Rangewide
BREEDING: Nests in a wide variety of forest types including deciduous, coniferous, and mixed forests. Typically nests in mature or old-growth forests (Hayward and Escano 1989, Reynolds et al. 1982, Speiser and Bosakowski 1987, Squires and Ruggiero 1996) and generally selects larger tracts of forest over smaller tracts (Bosakowski and Speiser 1994, Woodbridge and Detrich 1994). In the eastern U.S., nests in hardwood-hemlock (TSUGA CANADENSIS) forests, where black birch (BETULA LENTA) and American beech (FAGUS GRANDIFOLIA) are preferred nest trees (Speiser and Bosakowski 1987). In the western U.S., characteristically nests in coniferous forests including those dominated by ponderosa pine (PINUS PONDEROSA; Bright-Smith and Mannan 1994, Reynolds et al. 1992) or lodgepole pine (PINUS CONTORTA; Squires and Ruggiero 1996), or in mixed forests dominated by various coniferous species including fir (ABIES spp.), Douglas-fir (PSEUDOTSUGA MENZIESII), cedar (THUJA spp.), hemlock, spruce (PICEA spp.), and larch (LARIX spp.; Hayward and Escano 1989, Reynolds et al. 1982). Western birds also nest in deciduous forests dominated by aspen (POPULUS TREMULOIDES), paper birch (BETULA PAPYRIFERA), or willow (SALIX spp.; McGowan 1975, cited in Squires and Reynolds 1997; Swem and Adams 1992, cited in Squires and Reynolds 1997; Younk and Bechard 1994). ^While generally associated with remote habitat, goshawks in Europe apparently have adapted to human-occupied landscapes and nest near farms and settlements (Palmer 1988). Palmer noted that this species may be undergoing similar adaptation in northeastern U.S.; for example, it is apparently not uncommon in suburbs of Boston (L. Master, pers. comm.). ^Nests are generally constructed in the largest trees of dense, mature stands with high canopy closure (60-95 percent) and sparse groundcover, near the bottom of moderate slopes, and near water (Bull and Hohmann 1994, Hargis et al. 1994, Reynolds et al 1982, Siders and Kennedy 1994, Squires and Ruggiero 1996, Younk and Bechard 1994). Occasionally will nest in relatively open stands (10 percent canopy coverage; Reynolds et al. 1982). Nest height above the ground is significantly correlated with nest-tree height (Kennedy 1988, cited in Squires and Reynolds 1997). Nest height ranges from 2.5-43 meters (Gabrielson and Lincoln 1959, Siders and Kennedy 1994). May use same nest in successive years. May use other hawk nest as base. Nests in arctic tundra and taiga have also been documented in interior Alaska (Olendorff et al. 1989). ^Forages in both heavily forested and relatively open habitats. In Ponderosa pine forest of Arizona, habitat on sites selected for foraging had higher canopy coverage, greater tree density, and greater density of large trees (greater than 40.5 centimeter DBH), but lower prey abundance than non-foraging sites (Beier and Drennan 1997). In Nevada, foraged in open sagebrush

(ARTEMISIA spp.) adjacent to riparian aspen stands (Younk and Bechard 1992, cited in Squires and Reynolds 1997). ^NON-BREEDING: habitat requirements during winter are poorly understood, especially in the U.S. (Squires and Reynolds 1997). During winter in Sweden, inhabits a fragmented landscape of forests, clearcuts, wetlands and agricultural lands. Whereas non-forested habitats were used in proportion to their availability, large tracts of mature forest were used preferentially (Widen 1989).

Wyoming
Nests in mature and old-growth coniferous forest stands with dense canopies, large trees, and open understories for nesting and foraging. Although considered habitat generalists at large spatial scales, they tend to require relatively specific habitat structure for nesting (Squires and Reynolds 1997). They especially prefer stands of mature lodgepole pine, Douglas fir, and aspen, although forest structure is more important than tree species composition. Nests are usually in stands with large trees and well-developed canopies (75-85% canopy closure in western Montana and northern Idaho) (Hayward and Escano 1989). For the most part, the literature agrees that northern goshawks prefer large habitat patches in fairly remote areas, but the definition of "large" varies considerably from site to site, and it is impossible to generalize across the range. Nests are typically located near water toward the bottom of gentle to moderate slopes with southerly exposures and small openings near the nest trees (Wyoming Game and Fish Department 1996; Squires and Ruggiero 1996; Hayward and Escano 1989; Schuster 1980). In Yellowstone National Park, nests are found in spruce-fir and fir-whitebark pine stands. Winter habitats are more variable. Hunts in diverse habitats ranging from open sagebrush steppe to dense forests depending on prey, but may prefer mature forests for foraging (Squires and Reynolds, 1997). Deciduous and coniferous forest, forest edge, and open woodlands are also used. While generally associated with remote habitat, northern goshawks in Europe apparently have adapted to human-occupied landscapes and nest near farms and settlements (Palmer 1988). Palmer noted that this species may be undergoing similar adaptation in northeastern U.S.; for example, it is apparently not uncommon in suburbs of Boston (L. Master pers. comm.).

PHENOLOGY
Wyoming
Maximum life span at least 11 years (Squires and Reynolds, 1997).

FOOD HABITS
Rangewide
Forages during short flights alternated with brief prey searches from perches. Also hunts by flying rapidly along forest edges, across openings, and through dense vegetation. An opportunistic hunter, preys on a wide variety of vertebrates and, occasionally, insects. Prey is taken on the ground, in vegetation, or in the air. Despite their larger size, females do not capture larger or heavier prey than males (Boal and Mannan 1996). Dominant mammalian prey include five species of tree squirrels, four ground squirrels, and lagomorphs. Frequently killed birds include three galliformes, four corvids, six woodpeckers (piciformes) and the American robin (TURDUS MIGRATORIUS; Squires and Reynolds 1997). During the nesting season, the diet can vary with prey availability. For example, as more fledgling passerines become available, they make up a greater portion of the diet (Linden and Wikman 1983, Reynolds and Meslow 1984). Ratio of mammalian prey to avian prey in the diet during the breeding season (in percent): Arizona, 76:24 and 62:38 (Boal and Mannan 1994, Reynolds et al. 1994); Nevada, 67:32 (Younk and Bechard 1994); New York, 39:61 (Grzybowski and Eaton 1976); and Oregon, 42:59 and 45:55 (Bull and Hohmann 1994, Reynolds and Meslow 1984). ^Nonbreeding season food habits are unknown for North American populations. In Sweden, birds dominate the diet during the nesting season (86 percent of prey), whereas in winter, red squirrels (SCIURUS VULGARIS) comprise the bulk of the diet (79 percent; Widen 1987, cited in Squires and Reynolds 1997).

Food Habits
Wyoming
Eats mainly lagomorphs, squirrels, ducks, gallinaceous and other birds; local diet partly depends on availability. Tends to hunt low in forest canopy; a typical hunt involves a short, rapid attack from a perch.

REPRODUCTION
Rangewide
Usually one clutch produced per year, from late April through early May (Squire and Reynolds 1997); however, some individuals may not breed during cold, wet springs (DeStefano et al. 1994). Egg-laying may begin later at higher elevations and during cold, wet springs (Henny et al. 1985, Younk and Bechard 1994). Clutch is typically two to four

eggs, rarely one to five (Squires and Reynolds 1997). Average clutch size of 44 North American clutches is 2.7 eggs (Apfelbaum and Seelbach 1983 cited in Squires and Reynolds 1997). Eggs are laid every two to three days and incubation usually begins after the second egg is laid. Incubation, conducted principally by the female, takes 28-38 days; hatching is asynchronous. ^Few data regarding hatching success. In Oregon, hatching success in five nests was 81 percent (Reynolds and Wight 1978 cited in Squires and Reynolds 1997). Nest success (percentage of active nests that fledge greater than one young) in North America ranges from 44-94 percent and most populations produce 2-2.8 fledglings per successful nest (summarized in Squires and Reynolds 1997). ^Egg/nestling mortality has been attributed to exposure to cold and rain and siblicide (Boal and Bacorn 1994, Squires and Reynolds 1997). In northern Wisconsin, nest success dropped from 94 percent to 62 percent due to an increase in predation of nest contents and adult females by fishers. Increased predation by fishers was attributed to an increase in the fisher population and nest exposure due to tree defoliation by forest tent caterpillars (MALACOSOMA DISSTRIA; Erdman et al. 1998). ^Brooding and feeding of nestlings is performed principally by the female; the male brings food to the nest. The young begin flying at 35-42 days and become independent at about 70 days (Boal 1994, Squires and Reynolds 1997). Maintain one to eight alternate nests within a nest area (Squire and Reynolds 1997). Alternate nests range from 15-2066 meters apart (Reynolds and Wight 1978, cited in Squires and Reynolds 1997; Woodbridge and Detrich 1994). The average distance between nests of nearest neighboring pairs in Arizona was 3 kilometers (range = 1.6-6.4 kilometers; Reynolds et al. 1994). A small percentage (less than 10 percent) of subadults (1-2 years old) are sexually mature; however, most breeding birds are young adults (2-3 years old) or adults (Squires and Reynolds 1997). Nesting by subadults is more frequent in expanding populations and less frequent in stable populations (Reynolds and Wight 1978, cited in Squires and Reynolds 1997).

Wyoming
Builds large, bulky stick nests about 30-60 feet (9-18 meters) above the ground. May be used again in subsequent years, or the nesting pair may alternate between 2 or more nests within the nest site. Most pairs produce one brood per season with 2-3 fledglings per successful nest; nest success is usually between 80-94%. Cold, rainy weather increases chick mortality (Squires and Reynolds 1997).

ECOLOGY
Rangewide
Nesting densities of most western U.S. populations range from 6.6-10.7 pairs per 100 square kilometers (summarized in Squires and Reynolds 1997). The single nesting density estimate for the eastern U.S. is 1.17 pairs per 100 square kilometers (Kimmel and Yahner 1994, cited in Squires and Reynolds 1997). Home ranges during nesting vary from 95-3500 hectares depending on sex and habitat characteristics (Squires and Reynolds 1997). Home ranges of males are typically larger than those of females (Hargis et al. 1994, Keane and Morrison 1994, Kennedy et al. 1994). Exclusive of nesting areas, home ranges of adjacent pairs are not defended and may overlap (Squires and Reynolds 1997). The core area (encompasses nest site) constitutes 32 percent of the home range (Kennedy et al. 1994). Individuals typically enlarge or sometimes shift location of home ranges after breeding (Hargis et al. 1994, Keane and Morrison 1994). ^Home ranges of non-breeders are poorly known, but may be larger than those of breeders (Squires and Reynolds 1997). In North America, winter home ranges are unknown. In Sweden, winter home-ranges of males and females were similar and averaged 5700 hectares (Widen 1989). ^In California, 76.5 percent of males and 71.4 percent of females returned to the same nesting area in subsequent years. Males were significantly more likely to return to previously-inhabited territories in consecutive years than females (Detrich and Woodbridge 1994). In Arizona, 80 percent of nest areas examined in two consecutive years were re-used the second year by one or both members of the pair banded the first year (Reynolds et al. 1994). Sixty to 72 percent of adults located in consecutive years retained the mate from the previous year (Detrich and Woodbridge 1994, Reynolds et al. 1994). ^Dispersal of young is not well documented. Detrich and Woodbridge (1994) recaptured two adult females, banded as nestlings 5-7 years prior, 16 and 24 kilometers from their natal sites. Three females, banded as nestlings and recaptured as breeding adults, moved an average of 21.5 kilometers from their natal sites, and another female, captured as a breeding adult seven years after being banded as a nestling, moved 100 kilometers from its natal site (Squires and Reynolds 1997). ^Little is known regarding survivorship in the U.S. In Arizona, annual survivorship of male and females more than 1 year old was estimated to be 68.8 percent and 86.6 percent, respectively (Squires and Reynolds 1997). In Yukon, Canada, an observed population decline was attributed to increased mortality of eggs, nestlings, immatures and adults, as well as to dispersal following a precipitous decline in number of snowshoe hares (Doyle and Smith 1994). The maximum lifespan of a wild bird is 11 years (Squires and Reynolds 1997). The sex ratio is 1:1 prior to fledging and among adults (Mueller and Berger 1968, Reynolds et al. 1994).

Wyoming

TERRITORIALITY: Territorial against raptors during nesting. Forest stands containing nests are often small, approximately 10-100 heectares; territories may contain 1-5 alternative nest areas (Squires and Reynolds, 1997). Intolerant of human disturbance and defend large areas around nest trees (Finch, 1992).^COMMUNITY INTERACTION: Few natural predators. Great Horned Owls kill adults and nestlings; wolverines, martens, and similar carnivores also take birds.^DEMOGRAPHY: Density of breeding pairs low and difficult to document. Highly variable between populations.

TRENDS IN WYOMING

Populations suspected to be declining slightly due to loss of habitat from logging.

MANAGEMENT CONSIDERATIONS

In the past, the Wyoming Game and Fish Department accorded it lower priority because of the widespread distribution, general abundance, and adaptability to different habitat types. However, because of the possibility of population declines and concerns over the impacts of timber harvest, there is a need to establish population objectives and maintain current breeding range. Since habitat requirements vary between areas, managers should determine goshawk needs at a local level. Since incompatible timber harvesting techniques may decrease nesting habitat, managers also need to encourage Forest Service to consider goshawks in forest planning, e.g., ensure that nesting requirements are considered in the management plan; survey for nesting areas in areas slated for timber harvest; set up a monitoring program (Wyoming Game and Fish Department, 1996).^One of the species in greatest demand for falconry in Wyoming, which issues permits for capture. Data are no longer being collected on the number of falconers, species of rapteros used for falconry, or species of animals taken by raptors (Wyoming Game and Fish Department, 1998) but not considered a threat (Squires and Reynolds, 1997). Squires and Ruggiero (1996), who conducted a study in the Medicine Bow National Forest, recommend that the mature lodgepole pine habitat preferred by nesting goshawks be identified and managed. Mature lodgepole pine stands are not often recognized as potentially important nesting habitat; old-growth scoring procedures used by agencies may need modification so that forest structures associated with nesting habitat are identified (Squires and Ruggiero, 1996). Reynolds et al. (1992) recommends leaving uncut areas around active nests, ensuring nest, postfedgling, and foraging habitats, and selecting replacement nest sites before harvesting timber (4 per township). The Wyoming Game and Fish Department recently assessed goshawk management on the Shoshone National Forest (Wyoming Game and Fish Department 1997). They recommend initiating baseline surveys for nesting paris throughout the forest for two years. After that, a program monitoring population and production trends could be instituted.

Threats

Requires specialized nesting habitat of mature, park-like stands of lodgepole pine, and is threatened by logging of nest trees and habitat. Logging operations wihin 50-100 meters of nests will disturb nesting birds (Squires and Reynolds 1997).

Protection Status

WYNDD has no breeding records on land with any special protection, although breeding is almost certainly occurring within several wilderness areas. Of the non-breeding records, one each occurs in Yellowstone National Park, the Tensleep Preserve, a Research Natural Area, and Wilderness Area. All others occur on lands managed for multiple use.

INFORMATION NEEDS

Inventory Needs

Detailed distribution, habitat use and population information are needed for Wyoming. The Wyoming Game and Fish Department (1996) recommends obtaining baseline population information for Wyoming and developing a monitoring program, especially on U.S. Forests.

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AEGOLIUS FUNEREUS
BOREAL OWL

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:
Wide range, apparently large numbers and occurrences seem to make this species secure.

Wyoming
WYNDD State Rank: S2
Comments:
Uncommon; some threats; specialized habitat requirements.

State Status
Rare yearlong resident. Wyoming Game and Fish Department Species of Special Concern 4/Native Species Status 4; U.S. Forest Service Sensitive Species, Region 2 and Region 4.

US Forest Service
Management Status: S-USFS R2
S-USFS R4

TAXONOMY
General
Known as Tengmalm's Owl in European literature (AOU 1998).

Sub-Species
A. F. RICHARDSONI

DESCRIPTION
Small, 23 cm (9 in) owl of high elevation forests with large head and long wings. Chocolate brown with white wing spots, tail bars, and a white and brown mottled breast. Has a white facial disk, light-colored bill, white head spots. Juveniles are sold dark brown except for wing spots and white semi-circles outlining the inner facial disk. Females much larger than males.^SIMILAR SPECIES: Head spots, pale bill, dark brown color and relatively large size distinguish it from the saw-whet owl (Clark et al., 1989). Flammulated owl smaller without white spots on forehead, has dark eyes; other small earless owls have long legs or a long tail (Dorn and Dorn, 1990).

DISTRIBUTION
Rangewide
Breeds in North America from treeline in central Alaska east to Newfoundland; south central Oregon in the Cascade and Blue Mountains, and in the Rocky Mountains south through Washington, Idaho, Montana, Wyoming, and Colorado to northern New Mexico; then east through central Saskatchewan, southern Manitoba, northern Minnesota, southern Quebec and Ontario. Breeds in Eurasia from treeline in northern Scandanavia, Russia, and Siberia, south in the mountians to southern Europe, the western Himalayas, and western China (AOU 1983, Hayward and Hayward 1993). Winters mainly in hte breeding range, however it may move south in the eastern U.S. and Europe during eruption years (A.O.U. 1983, Hayward and Hayward 1993).

Wyoming

Occurs in Albany, Carbon, Fremont, Lincoln, Platte, Teton, Park and Uinta counties. All breeding and suspected breeding records are from Albany, Carbon and Teton Counties. The Wyoming Gap Analysis Atlas (Merrill et al., 1996) shows predicted or potential additional habitat near existing sites in the Medicine Bow, Shoshone, Bridger-Teton, and Targhee National Forests and Yellowstone and Grand Teton National Parks. See Garber et al. (1991) for general distribution.

Abundance
Listed as "Resident, abundance undetermined" by the Wyoming Game and Fish Department; should probably be "Resident, uncommon". Often not detected because of nocturnal nature and because they call only during a brief courtship period in the winter, so an accurate population estimate is difficult to assess. The short calling period between early February and late April is almost the only opportunity to locate them (Clark et al., 1989).

Migration
Resident; may disperse in years of low prey abundance (Hayward and Hayward, 1993).

HABITAT
Rangewide
Dense coniferous forest, mixed forest, thickets of alder, aspen, or stunted spruce, most commonly in proximity to open grassy situations (AOU 1983); muskeg bogs. In the Rockies, occurs generally in mature, multilayered spruce-fir forest. Roosts in dense cover by day, in cool microsites in summer; frequently changes roosting site. ^Nests in tree hole, natural cavity or old woodpecker hole; sometimes in artificial nest boxes (Harrison 1978). Nest site may be used in consecutive years. Three nest holes in Colorado were 78-100 mm in diameter (see Johnsgard 1988). A nest in Montana was in a dead broken-topped subalpine fir; the cavity opening measured 73 mm X 64 mm (Holt and Ermatinger 1989).

Wyoming
In the Rockies, the boreal owl generally occurs in mature, multilayered forest dominated by Engelmann spruce, subalpine fir, and lodgepole pine. The exact species, age, and size composition of forests varies with location and the owl's activity. It uses pole stands and openings where perches are available at forest edges for hunting, and seeks cool forests stands in spruce-fir forest for summer roost sites. Small mammal abundance may be greatest in these stands as well. Frequently changes its roosting site. Because spruce-fir forests contain few cavities, the best habitat might include small patchs of forest types with abundant cavities, such as aspen or ponderosa pine stands, within spruce-fir stands (Clark et al. 1989b; Hayward et al. 1993). Nest sites may be used in consecutive years. A nest in Montana was in a dead broken-topped subalpine fir (Holt and Ermatinger 1989).

PHENOLOGY
Rangewide
May forage day or night; most hunting occurs at night (Hayward 1989).

Wyoming
Peak activity occurs within 2 hours of sunset and sunrise (Clark et al., 1989).

FOOD HABITS
Rangewide
Eats mainly small mammals (often MICROTUS and CLETHRIONOMYS, also SOREX and PEROMYSCUS); also sometimes birds and insects (Bent 1938, Ryder et al. 1987, Hayward 1989).

Food Habits
Wyoming
Boreal owls are opportunistic hunters. Small mammals such as Microtus, Clethionomys, Sorex, and Peromyscus are the most important prey items, but they may also take birds and insects (Bent 1938, Ryder et al. 1987, Hayward 1989).

REPRODUCTION
Rangewide

Female may occupy the nest cavity 1-3 weeks prior to egg laying (Hayward 1989). In Colorado, nests were initiated from mid-April to early June; mid-April to late May in Idaho (Hayward 1989). Clutch size usually is 4-6. Incubation reported as 25-36 days, by female. Young fledge at about 4-5 weeks, independent at 5-6 weeks, sexually mature by 1 year. Mating system variable. See Johnsgard (1988).

Wyoming
Monogamous. Males call from potential nest sites between early Febrary and late April. Breeding effort may be related to small mammal abundance (Clark et al., 1989). Female may occupy the nest cavity 1-3 weeks prior to egg laying. In Colorado, nests were initiated from mid-April to early June; mid-April to late May in Idaho (Hayward 1989). Clutch size usually is 4-6. Incubation reported as 25-36 days, by female. Young fledge at about 4-5 weeks, independent at 5-6 weeks, sexually mature by 1 year. Mating system variable.

ECOLOGY
Rangewide
In Idaho, annual home range averaged 1528 ha (522-4119 ha); home ranges overlapped extensively; range was larger in winter than in summer; center of winter and summer ranges were separated by average of 2333 m (Hayward et al. 1987). Defends nest site only.

Wyoming
TERRITORIALITY: Males defend a small area around the nest site during breeding season, but otherwise home ranges overlap extensively. Home ranges in Idaho average 2471 acres. Small mammal abundance and distance between high quality foraging areas and potential nest cavities may be major factors determining home range and population size. (Clark et al., 1989). Appear to tolerate human disturbance and machine noise (Bighorn National Forest, 1996).^COMMUNITY INTERACTIONS: In areas of the Rocky Mountain Region, considered a dominant avian predator on small mammals. Potential prey competition with saw-whet owl, great gray owl, northern hawk owl, and marten. May compete with flying squirrel, pileated woodpecker, common flicker, and saw-whet owl for nest cavities. Preyed upon by marten, squirrels, and raptors (Hayward and Hayward, 1993).

TRENDS IN WYOMING
Undetermined, but suspected to be declining slightly due to loss of habitat from logging.

MANAGEMENT CONSIDERATIONS
Mature spruce-fir stands important, but exact size required is unknown. Probably needs uneven-age timber management or modifications of even-age systems that retain old forest characteristics (Hayward et al., 1993). Adequate nesting snags are necessary, so attention to flicker and woodpecker populations should be a part of owl management. Also nests readily in artificial nest boxes. Need to manage for abundant small mammal populations in high elevation conifer forest (Clark et al., 1989). Also need to get a good assessment of population status in the state with surveys and song playback techniques (Wyoming Game and Fish Department, 1997). Surveys should be conducted during peak breeding season when Males are calling, typically between 1 March and 15 April (Wyoming Game and Fish Department, 1998).Need to determine the effects of logging and clearcutting on populations. Because forest succession is slow in spruce-fir forests, clearcut sites will remain unsuitable habitat for centuries (Hayward and Hayward, 1993).

Threats
Preferred habitat is also very desirable commercial timber. Logging removes nesting snags and may decrease prey populations; clearcutting reduces old-growth or mature forest habitat (Hayward and Hayward, 1993). Also has restricted breeding locations and small remote populations (Finch, 1992).

Protection Status
All breeding and suspected breeding sites occur on National Forest or National Park lands. 6 records from Medicine Bow NF, 2 from Grand Teton NP, 1 from Yellowstone NP, 1 from J.D. Rockefeller Memmorial Parkway, and 1 from Targhee NF. 1 additional observation from Big Horn NF.

INFORMATION NEEDS

Inventory Needs
Detailed population information is needed for Wyoming. Surveys should be conducted in the Bighorn Mountains and the Shoshone National Forest.

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ATHENE CUNICULARIA
BURROWING OWL

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G4
Comments:
Widespread distribution in North America; relatively common in appropriate habitat in some areas, but habitat alteration and other factors are causing population declines in many areas.

Wyoming
WYNDD State Rank: S3B,SZN
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Uncommon; somewhat widespread; prairie dog erradication programs probably have (and continue to) caused declines.

State Status
Widespread but generally uncommon; prairie dog eradication has resulted in population declines across the state.

US Forest Service
Management Status: S-USFS R2

TAXONOMY
General
Placed in genus ATHENE by AOU (1997). Karyotypic studies suggest separate generic status as SPEOTYTO (AOU 1991). Sibley and Monroe (1990) cited DNA-DNA hybridization evidence in asserting that SPEOTYTO CUNICULARIA is not closely related to owls of the genus ATHENE.

Sub-Species
Burrowing owls in Wyoming and surrounding regions are of the subspecies A. c. hypugaea (Clark 1997).

DESCRIPTION
A small, diurnal, ground-dwelling owl. Legs are noticeably long and sparsely feathered below the tibiotarsal joint. Head is round, lacks ear tufts, with a distinct oval facial ruff. Iris is bright yellow. Wings long and rounded. Coloration is generally light brown with white spots above; underparts are a buffy white with occasional brown markings. Females typically darker than males (Haug et al. 1993). General Generic status uncertain. Placed in genus Athene by American Ornithologists Union (1998), but recent karyotypic studies suggest Speotyto (American Ornithologists Union 1991, Haug et al. 1993, Clark 1997). Sibley and Monroe (1990) cited DNA-DNA hybridization evidence in asserting that burrowing owls are not closely related to owls of the genus Athene. Up to 18 subspecies are recognized; A. c. hypugaea is the most widespread and forms the bulk of the North American population. Most other subspecies are geographically isolated on islands (Haug et al. 1993).

DISTRIBUTION
Rangewide
BREEDS: south-central British Columbia (nearly extirpated), southern Alberta, southern Saskatchewan, southern Manitoba south through western U.S., central Mexico, central and southern Florida, West Indies, and locally in much of South America. Withdraws from northernmost portions of breeding range in northern winter. Winters regularly to El

Salvador, casual to accidental to western Panama. California, New Mexico, and Arizona are important wintering areas in the U.S. (James and Ethier 1989).

Wyoming
Refer to Oakleaf et al. (1992) and Dorn (1990) for distribution by LAT/ LONG block. Probably occurs in suitable habitat (shrub-steppe/ grasslands) state-wide; often associated with prairie dog towns.

Abundance
Rangewide General: Breeding range covers much of western North America and the central Great Plains, extending from southern Canada to northern Texas, and central California east to Minnesota and eastern Texas. Year-round range (i.e., supports both breeding and wintering birds) lies to the south of the breeding range, extending into central Mexico. Year-round populations segments are known from Florida and the Caribbean islands. Winter range extends from northern Mexico and southern Texas to El Salvador and Panama (American Ornithologists Union 1983, James and Ethier 1989, Haug et al. 1993). Trends: Although widespread and occasionally locally abundant, burrowing owl abundance and range has declined noticeably. The North American range has contracted generally southward since the mid-1900's, and abundances have decreased in several areas (Haug et al. 1993, James and Espie 1997). Wyoming General: Wyoming forms part of the core of burrowing owl breeding range. The species is widespread in grassland and shrub-steppe habitats in the state, and is often associated with prairie dog (Cynomys ludovicianus and C. leucurus) colonies. Recorded in every LAT/ LONG block in the state (Oakleaf et al. 1992, Luce et al. 1997, Dorn and Dorn 1990, 1999; see also Merrill et al. 1996). The area in and around Goshen Hole may support the highest densities in the state (N. Korfanta, University of Wyoming, personal communication) Trends: Trends often assumed stable in the state (James and Espie 1997), but recent research suggests a decline, with low occupancy of historically active sites (N. Korfanta, University of Wyoming, personal communication). Monitoring efforts in surrounding states have also recorded declines in range and number of individuals (Haug et al. 1993, James and Espie 1997).

Migration
Migratory: No specific data to report; migratory habitat assumed to be same as breeding habitat (Haug et al. 1993).

Estimated Number of Occurrences
Wyoming General: Wyoming forms part of the core of burrowing owl breeding range. The species is widespread in grassland and shrub-steppe habitats in the state, and is often associated with prairie dog (Cynomys ludovicianus and C. leucurus) colonies. Recorded in every LAT/ LONG block in the state (Oakleaf et al. 1992, Luce et al. 1997, Dorn and Dorn 1990, 1999; see also Merrill et al. 1996). The area in and around Goshen Hole may support the highest densities in the state (N. Korfanta, University of Wyoming, personal communication) Trends: Trends often assumed stable in the state (James and Espie 1997), but recent research suggests a decline, with low occupancy of historically active sites (N. Korfanta, University of Wyoming, personal communication). Monitoring efforts in surrounding states have also recorded declines in range and number of individuals (Haug et al. 1993, James and Espie 1997).

HABITAT
Rangewide
Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports, nesting and roosting in burrow dug by mammal, or by owl (rarely) or gopher tortoise (Florida). Spends much time on the ground or on low perches such as fence posts or dirt mounds. ^Nests in abandoned burrow (e.g., prairie dog, ground squirrel, fox, woodchuck, tortoise), including badger excavations (see especially Green and Anthony 1989). May enlarge or modify burrow. In Florida, may dig own burrow. Nests in lava cavity in some areas. Abandoned burrows soon become unsuitable for nesting. See Cavanagh (1990) for an account of unsuccessful above-ground nesting on a lawn at an airport in Florida.

Wyoming
Breeding: Optimum habitat is dominated by short vegetation (i.e., grassland, shrub-steppe), includes many fresh burrows made by small mammals, and has high densities of large invertebrates and small mammals (Zarn 1974, Haug et al. 1993, Green and Anthony 1997). Although primarily prairie and shrub-steppe inhabitants, burrowing owls are occasionally found in open areas near human habitation (e.g., vacant lots, campuses, airports, golf courses, banks of irrigation canals). Low perches such as fence posts or dirt mounds are important habitat elements. Burrowing owls nest and roost in abandoned burrows dug by mammals (especially prairie dogs, ground squirrels, and badgers; fox,

woodchuck, and tortoise burrows are used in some areas) (Green and Anthony 1989, Haug et al. 1993). In the Great Plains, burrowing owls are chiefly associated with prairie dog burrows. Abandoned burrows soon become unsuitable for nesting. Uses satellite burrows around nest burrows, moving chicks at 10-14 days presumably to avoid predation. Because of its burrow requirements, loose soils are an important habitat element for this owl. In the northern Great Plains, aridic ustoll and typic boroll soils are used (Kantrud and Kologiski 1982); lacustrine soils are used in Canada (Wellicome and Haug 1995). To allow for early detection of predators, burrowing owls tend to select burrows that are surrounded by short vegetation and/ or many low perches. In shrub-dominated habitats, burrows surrounded by much bare ground and short grass are preferred to those surrounded by dense shrubs (Rich 1986, Green and Anthony 1997). In Colorado, occupied burrows were closer to roads and other burrows, and were surrounded by shorter vegetation and more bare ground, than randomly selected sites (Plumpton and Lutz 1993). Tall shrubs and cultivated land appear to be avoided; some evidence suggests a preference for areas near open water (Rich 1986). Owls concentrate nocturnal foraging in areas of high abundance of small mammals (e.g. deer mice and voles), which account for the bulk of their caloric intake (Wellicome 1997). In Saskatchewan, burrowing owls preferred foraging in dense, grass-forb vegetation >30 cm high in uncultivated areas and rights-of-way; they tended to avoid cropland and pasture (Haug and Oliphant 1990). Diurnal foraging (chiefly for invertebrates) was concentrated in the vicinity of the nest burrow (Haug and Oliphant 1990, Haug et al. 1993). Migratory: No specific data to report; migratory habitat assumed to be same as breeding habitat (Haug et al. 1993). Wyoming Breeding: Most habitat information described above applies to Wyoming population segments. Migratory: No Wyoming-specific data to report.

PHENOLOGY

Rangewide

Primarily nocturnal in winter in north, diurnal and crepuscular in summer; usually can be observed in daytime in Florida and southern part of winter range (Evans 1982). In Saskatchewan, peak foraging activity between 2030 and 0630 h (Haug and Oliphant 1990).

Wyoming

Primarily nocturnal in winter in north, diurnal and crepuscular in summer; usually can be observed in daytime in Florida and southern part of winter range (Evans 1982). In Saskatchewan, foraging activity peaked between 2030 and 0630 h (Haug and Oliphant 1990).

FOOD HABITS

Rangewide

Feeds primarily on large insects (especially in warmer months) and rodents; sometimes eats birds and amphibians. In the Dominican Republic, prey composition by number of items was 53.3% invertebrates, 28.3% birds, 14.9% reptiles, 2.5% amphibians, and 1.0% mammals (Wiley 1998). Catches prey in flight or drops to ground.

Food Habits

Wyoming

Feeds primarily on large insects (especially in warmer months) and rodents; sometimes eats birds and amphibians (Haug et al. 1993, Wiley 1998). Catches prey from active flight, hovering, perch-ambush, or ground foraging. Insects are primarily taken in daylight; rodents are hunted after dark (Thompson and Anderson 1988, Haug et al. 1993). Although invertebrates are the most frequently taken food item, small mammals (e.g. deer mice and voles) usually account for the bulk of intake biomass (Wellicome 1997); this holds specifically for Wyoming population segments (Thompson and Anderson 1988).

REPRODUCTION

Rangewide

Clutch size averages 6-7. Incubation, by female, lasts 27-30 days. Male provides food during incubation and early nestling stages. Young run and forage at 4 weeks, sustained flight at 6 weeks. Averages 3-5 fledglings per brood. First breeds at 1 year (some may not); generally 1 brood/year (double brooding documented in Florida).

Wyoming

Breeding begins as early as March at low elevations, and as late as May at higher sites (Haug et al. 1993). Clutch size averages 7-9. Incubation, by female, lasts 27-30 days. Male provides food during incubation and early nestling stages. Hatchlings run and forage at four weeks, and achieve sustained flight at six weeks. Burrowing owls average 3-5

fledglings per brood. Age at first breeding as early as one year. One brood per year is produced; no second brood has ever been recorded in western North America, although renesting will occur if a pair is displaced early from its original nest (Haug et al. 1993). Weather plays a strong and unpredictable role in abundance and availability of small mammal prey, which in turn can limit reproductive success (Wellicome 1998). Nest site fidelity appears strong rangewide (Haug et al. 1993, Plumpton and Lutz 1993, Lutz and Plumpton 1999) and in Wyoming (N. Korfanta, University of Wyoming, personal communication).

ECOLOGY

Rangewide

Reported densities: 8 pairs/sq km (California), 3.5-6 ha per pair in North Dakota, 13-16 ha/pair in Saskatchewan. ^Territory defense mainly limited to immediate vicinity of nest burrow; may share foraging area. ^Home range in Saskatchewan: 0.14-4.81 sq km; 95% of all movements within 600 m of nest burrow (Haug and Oliphant 1990). ^Badger plays important role in nesting ecology in northern Oregon; provides nest burrows, major predator (Green and Anthony 1989).

Wyoming

Reported densities: 0.8 pairs/ ha in agricultural lands along Colorado River in Arizona, 8 pairs/ km2 in California; 3.5-6 ha/ pair in North Dakota, 13-16 ha/ pair in Saskatchewan (Haug et al. 1993). Number of individuals tends to increase, and density decrease, with increasing size of prairie dog towns. In large prairie dog towns (>35 ha), owl distribution was less dense but clumped; clumping was unrelated to burrow availability (Desmond et al. 1995.) Badger predation was higher in colonies with lower densities of prairie dogs (Desmond and Savidge 1998). Desmond and Savidge (1998) observed a time lag in response to decline in density of active prairie dog burrows, suggesting that nest site fidelity may be strong despite dramatic changes in habitat quality. Territory defense is mainly limited to the immediate vicinity of nest burrow; pairs may share foraging areas with conspecifics. In Saskatchewan, 95% of all movements occurred within 600 meters of the nest burrow (Haug and Oliphant 1990).

TRENDS IN WYOMING

Trends seem to be stable.

MANAGEMENT CONSIDERATIONS

Historically, cultivation of native prairie eliminated much habitat. Although cultivation continues, urban and suburban expansion may be the primary habitat loss vectors today. Pesticide application (especially when targeted on grasshoppers and crickets) can directly contaminate breeding birds and reduce prey availability. Eradication of prairie dogs likely reduces habitat quality substantially. Predation by various raptors and mammals can be a significant source of mortality for small and shrinking population segments; vehicle collisions act similarly (Haug et al. 1993, James and Espie 1997). Protection Status In Wyoming, burrowing owl range is divided between privately owned lands and lands managed for multiple-use by the USDI Bureau of Land Management and USDA Forest Service (Thunder Basin National Grassland). Poisoning and shooting of prairie dogs are relatively unrestricted on most of these lands, and reduce the quality of burrowing owl habitat substantially. Comments Reintroductions have been successful in several areas that experienced large declines or local extinctions. Maintenance and enhancement of large colonies of prairie dogs may substantially increase habitat quality (Haug et al. 1993). Maintenance of prairie dog colonies may also be an efficient way to maintain habitat for several other species of conservation concern, such as Vulpes velox, Mustela nigripes, Buteo regalis, and Charadrius montanus (Campbell and Clark 1981, Bechard and Schmutz 1995, Mulhern and Knowles 1995, Knopf 1996, Wuerthner 1997, Ceballos et al. 1999, Van Pelt 1999). See Stapp (1998) for cautions on this management strategy.

Threats

Threats Historically, cultivation of native prairie eliminated much habitat. Although cultivation continues, urban and suburban expansion may be the primary habitat loss vectors today. Pesticide application (especially when targeted on grasshoppers and crickets) can directly contaminate breeding birds and reduce prey availability. Eradication of prairie dogs likely reduces habitat quality substantially. Predation by various raptors and mammals can be a significant source of mortality for small and shrinking population segments; vehicle collisions act similarly (Haug et al. 1993, James and Espie 1997).

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INFORMATION NEEDS

Inventory Needs
Detailed distribution, habitat use and population information are needed for Wyoming. Inventory and map existing prairie dog town complexes and conduct surveys in those complexes.

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AYTHYA COLLARIS
RING-NECKED DUCK

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:

Wyoming
WYNDD State Rank: S3B,S3?N
Comments:
Rank assigned with the help of zoologists at CO NHP. Uncommon to rare with minor threats; often concentrates in areas simular to breeding ponds during migration.

State Status
Uncommon yearlong resident (Dorn and Dorn, 1990). No formal federal or state status.

US Forest Service
Management Status:

DESCRIPTION
NON-TECHNICAL DESCRIPTION: Small to medium-sized diving duck with bold white ring near tip of bill. General profile like that of smilar-sized diving ducks but body is not foreshortened, tail is longer and often held off the water, and head has short crest that gives it a distinctive peaked and angular profile (Hohman and Eberhardt, 1998). TECHNICAL DESCRIPTION: Male is 40-46 cm in length, 542-910 grams in weight; females slightly smaller. Adult male has black head, neck, breast and upperparts; whitish to grayish belly and flanks, distinctive triangular white wedge extending upward in front of the folded wing. Bill slate-colored, with white at base and around nares; black tip bordered by white band. Female is grayish brown, pale on front of head, chin, and throat; white eye-ring; narrow white line extends back from eye. Bill slate-colored, with faint white band near tip (Hohman and Eberhardt, 1998). SIMILAR SPECIES: Superficially resembles the male Greater and Lesser scaups but is distinguished by peaked, angular head profile, darker upperparts contrasting with pale gray flanks, triangular vertical bar along anterior flanks in front of folded wing, distinctive white bill markings, and uniformly dark upper wings (Hohman and Eberhardt, 1998).

DISTRIBUTION
Rangewide
BREEDS: southeastern and east-central Alaska, central British Columbia eastward through northern Saskatchewan to Newfoundland, south to northeastern California, southeastern Arizona, southern Colorado, Iowa, Illinois, Pennsylvania (formerly), northern New York, Massachusetts. WINTERS: southeastern Alaska, southwestern U.S., southern Illinois, and Massachusetts south through Mexico to Panama, Grenada, West Indies; rarely Hawaii. (AOU 1983). In the U.S., the highest winter densities occur in eastern New Mexico (Bitter Lake refuge), the Mississippi River in Mississippi, Lake Isom and Reelfoot refuges (Missouri-Tennessee), the Florida panhandle (St. Marks refuge), eastern Texas panhandle, and southern San Joaquin Valley in California (Root 1988).

Wyoming
Breeding distribution is typically boreal with a southern extension along the Rocky Mountains. Wyoming lies on the southern periphery of the breeding range. Uncommon to rare resident breeder occurring throughout the state. The Wyoming Gap Analysis Atlas (Merrill et al., 1996) identifies potential additional habitat near existing sites in Yellowstone National Park, Targhee National Forest, the Medicine Bow Range, and along the Green River.

Abundance
Rare yearlong resident occurring throughout the state.

Migration
Uncommon yearlong resident, with migration peaks evident in April and October-November (Dorn and Dorn, 1990).

HABITAT
Rangewide
Marshes, lakes, rivers, swamps, especially in wooded areas. Winters primarily on freshwater and brackish situations of larger lakes, rivers, and estuaries (AOU 1983); prefers deep open water (Stiles and Skutch 1989). Sleeps by day near emergent vegetation by lakeshores (Madge and Burn 1988). Birds close to the coast may spend their nights out at sea but come in at dawn to feed in fresh water (Root 1988). In Minnesota, ducklings spent most of time in open water, used islands of decayed vegetation for resting (Wilson Bull. 104:472-484). Nests at margins of small ponds, sloughs, bogs, and marshes.

Wyoming
Strongly associated with beaver ponds and other forest wetlands, but also observed in unvegetated playas. Sedge-meadow marshes, lakes, rivers, and boggy areas are preferred for nesting (Merrill et al. 1996). Nests within 200 meters of open water feeding areas (Hohman and Eberhardt 1998), and sleeps by day near emergent vegetation along lakeshores (Madge and Burn 1988).

PHENOLOGY
Rangewide
Most active early morning and evening (Madge and Burn 1988).

Wyoming
Maximum life span is 20 years 4 months (Hohman and Eberhardt, 1998).

FOOD HABITS
Rangewide
Plant material important: tubers, leaves, rootstocks, and seeds of aquatic plants (pondweeds, algae, sedges, grasses, smartweeds, etc.). Also eats aquatic invertebrates, espec. in summer. Downy young: insects, snails, sponges, etc.; also seeds and other plant material.

Food Habits
Wyoming
They take a variety of plant material such as tubers, leaves, rootstocks, and seeds of aquatic plants (pondweeds, algae, sedges, grasses, smartweeds, etc.). Also eats aquatic invertebrates, especially in summer. Downy young take insects, snails, sponges, seeds, and other plant material. Their generalized diet facilitates colonization and occupancy of new areas with low productivity (Hohman and Eberhardt 1998).

REPRODUCTION
Rangewide
Clutch size is 6-14 (usually 8-10). Incubation, by female, lasts 25-29 days (Terres 1980). Young are tended by female, can fly about 49 days after hatching.

Wyoming
Home range size of breeding females probably influenced by the distance between nest site and open-water feeding areas and stage of reproduction. Nests on floating islands are more successful than those on mainland or solid islands (Hohman and Eberhardt, 1998). Clutch size is 6-14 (usually 8-10). Incubation, by female, lasts 25-29 days (Terres 1980). Young are tended by female, and can fly about 49 days after hatching.

ECOLOGY

Rangewide
Usually widely dispersed in winter, but concentrations of several thousand not uncommon (Terres 1980). Usually in flocks (Stiles and Skutch 1989). In Maine, daily survival rate of duckling was reduced in low-pH wetlands (Mcauley and Longcore, 1988, J. Wildl. Manage. 52:169-176).

Wyoming
TERRITORIALITY: Not territorial. Will fight with other males during breeding season, and defend space around nest sites and mate. COMMUNITY INTERACTIONS: Appears to be subordinate to all other waterfowl species in interspecific interactions. Eggs taken by a variety of species, most importantly mink, crows and ravens, and raccoons. Adults are taken by a wider variety of raptors and mammals, including foxes, raccoon, Northern Harriers, and Great Horned Owls (Hohman and Eberhardt, 1998).

TRENDS IN WYOMING
Increase is relatively recent trend due to increase in water (precipitation, availability) in the past couple years. Trend assigned with the help of Tim Britt, former WyGF employee (retired).

MANAGEMENT CONSIDERATIONS
Rangewide breeding habitats are somewhat protected because of their remote northern locations. Staging and wintering habitats need protection, however. Creation of small refuges has been successful in maintaining traditional use. Ingestion of lead shot is still a problem and monitoring of lead exposure should be continued.

Threats
May be threatened by logging at some breeding sites. Nationwide, potentially vulnerable to overharvest and prone to ingesting lead shot. Has the highest ingestion rate among North American waterfowl (Hohman and Eberhardt, 1998).

Protection Status
Two breeding records and one observation record occur in Yellowstone National Park. Five other breeding records occur on Forest Service lands, one of which lies within the Swamp Lake Special Botanical Area on the Shoshone National Forest. One record is undetermined, and another is on BLM land.

INFORMATION NEEDS
Inventory Needs
Detailed distribution, habitat use and population information are needed for Wyoming. Also research on habitat loss or degradation and the effects of lead exposure.

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BOS BISON
BISON

STATUS
US Endangered Species Act
US Fish & Wildlife Service: (PS)
Comments:
Subspecies ATHABASCAE in Canada is listed by USFWS as Endangered (Federal Register, 2 June 1970).

Rangewide
Global Rank: G4
Comments:
Occurs as wild, free-ranging populations in only small fragments of the once vast range in North America, but the species is secure globally due to the many managed populations on public and private lands.

Wyoming
WYNDD State Rank: S2
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Historic drastic decline; restricted range; the only wild, relatively free ranging populations in the lower 48 occur in Wyoming; ecological processes and rare species which were dependent on, or associated with bison are probably impared.

State Status

US Forest Service
Management Status:

TAXONOMY
General
Some authors regard New World B. BISON and Old World B. BONASUS as conspecific; they were regarded as separate species by Grubb (in Wilson and Reeder 1993). ^There has been some difference of opinion as to whether the two subspecies, BISON and ATHABASCAE, are worthy of recognition; different types of data suggest different conclusions (see Bork et al. 1991). van Zyll de Jong (1986) found that cranial and post-cranial skeletal data indicate a phenotypic discontinuity between grassland and woodland populations and concluded that recognition of the subspecies BISON and ATHABASCAE is fully justified. External phenotypic data support this distinction as well (van Zyll de Jong et al. 1995). See Geist (1990, 1991) for a summary of evidence that there are no taxonomically valid differences between wood and plains bison. MtDNA data (Polziehn et al. 1996) indicate that both the plains bison (subspecies BISON) and the wood bison (subspecies ATHABASCAE) form polyphyletic groups; neither is a well-defined taxon. ^The bison formerly was included in the genus BISON; mitochondrial and ribosomal DNA analyses, together with reproductive, cranial, and other molecular data, strongly indicate that the genus BISON should be treated as a synonym of BOS rather than as a distinct genus in the tribe Bovini (Miyamoto et al. 1989, Wall et al. 1992). ^See Georgiadis et al. (1991) for a phylogeny of the Bovidae based on allozyme divergence among 27 species. See Kraus and Miyamoto (1991) for a phylogenetic analysis of pecoran ruminants (Cervidae, Bovidae, Moschidae, Antilocapridae, and Giraffidae) based on mitochondrial DNA data.

Sub-Species
None. B.b. athabascae, a USFWS listed endangered species, was formerly thought to occur in Wyoming (Hall 1981; Clark and Stromberg 1987); however, it appears that all Wyoming bison are in fact B.b. bison.

DESCRIPTION
Massive bovid with large shoulder hump and head; largest terrestrial mammal in North America. Snout and neck are short. Adult length 200 - 380 cm, weight 400 - 1000 kg. Males noticeably larger than females. Adult coat uniformly

dark brown, with a woolly texture on head, neck, and front quarters; calves are a light tan. Adults of both sexes carry short, round, black horns.

DISTRIBUTION

Rangewide

Formerly widespread in North America from Alaska and western Canada across U.S. into northern Mexico. Currently found in isolated units throughout and external to historical range.

Wyoming

Clark and Stromberg (1987) indicated that this species has been collected from Campbell, Crook, Sublette, Park and Teton Counties; though their range map indicated that they now only occur in the Yellowstone Park area and the northern half of Teton County. Historically, they occured in virtually all LAT/ LONG blocks; currently, they are known from blocks 1, 2 and 8. There are several small captive populations in the state. B.b. athabascae, a USFWS listed endangered species, was formerly thought to occur in Wyoming (Hall 1981; Clark and Stromberg (1987), however, it appears that all of Wyoming' bison are in fact B.b. bison.

Abundance

The Wyoming Game and Fish Department lists this species as "Resident, rare".

Migration

Previously made mass migrations across the Great Plains in spring and fall. Probably moved southward a few hundred miles to winter pastures. Mountain populations moved to lower elevations in winter. Seasonal migrations are now greatly restricted.

HABITAT

Rangewide

Open plains and grasslands in south; woodland and openings in boreal forest, meadows, and river valleys in north. Like other large grazers, attracted to burned areas the next growing season (Shaw and Carter 1990). During the growing season at the Konza Prairie in northeastern Kansas, preferred areas that had been burned in spring; summer grazing was concentrated in large watershed area (79-119 ha) dominated by warm-season, perennial C4 grasses; in fall and winter, grazed both burned and unburned watersheds more uniformly but grazed most intensively in areas with large stands of cool-season, C3 grasses (Vinton et al. 1993). Cows usually give birth in isolation where vegetation provides cover; isolation during birth is infrequent where cover is lacking (Meagher 1986).

Wyoming

Historically widely distributed across grasslands, shrub-steppe, woodlands, and openings in boreal forests in North America. Like other large grazers, attracted to burned areas the next growing season (Shaw and Carter 1990). Cows usually give birth in isolation where vegetation provides cover; isolation during birth is infrequent where cover is lacking (Meagher 1986).

PHENOLOGY

Rangewide

Primarily diurnal (especially early morning and late afternoon), with several grazing periods interspersed with loafing and ruminating (Meagher 1986).

Wyoming

May live up to about 20 years.

FOOD HABITS

Rangewide

Primarily a grazer. Feeds on grasses, forbs, and sedges. See GHABCOM.

Food Habits

Wyoming
Primarily a grazer. Feeds on a variety of grasses, forbs, and sedges.

REPRODUCTION
Rangewide
Most cows breed at 2-4 years; males usually mature at 3 years, but most breeding done by older (6+ years) males. Most mating July-August. Gestation lasts about 9.5 months. Normally 1 calf, is born mainly mid-April to early June (as early as March in Oklahoma, sometimes as late as summer or early fall in South Dakota). Most calves are weaned by late fall or end of first year, remain with mother until spring or later if she does not conceive. Life span 18-22 years.

Wyoming
Most cows breed at 2-4 years; males usually mature at 3 years, but most breeding done by older (6+ years) males. Most mating July-August. Gestation lasts about 9.5 months. Normally 1 calf born in mid-April to early June (sometimes as late as summer or early fall in South Dakota). Most calves are weaned by late fall or end of first year, and remain with mother until spring or later if she does not conceive. Life span 18-22 years.

ECOLOGY
Rangewide
Gregarious. Often forms herds of 11 - 12 animals. Cows and young remain in herds throughout the year. Bulls solitary or in small groups until summer when they begin to mix with cow-calf herds. Home range in Northwest Territories averaged several hundred sq km (Larter and Gates 1990). May live up to about 20 years.

Wyoming
Gregarious. Historically, the main herds on the Great Plains numbered in the millions. Smaller herds of ca 12 animals are common in mosaics of forest and grassland. Cows and young remain in herds throughout the year. Bulls can be solitary or in small groups until summer when they begin to mix with cow-calf herds.

TRENDS IN WYOMING
Highly (if improperly...) managed species with relatively stable populations. Population in the Red Desert was allowed to go extinct in the 1960's due to improper management.

MANAGEMENT CONSIDERATIONS
Species is intensively managed within national parks in Wyoming. Very few animals are allowed to persist outside of park boundaries because of controversy over possible transmission of disease to domestic livestock. Recent Federal land purchases north of Yellowstone National Park may allow some range expansion.

Threats
Somewhat threatened by overgrazing within existing summer range. Maintained roads and snow-machine trails allow bison to use areas formerly snowbound in winter, thus increasing populations and stressing summer range. Some evidence suggests bison are avoiding areas of heavy snow-machine use in the winter. Potential winter range outside of Park boundaries is threatened by subdivision development. Populations are currently under lethal control outside of Park boundaries. Potential winter range habitat is threatened by development/ subdivision on winter ranges and along lowland migratory corridors. Threat from shooting as animals move northward onto winter range in Montana (they are controlled supposedly to keep livestock from contracting brucellosis, even though the transmission of this disease in winter from bison to livestock is both unlikely and undocumented).

Protection Status
Protected somewhat in Grand Teton and Yellowstone National Parks and the USFWS National Elk Refuge.

INFORMATION NEEDS
Inventory Needs
Herds are well-known. Currently, population and range expansion is limited by deliberate hazing and lethal control.

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BOTAURUS LENTIGINOSUS
AMERICAN BITTERN

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:
Considered of Moderate Priority on 1996 WatchList (Carter et al. 1996).

Rangewide
Global Rank: G4
Comments:
Widspread distribution but populations are declining; threat of habitat destruction.

Wyoming
WYNDD State Rank: S2B,SZN
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Rare to uncommon, but a peripheral species; limited and specialized habitat requirements.

State Status
USFS Region 2 Sensitive Species; Wyoming Game and Fish SS3.

US Forest Service
Management Status: S-USFS R2

TAXONOMY
General
May constitute a superspecies with B. PINNATUS (AOU 1998).

DESCRIPTION
Brown, medium-sized heron with stout body and neck and relatively short legs. Adult plumage all brown above and heavily streaked below. Crown rusty brown. A long black patrch extends from below the eye down the side of the neck, a feature unique among herons. Throat white. SIMILAR SPECIES: May be confused with juvenile night-herons, which are darker brown and have no black neck patch. Unlike other herons, American bitterns rarely perch in trees (Gibbs et al., 1992).

DISTRIBUTION
Rangewide
BREEDING: southeastern Alaska and southern Mackenzie to Newfoundland, south to southern California, central Arizona (formerly), southern New Mexico, central Kansas, central Missouri, central and western Tennessee, western Kentucky, central Ohio, southern Pennsylvania, northeastern West Virginia, eastern Maryland, and eastern Virginia (rarely North Carolina); locally in Texas, Louisiana, Florida, and Mexico south to Puebla and the state of Mexico (AOU 1983). In the northeastern U.S., abundance declines sharply south of northern New England and New York (Gibbs and Melvin 1992). Range is large but highly discontinuous due to restricted habitat. ^NON-BREEDING: southwestern British Columbia, northern Nevada, northern Texas, Ohio Valley (rarely), and New York south to southern Mexico (rarely or formerly to Panama) and the West Indies (AOU 1983). Occurs in winter primarily near the coast; areas of relatively high density include southern Florida, San Joaquin Valley (California), eastern North Carolina (no longer common, H. LeGrand, pers. comm.), Okefenokee Swamp, southern Louisiana, and various national wildlife refuges elsewhere (Root 1988).

Wyoming

Widespread; Wyoming forms part of the core of the taxon's breeding range, and there are scattered observations in marshes and wetlands statewide. A peripheral species. WYNDD has records from Sheridan, Uinta, Lincoln, Teton, Sweetwater, Carbon, Albany, Fremont, and Goshen counties.

Abundance
Uncommon to rare summer resident (Wyoming Game and Fish Department 1997; Dorn and Dorn 1990). State population size is unknown, but population densities are low for the species in general.Easily overlooked.

Migration
Peaks occur in April/May (mid-March) and early October (November) (Dorn and Dorn 1999). Wanders considerably after breeding.

HABITAT
Rangewide
BREEDING: Primarily large freshwater and (less often) brackish marshes, including lake and pond edges where cattails, sedges, or bulrushes are plentiful and marshes where there are patches of open water and aquatic-bed vegetation. Occurs also in other areas with dense herbaceous cover, such as shrubby marshes, bogs, wet meadows, and, rarely, hayfields (Brewer et al. 1991). Readily uses wetlands created by impoundments. Wetlands of 2.5 ha or more may support nesting; smaller wetlands may serve as alternate foraging sites (Gibbs and Melvin 1992). See Hanowski and Niemi (1990) for a quantitative study of habitat in Minnesota. ^Nests primarily in inland freshwater wetlands, sometimes in tidal marshes or in sparsely vegetated wetlands or dry grassy uplands. Breeding occurs primarily in wetlands with tall emergent vegetation. Sparsely vegetated wetlands and dry grassy uplands are sometimes used, as are tidal marshes in some areas (Stewart and Robbins 1958, Swift 1987). In comparison to the sympatric least bittern (IXOBRYCHUS EXILIS), uses a wider variety of wetland cover types, less densely vegetated sites, shallower water depths, and primarily freshwater habitats. ^Wetlands used in Maine were dominated by emergent and aquatic-bed (floating-leaved and submergent) vegetation, had a high diversity of vegetative life forms, and a high degree of cover/water interspersion (Gibbs et al. in press; Gibbs and Melvin 1990). Portions of wetlands used were dominated by sedges (CAREX spp.), broad-leaved cattail (TYPHA LATIFOLIA), and ericaceous shrubs. In a study of Quebec lakes, lakes with patches of floating-leaved plants, emergent growth along shorelines, and abundant amphibian populations were preferred (DesGranges and Houde 1989). ^At Horicon Marsh in Wisconsin, responded to tape-recorded calls only from shallow water cattail and dry cattail habitats and seemed to avoid deepwater cattails (Manci and Rusch 1988). At moist soil impoundments in Missouri, associated with water depths of less than 10 cm and vegetative cover characterized as "rank, dense, or sparse." Habitat use was not associated with "open" or "short" vegetative cover or water of depths of greater than 10 cm (Fredrickson and Reid 1986). In Minnesota, seven breeding territories had a mean water depth of 10 cm, vegetation height of 1.3 m, and density of sedge and grass stems of 117 stems/m squared (Hanowski and Niemi 1986). ^NON-BREEDING: Migrant bitterns were flushed at 25 sites during spring in Missouri with mean water depth of 26 cm, vegetation height of 63 cm, and stem density of 157 stems/m squared. Characteristics of 35 flush sites in fall were similar, except that vegetation was taller (118 cm) (Reid 1989). In areas where temperatures stay above freezing and waters remain open, especially in coastal regions where the ocean moderates climate (Root 1988). Wintering habitat is much like breeding habitat, and overwintering populations are heavily dependent on managed wetland areas, such as those occurring at wildlife refuges (Root 1988). Occasionally occurs in habitats that are more open than the usual ones. Overwintering occasionally takes place in brackish coastal marshes (Hancock and Kushlan 1984).

Wyoming
Breeds primarily large freshwater or brackish marshes, including lake and pond edges with emergent vegetation. Also occurs in other areas with dense herbaceous cover, such as shrubby marshes, bogs, and wet meadows (Brewer et al. 1991). Readily uses wetlands created by impoundments. Wetlands of 2.5 ha or more may support nesting; smaller wetlands may serve as alternate foraging sites (Gibbs and Melvin 1992). Sparsely vegetated wetlands and dry grassy uplands are sometimes used (Stewart and Robbins 1958, Swift 1987). Wintering habitat is much like breeding habitat, and overwintering populations are heavily dependent on managed wetland areas, such as those occurring at wildlife refuges (Root 1988).

PHENOLOGY

Rangewide
More active when light intensity is low (Palmer 1962).

Wyoming
Most active in dim light, but may forage at any time.

FOOD HABITS
Rangewide
Eats mainly fishes, crayfishes, amphibians, mice and shrews, insects, and other animals (Palmer 1962). Feeds young by regurgitation. Stealthy forager. The trunk is highly compressed to facilitate movement through dense vegetation. The repertoire of feeding behaviors is relatively small. Of 28 recognized heron foraging behaviors (Kushlan 1978), only four are used: standing in place, neck swaying (which may enable bitterns to overcome glare or permit a quicker strike by having muscles in movement when strike begins), walking slowly, and walking quickly. This is a solitary feeder that relies more on stealth than pursuit to capture prey. Its coloration, particularly its ventral stripes, provides camouflage in dense, vertical marsh vegetation, complements its inactive feeding repertoire, and permits solitary foraging (Kushlan 1978). Crypsis is thought to function mostly to reduce visibility to prey and competitors rather than to predators (Kushlan 1978). ^The long, thick bill enables the taking of a variety of large and small prey (Kushlan 1978), a conclusion supported by analyses of stomach contents. Based on 160 specimens (133 with food remains) collected throughout North America, stomach contents included insects (23%, including many Odonates), frogs and salamanders (21%), fish (21%, including catfish, sunfish, yellow perch, suckers, killifishes, and sticklebacks), crayfish (19%), mice and shrews (10%), snakes (5%), and small quantities of crabs, spiders, and unidentified invertebrates (Cottam and Uhler 1945). Nine stomachs from Pennsylvania contained fish, frogs, crayfish, watersnakes, snails, beetles, and grasshoppers (Warren 1890). Have been observed intercepting dragonflies in midair (Dudones 1983). Garter snakes (THAMNOPHIS SIRTALIS) feeding on frogs at pond margins are occasionally eaten (Ingram 1941). A captive individual ate 23.9 g (dry weight) of food (mice) per day, and required 22 hours to digest a meal and eject a pellet (Rhoades and Duke 1975).

Food Habits
Wyoming
Eats mainly insects, amphibians, small fish and mammals (Gibbs and Melvin 1992; Palmer 1962). Feeds young by regurgitation. Relies more on stealth than pursuit to capture prey and the trunk is highly compressed to facilitate movement through dense vegetation. Its coloration, particularly its ventral stripes, provides camouflage in dense, vertical marsh vegetation, complements its inactive feeding repertoire, and permits solitary foraging. Crypsis is thought to function mostly to reduce visibility to prey and competitors rather than to predators. The long, thick bill facilitates taking a variety of large and small prey (Kushlan 1978).

REPRODUCTION
Rangewide
Nesting occurs solitarily (non-colonially) on all-purpose territories that provide both feeding and nesting sites, but occasionally up to a few pairs nest in a small area (Harrison 1979). Polygyny is suspected to occur (Palmer 1962). Mating rituals are elaborate, and involve display of a tuft of white nuptial feathers located on the sides of the neck (see Baker 1980, Johnsgard 1980). BOTAURUS bitterns may undergo a change in iris color from yellow to orange during courtship (Wood 1986). ^The nest consists of a platform of reeds, sedges, cattail, or other available emergent vegetation, and is lined with fine grasses. Nests are usually placed on the ground, in a tussock, a few inches above water, or are floating; are surrounded by water, and have dense, overhead cover (Bent 1926, Vesall 1940, Cogswell 1977, Harrison 1978, Terres 1980). Nests may also be built in grassy uplands (Vesall 1940, Duebbert and Lokemoen 1977). Nests are usually accessed by two, well-beaten pathways (Gabrielson 1914). ^Egg-laying begins in late April or early May, about a month after the arrival at nesting areas, and continues until mid-June (Bent 1926). In the north-central U.S., nests may contain eggs from about early May to early July (Brewer et al. 1991). Clutch size ranges from two to seven eggs, usually three to five (Duebbert and Lokemoen 1977, Graber et al. 1978). Incubation, by the female only, begins with the first egg (Palmer 1962). Hatching occurs after 24-28 days (Burns 1915, Bent 1926, Vesall 1940), and chicks remain at or near the nest for two weeks (Gabrielson 1914, Vesall 1940, Harrison 1979, Terres 1980). Chicks are fed only by the female, and are given fish, frogs, snakes, crayfish, and mice (Gabrielson 1914, Byers 1951). Nests often become fouled with food debris (Vesall 1940). Post-fledging behavior of young is unreported. ^Apparently single-brooded (Palmer 1962). In upland habitats in North and South Dakota, 57% of 72 nests hatched at least one egg (Duebbert and Lokemoen 1977). Little is known about sources of egg, chick or post-juvenile mortality, age at fledging

or first breeding, or territory size. Age at fledging for the closely-related Eurasian bittern is 50-55 days (Cramp 1977). One banded American bittern lived at least eight years (Clapp et al. 1982). Probably undergoes extensive post-breeding dispersal, which has resulted in numerous sightings, mostly between September and December, at locations as distant as Iceland, Norway, and Great Britain (Cramp 1977). Information on molt is incomplete. Adults undergo a complete post-breeding molt from August to November, and possibly a pre-breeding renewal of body plumage (Palmer 1962, but see Bent 1926).

Wyoming
Polygyny is suspected to occur (Palmer 1962). Mating rituals are elaborate, and involve display of a tuft of white nuptial feathers located on the sides of the neck. Botaurus bitterns may undergo a change in iris color from yellow to orange during courtship (Wood 1986). Nests are usually hidden deep in marsh vegetation and difficult to find. In general, nest density will be low in any area. There is very little intersexual interaction beyond copulation. Incubation and care of young is by female only (Gibbs and Melvin 1992). Nesting is solitary, but occasionally there may be up to a few pairs nesting in a small area (Harrison 1979). The nest consists of a platform of reeds, sedges, cattails, or other available emergent vegetation, and is lined with fine grasses. It is usually placed on the ground a few inches above water, or is floating, and often has dense overhead cover (Bent 1926, Vesall 1940, Cogswell 1977, Harrison 1978, Terres 1980). Most nests in dense emergent vegetation over water 5-20cm deep.Egg-laying begins in late April or early May, about a month after the arrival at nesting areas, and continues until mid-June (Bent 1926). Clutch size ranges from two to seven eggs, usually three to five (Duebbert and Lokemoen 1977, Graber et al. 1978). Hatching occurs after 24-28 days (Burns 1915, Bent 1926, Vesall 1940), and chicks remain at or near the nest for two weeks (Gabrielson 1914, Vesall 1940, Harrison 1979, Terres 1980). Chicks are are given fish, frogs, snakes, crayfish, and mice (Gabrielson 1914, Byers 1951). Adults undergo a complete post-breeding molt from August to November, and possibly a pre-breeding renewal of body plumage (Palmer 1962, but see Bent 1926).

ECOLOGY
Rangewide
Basically solitary. Low population density. Too little is known of rates of predation on nests and adults to infer the importance of predation as a factor limiting populations. Similarly, only minimal information is available on the effects of parasites and disease. Wading birds are known to be susceptible Type C botulism (occasionally), avian cholera (infrequently), chlamydial infections (frequently), sarcocystis (rarely), and aspergillosis (infrequently) (Friend 1987). Known to harbor lice and flies (Peters 1936) and a number of species of nematodes (Boyd 1966).

Wyoming
Largely asocial; pair bonding is minimal. May migrate in small groups, however. Forages entirely alone; most active in dim light (Palmer 1962). Too little is known about predation rates on nests and adults to infer the importance of predation as a factor limiting populations. Similarly, only minimal information is available on the effects of parasites and disease. Wading birds are known to be susceptible Type C botulism (occasionally), avian cholera (infrequently), chlamydial infections (frequently), sarcocystis (rarely), and aspergillosis (infrequently) (Friend 1987). They also harbor lice and flies (Peters 1936) and a number of species of nematodes (Boyd 1966).

TRENDS IN WYOMING
Apparently stable (Tim Britt pers. comm.).

MANAGEMENT CONSIDERATIONS
Nationwide populations are declining, mostly due to loss and degradation of wetland breeding habitat, but human disturbance, and pesticides may also be factors to some extent. Preservation of wetlands, particularly large, shallow setlands with dense growth of robust emergent vegetation. Breeding areas should be protected from pesticides and other forms of pollution (Gibbs et al., 1992).

Threats
Species is susceptible to wetland habitat loss; otherwise, no known major threats.

Protection Status

Two observations are on TNC conservation easements on private land, one is on the Seedskadee National Wildlife Refuge, and another is on the Hutton Lake National Wildlife Refuge. Other records are from state or BLM land managed for mulitple use.

INFORMATION NEEDS

Inventory Needs

Detailed distribution, habitat use and population information are needed for Wyoming for all four species.

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BUCEPHALA ALBEOLA
BUFFLEHEAD

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:

Wyoming
WYNDD State Rank: S1B,S4N
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Relatively uncommon with some threats; limited distribution; specialized nesting habitat requirements; threatened by loss of nesting trees from logging.

State Status

US Forest Service
Management Status:

DISTRIBUTION
Rangewide
BREEDING: central Alaska, Mackenzie Delta, northern Prairie Provinces, northern Ontario, south to northern Washington, northern Montana; locally south to the mountains of Oregon, northern California, and northern Colorado (Andrews and Righter 1992). NON-BREEDING: Aleutians, Alaska Peninsula, Great Lakes, New Brunswick and Newfoundland, south to Baja California, mainland Mexico, Gulf Coast, Florida; occasionally in Hawaii. The most abundant wintering populations include those around Vancouver Island, along the Atlantic coast from the Bay of Fundy to Chesapeake Bay, and in northern California-southern Oregon, Mississippi, eastern New Mexico (Root 1988).

Wyoming
Rare resident breeder, typically breds in small mountain ponds in the northwest portion of the state; possibly breeds in low numbers in the Medicine Bow Mountains; common and distributed statewide during migration. Refer to Oakleaf et al. (1992) and Dorn (1990) for distribution by LAT/ LONG block.

Abundance
Listed as "Resident, uncommon" by the Wyoming Game and Fish Department.

HABITAT
Rangewide
BREEDING: Lakes, ponds, rivers and seacoasts (AOU 1983). Breeds in tree cavities in mixed coniferous-deciduous woodland near lakes and ponds (AOU 1983). Usually nests in natural tree cavities, or abandoned flicker holes. Females often nest in same site in successive years. NON-BREEDING: wintering on sheltered bays and estuaries as well as open freshwater situations (AOU 1983).

PHENOLOGY
Rangewide
Usually migrates at night.

FOOD HABITS
Rangewide
In fresh water feeds on aquatic insects, snails, amphipods, small fishes, and some aquatic plants. In salt water eats crustaceans, molluscs, fishes, and some aquatic plants. Often feeds in small groups, diving or watching for danger.

REPRODUCTION
Rangewide
Breeding begins mid-May in south to early June in north (Harrison 1978). Clutch size 6-11 (avg. 7-9). Incubation 28-33 days, by female (Terres 1980). In British Columbia, mean hatching date is mid- to late June (Savard et al. 1991). Young tended by female, fly 50-55 days after hatching. First breeds at 2 yr.

ECOLOGY
Rangewide
Usually seen in small groups of twos or threes. Female strongly defends brood territory. In British Columbia, breeding density not limited by nest sites but rather by territorial behavior (Gauthier and Smith 1987); also, may be excluded from some ponds at high Barrow's goldeneye densities (Savard et al. 1991).

TRENDS IN WYOMING
Probably stable, but unknown; current numbers may be lower than during pre-settlement times due to logging of old-growth forest. 95-10-23: Trend assigned with the help of Tim Britt, former WyGF employee (retired).

MANAGEMENT CONSIDERATIONS
Threats
Threatened by logging of old-growth forest adjacent to breeding ponds (typically nests in cavities in large diameter trees).

Protection Status
Protected in Yellowstone and Grand Teton National Parks; somewhat protected on U.S. Forest Service lands.

INFORMATION NEEDS
Inventory Needs
Detailed distribution, habitat use and population information are needed for Wyoming.

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BUFO BOREAS (NORTHERN ROCKY MOUNTAIN POPULATION)
WESTERN BOREAL TOAD

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:
In March 1995, USFWS determined that listing of the Southern Rocky Mountain population (Colorado, Wyoming, New Mexico) is warranted but precluded by actions of higher priority (Federal Register, 23 March 1995).

Rangewide
Global Rank: G4T4
Comments:

Wyoming
WYNDD State Rank: S2
Comments:
Apparent declines, poor reproduction, and few observations despite intensive surveys all warrant a high SRANK.

State Status
Wyoming Game and Fish Department Native Species Status 2^U.S. Fish and Wildlife Service former C2 species^U.S. Forest Service Region 2 Sensitive Species^.

US Forest Service
Management Status: S-USFS R2

TAXONOMY
Sub-Species
B.B. boreas is the only subspecies found in Wyoming. There are two genetically distinct populations, one in southeastern Wyoming and one in northwest Wyoming (C. Carey, pers. comm.).

DESCRIPTION
Stout body, head short and blunt. Olive, brownish or black body with a conspicuous white or yellowish mid-dorsal stripe. The sides and belly have many black spots; the throat is lighter. Immatures have bright yellow or orange flecks on the ventral surface of the feet and body. SIMILAR SPECIES: Distinguished from other toads by the absence of cranial crests and by a distinctive musky odor. Distinguished from spadefoots by round pupil and two tubercles (Baxter and Stone, 1985).

DISTRIBUTION
Wyoming
There are two distinct populations of concern in western North America - the Northern Rockies populations and the Southern Rockies population. It is likely that these will be taxonomically split subspecifically or even specifically in the near future. The Northern Rockies population is known from the mountains of western Wyoming, which are on the southern edge of its range. There are some indications that the distribution of this species may be contracting. Two sites are known from the north half of the Shoshone National Forest, 4 are known from the Wind River Mountains, and 1 is from the Wyoming/Salt River Range (Garber 1995).

Abundance
Very rare. Documented local extirpations in Colorado and Wyoming. Very few breeding records between 1980-1994. Total sightings reported between 1989-1995 is 26 (Garber, 1995).

Migration

Migrates between aquatic breeding and terrestrial nonbreeding habitats.

Estimated Number of Occurrences
Distributional observation records from several sources as summarized by the Wyoming Gap Analysis project (Merrill et al. 1996) yielded the following figures: Total records- 155; including: breeding records- 0, courtship records- 0, and number of WYNND records- 104. An additional 24 sites which were found between 1991 to 1994 in montane habitat are reported in Garber (1995). There are also an additional 265 known museum specimen records contained in the Wyoming Museum specimen database maintained by WYNND. While this yields a total of 444 total observations, many of these records (about 80%) are historical records (most are from 1960 or earlier) and many of these are duplicated in several databases (about 70% of the 444 records). Despite recent intensive surveys, it is estimated that there have been less than 50 observations of this species since 1980 and only 10 breeding records during this time. It appears to have declined drastically at formerly occupied sites throught Wyoming and Colorado based on intensive surveys conducted by several biologists (see Garber 1995).

HABITAT
Wyoming
Wet habitats in foothills, montane and subalpine areas. Found in subalpine meadows, aspen and spruce-fir forests and all riparian habitat types (Baxter, 1980). Montane amphibians limited to areas where fish are absent and there is suitable breeding habitat. Found in kettle ponds, beaver ponds, and old oxbouw lakes with still shallow water and a mud or silt bottom (Garber, 1995). Formerly occurred from the alpine zone down to the wetlands adjacent to the edge of coniferous forest. During the day, buries itself in loose soil or gopher or squirrel burrows near water. At night, ranges away from water (Finch, 1992).

Wyoming
Southeast population breeds from mid May to July depending on elevation and weather; at higher elevations, emerges after ice melts on breeding ponds and lakes. Hibernation begins in early September and emergence occurs from mid-May to mid-June, egg laying from mid-May to early mid-July, and egg hatching from late June to late September. Tadpoles are present from mid-July to late August and juveniles are present form mid July to late September (Garber 1995).

FOOD HABITS
Wyoming
Eats mainly insects, but ants may also be a large portion of the diet. Metamorphosed individuals feed on various small terrestrial invertebrates. Larvae filter suspended plant material or feed on bottom detritus.

REPRODUCTION
Wyoming
Breeds in ponds and lakes. Eggs and larvae develop in shallow areas of ponds, lakes, or reservoirs, or in pools of slow-moving streams. At high elevations, Southern Rocky Mountain boreal toads use shallow water along the north shoreline of small lakes where better exposure to the sun warms the water; Northern Rocky Mountain toads may behave similarly. Breeding and clasping take place in shallow water and eggs are laid in long gelatinous strings (Baxter and Stone 1985). Tadpoles may fail to transform before winter at high elevations, and these populations may be maintained by breeding adults moving up from lower elevations (Baxter and Stone 1985). High elevation Call is a short chirp, single or in series (Baxter and Stone, 1985).

ECOLOGY
Wyoming
Breeds from mid-May to July depending on elevation and weather. Egg laying continues through mid-July, and eggs hatch from late June to late September. Tadpoles and juveniles are present until late August-late September (Garber 1995b). Active day or night in summer, depending on conditions; probably mainly diurnal. Inactive in colder months. During the day, it buries itself in loose soil or gopher or squirrel burrows near water. At night, ranges away from water (Finch 1992). Seeks shelter under logs or rocks or in rodent burrows or other below-ground spaces.

TRENDS IN WYOMING

There are some indications that the distribution of this species is contracting. Resurveys of known sites fail to find toads. The Southern Rocky Mountain populations appears to be extirpated in the southern Laramie Range and only one breeding population still exists in the Medicine Bow/ Sierra Madre Mountains. Corn et al. (1989) found that the toad was absent from 94% of the historic sites in the Southern Rocky Mountain population. The southern Wind River Mountains, the Uinta Mountains and the Absaroka Mountains populations are notably declining as well.^Reasons for the decline are unknown. Habitat alteration from grazing, timber management, recreation, pesticides, or mineral development are all considerations. Another hypothesis is that some of these environmental factors may induce stress, which allows red-leg disease to flourish (Goettl et al., 1997). Recent observations of chytrid fungus infections in the southern Rockies population also raise concerns.

MANAGEMENT CONSIDERATIONS

The inexplicable and rapid decline in amphibian populations world-wide makes proper management and monitoring of this species even more urgent. Management should include the development of recovery plans and conservation strategies and agreements. Other strategies include monitoring environmental factors at breeding sites; identifying potentially suitable habitat; raising and re-introducing toads; and educating the public. It is important to determine the effects of UV-radiation, contaminants, logging, non-native trout, and disease on populations (Goettl et al. 1997). on montane amphibians. Moist, forested dispersion corridors should be left between all potential breeding amphibian habitat (Goettl et al. 1997; Garber 1995). The Swamp Lake Special Botanical Area contains one of the boreal toad populations, but its boundaries need to be expanded and exotic trout should be removed. All kettle pond complexes, major wetlands, oxbow lakes along major rivers, and beaver ponds in firest and second order streams should be protected as potential habitat (Garber 1995).

Threats

Major threats may include: increased predation from non-native trout; disturbance, degradation, and loss of wetland habitats, including conversion of small ponds into larger reservoirs by damming; water level manipulation in reservoirs and stockponds; and logging in montane habitats (Finch 1992). On the Shoshone National Forest, the highest threats are logging and the introduction of exotic trout. Diseases such as red-leg and chytrid fungus may cause substantial mortality.

Protection Status

Several populations are protected in Yellowstone and Grand Teton National Parks., and there are occurrences in the Fitzpatrick and Washakie Wilderness Areas and the Swamp Lake Special Botanical Area on the Shoshone National Forest. However, there is no specific management is conducted in the state for this species.

INFORMATION NEEDS

Inventory Needs

Studies are underway to determine the taxonomic status of boreal toads in the Rocky Mountains. Additional surveys are needed in both montane and lowland habitats to document new sites and to monitor population trends. Historical locations should be re-surveyed. The effects of logging and non-native fish on populations needs to be explored, and the prevalence of disease in extant populations should also be studied.

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CANIS LUPUS
GRAY WOLF

STATUS
US Endangered Species Act
US Fish & Wildlife Service: LE-XN
Comments:
Listed by USFWS as Endangered in Mexico and the lower 48 states except Minnesota (where Threatened). Nonessential experimental populations exist in the Greater Yellowstone Ecosystem and in central Idaho and soon are to be established in Arizona and New Mexico.

Rangewide
Global Rank: G4
Comments:
Holarctic distribution; survives in remote wilderness that is not subject to human population pressures; extirpated from most of contiguous U.S. due to human-caused direct mortality; reintroduced populations in Yellowstone and central Idaho have been increasing rapidly; 10,000s remain in Canada/Alaska, a couple thousand south of Canada, 100,000+ in Palearctic.

Wyoming
WYNDD State Rank: S2
Comments:
Rarity.

State Status
Reintroduced resident; U.S. Fish and Wildlife Service Endangered (experimental non-essential reintroduced population).

US Forest Service
Management Status:

TAXONOMY
General
Genetic data from northwestern Canada suggests the existence of a large panmictic population resulting from extensive movements of individuals and packs and from natural and human impacts on pack structure and function (Kennedy et al. 1991). Genetic transfer of coyote mitochondrial DNA into wolf populations has occurred through hybridization in a contiguous geographic region in Minnesota, Ontario, and Quebec; the frequency of coyote-type mtDNA in these wolf populations is greater than 50%; no coyotes sampled had a wolf-derived mtDNA genotype; probably hybridization is occurring between male wolves and female coyotes in regions where coyotes only recently have become abundant following conversion of forests to farmlands (Lehman et al. 1991). ^Wayne et al. (1992) examined mtDNA variability in North America, Europe, and southern Asia and found 18 mtDNA genotypes, seven derived from hybridization with coyotes, four confined to the New World, six confined to the Old World, and one shared by both areas. Genetic differentiation among populations is small but significant. In the Old World most localities have a single unique genotype, whereas in the New World several genotypes occur at most localities and three of the five genotypes are nearly ubiquitous. They concluded that apparent genetic differences among extant wolf populations may be a recent phenomenon reflecting population declines and habitat fragmentation rather than a long history of genetic isolation.

Sub-Species
Clark and Stromberg (1987) report three subspecies historically: CANIS LUPIS IRREMOTUS, C.L. NUBILUS, C.L. YOUNGI. No subspecies now recognized.

DESCRIPTION
Largest member of the dog family. Has long legs, a deep narrow chest, and proportionally large feet. Coloration is highly variable, from pure white to pure black. Usual color is cream mixed with brown or tan, with white around the

mouth. Facial ruff of fur is prominent. Total length 1.5-2.1 meters; tail 30-45 cm; hind foot 25-27 cm; feet > 35mm diameter; males 20-80 kg, females 18-55 kg. SIMILAR SPECIES: Coyote (CANIS LATRANS) is smaller, with shorter legs, smaller feet, smaller rostrum, and a proportionately larger brain case (Clark and Stromberg, 1987; Clark et al., 1989). Domestic dog has narrower face and proportionately shorter legs. Both coyotes and dogs lack prominent facial ruffs.

DISTRIBUTION

Rangewide

Formerly throughout North America south through much of Mexico; also Europe and Asia. Replaced by the red wolf in the southeastern U.S. Today found south of Canada only in northern Mexico (no recent confirmed reports; extirpated or maybe a few in eastern Sonora, Chihuahua, and/or Zacatecas?), a few areas in Rockies (northwestern Montana, reintroduction sites in Wyoming and Idaho), northwestern Great Lakes region (northeastern third of Minnesota, northern Wisconsin, Michigan Upper Peninsula), and Cascade Mountains of northern Washington (e.g., near Canadian border at Ross Lake). In 1995, wolf reintroductions were initiated in the Yellowstone ecosystem and in central Idaho (nonessential experimental populations) (USFWS 1994; Federal Register, 16 August 1994; Bangs and Fritts 1993; End. Sp. Bull. 20(4):4-5). Formerly much more numerous in the Rocky Mountain states than in the southwestern U.S. (Johnson 1991). Extirpated in much of southern Canada (see Theberge [1992] and Can. Field-Nat. 106:138 for range/status map); remains in 85% of former total Canadian range (Theberge 1991). Individuals recently have been found in North Dakota and Wyoming (End. Sp. Tech. Bull. 18:3, 15). Occurrences in the Dakotas have increased in recent years, likely related to range expansion and population increases in adjacent areas, especially Minnesota; most occurrences have been of young individuals, suggesting dispersal (Licht and Fritts 1994). In 1998, USFWS (Federal Register, 12 January 1998) announced its intention to reintroduce the Mexican gray wolf (subspecies BAILEYI) into Arizona and New Mexico (Apache and Gila national forests, also possibly White Sands Missile Range). ^See Bangs et al. (1998) for information on the status of gray wolf restoration in Montana, Idaho, and Wyoming.

Wyoming

In North America, gray wolves are currently secure in the core of their range in western and northern Canada and interior Alaska, although they have experienced a massive range contraction over the last 150 years in the contiguous United States. Formerly distributed statewide; historical records exist for Crook, Lincoln, Converse, Campbell, Carbon, Sheridan, Fremont, Teton, Niobrara, Sublette, Johnson, and Park counties. Prior to their reintroduction to Yellowstone National Park in 1995, there were only anecdotal sightings in Hot Springs county in the 1970s and outside Yellowstone National Park in the early 1990s. The reintroduced population has now expanded outward to Grand Teton National Park, the National Elk Refuge, and surrounding U.S. Forest Service administered lands. Although most pack territories encompass portions of Yellowstone National Park, in both 1998 and 1999 packs established in areas completely outside of the park.

Abundance

Historically abundant; extirpated during the 1940's (Clark and Stromberg 1987, Wyoming Game and Fish Department 1997), although there were scattered and often unverified reports of wolves in northwestern Wyoming from 1940 - 1995. Supposedly extirpated in the 1940's. Bounties were paid on 15,100 wolves from 1897-1908 (Clark and Stromberg, 1987). However, there have been scattered reports of wolves since then, mostly in the Yellowstone National Park area, including an individual which was shot on adjacent U.S. Forest Service lands (1993?), an individual (not confirmed) videotaped in the Park (1994?) and other observations. A "non-essential experimental" population was reintroduced to Yellowstone National Park in 1995, using wolves captured in Canada. The population has been expanding rapidly, and now numbers 100 - 120 individuals in about 10 established packs. This is the largest population on the southern periphery of the gray wolf's global distribution, although the population in central Idaho is similar in size. As populations in western Montana and central Idaho expand, they will probably begin exchanging individuals with the Wyoming population.

Migration

Wyoming resident, but can move long distances in short time periods in winter.

HABITAT

Rangewide

No particular habitat preference. In Minnesota and Wisconsin, usually occurs in areas with few roads, which increase human access and incompatible land uses (Thiel 1985, Mech et al. 1988, Mech 1989) but apparently can occupy semi-wild lands if ungulate prey are abundant and if not killed by humans (see Mladenoff et al. 1997). Minimum of 10,000-13,000 sq km (with low road density) might be necessary to support a viable population (USFWS 1990); a single pack does not constitute a "minimum viable population" (USFWS 1990). Young are born in an underground burrow that has been abandoned by another mammal or dug by wolf. In Northwest Territories, dens were most commonly located witin 50 km of northern tree line, which resulted in maximal availability of caribou during the denning and pup rearing period; within the tundra zone, dens were not preferentially located near caribou calving grounds (Heard and Williams 1992). In Minnesota, dens usually were not near territory boundaries; den use was traditional in most denning alpha females studied for more than 1 year; possibly the availability of a stable food supply source helped determine den location (Ciucci and Mech 1992).

Wyoming
Habitat generalist formerly found in grasslands, sagebrush steppe, coniferous and mixed forests, and alpine areas. Herds of large ungulates such as elk, deer, bison, or moose are critical habitat elements. Somewhat nomadic, without regular shelters. Only require dens on slopes or other high ground near water for whelping and rearing pups (Clark and Stromberg 1987a). The young are born in an underground burrow that has been abandoned by another mammal or dug by a wolf. In Minnesota and Wisconsin, dens usually are located in areas with few roads (Thiel 1985, Mech et al. 1988, Mech 1989), but apparently wolves can also occupy semi-wild lands if ungulate prey are abundant (Mladenoff et al. 1997). Den use was traditional in most denning females studied for more than 1 year; possibly, the availability of a stable food supply source helps determine den location (Ciucci and Mech 1992). A minimum of 10,000-13,000 sq km (with low road density) might be necessary to support a viable population; note that a single pack does not constitute a "minimum viable population" (U.S. Fish and Wildlife Service 1990).

PHENOLOGY
Rangewide
Mainly nocturnal. In fall-winter in Minnesota, spends most of time sleeping, resting, or traveling, little time feeding (Mech, 1992, J. Mamm. 73:570-571). In south-central Alaska, den site activity was mainly nocturnal; there was a high probability that groups of wolves would be present at the den at midday (Ballard et al., 1991, Can. Field-Nat. 105:497-504).

Wyoming
Pups join in hunting in fall of the year they were born. Wolves may reach 16 years old (Clark and Stromberg, 1987).

FOOD HABITS
Rangewide
Predominant prey: ungulates. When these are low or seasonally unavailable, eats alternative prey, such as beaver, snowshoe hare, rodents, and carrion. Commonly hunts in packs, but lone wolves and pairs are able to kill prey as large as adult moose (Thurber and Peterson 1993). In the vicinity of Glacier National Park, feeds primarily on white-tailed deer; sometimes kills mountain lions and sometimes usurps ungulate prey killed by lions (Bangs and Fritts 1993). White-tailed deer and moose carrion were the primary prey in southern Ontario (Forbes and Theberge 1996).

Food Habits
Wyoming
Carnivorous; will take small mammals and domestic animals, but requires large herds of ungulates such as moose, elk, bison, and deer for successful reproduction. When populations of large prey are low or seasonally unavailable, alternative prey is eaten, such as beaver, snowshoe hare, rodents, and carrion. Can consume up to 9 kg at a single feeding. Food is digested rapidly, and wolves require ca 1.8 kg of meat per day (Clark and Stromberg, 1987a). Commonly hunts in packs, but lone wolves and pairs are able to kill prey as large as adult moose (Thurber and Peterson 1993). In the vicinity of Glacier National Park, wolves feed primarily on white-tailed deer (Bangs and Fritts 1993); the Yellowstone population focuses primarily on elk. Interactions with mountain lions, coyotes, and bears (both black and grizzly) are common, especially near kills. Wolves often pursue, kill, and consume coyotes, and apparently have reduced coyote densities substantially within Yellowstone National Park.

REPRODUCTION

Rangewide

Breeds late fall/early winter in south, February-March in north. Gestation lasts about 2 months. Young are born in March and early April in the south (Hoffmeister 1986), late April in northwestern Montana, late May-early June in Northwest Territories (Heard and Williams 1992). Litter size is 4-10 (average 6-7); 1 litter/year. Only the dominant male/female mate and rear offspring. Pups emerge from the den in about 3 weeks. Pups are weaned in 50 days (also reported as 5 weeks). Young and parents vacate the den when young are about 3 months old (Hoffmeister 1986). Some offspring remain with the pack, others disperse as they mature. Breeding first occurs in the second or third year (Hoffmeister 1986). Lone wolves generally do not successfully rear young, but they may if food is abundant (Boyd and Jimenez, 1994, J. Mamm. 75:14-17).

Wyoming

Wolves are probably monogamous. They breed in late fall/early winter, and gestation lasts 63 days. The young are born in March and early April (Hoffmeister 1986) and emerge from the den or burrow after 6-8 weeks, when the family moves to rendezvous sites (Clark and Stromberg, 1987a; Clark et al., 1989b). Litter size is 4-10 (average 6-7), and there is commonly 1 litter/year. Only the dominant male/female mate and produce offspring. The young vacate the den at about three months (Hoffmeister 1986). Some offspring remain with the pack, and others disperse as they mature. Breeding first occurs in the second or third year (Hoffmeister 1986). Lone wolves generally do not successfully rear young, but they may if food is abundant (Boyd and Jimenez, 1994, Mamm 75:14-17).

ECOLOGY

Rangewide

Territorial throughout the year in most areas (but see GMIGRCOM). Packs consist of one or more family groups (generally 2-8 members, up to 21) with dominance hierarchy. In the Glacier National Park area, packs generally include 8-12 individuals (Bangs and Fritts 1993). Not uncommonly solitary; lone wolves may move through territories of established packs (e.g., see Thurber and Peterson 1993). ^Summer home ranges are smaller than winter ranges; annual range up to several hundred sq km, but may be much smaller (<50 sq km). In the Glacier National Park area, territory size averages around 780 sq km (Bangs and Fritts 1993). May occasionally move several hundred km, especially dispersing young. In Minnesota, most dispersers left when they were 11-12 months old; dispersal occurred mainly in February-April and October-November; 35% of known-age wolves remained in their natal territory for more than 2 years (Gese and Mech 1991). ^Population density is low; at Isle Royale National Park, Michigan, peak density was 9/100 sq km. Population density on Isle Royale followed trends in food supply (moose), with lag of 2-3 years (Peterson and Page 1988). ^Generally wolves are not instrumental in causing prey declines; effect varies with other circumstances. In Quebec, winter weather appeared to affect deer population trend more than did wolf predation (Potvin et al. 1992). In south-central Alaska, wolf predation may have limited caribou recruitment (Bergerud and Ballard 1988), though winter starvation also was proposed as a significant poplation control. May take livestock as secondary prey when deer fawns (the primary summer prey) are less vulnerable due to better prenatal nutrition resulting from mild winter (USFWS 1990). In Minnesota, snow-induced changes in deer distribution and mobility resulted in changes in wolf movement patterns, sociality, and feeding behavior (when snow was shallow, wolves traveled farther and more often, spent less time with pack members, and used conifer cover less and killed fewer deer there) (Fuller 1991).

Wyoming

Wolves are an important predator in natural ecosystems. Generally they are not instrumental in causing prey declines, although their effect on populations varies with other circumstances. May take livestock as secondary prey when young ungulates (the primary summer prey) are not available; this may occur if a mild winter results in better prenatal ungulate nutrition, leading to stronger, less vulnerable young (U.S. Fish and Wildlife Service 1990a). Pups join in hunting in fall of the year they were born. Dispersal is a gradual process lasting months to years. Yearlings especially travel far outside their natal territories and may travel several hundred kilometers. Low prey abundance also increases solitary movements and extraterritorial excursions among all age classes (Messier 1984). Territorial throughout the year in most areas. Pack home range size depends on prey densities and the population size of other packs. Ranges may be 50-300 square miles (125-750 square kilometers); in areas with less prey and fewer wolves, ranges may be up to 3100 square kilometers. In Glacier National Park area, territory size averages around 780 sq km (Bangs and Fritts 1993). Wolves are very social and live in packs of varying sizes that typically consist of a breeding pair, nonbreeding adults and/or yearlings, and pups (Clark and Stromberg, 1987a). In the Glacier National Park area, packs generally include 8-12 individuals (Bangs and Fritts 1993), although solitary individuals were common. Pack cohesion is based on strong bonds of affection and the social structure is based on a dominance hierarchy.

TRENDS IN WYOMING

The reintroduced population is increasing rapidly, with more pup production than predicted. However, pups produced in 1999 suffered high mortality from canine parvovirus, and production may be depressed until the population adapts to the disease. Also, lethal control may begin limiting population size and range as packs expand outward from the reintroduction zone.

MANAGEMENT CONSIDERATIONS

Most wolves will not take livestock if wild prey are abundant, and do not depredate domestic species as much as is perceived (Clark et al. 1989b). However, wolf predation of livestock and domestic dogs has occurred in Wyoming, and has the potential to increase as packs expand out from Yellowstone National Park. Lethal control of depredating wolves may increase in response. The Wyoming / Idaho / Montana meta-population will be de-listed when there are 10 breeding pairs in each state for each of three years. Wolves in the Great Lakes region have recently shown tolerance to human disturbance. Dens have been located within a kilometer of highways and logging areas, and within a military base. A rendezvous site was located 0.5 km from active training. This may suggests that wolves do not move their pups long distances in response to human disturbance and that pup survival is not affected by human disturbance (Theil et al. 1998). However, reaction to disturbance probably varies with individual packs. Acclimation to human activity may occur only after several generations of wolf-human proximity in a given area.

Threats

Not threatened in Yellowstone National Park, but can legally be shot to protect livestock outside of the park. Has a poor public image in some areas and has been shot and poisoned illegally. Populations may be limited in the future by lack of habitat and adequate prey base.

Protection Status

The reintroduced population has non-essential, experimental status. Although they are currently protected in Yellowstone National Park, individuals may be killed outside the park in defense of property.

INFORMATION NEEDS

Inventory Needs

Continue to intensively monitor this species.

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CATOSTOMUS DISCOBOLUS
BLUEHEAD SUCKER

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G4
Comments:
Widespread and often common in the Upper Colorado River drainage (Grand Canyon and above), Snake River system (Columbia River drainage), Wyoming and Idaho, and Pluvial Lake Bonneville basin, Idaho, Wyoming, and Utah.

Wyoming
WYNDD State Rank: S2S3
Comments:
1996: Rank assigned with the help of zoologists at CO NHP.

State Status

US Forest Service
Management Status:

TAXONOMY
General
Formerly referred to as PANTOSTEUS DELPHINUS, but the name DISCOBOLUS has priority over the name DELPHINUS. Included in the genus PANTOSTEUS by some authors, but PANTOSTEUS generally is regarded as a subgenus (Sublette et al. 1990). ^Hybridizes with other CATOSTOMUS species (COMMERSONI, LATIPINNIS, and PLEBIUS). See A87CRA01NA for taxonomic relationships and information on introgression of C. PLEBIUS genes into the C. D. JARROVII population in Nutria Creek in the Little Colorado River headwaters (briefly discussed in B90SUB01NA and A91ECH01NA). Subspecies JARROVII may warrant recognition at the species level (Starnes 1995). ^See Smith (1992) for a study of the phylogeny and biogeography of the Catostomidae.

DISTRIBUTION
Rangewide
Throughout the Upper Colorado River drainage (Grand Canyon and above), Wyoming, Colorado, Utah, New Mexico, and Arizona; Snake River system (Columbia River drainage), Wyoming and Idaho; and Pluvial Lake Bonneville basin, Idaho, Wyoming, and Utah (Page and Burr 1991).

Wyoming
Occurs in Sublette, Sweetwater, Uinta, Carbon, Lincoln, and Teton counties. Upper and middle Colorado River Basins, which includes Flaming Gorge Reservoir, are the last extensive habitat (Holden and Stalnaker, 1975).

HABITAT
Rangewide
Usually in large rivers and mountain streams, rarely in lakes. Occupies a wide range of fluvial habitats including cold, clear mountain streams to warm, turbid streams. Adults almost always in moderate to fast flowing water above rubble-rock substrate; young prefer quiet shallow areas near shoreline (Sublette et al. 1990). Spawned over loosely consolidated gravel in Kanab Creek, Arizona (Maddux and Kepner 1988).

FOOD HABITS
Rangewide
A bottom feeder. Scrapes algae and other organisms from rocks with chisel-like ridges inside each lip; ingests fine organism-laden sediments. May feed in stream riffles, or deeper rocky pools; in lakes it may feed over rocks near shore. May eat aquatic insect larvae.

REPRODUCTION
Rangewide
Apparently spawning occurs in spring-early summer at lower elevations, and mid- to late summer at higher elevations. Spawns February-September in Colorado River and its tributaries (Maddux and Kepner 1988). Size at maturity varies throughout range; individuals from smaller tributaries mature at smaller size (McAda and Wydoski 1983).

ECOLOGY
Rangewide
Little information is available.

MANAGEMENT CONSIDERATIONS

Protection Status
8 occurrences are from the Rock Springs District of the BLM and 2 are in Flaming Gorge. The city of Baggs, Seedskadee National Wildlife Refuge, Bridger-Teton National Forest, and Grand Teton National Park have one occurrence each.

INFORMATION NEEDS
Inventory Needs

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CHARINA BOTTAE
RUBBER BOA

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:
Widespread in western North America; secure due to widespread occurrence in many areas that still provide suitable habitat; declines have been reported for southern California, where human population expansion is a problem.

Wyoming
WYNDD State Rank: S2S3
Comments:
Believed to be rare. Probably has specialized habitat requirements.

State Status
Wyoming Game and Fish Department Nongame species

US Forest Service
Management Status:

TAXONOMY
General
Nussbaum and Hoyer (1974) showed that subspecies UTAHENSIS is indistiguishable from subspecies BOTTAE, and regarded the concept "umbratica" as meaningless; Collins et al. (1990) apparently agreed with this view and did not recognize any subspecies. Erwin (1974) proposed that subspecies UMBRATICA warrants full species status; this suggestion has not gained the support of other herpetologists. Stewart (1977) recognized two subspecies (BOTTAE and UMBRATICA) and, pending further study, regarded populations from Mt. Pinos and the Tehachapi Mountains, California, as intergrades between these two subspecies. Stebbins (1985) continued to recognize three subspecies (BOTTAE, UTAHENSIS, and UMBRATICA).

DESCRIPTION
Small, thick-bodied snake. Generally brown, but may appear green or bluish. No dorasal color pattern. Belly is white to pale yellow. Head indistinct from neck. Tail blunt. Adult length ca 625 mm. Females larger than males. Small eye with vertically elliptical pupil. Top of head covered with irregular large plates; ventral head scales small, without the elongate plants possessed by all other Wyoming snakes. Body scales small and unkeeled, in 38 to 44 rows at mid-body; caudal scales and anal plate are entire. Males usually jave paired anal spurs, a vestige of hind limbs. Distinguished in the field from other Wyoming snakes by small chin scales, blunt tail, and small eyes (Baxter and Stone, 1985). Nominal subspecies umbratica (Biosystems Analysis 1989).

DISTRIBUTION
Rangewide
Southern British Columbia south to southern California (San Bernardino Mountains; near Idyllwild, Riverside County; Mt. Pinos, Kern County; Tehachapi Mountains), central Nevada and southern Utah; from the Pacific coast east to north-central Wyoming and western Monata. Distribution spotty. From near sea level to about 10,000 ft (Stebbins 1985).

Wyoming

Wyoming lies on the southeast periphery of the taxon's main range, which is centered in the Pacific Northwest. It is known from Sheridan, Teton, Lincoln, Park, Fremont, and Washakie counties and Yellowstone National Park. Probably occurs in Big Horn County also. Apparently not uncommon in localized areas such as along Goose Creek near Sheridan and Tensleep Creek in Washakie County on the west slope of the Bighorn Mountains. Baxter and Stone (1985) also report sightings from Jackson. The Wyoming Gap Analysis atlas (Merrill et al., 1996) shows additional potential habitat throughout Wyoming.

Abundance
Rare (Baxter and Stone, 1985), but apparently not uncommon in localized areas such as along Goose Creek near Sheridan and Tensleep Creek in Washakie County on the west slope of the Bighorn Mountains.

Migration
Resident.

HABITAT
Rangewide
Woodlands, forests, chaparral, meadows, grassy areas, wet and sandy edges of rocky streams. Found under logs and rocks and under the bark of dead fallen trees. Nominal subspecies UMBRATICA: pine forests near streams and meadows (Biosystems Analysis 1989).

Wyoming
Foothills and lower montane zones near water in woodlands, forests, chaparral, meadows, grassy areas, and the wet, sandy edges of rocky streams. Avoids arid regions. Seeks cover beneath logs, flat rocks, and probably in rodent burrows (Baxter and Stone 1985; Biosystems Analysis 1989).

PHENOLOGY
Rangewide
Active from March to November.

Wyoming
It is active from March to November.

FOOD HABITS
Rangewide
Mostly eats mice and shrews, but also known to prey on lizards, snakes, and small birds. Kills prey by constriction.

Food Habits
Wyoming
Takes rodents and perhaps some invertebrates (Baxter and Stone 1985). Also known to prey on lizards, snakes, and small birds. Kills prey by constriction.

REPRODUCTION
Rangewide
Live-bearing; 2-8 young are born August-November.

Wyoming
Bears its young alive. Two to eight young are born live from August - November. A female captured at the Tensleep fish hatchery bore a litter of seven young (Baxter and Stone, 1985).

ECOLOGY
Wyoming
Species is secretive and difficult to study, partly because of its crepuscular and nocturnal habits (Baxter and Stone 1985).

TRENDS IN WYOMING
The population is believed to be stable, but there are no data to support this supposition due to the secretive nature of this species.

MANAGEMENT CONSIDERATIONS
Requires moist and riparian habitat, so any degradation in those areas within the range of the species in Wyoming may impact populations.

Threats
Threats are on the increase due to habitat degradation.

Protection Status
Protected in Yellowstone and Grand Teton National Parks. One occurrence is on the BLM Red Canyon Area of Critical Environmental Concern.

INFORMATION NEEDS
Inventory Needs
Basic life history, distribution, habitat use and population information are needed for Wyoming.

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COTURNICOPS NOVEBORACENSIS
YELLOW RAIL

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:
Considered Moderately High Priority on 1998 Watch List (Carter et al. 1998). A special concern species in Minnesota, California, and Wisconsin. In New Jersey and New York it is protected by non-game legislation.

Rangewide
Global Rank: G4
Comments:
Widespread distribution centered in south-central and southeastern Canada; apparently rather rare in most areas, though this is partly because of difficulty in detection; known to be fairly common in some areas; evidently declining in some areas where habitat destruction is ongoing, but there are some significant areas of protected habitat.

Wyoming
WYNDD State Rank: SA?B,SZN
Comments:
Only four records known; a rare, accidental migrant.

State Status

US Forest Service
Management Status:

TAXONOMY
General
May constitute a superspecies with C. EXQUISITUS (AOU 1998).

DISTRIBUTION
Rangewide
In the Americas from southern Canada and northern U.S., south to southern South America, Greater Antilles (except Puerto Rico), and Lesser Antilles (AOU 1983, Marti 1992). Variable occurrence within this range, with low densities at northern periphery (Marti 1992). In Old World from British Isles, southern Russia, and southern Siberia, south through Eurasia and Africa to southern Africa, Madagascar, East Indies, and Australia. Populations in northern North America are partially migratory. Introduced (1958 and later) in Hawaii; now on all main islands (AOU 1983).

Wyoming
Refer to Dorn and Dorn (1990) for distribution by LAT/ LONG block.

Abundance
Not listed by the Wyoming Game and Fish Department.

HABITAT
Rangewide
Fields of dense grass. Open and partly open country (grassland, marsh, lightly grazed pasture, hayfields), often around human habitation (AOU 1983). Nests in buildings (church steeples, attics, platforms in silos and barns, wooden water tanks, duckblinds), and hollow trees; rarely in trees with dense foliage (AOU 1983). Caves, cliff crevices, and cut bank burrows are commonly used in the western U.S. but rarely in the east (Otteni et al. 1972, Martin 1973, Rudolph 1978, Millsap and Millsap 1987, Gubanyi 1989, R. Ferren, pers. comm., S. Smith, pers. comm). Uses nest boxes (Marti and

Wagner 1985). Reproductive success generally is higher in a properly placed and maintained nest box than in a natural nest cavity. ^FORAGING HABITAT: Dense grass fields including saltmarsh, wet meadows, lightly grazed pastures, grass hayfields, and recently abandoned agricultural fields (Colvin 1980, 1984, 1985; Rosenburg 1986; Colvin and Hegdal 1988; Gubanyi 1989). ^Occasionally in alfalfa/grass (Colvin 1984), small grain (Ault 1971, Rosenburg 1986) or along fencelines and roadsides (Ault 1971, Byrd 1982). In an intensively farmed area of eastern Virginia where grass availability was very low, barn owls foraged in five-year-old clearcuts, barnyards, and a pine (PINUS spp.) plantation used as a blackbird roost (Rosenburg 1986). Cultivated habitats generally of little importance because of low prey populations and/or dense protective cover (Colvin 1984, Rosenburg 1986). ^NESTING HABITAT: Uses natural or human-created cavities. Tree cavities are the principal nest site used in most areas of the Northeast (Colvin et al. 1984). Most frequently found in silver maple (ACER SACCHARINUM), American sycamore (PLATANUS OCCIDENTALIS), and white oak (QUERCUS ALBA) (Colvin et al. 1984, Byrd and Rosenburg 1986). ^A wide variety of human-made "cavities" are used as nest sites. Large platforms within barns and silos, tunnels dug into silage in roofed or topless silos, cavities among hay bales stored inside barns, barn cupola shelves, wooden water tanks, and offshore duckblinds are frequently used; feed bins, church steeples and belfries, platforms within commercial and industrial buildings (e.g., warehouses, grain elevators, mills, factories), attics of abandoned or occupied houses, ledges within chimneys, platforms beneath bridges, and World War II cement watch towers are occasionally used (Stotts 1958, Scott 1959, Reese 1972, Klaas et al. 1978, Soucy 1979, Bunn et al. 1982, Hegdal and Blaskiewicz 1984, Colvin 1984, Byrd and Rosenburg 1986, Matteson and Petersen 1988, Parker and Castrale 1990). In addition, nest boxes are readily used (Otteni et al. 1972, Marti et al. 1979, Soucy 1980, Ziesemer 1980, Colvin et al. 1984, Cook 1985, Schulz 1986, Byrd and Rosenburg 1986, Bendel and Therres 1988, Parker and Castrale 1990). ^NON-BREEDING: In winter often roosts in dense conifers; also roosts in nest boxes if available (Marti and Wagner 1985).

PHENOLOGY

Rangewide

Although rails call frequently throughout the day and extensively throughout the night, these birds are not actively nocturnal. During the nighttime they are sedentary. During the day they actively feed and do most of their nest-building. Migration occurs primarily during the night. In the fall the birds are silent and very difficult to locate, in the spring they are much easier to find.

FOOD HABITS

Rangewide

Reported foods include small snails, insects, seeds, grasses, and clover leaves (Terres 1980). Vegetation and invertebrates are the most common foods. Most of the feeding activity takes place during the daytime, and when searching for food in water the birds have been seen with their heads 1.5 inches under the water (Savaloja 1981). In Minnesota rails feed on the snail SUCCINEA RETUSA (Savaloja 1981). Adults will feed on snails and small invertebrates found in dry grass, and seeds, grasses, and clover leaves found in sedge marshes. When the young are being reared, snails are an important food resource.

REPRODUCTION

Rangewide

Nests in late winter, spring, and/or early summer in most of North America. Breeds throughout year in Texas; up to three broods/year. Some California birds attempt two broods/year. One brood/year in most of the range. Nests with eggs or young have been found in the northeastern U. S. during every month of the year (Poole 1930; Bent 1938; Scott 1950; Stewart 1952; C. Rosenburg, unpubl. data), but peak egg-laying occurs mid- April (Colvin 1984, Byrd and Rosenburg 1986). Second clutches typically laid between June and September (Wallace 1948, Keith 1964, Reese 1972, Soucy 1979). ^Incubation by female, 21-24 days for single egg, 29-34 days for full clutch. Eggs are usually laid two days apart and hatch asynchronously since incubation starts after the laying of the first egg (Wallace 1948, Smith et al. 1974). Mean clutch size between 4 and 6 eggs but ranges between 1 and 13 eggs (Bent 1938, Otteni et al. 1972, Parker and Castrale 1990, Reese 1972, Smith et al. 1974). Clutch size depends on condition; increases with food supply and after mild winters in some areas. ^Peak hatching period in the northeast occurs in mid-May (Colvin 1984, Byrd and Rosenburg 1986, S. Smith, pers. comm.). Female broods and feeds young, male brings food. Young fly at 50-55 days in England and reported to fledge at eight to ten weeks of age in U. S. (Pickwell 1948, Reese 1972, Smith et al. 1974). Peak fledging occurs in mid to late July (Colvin 1984, Byrd and Rosenburg 1986). Juveniles may remain in the vicinity

of the nest site for several weeks before dispersing (Otteni et al. 1972, Smith et al. 1974, Marti 1990). ^In northern Utah, 71% of all nesting attempts yielded at least one fledgling. Reproductive success and productivity were reduced following winters with particularly low temperatures and long periods of deep snow cover (Marti 1994). Breeding density depends on availability of nest sites and food supply. See Marti (1989) for information on breeding phenology in different areas. ^Matures and breeds within its first year (Stewart 1952, Maestrelli 1973, Marti 1990) and sometimes as early as seven months of age (B. Colvin, pers. comm.). Typically monogamous, but Colvin and Hegdal (1989) reported that as up to 10% of adult males in their New Jersey study may be polygenous.

ECOLOGY

Rangewide

Susceptible to starvation during prolonged low temperatures and snow cover (Marti and Wagner 1985). In Utah, most adults survived only 1 breeding season (Marti 1989). ^May forage up to about 5-6 kilometers from nesting or roosting site, but generally less than 1.6 kilometers. Home range in Virginia averaged about 850 hectares (Byrd and Johnston 1991). Home ranges may overlap considerably where nest sites and prey are abundant. ^Young have been recovered great distances from natal areas (commonly >80 kilometers and as much as 1800 kilometers) (Stewart 1952; Soucy 1980, 1985). Although juveniles have been recovered from essentially every compass direction from their natal area, most had traveled in a southerly direction (Stewart 1952). Stewart (1952) suggests that juveniles in the northern U.S. migrate south but return to nest somewhere within 320 kilomters of their natal sites. Marti (1990) reported that most individuals banded as nestlings and later found breeding did so within about 50 km from their natal areas. Extensive banding of nestlings and capture of adults in southwest New Jersey revealed that only 5% of nestlings banded within the study area enter the adult in 1989 (Colvin and Hegdal 1989). Very successful at colonizing new areas because of this broad dispersal behavior. ^Disease, parasites, and predation are natural factors that may in part limit populations. In California, diseases documented include tuberculosis, aspergillosis, and trichomoniasis (Schulz 1986). Toxoplasmosis and eastern equine encephalitis have been detected in New Jersey, although no impact to the birds was apparent (Colvin and Hegdal 1986, 1987). Salmonellosis has been recorded in Pennsylvania (Locke and Newman 1970) and New Jersey (Kirkpatrick and Colvin 1986). Kirkpatrick and Colvin (1986) found SALMONELLA-positive nestlings at five of the 25 New Jersey nest sites examined, and reported that all infected young apparently fledged. ^Dipteran ectoparasites and lice have been found on barn owls (Schulz 1986, Kirkpatrick 1989). The endoparasites TRYPANOSOMA, CAPILLARIA, and PORROCAECUM have been identified from the feces of New Jersey barn owls (Colvin and Hegdal 1986). ^NON-BREEDING: solitary or in pairs.

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CYGNUS BUCCINATOR
TRUMPETER SWAN

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:
Considered Moderately High Priority on 1998 Watch List (Carter et al. 1998).

Rangewide
Global Rank: G4
Comments:
Although Pacific Coast Population is increasing, Rocky Mountain Population has moderately increased, and the Interior population of midwestern, northern, and Canada subpopulations have expanded, serious threats to winter habitat availability and quality are present for all three major populations. The Pacific Coast Population continues to lose wintering habitat in Washington and British Columbia. Some areas of Alaska breeding habitat are open to development. No overall swan management plan has been enacted for the state. Serious potential for disease outbreaks on reduced winter ranges exist. Species has a high fragility ranking on breeding and winter habitat, i.e., sensitive to disturbance and pollution.

Wyoming
WYNDD State Rank: S1B,S2N
Comments:
Rank assigned with the help of zoologists at CO NHP. Although this is a migrant species, the rank of S2 applies to both breeding and non-breeding status. Rare; specialized breeding habitat required; few nesting sites; low population size; specialized foraging habitat; some threats.

State Status
Wyoming Game and Fish Department Rank: Species of Special Concern Priority 2.^USFS Sensitive Species, Regions 2 and 4.

US Forest Service
Management Status: S-USFS R2
S-USFS R4

TAXONOMY
General
C. CYGNUS and C. BUCCINATOR have been considered conspecific by some authors (AOU 1983). See Meng et al. (1990) for information on variability of DNA fingerprints in C. CYGNUS, C. OLOR, and C. COLUMBIANUS.

DESCRIPTION
NON-TECHNICAL DESCRIPTION: Largest swan in the world, typically weighing between 21-30 pounds and standing four feet high.. All white, with red-brown head and neck; eyes brown, feet and legs black. Sexes alike, although males larger. Pink stripe at base of black bill is diagnostic characteristic, as is the deep, sonorous, rasping call "like horn of old-fashioned French taxi" (Terres, 1980).^TECHNICAL DESCRIPTION AND IDENTIFYING CHARACTERISTICS: Large, white swan, head and neck often stained rufous by iron-rich waters. Bill is all black, very rarely shows small yellow spot in front of eyes, and often has pink streak along rear upper edge of lower mandible. Culmen profile straight. Total length of adult male is 1.47 meters; adult female is 1.45 meters. May reach 30 pounds. Immature swans gray-brown with yellowish feet and pink bills; mostly white during second year, with black feet and bill (Mitchell, 1994).^SIMILAR SPECIES: Similar to but larger than Tundra Swan (CYGNUS COLUMBIANUS), which has yellow spot in front of eyes and a concave culmen profile. These species are very hard to distinguish in the field, and the best differentiating characteristic is their calls. Tundra swans have a higher-pitched quaver than the deep, trumpet-like Trumpeter swan call.

DISTRIBUTION

Rangewide

BREEDING: Formerly throughout North America from central Alaska to western Hudson Bay (James Bay) and then southeast to Nova Scotia, with the southern limit extending to northwest Mississippi and eastern Arkansas in the east and possibly California in the west. Presently Alaska (Interior, Southcentral, Gulf of Alaska, and Chilkat basin), Yukon, British Columbia, Alberta, Washington, Oregon, Nevada, Montana, Idaho, Wyoming, South Dakota, Minnesota, Wisconsin, Michigan, Saskatchewan, and Ontario (J94MIT01AKUS). Alaska contains over 85% of the world's breeding population, and breeding areas outside of Alaska are very localized (J94MIT01AKUS). NON-BREEDING: Formerly from the present range in southeast Alaska (a few small flocks along the Gulf of Alaska), along the British Columbia coast, Washington, Oregon, and occasionally California but historically extending to southern California, possibly Arizona and New Mexico, along Gulf Coast to central Florida, and along Alantic coast as far as ice free waters existed (J94MIT01AKUS). Present range includes the Gulf of Alaska coast, southeast Alaska, British Columbia, western Washington, western Oregon, occasionally California, e. Nevada, w. Utah, s. Montana, e. Idaho, nw Wyoming, sw South Dakota, and small resident populations in the midwestern states, Saskatchewan, and Ontario (J94MIT01AKUS). In the contiguous U.S. and adjacent Canada, the highest winter densities occur in western Wyoming, western British Columbia (coast and interior lakes), southeastern Oregon, and southwestern Montana, mainly on wildlife refuges (Root 1988). Interior population (resulting from transplants and captive propagation) consists of flocks in Lacreek National Wildlife Refuge, South Dakota, and Hennepin County Park Reserve District, Minnesota; these gradually are exhibiting southward movement in fall but still are dependent on supplemental feeding. The Rocky Mountain population nests in the Rocky Mountains of Canada and the U.S. (Idaho, Montana, Wyoming) and winters primarily in the Greater Yellowstone Ecosystem (Spahr et al. 1991). Breeding areas in Canada include Peace River area of Alberta and British Columbia and Toobally Lakes area of Yukon, plus some areas farther north in Northwest Territories (Johnson and Herter 1989). Has been introduced at Summer Lake in southern Oregon. Formerly nested south to Nebraska, Indiana, and Manitoba, and wintered formerly also in the eastern U.S.

Wyoming

Occurs in Crook, Weston, Goshen, Carbon, Albany, Natrona, Converse, Johnson, Big Horn, Washakie, Hot Springs, Fremont, Sweetwater, Uinta, Sublette, Park, Teton, and Lincoln counties (Merrill et al, 1996). But most EOs, especially breeding records, are in Park and Teton counties in Yellowstone and Grand Teton National Parks.^The Wyoming Gap Analysis Project atlas (Merrill et al., 1996) shows additional potential habitat in the northeast corner of Crook County near the Black Hills National Forest and in the Targhee National Forest.

Abundance

Listed as "Resident, uncommon" by the Wyoming Game and Fish Department. Relatively few suitable nesting sites; very low numbers overall.

Migration

Wyoming supports a mix of long-distance migrants, local migrants, and non-migratory trumpeter swans. Those in northwestern Wyoming may not migrate, or may only migrate very short distances between seasons. Birds in the rest of the state may also be short-distance migrants, but winter sightings may include some birds that breed in areas far to the north.

HABITAT

Rangewide

Ponds, lakes, and marshes, breeding in areas of reeds, sedges or similar emergent vegetation, primarily on freshwater, occasionally in brackish situations, wintering on open ponds, lakes and sheltered bays and estuaries (AOU 1983). In the intermountain western U.S., winters in areas of geothermal activity, springs, and dam outflows (Spahr et al. 1991). Primarily breeds in freshwater, on edges of large inland waters; typically in emergent marsh vegetation, or on a muskrat house, beaver lodge, or island. The nest is a large mass of plant material. Uses same nesting sites in successive years.

Wyoming

Primarily breeds on edges of large inland water bodies, typically in emergent marsh vegetation, or on a muskrat house, beaver lodge, or island. The nest is a large mass of plant material. Uses same nesting sites in successive years. A

summary of seasonal habitat use in Wyoming showed that the most successful nesting pairs were in sites with: little human disturbance; short distances between early spring feeding areas; abundant food and nesting sites; nesting materials available; brood-rearing areas available; and emergent vegetation around nest. Successful pairs also had previous nesting experience and could adapt to disturbance (Lockwood 1988). In the intermountain western U.S., winters in areas of geothermal activity, springs, and dam outflows (Spahr et al. 1991).

PHENOLOGY
Rangewide
Staging and breeding individuals may be active day and night (Henson and Cooper 1994).

Wyoming
Swans greater than 24 years old are known (Kennard, 1975).

FOOD HABITS
Rangewide
Adults feed mostly on aquatic vegetation; young first eat aquatic insects and crustaceans but in 5 weeks begin feeding on aquatic plants. Also may graze in fields (McKelvey and Verbeek 1988). Prefers shallow, slow-moving water for feeding.

Food Habits
Wyoming
Adults feed mostly on aquatic vegetation. In a study of the food habits of swans in the greater Yellowstone ecosystem, Squires and Anderson (1995) found that Chara species, Eoldea canadensis, Potamogeton species, and P. pectinatus tubers were important. Young first eat aquatic insects and crustaceans at first but at 5 weeks begin feeding on aquatic plants. Also may graze in fields (McKelvey and Verbeek 1988). Prefers shallow, slow-moving water for feeding.

REPRODUCTION
Rangewide
Nesting begins in late April or early May in the intermountain western U.S. Clutch size is 2-9 (usually about 5). Incubation, mainly by female, lasts 33-37 days (Harrison 1978). Hatching occurs in latter half of June in southern Alaska, June in the intermountain Western U.S. Nestlings are precocial but remain with adults until subsequent spring. Fledging occurs at 100-120 days. Young remain with parents through winter; siblings may stay together for a few years, may rejoin parents after the nesting period. First nests at 4-5 years (may form pair bonds earlier). Life-long pair bond. Rarely more than one pair nests on a single body of water.

Wyoming
Monogamous. Nesting begins in late April or early May in the intermountain west. Clutch size is 2-9 (usually about 5). Incubation, mainly by female, lasts 33-37 days (Harrison 1978). Hatching occurs in June, and nestlings are precocial. Fledging occurs at 100-120 days. Young remain with parents through winter and into the following spring. Young siblings may stay together for a few years, and may rejoin parents after the nesting period. First nests at 4-5 years, but may form pair bonds earlier.

ECOLOGY
Rangewide
In summer, nonbreeding flocks of 20-100 individuals may occur on large lakes and reservoirs. Defends breeding territory of about 5-10 acres.

Wyoming
Territories vary from about 1.5-100 hectares. Territory size and swan density may reflect shoreline complexity and/or forage resources (Mitchell 1994), but rarely does more than one pair nest on a single body of water. Territories and nest sites are often the same from year to year. Antagonistic toward a wide variety of raptors, waterfowl, and other birds and mammals (Banko 1960); pairs may tolerate previous year's young (Lockman et al. 1987). Defends breeding territory of about 5-10 acres. No winter territoriality exhibited (Mitchell 1994). Henson and Cooper (1994) suggest that the habitat quality in the Rocky Mountain region is relatively low because of the lack of food resources necessary for female swans

to maintain incubation of eggs. This may explain the relatively slow growth, poor cygnet production, and low recruitment seen in the Rocky Mountain populations and their failure to colonize other breeding and wintering areas.

TRENDS IN WYOMING

Relatively stable; recent slight increases in population size. Trend assigned with the help of Tim Britt, former WyGF employee (retired) who indicates a slight decrease.

MANAGEMENT CONSIDERATIONS

Trumpeter swans are sensitive to disturbance at nest and roost sites. Recreational activities around nest sites may cause nest failures or cygnet loss. Disruption of winter foraging may reduce calorie intake and diminish condition. Protection of the wintering grounds of the Rocky Mountain population is important (Lockman et al., 1987). Original declines in swan populations were due to overhunting. Lead poisoning from shot and fishing sinkers is widepsread. Most breeding habitat is secure, but local problems with polllution, recreation, extractive inductreis, and industiral development exist (Holton, 1988). Winter habitat in some areas is declining or being lost to development. A study in the greater Yellowstone area (Squires and Anderson, 1997) suggests that swans feed at a higher rate during spring, and spring use areas may be important for deposition of fat reserves before nesting. These areas should be given a high priority for protection.

Threats

Threatened by human disturbance at nesting sites, pesticides and other contaminants, and degradation of breeding and winter habitat. They have a low population size and low reproduction rates (Mitchell, 1994). Collisions with power lines common in Wyoming (Lockman, 1990).

Protection Status

Eighteen EOs are protected in Grand Teton National Park, 30 are protected in Yellowstone National Park, and 2 are protected in the J.D. Rockefeller National Parkway. Most of these are breeding sites. Five EOs are also protected on the Bridger-Teton, 3 of which are in the Teton Wilderness, and 6 EOs are found in the Targhee National Forests. One is in the Swamp Lake Special Botanical area on the Shoshone National Forest, and four are found in the National Elk Refuge.

INFORMATION NEEDS

Inventory Needs

Basic life history, detailed distribution, habitat use and population information are needed for Wyoming.

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FALCO COLUMBARIUS
MERLIN

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:
Widespread (Holarctic) distribution; increasing population trends in areas formerly negatively impacted by pesticide pollution; still threatened in some areas by habitat loss; organochlorine use in Central and South America poses a threat.

Wyoming
WYNDD State Rank: S2B,SZN
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Relatively rare, but may be more common than suspected; low population numbers; peripheral breeder; no known major threats; documented decline in portion of Wyoming.

State Status
Wyoming Game and Fish Department Uncommon resident/Species of Special Concern 3/Native Species Status 3/Neotropical Migrant.^ US Forest Service Region 2 Sensitive Species

US Forest Service
Management Status: S-USFS R2

TAXONOMY
General
See Olsen et al. (1989) for a study of relationships within the genus FALCO based on electrophoretic patterns of feather proteins.

DISTRIBUTION
Rangewide
Holarctic distribution. BREEDS: from northward tree limit in Alaska, Canada, and Eurasia southward to southern Alaska, Oregon, Idaho, South Dakota, northern Great Lakes region, New York, Maine, Nova Scotia, British Isles, and central Russia. NORTHERN WINTER: southern British Columbia and western and southern U.S. south to Venezuela and Peru, and in Europe, extreme northern Africa, and China. Holarctic distribution.

Wyoming
Breeding range i sprimarily boreal with southward extensions along the Cascades and Rockies. Wyoming is on the southern periphery of the breeding range; most have been observed in the northeast quarter of the state (Ayers and Anderson, 1998). SRANGE rank reflects breeding range. Resident breeder; breeding records from Albany, Campbell, Carbon, Crook, Hot Springs, Johnson, Lincoln, Natrona, Park, Sweetwater, Teton, Uinta, Washakie, and Weston counties and Yellowstone National Park. There is one feeding site record in Albany County, and observation records from Albany, Carbon, Converse, Fremont, Hot Springs, Natrona, Park, Sublette, and Teton counties and Yellowstone National Park.^The Wyoming Gap Analysis Atlas (Merrill et al., 1996) shows populations distributed widely but thinly throughout the state. Nearly all other areas of the state are potential sites; predicted areas for additional sites include a few scattered points in the Absaroka, Bighorn, and Salt River/Wyoming Ranges, Campbell and Crook counties, and Yellowstone National Park.

Abundance

Yearlong resident, rare in summer, uncommon in winter (Dorn and Dorn 1999); widely distributed but not abundant. Jimmy Fustos (pers.comm.) predicted in a 1991 letter to WYNDD that there are at least 150 nests in the state. Its secretive nature makes it very difficult to conduct accurate surveys, however.

Migration
Migration peaks in April and October (Dorn and Dorn 1990).

HABITAT
Rangewide
Nonbreeding: a wide variety of habitats including marshes, deserts, seacoasts, near coastal lakes and lagoons, open woodlands, fields, etc. May roost in conifers in winter. In southeastern Montana, breeding males appeared to prefer patchy shrub/grassland habitats for hunting (Becker and Sieg 1987). Urban-breeding merlins in Saskatchewan avoided hunting in agricultural areas where prey abundance was low (Sodhi and Oliphant 1992). ^Nests in conifer woodland or wooded prairie (e.g., groves of deciduous trees along rivers), including planted shelterbelts; often near water; in towns in some areas (e.g. Alberta, Manitoba, Saskatchewan). Nests in trees in abandoned crow, magpie, hawk, or squirrel nest; also in natural tree cavity or abandoned woodpecker hole, on bare cliff ledge, or scrape on ground (arctic, heather moor of U.K.). Not infrequently returns to same nesting area in successive years.

Wyoming
In open/ edge habitats at lower elevations in the state; usually along mountain foothills, but sometime in cottonwood riparian habitats; typically nests in an old magpie nest. Also nests in ponderosa, limber pine, and Douglas fir in or near rolling grassland. In a Montana study, sagebrush steppe, ponderosa pine and riparian habitat were used more frequently than grasslands and agricultural areas. Short grass prairie also used (Merrill et al., 1996). Many remain within breeding range near towns to feed on passerine birds at bird feeders (Clark et al., 1989).^A study in southeastern Montana found that nest sites were selected for easy access with maximum concealment of the nest. Chose trees on south-facing slopes in areas of lower tree density in taller stands (Sieg and Becker, 1990). In southeastern Montana, breeding males appeared to prefer patchy shrub/grassland habitats for hunting (Becker and Sieg 1987).

PHENOLOGY
Rangewide
Preyed on emerging bats around sunset in Puerto Rico (Rodriguez-Duran and Lewis 1985).

Wyoming
Maximum life span seldom exceeds 8 years (Oliphant et al., 1993).

FOOD HABITS
Rangewide
Bulk of diet usually consists of small to medium-sized birds, often flocking species. Large flying insects (e.g., dragonflies) may be important for young learning to hunt. Also eats toads, reptiles, and mammals (including bats in the West Indies). Uses inconspicuous perches and searching flights when hunting. May cache prey in various seasons. Prey requirements for adults and young during 120-day breeding/rearing period: several hundred sparrow-size birds (see Palmer 1988).

Food Habits
Wyoming
Most studies report that merlins specialize on one or two locally abundant species of small birds (Sodhi et al. 1993), often flocking species. Prey requirements for a pair and their young during a 120-day breeding/rearing period is several hundred sparrow-size birds (Palmer 1988). Large flying insects (e.g., dragonflies) may be important for young learning to hunt. Also eats toads, reptiles, and mammals. Uses inconspicuous perches and searching flights when hunting. May cache prey in various seasons.

REPRODUCTION
Rangewide

Laying generally is completed in southeastern Montana by May 20, which is the peak date in Saskatchewan, where clutches were initiated between mid-April and late May (Sodhi et al. 1992); clutches were completed by late May in Denali Park, Alaska. Clutch size is 2-7 (average 3-5). Incubation, primarily by the female, lasts 31-32 days (male brings food). Young fledge in 25-35 days, remain dependent on parents for food 2-5 more weeks (young remained in vicinity of nest 7-19 days after fledging in southeastern Montana, Becker and Sieg 1985). First breeds at 1-2 years (occasionally 1 year). Yearling male may help nesting pair (James and Oliphant 1986). See Sodhi et al. (1992) for information on an expanding Saskatchewan population characterized by very high reproductive success.

Wyoming
In Wyoming, nests exclusively in old, domed magpie nests that are well concealed among branches of coniferous or decidous trees at the edge of a stand (Wyoming Game and Fish Department 1998). Nest sites are apparently used continuously by a succession of pairs; Ayers and Anderson (1998) found that nests had been used for an average of twelve years at the time of their study. They also found that productivity was high, with an 80% nest success rate and an average of ca 4 fledglings for each successful breeding attempt. Merlins arrive in Wyoming in late March or early April. In Montana, breeding density is 3.8 pairs/100 square km (Sodhi et al. 1993), and laying is generally completed in southeastern Montana by May 20. Clutch size is 2-7 (average 3-5). Incubation, primarily by the female, lasts 31-32 days (male brings food). Young fledge in 25-35 days, and remain dependent on parents for food 2-5 more weeks (Becker and Sieg 1985). First breeds at 1-2 years (occasionally 1 year). Yearling male may help nesting pair (James and Oliphant 1986).

ECOLOGY
Rangewide
At Saskatoon, Saskatchewan, breeding density was 25.4 pairs/100 sq km, the highest recorded for this species (Sodhi et al. 1992). Hunting range sizes (May-July) in Saskatoon varied from about 2-14 sq km (average 6-7 sq km) in residents to 0.6-64 sq km (average 9 sq km in females, 34 sq km in males) in immigrants; neighboring hunting ranges overlapped by 0-77% (Sodhi and Oliphant 1992). ^In Montana, nestling-period home range of 3 telemetered males was 13-28 sq km; moved up to 8-9 km from nest site (Becker and Sieg 1985).

Wyoming
TERRITORIALITY: Nest sites defended during breeding season; feeding territories not defended. Home range varies with prey abundance. Most males change home range sized from incubation to nestling period. In Montana, mean home range size during nestling period was ca 23 square km (Sodhi et al., 1993). COMMUNITY INTERACTION: Usually solitary when not breeding. Mob Great Horned Owls. Mobbed by Brewer's Blackbirds and Tree Swallows. Moderate depression of bird species, both prey and non-prey, around nest sites. House sparrows do not usually form large flocks around nests. Apparently habituate to nearby human activity (Sodhi et al., 1993).

TRENDS IN WYOMING
Most of the populations in the state are suspected to be stable, but this is unknown. The population along the Green River has apparently been extirpated; no reason is known for the decline there. Ayers and Anderson (1998) found high productivity rates in their survey of northeast Wyoming, which suggests that populations there are stable.

MANAGEMENT CONSIDERATIONS
The Wyoming Game and Fish Department conducted a statewide survey beginning in 1998. Their objectives include: revisiting historic nest sites to determine reoccupancy and productivity; determining relative abundance and establishing a baseline inventory to monitor trends; refining survey techniques; quantifying habitat use; and providing management recommendations (Ayers and Anderson, 1998). The Wyoming Game and Fish Department (1991) also recommends protecting historical and potential nest trees, avoiding premature fledging caused by the researcher, coordinating with other management agencies, and requiring falconers to show collection locations to WG&F personnel. ^Taken for falconry; opinions vary on the degree of threat this poses.

Threats
Toxicity testing of eggs is warranted, since pesticides, especially DDE, have had a deleterious effect on eggshell thickness in the past and may also impact prey populations (Clark et al., 1989; Becker and Seig, 1987). Conversion of shrublands and grasslands to agriculture generally decreases availability of small birds, so forage distances increase.

Also decreases habitat. Because nests are difficult to find, they may be inadvertantly destroyed by timber harvest. Human disturbance may or may not affect nesting, depending on the individuals (Mikol-Ritter, 1993).^Species is also taken legally and illegally by falconers, although opinions vary on the degree of threat this poses.

Protection Status
Of the 41 breeding sites, 16 are on state or state/private land. Nine are on BLM land: 4 on the Casper District, 2 on the Rock Springs District, 2 on the Worland District, and one in the Jackson Canyon ACEC. The Seedskadee National Wildlife Refuge has 7 sites, the Thunder Basin National Grassland has 3 sites, and the Black Hills National Forest and the Fontennelle Dam both have 2 sites. Tensleep Preserve, Keyhole State Park, the Shoshone National Forest, and the Bud Love and Ed O. Taylor state wildlife habitat management units each have one site.^Observations occur on state, BLM, Forest Service, and Fish and WIldlife land. One was seen in Yellowstone National Park and one in Grand Teton National Park.

INFORMATION NEEDS

Inventory Needs
Detailed distribution, habitat use and population information are needed for Wyoming. Additional surveys in nesting habitat are needed. Populations should be closely monitored and additional surveys conducted.

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FALCO PEREGRINUS ANATUM
PEREGRINE FALCON

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:
USFWS (Federal Register, 30 June 1995) proposed removing this subspecies from the list of endangered and threatened wildlife. USFWS proposed removing all Endangered Species Act protection from ANATUM and all other subspecies (including removing designation of endangered due to similarity of appearance for falcons with the 48 conterminous U.S.) (Federal Register 63:45446-45463, 26 August 1998).

Rangewide
Global Rank: G4T3
Comments:
Widespread distribution; large number of occurrences, many in remote wilderness; recovering from regional extirpation due to pesticide poisoning in the eastern United States and southeastern Canada and from significant reduction in numbers over many other portions of the range; numbers currently are stable or increasing; recovery objectives have been met in most areas.

Wyoming
WYNDD State Rank: S1B,S2N
Comments:
1996: Rank assigned with the help of zoologists at CO NHP.

State Status
Rare yearlong resident. Wyoming Game and Fish Department Species of Special Concern 3/Native Species Status 3/Neotropical Migrant^U.S. Fish and Wildlife Service Endangered Species

US Forest Service
Management Status:

DESCRIPTION
Black helmet, nape and mustache strip or wedge below the eye is most distinguishing feature. Adults are crow-sized, with dark gray back and tail, and tan to white breast streaked with brown. The cere and feet are yellow in adults and the eyes are dark brown. The plumage of both sexes is similar. Females are one-third larger than males. Immatures have a dark brown back, tail, and helmet with a heavily streaked breast. SIMILAR SPECIES: Same size as the lighter colored and more common prairie falcon. In flight, prarie falcons have contrasting dark brown axillaries or patches under wings next to body which peregrines lack; also have less prominent facial markings, sandy brown on back, not barred beneath but streaked. Other falcons are either larger or smaller with less prominent facial markings (Dorn and Dorn, 1990; Clark et al., 1989).

DISTRIBUTION
Rangewide
Breeds across interior Alaska, south of the Brooks Range eastward across Canada and south to Baja California and Mexico including the south-central United States and the Atlantic coast (Palmer 1988, Ambrose et al. 1988). Now absent from large areas of its former range, particularly in the eastern United States. Some successful introductions have been made in these areas, but this part of the range may no longer be F. P. ANATUM due to use of non-native falcons in reintroduction efforts. Winters largely within the breeding range.

Wyoming
Wyoming is at the core of the taxon's breeding range. Breeding recorded in Albany, Sublette, Park, and Teton counties. Feeding area in Albany County, and reintroduction (but no breeding confirmed) in Sublette County. Observations

reported from Albany, Carbon, Converse, Johnson, Lincoln, and Teton counties and Yellowstone National Park. The Wyoming Gap Analysis Project (Merrill et al., 1996) show peregrines in all of the mountain ranges in the state and predict additional habitat throughout the rest of the state. However, they caution that their predicted distribution may be overestimated because important habitat features such as cliffs and gorges are not mapped on the Gap maps. The Chihuahuan Desert Research Institute considered the Oregon Buttes, Green River Cliffs, Sweetwater River Cliffs, Steamboat Mountain, North and South Table Mountains, Pilot Butte, Spring Butte, and Black Rock potential eyrie sites (Jenkins, 1979). (These features arre all in southwest Wyoming, and many are in or around the Great Divide Basin).

Abundance
Listed as "Resident, rare" by the Wyoming Game and Fish Department. In 1997, there were 40 breeding pairs that fledged 77 young. The Wyoming Game and Fish Department has surpassed the objectives of its reintroduction program, which were to establish and maintain a self-sustaining breeding population in the wild (Wyoming Game and Fish Department, 1998).

Migration
Migration peaks are evident in April and September (Dorn and Dorn 1990). Greater Yellowstone Ecosystem birds may winter in Mexico or Central America or near large western rivers or waterfowl refuges. Some may remain in their breeding territories throughout the year if there is an adequate winter food source (Clark et al. 1989).

HABITAT
Rangewide
See files for FALCO PEREGRINUS.

Wyoming
Historically, Rocky Mountain birds nested in a variety of habitats, but often close to water on cliffs. Mountain cliffs and river gorges are typical nest locations in the Greater Yellowstone Ecosystem. Eyries are found on dominant cliffs at heights greater than 200 feet (60 meters). In the Bighorns, nests are found above 6000 feet elevation on southern exposures (Bighorn National Forest, 1996). Occasionally nest on man-made structures including bridges, buildings, and release towers (Clark et al., 1989). Non-breeders occur over a wide habitat range: mountain meadows, grasslands, marshes, riparian, ponds, desert shrub, and human settlements (Merrill et al., 1996). Migrating birds stop over at areas with large waterfowl concentrations.

PHENOLOGY
Rangewide
See files for FALCO PEREGRINUS.

Wyoming
May live as long as 20 years (Terres, 1979).

FOOD HABITS
Rangewide
See files for FALCO PEREGRINUS.

Food Habits
Wyoming
Almost exclusively small- to medium-sized birds taken in flight. Common prey species include swallows, jays, doves, shorebirds, and small songbirds. Their hunting range usually does not extend arther than ten miles from the nest site, although they have been observed hunting up to 18 miles away (Clark et al., 1989).

REPRODUCTION
Rangewide
See files for FALCO PEREGRINUS.

Wyoming

Generally breeds at 2 or 3 years of age. Male establishes a territory in mid to late March and will bond with mate from previous breeding season unless she does not return, in which case he will court other females. Nests are a scrape in the sand or dirt on a ledge. Three to four eggs are laid in this depression in April or May. Incubation lasts 33-34 days. Young are raised by both parents (Clark et al., 1989). High fidelity to nest site.

ECOLOGY
Rangewide
See files for FALCO PEREGRINUS.

Wyoming
TERRITORIALITY: Territories are aggressively defended from other birds.^COMMUNITY INTERACTIONS: In Wyoming, approximately fifteen percent of the mortality of young falcons released by the Peregrine Fund recovery program is caused by golden eagles. Release sites are situated to avoid golden eagle nests. Tolerant of human activity (Wyoming Game and Fish Department, 1996).

TRENDS IN WYOMING
The number of breeding pairs and number of young fledged has been steadily increasing since 1987 (Wyoming Game and Fish Department, 1997).

MANAGEMENT CONSIDERATIONS
The effects of the 1988 fires on the Greater Yellowstone populations is uncertain, but the fires may benefit them by improving prey availability and foraging habitat.^Continue intensive annual monitoring efforts currently undertaken by Wyoming Game and Fish Department to ensure continued success of the recovery program, particularly since birds may be affected by factors outside the state (such as pesticide use on wintering grounds). Need to monitor reproductive trends and pesticide levels. Work cooperatively with federal and state agencies, conservation groups, and private concerns (Clark et al., 1989). On the Shoshone National Forest, approx. 60 days are currently required annually to get production data for the 12 known nesting pairs. Considerably more effort would be required to document the expanding population and to survey additional habitat. At a minimum, the current level of monitoring should continue (Wyoming Game and Fish Department 1997).

Threats
Threats include pesticide poisoning, low breeding densities, reproductive isolation, and reduced availability of foraging habitat and prey (Finch, 1992).

Protection Status
SPROTEOS rank based on breeding records. Four breeding records occur on National Forest land, one of which occurs in the Teton Wilderness on the Bridger-Teton. Yellowstone National Park and the BLM have one breeding record each. A reintroduction record occurs on the Bridger-Teton. Two feeding areas are reported for BLM land, and one for the Mortenson Lake National Wildlife Refuge. Of the observation records, 9 occur in National Parks, 6 occur on National Forests, one occurs on BLM land, and 3 occur on state land, one of which is from the Bud Love Wildlife Habitat Management Unit.

INFORMATION NEEDS
Inventory Needs
Document expanding population; additional surveys in nesting habitat are needed. Continue monitoring programs.

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GAVIA IMMER
COMMON LOON

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:
Listed on the 1987 and 1995 lists of migratory nongame birds of management concern in the U.S. (USFWS 1987, 1995). Within the northeastern states, legal status ranges from endangered to unlisted (although protected under migratory bird laws) (Rimmer 1992).

Rangewide
Global Rank: G5
Comments:

Wyoming
WYNDD State Rank: S2B,SZN
Comments:
1996: Rank assigned with the help of zoologists at CO NHP.
1995: Peripheral breeding species with specialized and limited breeding habitat requirements threatened by human disturbance.

State Status
Wyoming Game and Fish Department Species of Special Concern 1. The breeding population in Wyoming is restricted in range and numbers, and the amount of suitable habitat is currently declining from increased human use and disturbance of nesting lakes (Wyoming Game and Fish Department, 1998).^USFS Regions 2 and 4 Sensitive Species

US Forest Service
Management Status: S-USFS R2
S-USFS R4

TAXONOMY
General
Considered conspecific with G. ADAMSII by some authors (AOU 1983).

DESCRIPTION
A large waterbird with a black head, heavy dagger-like bill, white necklace on black neck, prominent white checkers on the back, white underparts, red eye, and steep forehead in profile. Weight varies between six and fourteen pounds; body length is from 24 to 36 inches and the wing span ranges from four to five feet. Males are typically larger and heavier than females, but the sexes are similar in plumage. Subadults and winter-plumaged adults are gray to gray-brown with a white throat. Winter-plumaged adult always has white spots on the wing coverts (usually hidden when wing is folded); juvenile has broad, pale edges on the feathers of the back and scapulars (McIntyre and Barr 1997). There are four types of vocalizations. The wail, which sounds like a wolf's howl, is used for long-distance communication. The tremolo sounds like a quavering laugh and is typically used when loons are annoyed or alarmed, or in social greeting. The yodel, the distinctive call most associated with loons, is used to establish or defend a territory. The hoot is a soft one-note call used for communication in close quarters (Ritter 1989). Similar Species: The distinctive plumage pattern and larger size distinguish this species from all other congeners except G. adamsii, which has an ivory yellow bill. The arctic loon and Pacific loon are smaller, with smaller bills and even, vertical divisions between the gray and white on the side of the neck. They have no light areas around the eye. The red-throated loon is also smaller, with a more slender bill; its neck lacks a pale wedge or collar. In flight, all species carry their heads slightly lower than their bodies, which are slightly arched to form a concave ventral surface, with feet extended. The Common and Yellow-billed loons are larger and more robust than the others, and the feet project farther from the body than they do in the Arctic, Red-throated, and Pacific loons (McIntyre and Barr 1997).

DISTRIBUTION

Rangewide

BREEDING: Iceland, Greenland, and across Canada and the northern U.S. to Alaska, south to California, Montana, North Dakota, Iowa, Illinois, Indiana, Ohio, Pennsylvania, New York, southern New England, and Nova Scotia (AOU 1983). ^NON-BREEDING: mainly along Pacific coast from Aleutians to Baja California and Sonora, along Atlantic and Gulf coasts from Newfoundland to Florida and west to Texas, and in western Palearctic along Atlantic coast to northwestern Africa (AOU 1983). In North America, most concentrated in winter along the South Carolina coast, around Vancouver Island, in northern California, along the Gulf Coast adjacent to the Florida panhandle, and along the Atlantic seaboard from Massachusetts to Maine (Root 1988).

Wyoming

Strongly boreal breeding distribution, with a disjunct breeding center in northwest Wyoming. Breeding range may be shifting northward. In summer, loons are found in freshwater lakes in a broad band of boreal and mixed forest across North America (McIntyre and Barr, 1997). Wyoming is on the southern edge of its breeding range, which may be shifting northward. They usually winter along the coast. While distributed virtually statewide during migration, they use only a few sites as major staging areas. The only known confirmed breeding locations (about 26) occur in the northwestern corner of the state in Yellowstone National park and just to the south. However, its distribution during the spring and fall migration appears to be statewide (Oakleaf et al., 1992). Occurs in Albany, Big Horn, Carbon, Converse, Crook, Fremont, Johnson, Laramie, Natrona, Niobrara, Park, Platte, Sheridan, Sublette, Sweetwater, Teton, Uinta, Washakie, and Weston counties. The only known confirmed breeding locations occur in Yellowstone National Park and just to the south in Park and Teton counties. The Wyoming Gap Analysis (Merrill et al., 1996) shows possible potential habitat along Cottonwood Creek in southern Sublette County and predicts additoinal locations in the Absaroka Range along the border between Yellowstone National Park and the Shoshone National Forest in Park County.

Abundance

Listed as "Summer resident, uncommon" by the Wyoming Game and Fish Department. Ritter (1989) mentions only 20 known breeding pairs.

Migration

Loons stage for fall migration from September through October, aggregating on specific large lakes. They move in groups of 15-25, although some remain solitary or in smaller groups of 2 or 3. They follow the break-up of lake ice on their spring migration northward in April and May. The earliest April sighting in the Wyoming Game and Fish Wildlife Observation System was April 1, 1979 (Ritter, 1989).

HABITAT

Rangewide

BREEDING: Lakes containing both shallow and deep water areas (McIntyre 1975, 1988; Strong 1985). Water clarity is an important component of breeding habitat selection. Loons are visual predators and generally need clear visibility to at least three to four m (McIntyre 1988), although they can adapt to some conditions of low water clarity (McIntyre 1975). In studies comparing lakes with and without loons, higher turbidity has been suggested as a factor influencing lack of occupancy (Barr 1973, McIntyre 1988). ^Availability of nest sites also influences habitat selection. Most studies have shown that small islands (usually < 2.5 ha) are strongly preferred over mainland nest sites (Olson and Marshall 1952, Vermeer 1973, McIntyre 1975, Titus and VanDruff 1981, Strong 1985), and that quiet, backwater sites may be selected over mainland sites (Strong 1985). Loons have been found nesting in marshy portions of lakes in water depths no greater than 0.5 m (Alvo 1981). If natural islands are lacking or are unsuitable due to human disturbance or other factors, loons will readily use shoreline nest sites. Optimal nest sites, as measured by degree of success, include overhead cover to conceal eggs from predators, protection from wind and waves, good visibility by incubating adults, and a steep slope adjacent to the nest for adequate underwater approaches and exits (McIntyre 1975, 1983, 1988). ^Brood-rearing areas are typically located in shallow coves of fairly uniform depth, sheltered from prevailing winds and wave action, and are independent of nest site location (McIntyre 1983, Strong 1985). Adults tending chicks prefer shallow water areas (< 2 m) close to land (< 150 m) (Strong 1985, Strong and Bissonette 1989). Deepwater areas (> 4 m) distant from land (> 250 m) are avoided by feeding adults and adults tending chicks, but are often used for social

interactions (Strong 1985). Breeding adults usually feed outside of nursery areas (Strong 1985), occasionally outside of their territories (McIntyre 1983), and may visit nearby lakes for feeding (Miller and Dring 1988). ^NON-BREEDING: Inland lakes and rivers and coastal waters during migration. Most nonbreeding subadults apparently remain in coastal areas during breeding season. Winter primarily in coastal marine habitats, including bays, coves, channels, inlets and other shallow areas (Bent 1919, McIntyre 1988, Palmer 1962). Some individuals overwinter on inland lakes and rivers, although this appears to be largely weather influenced (McIntyre 1988). While shallow, inshore waters appear to be utilized more frequently than deeper, offshore waters (McIntyre 1978, Daub 1989), some use continental shelf waters up to 100 m in depth and 100 km from land (Haney 1990). In the southeastern U.S. (between 29 degrees and 35 degrees North latitude), wintering loons were most common in waters up to 19 m deep but were rare or absent in highly turbid waters five to 15 km from shore. Loon distribution shifted farther offshore during midwinter to avoid increases in these turbid water areas (Haney 1990). Feeding typically occurs in water depths less than five meters, while maintenance activities (e.g., preening and drifting) take place in deeper water (McIntyre 1978, Daub 1989).

Wyoming
In general, loons prefer to nest on remote lakes greater than 10 acres in diameter between 1800 and 2400 meters elevation. Lakes should be ice-free for a minimum of four months and have emergent vegetation for cover. They must be deep enough to allow the loons to dive and clear enough for them to see fish, aquatic invertebrates, and amphibians (McIntyre 1975, 1988; Strong 1985). Most studies have shown that small islands (usually < 2.5 ha) are strongly preferred over mainland nest sites (Olson and Marshall 1952, Vermeer 1973, McIntyre 1975, Titus and VanDruff 1981, Strong 1985). However, if natural islands are lacking or are unsuitable due to human disturbance or other factors, loons will readily use shoreline nest sites. Optimal nest sites, as measured by degree of reproductive success, include overhead cover to conceal eggs from predators, protection from wind and waves, good visibility by incubating adults, and a steep slope adjacent to the nest for adequate underwater approaches and exits (McIntyre 1975, 1983, 1988). Brood-rearing areas are typically located in shallow coves sheltered from prevailing winds and wave action. Their location is independent of the nest site (McIntyre 1983, Strong 1985, Strong and Bissonette 1989, McIntyre and Barr 1997).

PHENOLOGY

Wyoming
It is generally assumed that loons may begin breeding at four years old, although it may be as late as seven. They breed annually, usually producing 2 eggs. Marginal lakes and high population density negatively affect reproductive success (McIntyre and Barr, 1997). Loons are estimated to live for 15-30 years, but there are no data supporting this speculation.

FOOD HABITS
Rangewide
Dives from surface, feeds mainly on fishes; also amphibians and various invertebrates (Terres 1980). If nesting on small lake, may use adjacent lake for supplementary foraging (Johnsgard 1987). In Ontario, loons attempting to raise chick on fishless acidic lake fed chick benthic algae and possibly benthic invertebrates but flew to other lakes to feed themselves (Alvo et al. 1988). Feeds usually in waters less than 5 m deep. ^Primarily piscivorous, but are opportunistic and will eat any suitable prey they can readily see and capture (McIntyre 1988). Their primary food on breeding lakes is yellow perch (PERCA FLAVESCENS), followed by other shallow, warmwater fish and minnows (Cyprinidae) (Olson and Marshall 1952, Palmer 1962, Barr 1973, McIntyre 1986). Salmonids are taken on lakes that have low populations of other fish species (McIntyre 1988). On the Great Lakes, alewives (ALOSA PSEUDOHARENGUS) appear to be the most common prey item (McIntyre 1988). Crustaceans, especially crayfish (Decapoda), are commonly taken, and plant material is occasionally eaten (Palmer 1962, McIntyre 1988). On lakes without fish, loons have been reported feeding on molluscs, insects, amphipods and amphibians (Munro 1945, Parker 1985). Young have a diversified diet consisting primarily of small fish and minnows, aquatic insects and crayfish (McIntyre 1988). ^Winter foods are reported to include flounder (Pleuronectoidei), rock cod (GADUS MORHUA), herring (CLUPEA spp.), menhaden (BREVOORTIA PATRONUS), sea trout (SALMO spp.), sculpin (LEPTOCOTTUS ARMATUS), and crabs (Palmer 1962, McIntyre 1988). A detailed study of winter feeding patterns and preferences has not been conducted.

Food Habits
Wyoming
Loons eat fish by pursuing them underwater, and require clear water conditions for feeding. They favor the slower, more erratic fish, but may also eat frogs, crayfish, invertebrates, and some plant material. Breeding need not be on lakes

with fish, however. Fitch (1987) found successful nestings on two lakes in Wyoming that had no fish. Adults flew to nearby lakes to feed (Ritter, 1989).Feeds usually in waters less than 5 m deep (McIntyre 1988).

REPRODUCTION

Rangewide

ARRIVAL AND TERRITORY ESTABLISHMENT: Timing of spring arrival is correlated with latitude and dictated primarily by ice-out phenology (McIntyre 1988). In southern portions of the breeding range, pairs may reoccupy territories in March, while at northern latitudes arrival may be delayed until mid or late May (McIntyre 1988). In Minnesota, an average of eight days elapsed between ice break-up and loon arrival in an early ice-out year, five days in an average year, and three days in a late year (McIntyre 1975). Males typically return first, especially in southern breeding areas (McIntyre 1975, 1988; Sutcliffe 1980). However, pairs often arrive together at northern lakes (McIntyre 1988). Territories are established immediately after arrival and may change in size as the breeding season progresses, expanding after chicks hatch and shrinking for failed pairs (McIntyre 1988). ^COURTSHIP: It is believed that pairs remate each spring and that courtship serves primarily to renew the pair bond (McIntyre 1988). Courtship begins shortly after territory reoccupation and involves quiet, shared displays, including simultaneous swimming, head posturing and short dives. Vocalizations are not extensive. Copulation sequences are stereotyped, typically last from three to ten minutes, and take place on land (McIntyre 1988). Some copulation sites become nest sites (McIntyre 1975). ^NESTING PERIOD: Nest-building is conducted by both members of the pair and may immediately follow copulation, sometimes lasting over four days (McIntyre 1975, 1988). Egg-laying begins one to 4.5 weeks after spring arrival, usually during mid-May in the south, and well into June farther north (Palmer 1962, McIntyre 1975). Eggs are typically laid at two-day intervals (McIntyre 1975). Replacement clutches following failures of first nests are common (McIntyre 1975, 1988). Renests have been reported to occur within five days of a nest loss (Olson and Marshall 1952), but intervals of 10-14 days appear to be most common (Olson and Marshall 1952, McIntyre 1975, Sutcliffe 1980). Up to three laying cycles have been recorded in a season (Olson and Marshall 1952, McIntyre 1975). Nests lost early in the season are more likely to be replaced than those lost later (McIntyre 1988). Replacement clutches have been initiated as late as early July in Vermont (Kaveney and Rimmer 1989). If waters rise during incubation, loons continue adding to the nest's height to prevent flooding (McIntyre 1988). Replacement nests tend to have smaller outside dimensions (McIntyre 1975). Nest bowls are often reused in subsequent years, and occasionally within years for replacement clutches (Strong et al. 1987). ^CLUTCH SIZE AND INCUBATION: Most clutches contain two eggs, and most one-egg clutches result from loss of the first egg (McIntyre 1975, Titus and VanDruff 1981). Three-egg clutches are very rare (Bent 1919, McIntyre 1988), and only two four-egg clutches have been reported (Nelson 1983, Zicus et al. 1983). Second eggs are smaller than first eggs, and eggs in replacement clutches are smaller than those in original clutches (McIntyre 1988). Both pair members incubate, beginning with the laying of the first egg, for an average period of 28-29 days, ranging from 26-31 days (Bent 1919, Olson and Marshall 1952, Palmer 1962, McIntyre 1975). An adult is present at the nest 99 percent of the time, and the eggs hatch within a day of one another (McIntyre 1975). ^CHICK REARING: Chicks leave the nest within 24 hours of hatching and are soon moved to nursery areas (McIntyre 1988). In Saskatchewan, nurseries were located an average of 500 m from nest sites and occupied about 15 percent of territory size (McIntyre 1983). Both adults tend the young by feeding, carrying and defending them for several weeks. Chicks are carried on their parents' backs until they reach three weeks of age (McIntyre 1975). Although chicks are capable of short dives at the time of nest departure and may capture some fish by the second or third week (McIntyre 1975), they are fed largely by their parents until eight weeks of age (McIntyre 1988). Adults aggressively defend chicks underwater and on the surface (McIntyre 1988). Most juveniles are capable of flight at 11-12 weeks (Barr 1973, McIntyre 1975), and some leave their small, natal lakes or parental territories shortly afterwards (McIntyre 1975). ^NESTING SUCCESS: Breeding success varies considerably among populations. Most failures occur during incubation, from factors such as predation, flooding or stranding due to water level fluctuations, and human intrusion (Olson and Marshall 1952, McIntyre 1975, Wood 1979, Titus and VanDruff 1981, Rimmer and Kaveney 1988). In Ontario, lack of attempted breeding was associated with small, brown, low-alkalinity lakes; successful breeding associated with large, clear, high-alkalinity lakes; unsuccessful breeding resulted primarily from brood mortalities on acidic lakes, most likely due to shotage of suitable food for young (Alvo et al. 1988). ^Chick survival is relatively high, especially after chicks reach two to three weeks of age (McIntyre 1988). However, Alvo et al. (1988) recently found higher mortality of older chicks on highly acidified lakes in Ontario, due to presumed starvation from an inadequate food base. Fledging success (percent of hatched chicks fledged) from a sample of 1,500 pairs across the breeding range averaged 80 percent (range = 67-94 percent) (McIntyre 1988). Productivity (number of fledglings per pair) of this sample averaged 0.60 and varied widely between 0.22 for nine pairs in Minnesota (McIntyre 1975) and 0.97 for 132 pairs in New York (Parker and Miller 1988). ^SITE FIDELITY: Appear to be faithful to breeding territories. Banded adults have been recaptured on the same breeding territory in subsequent years

(McIntyre 1974, Yonge 1981, Eberhardt 1984). Yearly reuse of nest sites and nursery areas has been documented (Strong et al. 1987, Jung 1991), but it is not known whether the same individuals were involved. Sonograms of yodel calls suggest that individual males return to the same territory each year (McIntyre 1988, Miller 1989). Little is known about mate fidelity of breeding pairs.

Wyoming
Loons begin nesting within 1-2 weeks of their arrival at a nesting lake. Territories are established immediately after arrival and may change in size as the breeding season progresses, expanding after chicks hatch and shrinking for failed pairs (McIntyre 1988). An average of two eggs is laid in a shallow depression rimmed with vegetative material, usually within 1.5 meters of shore. Nest bowls are often reused in subsequent years, and occasionally within years for replacement clutches (Strong et al. 1987). Hatching in Wyoming occurs in early to mid-June. Young chicks spend their first 2 weeks in a nursery area, such as a sheltered bay with small fish for food. They are dependent on adults for food and protection for at least 2 months. Both adults tend the young by feeding, carrying and defending them for several weeks. Chicks are carried on their parents' backs until they reach three weeks of age (McIntyre 1975). Most juveniles are capable of flight at 11-12 weeks (McIntyre 1975, Ritter 1989), and some leave their small, natal lakes or parental territories shortly afterwards (McIntyre 1975). It is believed that pairs remate each spring and that courtship serves primarily to renew the pair bond (McIntyre 1988). Courtship begins shortly after territory reoccupation and involves quiet, shared displays, including simultaneous swimming, head posturing and short dives. Vocalizations are not extensive. Copulation sequences are stereotyped, typically last from three to ten minutes, and take place on land (McIntyre 1988). Some copulation sites become nest sites (McIntyre 1975). Replacement clutches are common if the first nest fails (McIntyre 1975, 1988). Renests have been reported to occur within five days of a nest loss (Olson and Marshall 1952), but intervals of 10-14 days appear to be most common (Olson and Marshall 1952, McIntyre 1975). Up to three laying cycles have been recorded in a season (Olson and Marshall 1952, McIntyre 1975). Nests lost early in the season are more likely to be replaced than those lost later (McIntyre 1988). If waters rise during incubation, loons continue adding to the nest's height to prevent flooding (McIntyre 1988). Breeding success varies considerably among populations. Most failures occur during incubation, from factors such as predation, flooding or stranding due to water level fluctuations, and human intrusion (Olson and Marshall 1952, McIntyre 1975, Titus and VanDruff 1981). Chick survival is relatively high, especially after chicks reach two to three weeks of age (McIntyre 1988). Appear to be faithful to breeding territories. Banded adults have been recaptured on the same breeding territory in subsequent years (McIntyre 1975).

ECOLOGY
Rangewide
Hectares of water area per territorial pair: 503 (New Hampshire); 44, 73 (Minnesota); 39 (Saskatchewan); 351 (New York) (Johnsgard 1987). Lakes smaller than 80 ha generally support only one breeding pair. Typically, territory size is larger on large lakes than on small lakes. Generally, loss of eggs to predators is not a primary cause of breeding failure (Johnsgard 1987). Wintering birds may defend feeding territories during the day, gather into rafts at night. ^Ecology of wintering loons is not well studied. McIntyre (1978) found that loons off the Virginia coast maintained individual feeding territories of four to eight ha during the day and rafted together at night. Activity patterns were significantly correlated with tidal changes. Maintenance behavior was greatest during the mid-period of tidal rise. Feeding activities peaked late in the flood tide and during the first half of the ebb tide. In Rhode Island, no winter feeding territories, feeding assemblages, or tide-correlated activity patterns were noted by Daub (1989).

Wyoming
TERRITORIALITY: Loons defend their territory during nesting, rearing chicks, and feeding. Territory size is determined by the availability of physiographic features such as bays and inlets that form visibility barriers between loon pairs. The yodel call serves as a territorial call; territories and mates may be switched before nesting. Territories are maintained by vocalization and fighting (McIntyre and Barr, 1997).^COMMUNITY INTERACTION: Territorial defense against other species, especially waterfowl, is intense (McIntyre and Barr, 1997). Ritter (1989) cites several sources that report predation on loon eggs by herring gulls, ravens, mink, raccoon. McIntyre (1975) finds that predation accounts for 75% of all nest losses. Wintering birds may defend feeding territories during the day, and gather into rafts at night. It is generally assumed that loons may begin breeding at four years old, although it may be as late as seven. They breed annually, usually producing 2 eggs. Marginal habitat and high population density negatively affect reproductive success (McIntyre and Barr 1997).

TRENDS IN WYOMING

Very few breeding pairs, but numbers are relatively stable.

MANAGEMENT CONSIDERATIONS

Loons are very sensitive to disturbance, and one of the most important management actions involves maintaining or reducing levels of human disturbance near nesting and nursery areas. This may entail allowing camping only in designated areas away from loon nests; decreasing access to lakes with nests; restricting or preventing motorized vehicles on nesting lakes; and limiting visitor access. Titus and VanDruff (1981) found that loon reproduction was more successful on lakes without motorized craft than it was on lakes where motors were allowed. Avoiding developments on loon lakes may also insure water clarity, an important feature of lake habitat. Since most known breeding sites are within National Park boundaries, many of these options are already implemented.The Loons nesting on reservoirs can be vulnerable to sudden increases in water levels, which floods the nest; an effort could be made to hold water levels constant during the incubation period. Several studies have found that loons nest successfully on artificial islands in lakes or reservoirs. These provide habitat for nesting and reduce predation on chicks.

Threats

The primary threat is from human disturbance during the nesting period. Loons often leave nests when approached too closely, leaving eggs vulnerable to predators and chilling. Chemical pollution, shoreline developments, fluctuating water levels, and predators are also factors (Ritter, 1989). In addition, several nest sites are near USFS roads. The loon's narrow habitat requirements make them susceptible to habitat degradation.

Protection Status

Nineteen breeding sites are protected in Yellowstone and Grand Teton National Parks, and an additional eight are somewhat protected in wilderness areas on the Targhee, Shoshone, and Bridger-Teton National Forests. There is one occurrence on BLM land. Some staging and feeding areas occur on Seedskadee National Wildlife Refuge, the National Elk Refuge, Flaming Gorge National Recreation Area, Shoshone and Medicine Bow National Forests, and Yellowstone and Grand Teton National Parks. Others occur on state reservoirs and parks.

INFORMATION NEEDS

Inventory Needs

Surveys of potential nesting habitat by cooperative inter-agency agreements should be continued. The effect of acid rain on lakes in Wyoming needs to be monitored, since loons are sensitive to high acid levels.

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GILA COPEI
LEATHERSIDE CHUB

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G3G4
Comments:
Small range (perhaps two dozen sites) in Wyoming, Idaho, and Utah; probably stable but status is not well known.

Wyoming
WYNDD State Rank: S2
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Uncommon to rare; limited distribution/ habitat, but a peripheral species; GRANK of "G4"; Idaho's SRANK is "S1"; no known major threats; some habitat is somewhat protected.

State Status

US Forest Service
Management Status:

TAXONOMY
General
Original name SQUALUS COPEI; subsequently placed in 6 other genera. Uyeno (1960, Ph.D. diss., Univ. Michigan) restudied taxonomy and placed it in genus GILA, subgenus SNYDERICHTHYS (B80LEE01NA). Starnes (1995) treated SNYDERICHTHYS as a full genus and referred to this species as S. COPEI; he noted that the populations in separate subbasins of the Bonneville Basin system should be investigated for polytypy.

DISTRIBUTION
Rangewide
Upper Snake River system (above Shoshone Falls), Wyoming and Idaho, south to the Sevier River system, southern Utah; common (Page and Burr 1991). May have been introduced into upper Snake River (not taken there until 1934). Introduced into Colorado River drainage, Utah.

Wyoming
Occurs in the Bonneville Basin (Bear River/ Sulfur Creek near Evanston) and the Upper Snake River drainage (Buffalo Fork).

Abundance
Baxter and Simon (1970) stated that this species is rare in Wyoming.

HABITAT
Rangewide
Adults found in rocky flowing pools, sometimes riffles, of cold creeks and small to medium rivers. Young found in brushy areas or in quiet pockets near shore. Current usually moderate; vegetation frequently sparse; water depths usually 60-90 cm or less (Sigler and Miller 1963).

FOOD HABITS
Rangewide
Probably eats small drift organisms, algae, and aquatic insects (Sigler and Sigler 1987).

REPRODUCTION
Rangewide
Probably spawns in the summer, June-August (based on presence of brightly colored males and females distended with eggs during these months), at 15-20 C (Sigler and Miller 1963). In Utah, peak spawning occurred in May, with some activity possibly extending into early June; maximum age was 8 years (Johnson et al. 1995).

ECOLOGY
Rangewide
Little is known about the life history of this species.

TRENDS IN WYOMING
Probably stable, but unknown.

MANAGEMENT CONSIDERATIONS
Threats
No known threats; threats need to be determined.

Protection Status
May be somewhat protected on the Buffalo Fork River.

INFORMATION NEEDS
Inventory Needs
Determine baseline population densities for all habitat types used; determine habitat types; determine life history; determine effects of non-native fish on species.

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GRUS AMERICANA
WHOOPING CRANE

STATUS
US Endangered Species Act
US Fish & Wildlife Service: (LE-XN)
Comments:
Introduced Florida population is listed by USFWS as an experimental nonessential population (Federal Register, 22 January 1993). In 1996, USFWS proposed to designate the Rocky Mountains population as an experimental nonessential population (Federal Register, 6 February 1996). Rocky Mountain population designated as experimental nonessential (Federal Register 62:38932-38939, 21 July 1997). Elsewhere, listed by USFWS as Endangered (Federal Register, 21 July 1997).

Rangewide
Global Rank: G1
Comments:
Breeds in one small area in Canada, winters primarily along the Texas coast; historically much more widespread; total population in the mid-1990s was about 240, with about 90 in captive flocks; numbers increasing; problems include habitat degradation, low productivity associated with drought, and mortality from collisions with powerlines along lengthy migratory route.

Wyoming
WYNDD State Rank: S1N
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Endangered; no reproduction.

State Status
Rare summer resident; U.S. Fish and Wildlife Service Experimental Nonessential Population

US Forest Service
Management Status:

TAXONOMY
General
Based on DNA data, G. GRUS, G. AMERICANA, G. MONACHUS, and G. NIGRICOLLIS form a monophyletic lineage apart from G. JAPONICUS (Krajewski and Fetzner 1994), and the closest living relative of G. AMERICANA may be G. GRUS (Love and Deininger 1992). ^GRUS AMERICANA exhibits low mtDNA diversity; may have a single mtDNA haplotype (Snowbank and Krajewski 1995).

Sub-Species
Monotypic species.

DISTRIBUTION
Rangewide
BREEDING: formerly ranged over much of central and eastern North America. Currently, west of Little Buffalo River, between Great Slave Lake and Lake Athabaska, vicinity of Wood Buffalo National Park, in south-central Mackenzie and adjacent northern Alberta; breeding range has been expanding, particularly southward, in the area of Wood Buffalo National Park (Kuyt 1993). NON-BREEDING: formerly the tallgrass prairies of southwestern Louisiana and from Texas to central Mexico. Currently, Gulf Coast of Texas, Aransas National Wildlife Refuge (NWR), Matagorda Island, Isla San Jose, portions of the Lamar Peninsula, and Welder Point on the east side of San Antonio Bay. Introduced in Grays Lake NWR, Idaho; these birds winter in central New Mexico (Bosque del Apache NWR); this attempt at establishing a new population did not succeed and will become extirpated. Introductions at Kissimmee Prairie in Florida by the USFWS began in 1993; this population will be nonmigratory. MIGRATION: through Great Plains from southern

Canada and Dakotas south to Texas (AOU 1983). RESIDENT: formerly a small non-migratory population occurred around White Lake, Louisiana.

Wyoming
Wyoming is primarily used for summer range and migratory stopovers. During the breeding season, the sspecies occurs mainly in the northwestern corner of the state in Sublette, Teton, Park, Sweetwater, Fremont, and Lincoln counties and Yellowstone National Park. Occurs in some wetlands (mainly in low elevations); mainly in the northwestern corner of the state. Major summer sites include Yellowstone National Park, Grand Teton National Park, and the Upper Green River Basin (Clark et al., 1989). The Wyoming Gap Analysis Atlas (Merrill et al., 1996) predicts additional habitat near existing sites in the Bridger-Teton National Forest and Yellowstone National Park. Historical records from around 1900 (?) suggest nesting in Yellowstone National Park (Allen, 1952; Kemsies, 1930). Range and movements coincide with those of the Rocky Mountain Population of sandhill cranes, which use western and central Wyoming for important breeding (production) habitat. As of spring 1996, none of the 4 remaining in the unsuccessful and abandoned Grays Lake foster program used staging or summer range in Wyoming. Occasional migrants from the Wood Buffalo National Park, Canada/ Texas coastal population stopover in southwestern Wyoming.

Abundance
Listed as "Summer resident, controlled" by the Wyoming Game and Fish Department. Only a few individuals are observed every year (<5).

Migration
Summer resident from April to September; earliest record March 27, latest record mid-October (Dorn and Dorn, 1990; Clark et al., 1989). Individuals from the Aransas/Wood Buffalo flock use portions of Wyoming, primarily near Farson, as brief stopover points during fall and spring migration (Andrea Cerovski, personal communication, July 1996). Introduced individuals migrate south from Idaho and portions of Utah, Montana, and Wyoming primarily to central New Mexico (Bosque del APache National Wildlife Refuge).

HABITAT
Rangewide
Freshwater marshes and wet prairies, in migration and winter also in grain and stubble fields and on shallow lakes and lagoons (AOU 1983). Winters on salt flats, marshes, and along barrier islands (Matthews and Moseley 1990). Radio-marked migrants roosted primarily in palustrine wetlands, many of which were smaller than 0.5 ha (Howe 1989). Migration habitat includes mainly sites with good horizontal visibility, water depth of 30 cm or less, and minimum wetland size of 0.04 ha for roosting (Armbruster 1990, which see for further details). ^Nests in dense emergent vegetation (sedge, bulrush) in shallow ponds (Kuyt 1995), freshwater marshes, wet prairies, or along lake margins, within large expanses of undisturbed wilderness. Pothole breeding sites are separated by narrow ridges vegetated by black spruce, tamarack, and willow. Favors sites with slightly alkaline ponds. The nest is a mound of marsh vegetation rising 8-19 inches above the surrounding water level.

Wyoming
In the Greater Yellowstone Ecosystem, uses shallow wetlands, wet meadows, and adjacent upland sites. Roosts primarily in palustrine wetlands smaller than 0.5ha with good horizontal visibility and a water depth of 30cm or less (e.g., Howe 1989, Armbruster 1990). Historically, major staging and stopover areas probably included wetlands across much of the upper Green River Basin. Preferred sites have minimal human disturbance. Return to the same summer territories for life unless habitat is degraded (Clark et al., 1989).

PHENOLOGY
Rangewide

Wyoming
Estimated longevity is 22-30+ years (Lewis, 1995).

FOOD HABITS
Rangewide

During summer, feeds on insects, crustaceans, and berries; winter diet includes grains, acorns, wolfberry fruit, insects, crustaceans (e.g., blue crab, crayfish), mollusks (e.g., the clam TAGELLUS PLEBIUS and the snail MELAMPUS COFFEUS), fishes, amphibians, reptiles, marine worms (USFWS 1980, Hunt and Slack 1989). Blue crabs obtained from flooded tidal flats and sloughs dominate diet in Texas until January; then cranes move to shallow bays and channels to eat clams and an occasional crab (Matthews and Moseley 1990). Radio-marked migrants fed primarily in a variety of croplands (Howe 1989). Probes in mud or sand in or near shallow water, takes prey from water column, or picks items from substrate (Ehrlich et al. 1992).

Food Habits
Wyoming
Omnivorous. Easts plant tubers, leaves and berries, cultivated grain crops, invertebrates and small fish, frogs, birds, and mammals (U.S. Fish and Wildlife Service 1990, Hunt and Slack 1989). Probes in mud or sand in shallow water (Ehrlich et al. 1992).

REPRODUCTION
Rangewide
Breeding begins in early May. Pair mates for life. Both sexes, in turn, incubate 2, sometimes 1-3, eggs for 33-34 days. Nestlings are precocial. Young are tended by both adults, fledge when no less than 10 weeks old (no earlier than mid-August), remain with parents until following year (dissociate after arrival on breeding grounds). Sexually mature at 4-6 years.

Wyoming
No reproduction in the state. In other areas, nests in dense emergent vegetation in shallow ponds (Kuyt 1995) in remote areas with minimal human disturbance. The nest is a mound of marsh vegetation rising 8-19 inches above the surrounding water level.

ECOLOGY
Rangewide
Population has exhibited 10-year periodicity (Boyce and Miller 1985, Dennis et al. 1991). ^Mated pairs and families establish and defend winter territories on coastal marshes in Texas. Breeding territories are very large, averaging 770 ha (Johnsgard 1991). Home ranges of breeding pairs in Canada were about 3-19 sq km (Kuyt 1993).

Wyoming
TERRITORIALITY: Males in the Rocky Mountain population established and defended 16 hectare or larger territories on the summering grounds beginning at age 3 years (Lewis, 1995).Free-ranging populations may exhibit a multi-year periodicity (Boyce and Miller 1984, Dennis et al. 1991).^COMMUNITY INTERACTION: Coyote, red fox, and Northern raven prey on eggs and chicks. Golden and bald eagles take fledged young (Lewis, 1995).

TRENDS IN WYOMING
Significant decline since historical times. Birds occurring in Wyoming during the breeding season are very few in number (<5) and do not reproduce, although historical reocrds from around 1900 suggest that nesting occurred in Yellowstone National Park and adjacent regions (Allen 1952). Whooping cranes now occurring in northwestern Wyoming were originally intorduced into a migratory sandhill crane flock in the hopes of establishing a new whooping crane breeding population. Although they do migrate with the sandhill cranes, they do not reproduce, perhaps because sandhill crane bredding behavior is too different from that of the whooping crane. Recovery efforts were abandoned in 1989 due to high mortality and the lack of pairing and reproduction. Late sexual maturity, small clutch size, and critically low population levels contribute to low recovery success.

MANAGEMENT CONSIDERATIONS
Intolerant of human disturbance, especially during nesting, brood rearing, and during the flightless molt. Will desert nests. Cranes are susceptible to collisions with powerlines. Should avoid wetlands frequented by cranes when constructing new powerlines (Clark et al., 1989). Because the whooping crane/sandhill crane cross-fostering project has not resulted in whooping crane reproduction, management efforts may be best focused on maintaining and possibly

increasing the quantity of stopover habitat for migrants from the main breeding population. Recovery of this species may ultimately require repeated population supplementation with captive-bred birds. However, note that the Wyoming Game & Fish Departmanet (1997) recommends abandoning efforts for this species in Wyoming.

Threats
Intolerant of human disturbance; collides with power lines or barbed wire finces; vulnerable to disease, especially avian tuberculosis (Clark et al., 1989). Habitat loss is a significant threat (Lewis, 1995).

Protection Status
One observation each occurs in Yellowstone and Grand Teton National Parks. 6 occurrences are on state land, 2 are on the Seedskadee National Wildlife Refuge, 4 are on the Bridger-Teton National Forest, 1 is from the Targhee National Forest, 1 each occurs on the Worland and Rock Springs District of the BLM, and 1 occurs in Big Piney.

INFORMATION NEEDS
Inventory Needs
Research focused on increasing the potential for breeding in the cross-fostered population could help establish a new breeding flock. Howeverm, research efforts may be best committed to maintaining and increasing the quality of stopover habitat for migrants from the main breeding population.

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HALIAEETUS LEUCOCEPHALUS
BALD EAGLE

STATUS
US Endangered Species Act
US Fish & Wildlife Service: LT
Comments:
Federal status is categorized by state/region, rather than by subspecies. Listed as Threatened in the coterminous U.S.; not federally classified as Endangered anywhere as of mid-1995 (USFWS, Federal Register, 12 July 1995).

Rangewide
Global Rank: G4
Comments:
Widespread distribution in North America; large numbers of occurrences, many of high quality, particularly in Alaska and British Columbia, but suffered great decline in southern and eastern part of range earlier this century; still susceptible to a number of threats, particularly environmental contaminants and excessive disturbance by humans; recent rangewide improvement in numbers and the protection offered by governments prevent it from being ranked any higher.

Wyoming
WYNDD State Rank: S2B,S3N
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Uncommon species with low numbers; nesting habitat is limited; cottonwood community portions of nesting habitat/ winter use areas are threatened due to problems with cottonwood regeneration (from flood control and overgrazing).

State Status
Yearlong resident, rare in summer, common in winter (Dorn and Dorn, 1990).^Wyoming Game and Fish Department Species of Special Concern 2/Native Species Status 2;^US Fish and Wildlife Service Threatened;^US Forest Service Region 2 Sensitive Species.

US Forest Service
Management Status:

TAXONOMY
General
The two subspecies, H. L. LEUCOCEPHALUS (southern U.S. and Baja California) and H. L. ALASCANUS (northern U.S. and Canada) intergrade broadly in the central and northern U.S. Constitutes a superspecies with H. ALBICILLA (AOU 1998).

DESCRIPTION
Large, powerful diurnal raptor. Adult has white head and tail and very dark brown to charcoal black wings and bodies, bright yellow bills, feet, and lower legs. Immature is brownish-black to light brown with lighter wing linings, often with a hint of white at base of tail (Clark et al., 1989; Dorn and Dorn, 1990). Females are larger than males. Birds that breed in the Greater Yellowstone Ecosystem are 3-8% smaller and weigh up to 13% less than migrant adults from more northern latitudes (Clark et al., 1989). ^SIMILAR SPECIES: Immature Golden eagle has white at base of tail and at base of flight feathers beneath. Adult lacks lighter wing linings; Turkey vulture has naked head, black throughout. Dark phase hawks are smaller and usually have light flight feathers beneath (Dorn and Dorn, 1990).

DISTRIBUTION
Rangewide
BREEDING: central Alaska, northern Yukon, northwestern and southern Mackenzie, northern Saskatchewan, northern Manitoba, central Ontario, central Quebec, Labrador, and Newfoundland, south locally to the Commander and Aleutian

Islands, southern Alaska, Baja California (both coasts), Sonora (Brown et al. 1988), New Mexico, Arizona, Texas Gulf Coast, and Florida (including the Keys); very local in Great Basin and prairie and plains regions in interior North America, where breeding range recently has expanded to include Nebraska and Kansas. NON-BREEDING: generally throughout the breeding range except in the far north (AOU 1983, Sibley and Monroe 1990), most commonly from southern Alaska and southern Canada southward. The Chilkat Bald Eagle Preserve, Alaska, supports the largest wintering population anywhere (Ehrlich et al. 1992). Winter concentrations occur in British Columbia-northwestern Washington, along the Missouri and Mississippi rivers, and in northern Arkansas. One of the largest fall (mid-October to mid-December) migrant concentrations (200-300 birds at any one time, close to a thousand individuals through the season) occurs at Hauser Lake near Helena, Montana.

Wyoming
The breeding range is mostly boreal with southern extensions along coasts and mountain ranges. Wyoming forms part of the core winter / year-round range. The species is a resident breeder in scattered locations throughout the state, but most pairs are in the northwest along the Snake River and in the southeast along the upper North Platte River; the Bighorn, Green, and Wind rivers also support breeding concentrations. In winter, individuals are widely distributed and may be observed near any large stream or impoundment. The Wyoming Gap Analysis Project atlas (Merrill et al. 1996) shows bald eagles in all counties, presumably due to the prevalence of winter sightings.

Abundance
Uncommon resident (Wyoming Game and Fish Department 1997). Populations shrank during the 1960's but have rebounded with the banning of DDT. The Greater Yellowstone Ecosystem reports birds on all major rivers and lakes in the area (Clark et al. 1989), and the Wyoming Game and Fish Department (1997) cites an increase in nesting pairs from 20 in 1978 to 78 in 1998. Much of this is due to an increase in pairs nesting in Teton and Lincoln counties (Clark et al. 1989, Wyoming Game and Fish Department 1999). In winter, individuals may occur on any large river or lake in the state.

Migration
Up to 100 migrants may winter in the Greater Yellowstone Ecosystem (Clark et al., 1989). Breeding birds are resident in their home range year round, although some nesting at high altitudes move to lower elevations in winter.

HABITAT
Rangewide
Breeding habitat most commonly includes areas close to (within 4km) coastal areas, bays, rivers, lakes, or other bodies of water that reflect the general availability of primary food sources including fish, waterfowl, and seabirds (Andrew and Mosher 1982, Green 1985, Campbell et al. 1990). Preferentially roosts in conifers or other sheltered sites in winter in some areas; typically selects the larger, more accessible trees (Buehler et al. 1991, 1992). Perching in deciduous and coniferous trees is equally common in other areas (e.g., Bowerman et al. 1993). Communal roost sites used by two or more eagles are common, and some may be used by 100 or more eagles during periods of high use. Winter roost sites vary in their proximity to food resources (up to 33 km) and may be determined to some extent by a preference for a warmer microclimate at these sites. Available data indicate that energy conservation may or may not be an important factor in roost-site selection (Buehler et al. 1991). In Saskatchewan lakes, density was positively correlated with abundance of large fishes (Dzus and Gerrard 1993). In winter, may associate with waterfowl concentrations or congregate in areas with abundant dead fish (Griffin et al. 1982); often roosts communally at night in trees that are used in successive years. Wintering areas are commonly associated with open water though in some areas eagles use habitats with little or no open water if other food resources (e.g. rabbit or deer carrion) are readily available. Avoids areas with nearby human activity (boat traffic, pedestrians) and development (buildings) (Buehler et al. 1991). BREEDING: Usually nests in tall trees or on cliffs near water. Nest trees include pines, spruce, firs, cottonwoods, oaks, populars, and beech. Ground nesting has been reported on the Aleutian Islands in Alaska, in Canada's Northwest Territories, and in Ohio, Michigan, and Texas. Nests located on cliffs and rock pinnacles have been reported historically in California, Kansas, Nevada, New Mexico and Utah, but currently are known to occur only in Alaska and Arizona. Same nest may be used year after year, or may alternate between two nest sites in successive years. In British Columbia, nests with overhead canopy of foliage were most successful (Palmer 1988). See Livingston et al. (1990) for model of nesting habitat in Maine, Wood et al. (1989) for characteristics of nesting habitat in Florida (most nests in live pine trees). In Oregon, most nests were within 1.6 km of water, usually in largest tree in stand (Anthony and Isaacs 1989). In Colorado

and Wyoming, forest stands containing nest trees varied from old-growth ponderosa pine to narrow strips of riparian vegetation surrounded by rangeland (Kralovec et al. 1992).

Wyoming
In the Greater Yellowstone Ecosystem, they occupy riparian or lacustrine habitat as breeders but occasionally exploit upland areas for food. Nest sites are distributed around the periphery of lakes and reservoirs and linearly along forested corridors of major rivers, usually within 0.9 miels of shore. Bald eagles choose older large-diameter trees of a variety of species in which to nest, most often in the taller trees of a large stnad.On rivers, eagles concentrate on runs and pools for foraging. Riffles are important seasonally as selected prey fish use them for spawning and feeding. On lakes and reservoirs, eagles use shallow areas, gently sloping shorelines and wetlands (Clark et al., 1989).They preferentially roost in conifers or other sheltered sites in winter, typically selecting the larger, more accessible trees. Communal roost sites are commonly used by two or more eagles, and some may be used by 100 or more individuals during periods of high use. Winter roost sites vary in their proximity to food resources (up to 33 km) and may perhaps be selected for their warmer microclimate. Wintering areas are commonly associated with open water though some eagles use habitats with little or no open water if other food resources, such as rabbit or deer carrion, are readily available. Eagles may avoid areas with nearby human activity and development, although this behavior is variable.

PHENOLOGY
Rangewide
In the Columbia River estuary, foraging activity was most common at low tide and first daylight (Watson et al. 1991). In Arizona, foraging activity during the breeding season peaked at 0800-1000 and 1600-1900 MST (Grubb 1995).

FOOD HABITS
Rangewide
Feeds opportunistically on fishes, injured waterfowl and seabirds, various mammals, and carrion (Terres 1980). See Haywood and Ohmart (1986), Kralovec et al. (1992), Brown (1993), and Grubb (1995) for diet of inland breeding populations in Arizona, Colorado, and Wyoming. Hunts live prey, scavenges, and pirates food from other birds (e.g., osprey) and, in Alaska, sea otter (Watt et al. 1995, Condor 97:588-590). See Palmer (1988) for further information on hunting methods. In the Columbia River estuary, tidal flats and water less than 4 m deep were important foraging habitats (Watson et al. 1991). See Caton et al. (1992) for information on foraging perches used in Montana. Sheep carcasses were significant food sources in winter in Oregon (Marr et al. 1995, Wilson Bulletin 107:251-257).

Food Habits
Wyoming
In the Greater Yellowstone Ecosystem, prey species include sucker, trout, whitefish, chubs, waterfowl, some passerines and game birds, carrion from elk, deer, antelope, and moose, and ground squirrels, beaver, and hares (Clark et al. 1989b). Eagles may congregate at areas where the food supply is seasonally concentrated, such as high waterfowl aggregations or abundant spawning fish (Griffin et al. 1982).

REPRODUCTION
Rangewide
Clutch size is 1-3 (usually 2). Incubation lasts about 5 weeks, by both sexes. Second hatched young often dies. Young first fly at 10-12.5 weeks, cared for by adults and may remain around nest for several weeks after fledging. Generally first breeds at about 5-6 years. Adults may not lay every year.

Wyoming
Approximately 70 occupied nest sites have been documented in the Greater Yellowstone Ecosystem (Clark et al., 1989). Nest sites are distributed around the periphery of lakes and reservoirs and along forested corridors of major rivers, usually within 1 mile of shore. In Wyoming, forest stands containing nest trees varied from old-growth ponderosa pine to narrow strips of riparian vegetation surrounded by rangeland. Bald eagles choose older, larger trees for nesting, most often one of the taller trees of a large stand. The size of the tree is more important than its species. Both males and females build the nest, which is used over several years and may reach 2 meters high by 1.5 meters wide with time. Clutch size commonly is one to three eggs. Both sexes incubate eggs for about 5 weeks. Eggs hatch from late March to May, and the second young to hatch often dies. The fledglings are dependent on adults for up to 8 weeks. Young first

fly at 10-12 weeks, and are cared for by adults and may remain around the nest for several weeks after fledging. They generally first breed at about 5-6 years. Adults may not lay every year.

ECOLOGY

Rangewide

Commonly roosts communally, especially in winter. See Curnutt (1992) for information on the dynamics of a year-round communal roost in southern Florida. Territory radius around active nest averaged 0.6 km in Minnesota (Mahaffy and Frenzel 1987). Maximum distance between feeding area and night roost site was less than 16 km in winter in Missouri (Griffin et al. 1982). In north-central Arizona, February-April home range of immatures averaged 400 sq. km; birds moved frequently and roosted singly or in small groups (Grubb et al. 1989). ^In Montana, the introduction of shrimp (MYSIS RELICTA) had a cascading effect through the food chain, ultimately causing displacement of bald eagles (Spencer et al. 1991).

Wyoming

TERRITORIALITY: Home ranges of adults nesting along the Snake River include an average of 6.8 miles (11 km) of river, but only about 3.7 miles (6 km) are key use areas. Density of pairs is higher along river sections that are braided. Riparian and lacustrine habitat may be included within the range.

TRENDS IN WYOMING

Populations declined in the 1950-1960's, but currently appear stable to slightly increasing.

MANAGEMENT CONSIDERATIONS

Although the population on the Greater Yellowstone Ecosystem is increasing, long-term trends may be negatively affected by human activity and loss of habitat from development. Human disturbance causes reduced nest attentiveness and sometimes abandonment. Population size and productivity should continue to be monitored, and management plans are needed for protecting habitat (Clark et al. 1989b). In addition, monitoring of blood contaminant levels is advised, and the cumulative effects of anthropogenic disturbances should be investigated. Some birds in marginal habitats appear to adapt by increasing their home range and developing a tolerance to human activity. This behavior has not been studied, however, and it is not known whether the future nesting population in Wyoming will be able to maintain itself under marginal conditions (Wyoming Game and Fish Department 1996). The objectives of the Wyoming Game and Fish Department are to maintain more than 70 pairs of nesting eagles, fledge an average of at least 60 young annually, and continue increasing nesting pairs in other parts of the state.

Threats

While populations appear to have recovered, there are still threats from human disturbance and loss of riparian cottonwood communities. Fidelity to nest sites is high, so degradation of the site decreases reproduction (Oakleaf, 1982). Subdivisions and recreation are major threats to habitat and reproductive success.

Protection Status

Twenty-eight breeding locations are protected in Grand Teton and Yellowstone National Parks, and nineteen were recorded from BLM land and seven from state land. The Bridger-Teton National Forest has 14 breeding records, one of which is on the Teton Wilderness. The Medicine Bow and Shoshone National Forests have one breeding record each, as does the Seedskadee NWR, the Caribou National Forest, and the Bighorn Canyon National Recreation Area. Of the communal sites for nonbreeding eagles, 3 occur on the Thunder Basin National Grassland, 1 in the Jackson Canyon Area of Critical Environmental Concern, 15 on BLM land, 11 on state land. Many of the locations in southeastern Wyoming are on private land, as are those in Teton and Lincoln counties. The latter locations are responsible for much of the recent population increase (Wyoming Game and Fish Department 1996). The Murie Audubon Society in Casper has been active in protection issues. The Murie Audubon Society has been active in protection issues (see Element Manual File).

INFORMATION NEEDS

Inventory Needs

Continue multi-agency monitoring and habitat protection efforts.

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HISTRIONICUS HISTRIONICUS
HARLEQUIN DUCK

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:
Eastern North America population petitioned for listing as endangered or threatened in September 1995 (USFWS 1998). Listing found to be not warranted in April 1998 (USFWS 1998).

Rangewide
Global Rank: G4
Comments:
Although still globally widespread, the Atlantic population may be reaching critically low levels and the Pacific population has experienced substantial declines. Harlequins may exhibit high breeding and wintering site fidelity and small local breeding populations, and are thus subject to local extirpations. Declining overall populations may provide little chance of recolonization.

Wyoming
WYNDD State Rank: S1B,SZ?N
Comments:
Rare with some threats; limited distribution; specialized nesting habitat requirements; peripheral species.

State Status
Wyoming Game and Fish Department Species of Special Concern 3/Native Species Status 3; US Forest Service Sensitive Species in Regions 2 and 4.

US Forest Service
Management Status: S-USFS R2
S-USFS R4

DESCRIPTION

Small duck. Male in breeding plumage is blue-gray with chestnut flanks and several white strips or spots on body and head; female and eclipse male gray or gray-brown with 2 or 3 white spots on head. Beak, feet, and legs are bluish gray.^.SIMILAR SPECIES: Female Bufflehead has a single wwhite head patch behind the eye, none below or in front; scoters have larger bill with flatter forehead (Dorn and Dorn, 1990).

DISTRIBUTION
Rangewide
Holarctic. BREEDING: Eurasia and two disjunct regions in North America. Pacific population breeds from western Alaska (see Johnson and Herter 1989 for details), northern Yukon, northern British Columbia, and southern Alberta south to Oregon, Idaho, Wyoming, and east of the Continental Divide in Montana (perhaps historically in California and Colorado). The Atlantic population breeds from Baffin Island (at least formerly), Greenland, and Iceland through central and eastern Quebec, eastern Labrador, northern Newfoundland (perhaps historically much more widely in the North Atlantic region). Occurs in summer in Mackenzie Valley and near Great Slave Lake, Northwest Territories. In the Palearctic, breeds in Iceland and Greenland, and from the Lena River in Siberia east to Kamchatka and south to northern Mongolia and the Kurile Islands (American Ornithologists Union 1983). NON-BREEDING: Eurasia; Aleutian and Pribilof islands south to central California; southern Labrador, Newfoundland, Nova Scotia, south to Maryland (but mostly north of Cape Cod); accidental in Hawaii; much more abundant in the Aleutians than farther south in southwestern Canada and U.S. Pacific Northwest.

Wyoming

Breeding occurs on the east and west sides of Canada, with a southern extension through Montana to northwest Wyoming, which is on the southeastern permimeter of the Pacific population's range. Breeding is known in the mountains of Teton, Park, Bighorn, Sublette, and perhaps Lincoln counties. Downing (1990) also reports sightings in Shell Creek Canyon and the Little Bighorn River Canyon in the Bighorn National Forest, but WYNDD has no location information. The Wyoming Gap Analysis Project atlas (Merrill et al. 1996) predicts additional habitat along the Wind River and Absaroka Ranges in the Shoshone National Forest, along the west side of the Bighorn Range, in the Salt River and Wyoming Ranges in the Bridger-Teton National Forest, and near existing habitat in Yellowstone National Park.

Abundance
Listed as "Summer resident, uncommon" by the Wyoming Game and Fish Department; should be "Summer resident, rare". Cassirer et al., (1996) estimated breeding population in Wyoming to be 40. Surreptitious behavior makes accurate population estimates difficult.

Migration
Observed in Wyoming as early as April 3 and as late as November 1, but usually occurs between late April-May to September. A migration peak for males and non-breeding females occurs in early July (Dorn and Dorn 1990) when they depart of the Pacific coast. Females with young depart for wintering grounds on the coast as soon as the young can fly, typically from mid-August to late September (Wallen and Groves 1989).

HABITAT
Rangewide
Winters in rough coastal waters, especially along rocky shores or reefs; summering nonbreeders and immatures also occur in this habitat (Cassirer et al. 1993). ^Nests along fast-moving rivers and mountain streams on rocky islands or banks. Streams are braided to reticulate with many riffles and rapids (Cassirer et al. 1993). Requires relatively undisturbed, low gradient, meandering mountain streams with dense shrubby riparian areas (greater than 50% streamside shrub cover), and woody debris for nesting and brood rearing; also needs mid-stream boulders or log jams and overhanging vegetation for cover and loafing; indicator of high water quality (Spahr et al. 1991). Sometimes nests beside mountain lakes and lake outlets. ^Nests in a hollow, usually under the cover of bushes within about 30 m of water; also in rock crevice among boulders, in rock cavity in cliff face, in a tree cavity (Cassirer et al. 1993), in a puffin burrow, or similar hidden site; occasionally on open tundra (Ehrlich et al. 1992). Tends to breed in the same area in successive years.

Wyoming
Occurs in forest-dominated riparian communities (Merrill et al. 1996). Nests on rocky islands or on the banks of undisturbed rivers and braided mountain streams with many riffles and rapids (Cassirer et al. 1993). Requires relatively undisturbed, low gradient, meandering streams with dense (greater than 50%) streamside shrub cover, and woody debris. Nests within about 30 m of water in rock crevice among boulders, in rock cavity in cliff face, or in a tree cavity (Cassirer et al. 1993). Tends to breed in the same area in successive years. The species is an indicator of high water quality (Spahr et al. 1991).

PHENOLOGY
Wyoming
In Wyoming, begin arriving during the last week of April. By mid-July, the majority of males and nonbreeding females depart of the Pacific coast, while females with young depart as soon as the young can fly, typically from mid-August to late September (Wallen 1989).

FOOD HABITS
Rangewide
Diet is almost exclusively benthic aquatic invertebrates; feeds primarily on crustaceans and mollusks, also insects, and a few small fishes (Bellrose 1976); marine diet also includes roe. Dives for food in strong currents.

Food Habits
Wyoming

They dive in strong currents almost exclusively for benthic aquatic invertebrates (Bellrose 1976). A study in Grand Teton National Park found that food sources in August included Plecopteran, Ephemeropteran, and Trichopteran specimens in more than 95% of the feeding site examinations (Wallen 1987). Ducks will also take insects and small fish.

REPRODUCTION

Rangewide

In the intermountain western U.S., incubation begins mid-May through late June, depending on elevation and snow melt (Spahr et al. 1991). Male defends female until incubation begins, then pair bond ends. Clutch size is 5-10 (usually 6-8). Incubation reported as 27-32 days, by female. Nestlings are precocial and downy. Young are tended by female, first fly in 5-6 weeks. Brood size at fledging usually is 2-5. First breeds apparently at 2 years. Compared to other ducks, productivity is relatively low (Spahr et al. 1991) and highly variable from year to year. Multi-year pair bond.

Wyoming

In the intermountain western U.S., incubation begins mid-May through late June, depending on elevation and snow melt (Spahr et al. 1991). Male defends female until incubation begins and the pair bond ends. Incubation, by female, is reported at 27-32 days. Clutch size is 5-10 (usually 6-8), and brood size at fledging usually is 2-5. Nestlings are precocial and downy. The young are tended by the female and first fly in 5-6 weeks. First breeds apparently at 2 years. Compared to other ducks, productivity is relatively low (Spahr et al. 1991) and highly variable from year to year. In Grand Teton National Park, more than 50% of the females on the summer range are unsuccessful or non-breeding hens (Clark et al. 1989b). These ducks exhibit a high degree of homing ground fidelity; fifty percent of marked adults returned to the same stream in successive years (Wallen 1987). Hens with broods seem intolerant to disturbance (Wallen, 1987).

ECOLOGY

Rangewide

Often seen in compact flocks during the winter.

Wyoming

Harlequins in the Greater Yellowstone Ecosystem rarely occur in flocks of more than six. Paired drakes defend a small area ca 6.5 feet (2 meters) radius around their mate (Clark et al., 1989). Pairs avoid other pairs during the breeding season, allowing home ranges to overlap extenesively in some locations. An estimated maximum of 50 adult ducks and 50-55 young of the year potentially could occupy the Greater Yellowstone Ecosystem during the breeding season.

TRENDS IN WYOMING

Both breeding and wintering distribution may be declining in the Pacific population. Range seems to be shrinking (Cassier et al., 1996)Trend assigned with the help of Tim Britt, former WyGF employee (retired).

MANAGEMENT CONSIDERATIONS

Further research needs to be conducted to evaluate the conservation needs of this species. Productivity of young appears lower in areas with heavy human recreation. Because of the scarcity of known breeding locations on the national forests and the susceptibility to human disturbances in the national parks, should be considered a highly sensitive species. Trail construction and maintenance along known breeding streams should be avoided during the first 7-10 days after chick hatch. Also, collection of wild birds should be strictly limited (Clark et al., 1989).^. The Wyoming Game and Fish Department surveyed ducks in the Shoshone National Forest (Wyoming Game and Fish Department, 1997). They concluded that surveys are primarily effective in May and June, and recommended helicopter surveys over ground surveys because the latter is much more time-consuming and labor-intensive. They recommend regular sampling of known habitat, and coordinating efforts with other agencies such as the Forest Service and the National Park Service.

Threats

Threatened by human disturbance; may be threatened by logging and overgrazing at some EO's on U.S. Forest Service administered lands. Threatened by restricted distribution, dependence on limited stream habitats, and need for cavities (Finch, 1992). Also, since the population in Wyoming is on the edge of the Pacific range, these individuals are probably

susceptible to subpopulation declines caused by marginal habitat, stress form long-distance migration, loss of habitat, and stochastic events (Oakleaf et al., 1997; Wallen, 1993).

Protection Status
Three breeding sites, one feeding area, and five observation records are protected within Yellowstone National Park. Three breeding records and four observations are within Grand Teton National Park, and one observation is in John D. Rockefeller Memorial Parkway. The Bridger-Teton National Forest has one observation and one breeding EO in the Bridger Wilderness; the Targhee has two breeding sites and two observation records. One observation record occurs on the BLM Worland District. Additionally, one potential breeding record is known from the Elephant Head potential RNA in Shell Canyon (Bighorn NF).

INFORMATION NEEDS
Inventory Needs
Baseline data and intensive surveys are needed on location of wintering grounds, length of generation time, annual variation and birth and death rates, and quantification of occupied habitat (Clark et al, 1989). Additionally, detailed distribution, habitat use and population information are needed for Wyoming. Potential breeding habitat and wintering habitat should be identified and surveyed annually. The impact of human disturbance should be assessed (Wyoming Game and Fish Department, 1996). Wallen (1993) identifies the Shoshone and Brdiger-Teton Forests, Shell Canyon in the Bighorn National Forest, and the portion of the Targhee National Forest along hte Wyoming border south to the headwaters of the Salt, Bear and Greys Rivers as priorities.

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LAGOPUS LEUCURUS
WHITE-TAILED PTARMIGAN

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:

Wyoming
WYNDD State Rank: S1
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Rarity, limited distribution.

State Status
Wyoming Game and Fish Department Game Bird - no season.

US Forest Service
Management Status:

TAXONOMY
General
Ellsworth et al. (1995) examined phylogenetic relationships among North American grouse based on mtDNA data and found that FALCIPENNIS CANADENSIS is more closely related to BONASA UMBELLUS (ruffed grouse) than to DENDRAGAPUS OBSCURUS (blue grouse), which is allied with LAGOPUS (ptarmigan) and TETRAO (capercaillie, a European grouse).

DESCRIPTION
Smallest grouse in North America. Winter pelage is white except for dark bill and eyes and red eye combs. In summer, body is mottled black or brown with white belly, wings, and tail. Looks patchy during springs and fall molts. They are noted for plumage that changes from white in winter to brown in summer. SIMILAR SPECIES: Distinguished from other ptarmigans in all seasons by white tail (Scott et al., 1987; Braun et al., 1993).

DISTRIBUTION
Rangewide
RESIDENT: central Alaska, northern Yukon, southwestern Mackenzie, south to Kenai Peninsula; Vancouver Island, Canada, Cascade Mountains in Washington, and in Rocky Mountains from British Columbia and Alberta south to northern New Mexico; introduced and established outside native range in high central Sierra Nevada in California (see Frederick and Gutierrez [1992] for account of release and range expansion); releases also have been made in the Wallowa Mountains in Oregon, Pike's Peak in Colorado, and Uintah Mountains in Utah.

Wyoming
The main distribution is from northern Montana and Washington northward into Canada and Alaska, but there are disjunct breeding centers in Wyoming and Colorado. Also reported from Albany, Teton, Park, Linclon, and possibly Hot Springs counties. However, only the population in the Snowy Range has been confirmed extant. There are several scattered reports from the Yellowstone/ Grand Teton National Park area and in the Absaroka Range, but these are all unconfirmed records that are believed to be erroneous. The Wyoming Gap Analysis atlas (Merrill et al., 1996) only shows records in the Snowy Range.

Abundance
Listed as "Resident, rare" by the Wyoming Game and Fish Department (1997).

Migration
Yearlong resident (Dorn and Dorn, 1999).

HABITAT
Rangewide
Alpine tundra, especially in rocky areas with sparse vegetation (AOU 1983). Summer habitats in the Rocky Mountains consistently include moist, low-growing alpine vegetation. In Colorado, percent canopy cover of willow was higher at winter feeding sites than at random sites (Giesen and Braun 1992). In the Sierra Nevada, breeding season habitats were in areas of tall (>30 cm) willow shrubs and contained more subshrub, moss, and boulder cover than in unused habitats; in postbreeding season, used topographic depressions within breeding territories; brooding hens used moist meadows, while flocks occupied sites with abundant boulders; primarily used the SALIX ANGLORUM ANTIPLASTA vegetation alliance on rocky, north-facing slopes; willow abundance and proximity to water were important habitat factors (Frederick and Gutierrez 1992). Nests in alpine tundra, in rocky areas or sparsely vegetated, grassy slopes. Tends to search for vacant territory in natal area. High fidelity to breeding territory in successive years.

Wyoming
Inhabits alpine areas at or above timberline in sparsely vegetated rocky areas, krummholz, and wet willow- or graminoid-dominated communities near snowfields or streams (Braun et al. 1993; American Ornithologists' Union 1983). Summer habitats in the Rocky Mountains include moist, low-growing alpine vegetation with high percentages of willow canopy cover (Giesen and Braun 1992). Ptarmigans nest in alpine tundra, in rocky areas, or on sparsely vegetated, grassy slopes. They tend to search for vacant territory in natal areas and exhibit a high fidelity to breeding territory in successive years.

PHENOLOGY
Wyoming
Forages throughout the day.

FOOD HABITS
Rangewide
Winter diet alder catkins, willow buds and twigs (primary winter food in Colorado is willow buds); also buds and needles of spruces, pines, and firs. Spring and summer diet leaves and flowers of herbaceous plants, willow buds, berries, seeds, and insects.

Food Habits
Wyoming
Forages throughout the day in wind-swept willow and snow-free ridges. In winter, takes willow buds, stems, and leaves, and alder or birch in absence of willow. Forages in wind-swept willow and snow-free ridges. Summer diet includes buds, leaves, stems, seeds, fruits, flowers, and insects. Females with broods forage close to streams or in moist depressions (Braun et al., 1993).

REPRODUCTION
Rangewide
Female incubates 4-7, sometimes 3-9, eggs for 22-23 days (Harrison 1978). Nestlings are precocial and downy. Brood size in Sierra Nevada averaged 2.6-2.8; brood size in five areas in Colorado was 3.2-4.5; brood size at flight age in Montana was 3.3-3.5. Young are guarded by both parents, capable of flying in about 10 days. Monogamous. In the Sierra Nevada, reproductive success decreased with increasing spring snow depth (Condor 94:622-627).

Wyoming
Monogamous. Pair formation occurs in late April to mid-May. The nest is constructed on the ground in a shallow bowl of loose dried vegetation. Female incubates 4-7 eggs for 22-23 days (Harrison 1978). Nestlings are precocial and

downy, with an average of one brood per season. Total clutch failure is high, usually due to predation. Females defend clutch and do not flush easily, and males guard females on nest. Hen accompanies brood until late September, when birds mix with other late summer flocks (Braun et al. 1993). Broods stay together in family groups until the following spring (Harrison 1978). Overall breeding density at Logan Pass, Montana, was 6.8/100 ha; in Colorado, breeding density in three unhunted populations was 9.6-11.9/100 ha (Frederick and Gutierrez 1992).

ECOLOGY

Rangewide

Broods stay together in family groups until following spring (Harrison 1978). Sedentary. In the Sierra Nevada, overall density was 4.4-5.7/100 ha in breeding season, 4.7-7.1/100 ha postbreeding; density within occupied habitat was 10.5-14.2/100 ha in breeding season, 21.8-27.7/100 ha postbreeding; number of breeding pairs was 1.8/100 ha and 2.8/100 ha in two areas (Frederick and Gutierrez 1992). Overall breeding density at Logan Pass, Montana, was 6.8/100 ha; density within suitable habitat was 19.3/100 ha; 10.6/100 ha postbreeding. In Colorado, breeding density in three unhunted populations was 9.6-11.9/100 ha; 15.7-23.4 postbreeding (see Frederick and Gutierrez 1992). In Colorado, winter home ranges of 17 females averaged 1.62 sq km (4 of these averaged 2.44 sq km); those of 2 males averaged 0.44 sq km; winter density averaged 10-20 birds/sq km (Giesen and Braun 1992).

Wyoming

Both males and females defend territories during the breeding season, but not in winter. They group up in late summer/early autumn and form loosely organized male or females flocks that disassociate in early summer as territories are established. In Colorado, the winter home ranges of 17 females averaged 1.62 sq km (4 of these averaged 2.44 sq km); those of 2 males averaged 0.44 sq km. Winter density averaged 10-20 birds/sq km (Giesen and Braun 1992). These birds have behavioral adaptations that allow them to tolerate a wide range of temperatures without expending excess energy. They generally walk rather than fly, and select microhabitats that are several degrees warmer than the ambient temperature.

TRENDS IN WYOMING

Probably extirpated from the Snowy Range; last observed there in the late 1970's. The reason for the decline is unknown. It is unknown if there are other populations still existing in the state.

MANAGEMENT CONSIDERATIONS

This species is managed as a game bird, although no season is specified. Harvest tends to be lower when hunting season is later because alpine areas become less accessible. Varying the hunting season period from year to year may help hunted populations recover. To maintain natural population patterns, managers should consider closing roads in alpine areas, rerouting roads and ski trails, relocating snow fences, and reducing or changing the timing of livestock grazing (Braun et al., 1993).

Threats

Threatened due to limited distribution and low population size. The reasons that the Snowy Range population declined are unknown. However, recreation (including snowmobiling) and sheep grazing are major land use activities in the area. Braun et al., (1993) propose that localized distribution of birds is probably affected by road construction, off road vehicles, overgrazing, and other uses that reduce the abundance and distribution of winter food, principally willow. Since population size was small to begin with, any of the above factors may have had a large effect on the population.

Protection Status

The Snowy Range locations occur on the Medicine Bow National Forest but receive no additional special protection.

INFORMATION NEEDS

Inventory Needs

Detailed distribution, habitat use and population information are needed immediatly for Wyoming. The putative population in the Snowy Range should be investigated.

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LASIONYCTERIS NOCTIVAGANS
SILVER-HAIRED BAT

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:

Wyoming
WYNDD State Rank: S3B,SZ?N
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Probably a widespread, but uncommon species in Wyoming; no known major threats, but may be somewhat threatened by disturbance at roost sites.

State Status

US Forest Service
Management Status:

TAXONOMY
General
No subspecies are recognized.

DISTRIBUTION
Rangewide
Occurs throughout the U.S. north through most of southern Canada. Small populations may also be found in northern Mexico and southern Alaska. Known also from Bermuda. Most overwinter apparently in the southern part of the range. Males seem to stay farther south in spring and summer than do females.

Wyoming
Clark and Stromberg (1987) indicated that this species was distributed throughout the entire state, with records in Park, Teton, Fremont, Natrona, Converse, Sweetwater, Laramie and Albany Counties. They have been reported from the following LAT/LONG blocks: 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 17, 18, 19, 20, 21, 22, 23, 25, 27 and 28. May be migratory.

Abundance
The Wyoming Game and Fish Department lists this species as "Residency undetermined, uncommon", while Clark and Stromber (1987) state that this species are probably abundant in Wyoming. Garber (1991) reported that while conducting surveys (using a "bat-detector" and mist nets) in north-western Wyoming, that he did not record any positive occurences of the species there, although he thought he had heard them on 1-2 occassions.

HABITAT
Rangewide
Prefers forested (frequently coniferous) areas adjacent to lakes, ponds, and streams. During migration, sometimes occurs in xeric areas. Summer roosts and nursery sites are in tree foliage, cavities, or under loose bark, sometimes in buildings. In Manitoba, migrants roosted typically in narrow crevices in tree trunks (Barclay et al. 1988). See Vonhof

and Barclay (1996) for information on characterisitcs of roost trees in British Columbia. See Campbell et al. (1996) for roost characteristics in Washington. Rarely hibernates in caves. Relatively cold tolerant. Young are born and reared in tree cavities or similar situations. In South Dakota, maternity aggregations primarily were in woodpecker-created cavities in ponderosa pines (Mattson et al. 1996).

Wyoming
Prefer grassy valleys surrounded by well-forested hillsides of ponderosa pine and containing a source of standing water (A68TUR65WYUS). Grassy alpine meadows. Collected over the Green river (A55KRU65WYUS). Forest-dwelling; streams, ponds, and woodland clearings to 10,000 ft (B75ARM01NAUS) including cottonwood-willow communities (A59NEG01WYUS). In Pryor mountains area were taken in saltbush-sagebrush-grasslands (N91WOR65WYUS).

PHENOLOGY
Rangewide
Leaves roost and begins to forage relatively late. Migrants in Manitoba emerged from roosts typically 30 minutes after sunset in spring (Barclay et al. 1988). Major activity peaks 3 hours after sunset and later at 7-8 hours after sunset. May be active at low air temperatures. Roosting migrants in Manitoba became torpid at air temperatures below 20 C (Barclay et al. 1988). Active throughout the year in southeastern Virginia and northeastern North Carolina; winter activity occurred on evenings when air temperature was 13 C or more (Padgett and Rose 1991).

FOOD HABITS
Rangewide
Forages for small to medium-size flying insects over small water bodies within forested areas.

REPRODUCTION
Rangewide
Breeds in late September. Fertilization is delayed until spring. Gestation lasts 50-60 days. Litter of 1-2 young is born in June-July, sometimes later in north. Sexually mature in first summer. Able to fly at about 3 weeks. Maternity colonies are small (Parsons et al. 1986).

ECOLOGY
Rangewide
Densities probably low. Usually roosts singly, but occasionally in groups of up to 3-6 (Barclay et al. 1988).

TRENDS IN WYOMING
Populations are believed to be stable.

MANAGEMENT CONSIDERATIONS
Threats
Cave roosts threatened by human disturbance, but cave roosts may represent a small fraction of their prefered roost sites.

Protection Status
May be protected somewhat on Federally administered lands.

INFORMATION NEEDS
Inventory Needs
Basic life history, detailed distribution, habitat use and population information are needed for Wyoming.

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LASIURUS CINEREUS
HOARY BAT

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:
Subspecies SEMOTUS of Hawaii is listed by USFWS as Endangered.

Rangewide
Global Rank: G5
Comments:

Wyoming
WYNDD State Rank: S2B,SZ?N
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: A relatively common species which is distributed throughout Wyoming; no known major threats, but may be somewhat threatened by logging.

State Status

US Forest Service
Management Status:

TAXONOMY
General
New World LASIURUS were placed in the genus NYCTERIS by Hall (1981), who based the change on nomenclatural (rather than biological) concerns; few if any other authors have followed this change (see Jones et al. 1992; Koopman, in Wilson and Reeder 1993). See Baker et al. (1988) for a genic analysis and information on relationship to other LASIURUS. Subspecies SEMOTUS of Hawaii formerly was regarded by some authors as a distinct species.

Sub-Species
LASIURUS CINEREUS CINEREUS

DESCRIPTION
DESCRIPTION: Large bat with thick, round, short ears edges with black bare skin. Fur is dark with white tips, especially around the face. Length 130-145 mm; tail 55-58 mm; hind foot 9-11 mm; ear 17-19 mm; forearm 48-52 mm; weight 20-35 grams. Females slightly larger than males.

DISTRIBUTION
Rangewide
Occurs throughout the U.S. north to northern Canada (southern British Columbia, southeastern Mackenzie, Hudson Bay, and southern Quebec), south through Mexico to Guatemala; also in western South America (Colombia and Venezuela to central Chile, Uruguay, and central Argentina), Hawaii, Galapagos, Bermuda, and (accidently) on other islands. Rare or absent in most of the southeastern U.S. and in deserts of the Southwest. The only nonmarine mammalian species native to Hawaii (subspecies SEMOTUS). Wintering areas for northern breeders include the southeastern U.S., southern California, and northern Mexico. In the U.S., adult females bear young in northeastern, midwestern, and prairie states, in small numbers south to Arkansas, Louisiana, and Tennessee; adult males summer in the western states, generally in montane areas; adult males and females both have been found in early summer only in the Black Hills of South Dakota (Layne 1978).

Wyoming
Very widely distributed. Clark and Stromberg (1987) indicated that this species was distributed throughout Wyoming, with records in Teton, Campbell, Fremont, Sweetwater, Converse and Laramie Counties and probably occuring in the remaining counties. They have been reported from the following LAT/LONG blocks: 3, 4, 5, 6, 8, 10, 11, 13, 14, 19, 20, 21, 22, 23, 24, 26, 27, and 28.

Abundance
The Wyoming Game and Fish Department lists this species as "Summer resident, rare"; Clark and Stromberg (1987) also state that this species is "poorly known". Garber (1991) found that while conducting bat surveys in northwestern Wyoming while using a "bat detector" and mist nests, that although this species was relatively uncommon, it was the second most common species encountered during his survey.

Migration
Migration takes place in waves, with large numbers passing through an area on a few nights in spring and fall (Layne 1978). Females precede males in spring migration. Those migrating through the western U.S. in fall go south at least into Mexico (Caire et al. 1989).

Estimated Number of Occurrences
Distributional observation records from several sources as summarized by the Wyoming Gap Analysis project (Merrill et al. 1996) yielded the following figures: Total records- 40; including: breeding records- 0, courtship records- 0, and number of WYNND records- 19.

HABITAT
Rangewide
Prefers deciduous and coniferous forests and woodlands. Roosts usually in tree foliage 3-5 m above ground, with dense foliage above and open flying room below, often at the edge of a clearing and commonly in hedgerow trees. Sometimes roosts in rock crevices, rarely uses caves in most of range. Hibernating individuals have been found on tree trunks, in a tree cavity, in a squirrel's nest, and in a clump of Spanish-moss. Solitary females with young roost among tree foliage; female may use same site in successive years.

Wyoming
Found in greasewood flats, shortgrass prairies, aspen-pine forests, sagebrush grasslands, prairie and foothills shrublands, riparian shrub, and urban areas (Wyoming Game and Fish Department 1997; Clark and Stromberg 1987a). Also found in the Pryor Mountains in juniper-black sage and saltbush-sagebrush-grassland environments (Worthington, 1991). Usually roosts in tree foliage 3-5 m above ground, with dense foliage above and open flying room below, often at the edge of a clearing. Sometimes roosts in rock crevices, but generally rarely uses caves. Hibernating individuals have been found on tree trunks, in a tree cavity, in a squirrel's nest, and in a clump of Spanish-moss. Solitary females with young roost among tree foliage. Female may use same site in successive years.

PHENOLOGY
Rangewide
Emerges usually well after dark, though Layne (1978) stated that emergence occurs early in the evening and, at least in Hawaii, diurnal flight is known (Fujioka and Gon 1988). Feeding activity peaks 4-5 hours after sunset, with a secondary peak several hours before dawn. May hibernate in north.

Wyoming

FOOD HABITS
Rangewide
Feeds chiefly on large moths and to a lesser extent on other insects over clearings. Begins foraging in early evening before it becomes too dark to see them (Layne 1978) (others report that this species emerges late in the evening). May forage around lights in nonurban situations (Furlonger et al. 1987). May forage at considerable distances (a mile or more) from the diurnal roost site; often along streams or lake edges. Hunting area may be defended if food is scarce.

Food Habits
Wyoming
Feeds chiefly on large moths and other insects and forages in forest openings or along streams and lakes. Female sometimes carry young during the feeding flight. May forage at considerable distances (a mile or more) from the diurnal roost site. The hunting area may be defended if food is scarce.

REPRODUCTION
Rangewide
In North America, breeding occurs September-November, with delayed fertilization. Gestation lasts 90 days. Litter size is 1-4 (average 2), with one litter per year born between mid-May and early July in most areas. Young are able to fly at 4 weeks. Probably becomes sexually mature in first summer. Female sometimes may carry young during feeding flight.

Wyoming
In North America, breeding occurs in September through November; fertilization is delayed. Gestation lasts 90 days. Litter size is 1-4 (average 2), with one litter per year born between mid-May and early July in most areas. Young are able to fly at 4 weeks. Bats probably become sexually mature in the first summer.

ECOLOGY
Rangewide
Basically solitary, except for mother-young association; however, during migration, groups of up to hundreds of individuals may form. Dispersed population allows little chance to obtain density figures. ^Some mother-young groups often change roosts whereas others do not; movements generally are less than 100 m from the previous roost. ^Important predators include various birds and snakes.

Wyoming
Basically solitary, except for mother-young association; however, during migration, groups of up to hundreds of individuals may form. This habit makes it difficult to estimate species density. Preyed on by various birds and snakes.

TRENDS IN WYOMING
Populations are believed to be stable.

MANAGEMENT CONSIDERATIONS

Threats
Roosts in forests, so may be threatened by logging.

Protection Status
Two locations are from Grand Teton National Park, 14 are from Forest Service or BLM lands administered for multiple use, and three are on state land.

INFORMATION NEEDS
Inventory Needs
Basic life history, detailed distribution, habitat use and population information are needed for Wyoming.

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LUTRA CANADENSIS
RIVER OTTER

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:
Large range in much of North America north of Mexico; population trend probably is relatively stable; recent reintroduction and management efforts have improved conservation status.

Wyoming
WYNDD State Rank: S3
Comments:
Athough relatively widespread, its habitat requirements are specialized (aquatic habitats) which limits its "actual" distribution in the state; uncommon; no known majorr threats but possibly impacted (directly and indirectly) by overgrazing, logging and agricultural development.

State Status

US Forest Service
Management Status:

TAXONOMY
General
Van Zyll de Jong (1987) used the generic name LONTRA for New World otters; this would be appropriate if New World otters are more closely related to AONYX otters of Africa than to LUTRA otters of Eurasia and Africa. Jones et al. (1992) retained New World otters in LUTRA, whereas Wozencraft (in Wilson and Reeder 1993) followed van Zyll de Jong in using LONTRA as the generic name. ^Patterns of genetic variation do not concur with current subspecific designations (Serfass et al. (1998); use of subspecific names is not recommended.

DESCRIPTION
Large, semi-aquatic mustelid with a long, streamlined body and a dorso-ventrally flexible tail. The pelage is dense, ranging from dark brown to pale chestnut on upper parts and light brown mixed with gray on the ventral surface. Adults measure 900-1300 mm in length and weigh from 5 - 14 kgs. Males are larger than females. The head is flat and blunt, with a nose positioned high on the head to allow the otter to swim low in the water. The ears and valvular nostrils close off when submerged. Legs are short, with webbed feet and nonretractable claws.

DISTRIBUTION
Rangewide
Throughout most of North America north of Mexico, except the extreme southwestern U.S. Extirpated from large areas of the interior U.S. following European colonization. Has been reintroduced in some parts of the range (e.g., Colorado, Virginia).

Wyoming
Wyoming forms part of the core of the species' range but otters formerly occurred in all major streams and lakes in the state. There was a large range contraction during the past 120 years;. The species is now expanding outward from Yellowstone and Grand Teton National Parks where native populations persisted and northern Colorado (where

populations have been reintroduced) into historic range. It is currently most common in northwestern Wyoming, especially in the Yellowstone and Snake River basins, but also occurs in low numbers in drainages throughout the western two-thirds of the state (Clark and Stromberg 1987). Observations in the Laramie, Encampment, and North Platte rivers may be of migrants moving north from Colorado (personal observations, G. Beauvais, University of Wyoming).

Abundance
The Wyoming Game and Fish Department lists this species as "Resident, uncommon". Clark and Stromberg (1987) stated: "Curently, they are most common in northern Wyoming, but may occur in most river drainages throught the state in low numbers. They are most abundant in Yellowstone National Park and in the Snake River and its tributaries."

Migration
May be some seasonal migration between high and low elevations to avoid frozen lakes and streams.

HABITAT
Rangewide
Streams, lakes, ponds, swamps, marshes, estuaries (in some areas), beaver flowages, exposed outer coast (Pacific Northwest, Alaska). When inactive, occupies hollow log, space under roots, log, or overhang, abandoned beaver lodge, dense thicket near water, or burrow of other animal; such sites also are used for rearing young. Highly associated with beaver on Mount Desert Island, Maine (Dubuc et al. 1990). Uses traditional haul-out sites along the banks of aquatic habitats. May travel long distances overland, particularly in snow.

Wyoming
Requires undisturbed, unpolluted riparian habitat in sparsely populated areas. Uses streams, lakes, ponds, swamps, marshes, and areas of beaver activity. When inactive, occupies a hollow log, space under roots, abandoned beaver lodges, dense thickets near water, or burrows of other animals. Such sites also are used for rearing young. Streams with abundant in-channel coarse woody debris and oxbow/ backwater environments appear to be preferred.

PHENOLOGY
Rangewide
Active in winter, even in fresh deep snow. May be active at any time of day. In Idaho, most active from dawn to midmorning and in the evening (see Toweill and Tabor 1982).

FOOD HABITS
Rangewide
Feeds opportunistically on aquatic animals, particularly fishes (mostly slow-moving, mid-size species), frogs, crayfish, turtles, insects, etc., sometimes birds and small mammals. In coastal waters eats marine species (Bowyer et al. 1995). Commonly preys on nesting seabirds in some areas (e.g., Alaska islands). See Toweill and Tabor 1982 for many further details.

Food Habits
Wyoming
Feeds opportunistically on aquatic animals, particularly slow-moving, medium-sized fish, frogs, and sometimes birds and small mammals. Macroinvertebrates can be seasonally important.

REPRODUCTION
Rangewide
Implantation is delayed 8 months or more. Gestation, including delayed implantation, lasts 9-12 months. In many areas, births peak in late winter-early spring; parturition dates may not be closely synchronized within a given population. Litter size is 1-6 (average 2-3); 1 litter per year. Young may first enter water at about 7 weeks, are weaned at about 3 months, stay with mother for about a year. Male may rejoin family after young leave den. Females breed for the first time at 2 years. Males become sexually mature at 2 years, but may not breed successfully until 5-7 years old. Females

evidently breed in alternate years in some areas (e.g., Alabama, Georgia), every year in Oregon (see Toweill and Tabor 1982).

Wyoming
Females breed for the first time at 2 years. Males become sexually mature at 2 years, but may not breed successfully until 5-7 years old. Implantation is delayed 8 months or more. Gestation, including delayed implantation, lasts 9-12 months. In many areas, births peak in late winter-early spring but parturition dates may not be closely synchronized within a given population. Litter size is 1-6 (average 2-3) and there is 1 litter per year. Young may first enter the water at about 7 weeks and are weaned at about 3 months. The young stay with the mother for about a year. Otters are one of the most social mustelids; temporary social groups may form consisting of more than one family, a family and nonbreeding otter, subadult groups of either sex, and bachelor groups.

ECOLOGY
Rangewide
Home range typically is linear; 20-30 miles for a pair or male; less for females with young (Jackson 1961). May hunt over as much as 80-100 km of stream during the course of one year. In coastal Alaska, summer home range size averaged around 20 km of shoreline in males, 10 km in females, with ranges twice as large in oiled areas (Bowyer et al. 1995). ^Population density of one per 2.2 miles has been recorded (Baker 1983). Density was estimated at one otter per 86 ha of coastal marsh in Louisiana (Shirley et al. 1988). In Idaho, density was one family group and 1-3 subadults or nonbreeding adults per 15 km of waterway, plus one breeding adult male for each 20-30 km of waterway (see Toweill and Tabor 1982). Density in coastal areas of the Gulf of Alaska was 0.30-0.85 otters/km of shoreline (Testa et al. 1994, Bowyer et al. 1995).

Wyoming
A social mustelid, commonly occurring in groups of 5 or more. In the intermountain West, home ranges vary from 31-78 km of waterway. Otters are active in winter and can travel long distances overland, particularly in snow. They may hunt over as much as 80-100 km of stream during the course of one year. May be active at any time of day. Uses traditional haul-out sites along the banks of aquatic habitats.

TRENDS IN WYOMING
Suspected to be at least stable, but may be increasing.

MANAGEMENT CONSIDERATIONS
Habitat loss, combined with overharvest early in the 1900's, resulted in the decline of otter populations throughout North America. In Wyoming, it is classified as a Priority 3 species. Management options include harvest regulations, habitat protection and enhancement, monitoring programs, reintroduction, and population augmentation (Clark et al. 1989).

Threats
Factors that degrade water quality, such as overgrazing by livestock or logging, may impact aquatic food supply. Trapping mortality is unknown, but possibly significant. Channelization, impoundment, and other activities that reduce channel complexity and structure probably reduce habitat quality. It is unknown if the introduction of exotic trout has been benificial or detrimental.

Protection Status
Five observations occurred in Yellowstone and Grand Teton National Parks and the J.D. Rockefeller Memorial Parkway. Thirteen occurrences are on federal land managed for multiple use, including the only breeding record. Four are on state or city property.

INFORMATION NEEDS
Inventory Needs

Information on basic life history, distribution, habitat requirements, and population sizes are needed for Wyoming. Detailed knowledge of food habits and cover requirements may help identify the best areas for reintroduction or population augmentation.

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LYNX CANADENSIS
NORTH AMERICAN LYNX

STATUS
US Endangered Species Act
US Fish & Wildlife Service: LT
Comments:
USFWS (Federal Register, 26 August 1994) found that federal listing of the North American population may be warranted and initiated a formal status review. USFWS (Federal Register, 27 May 1997) determined that listing of the contiguous U.S. population is warranted but precluded by other higher priority actions. USFWS (Federal REgister, 8 July 1998) proposed listing the U.S. lower 48 population segment as threatened. USFWS (Federal Register, 8 July 1999) extended for not more than six months a decision to list the contiguous United State population segment as a threatened species; this extension was made to allow time to resolve a dispute over the status of the U.S. lower 48 lynx population. USFWS (2000) determined threatened status for the contiguous U.S. distinct population segment of L. CANADENSIS.

Rangewide
Global Rank: G5
Comments:
Large range in northern North America; declines have occurred in some populations, but apparently still widespread and relatively abundant in most of historic range, though population data are lacking for many areas; habitat loss/fragmentation and susceptibility to overharvest are the major concerns. ^In the contiguous U.S., overall numbers and range are substantially reduced from historical levels. At present, numbers have not recovered from overexploitation by both regulated and unregulated harvest that occurred in the 1970s and 1980s. Forest management practices that result in the loss of diverse age structure, fragmentation, roading, urbanization, agriculture, recreational developments, and unnatural fire frequencies have altered suitable habitat in many areas. As a result, many states may have insufficient habitat quality and/or quantity to sustain lynx or their prey. Human access into habitat has increased dramatically over the last few decades contributing to direct and indirect mortality and displacement from suitable habitat. Although legal take is highly restricted, existing regulatory mechanisms may be inadequate to protect small, remnant populations or to conserve habitat. Competition with bobcats and coyotes may be a concern in some areas.

Wyoming
WYNDD State Rank: S1
Comments:
Has probably declined since pre-settlement times; no population estimates are available, but numbers are probably very low.

State Status
Wyoming Game and Fish Department Species of Special Concern 2/Native Species Status 2, primarily due to unknown status of population and threat to its habitat. Protected by Wyoming State Statute in 1973^U.S. Forest Service Sensitive Species in Region 2 and Region 4^U.S. Fish and Wildlife Service - proposed for listing as Threatened in 1998.

US Forest Service
Management Status: S-USFS R2
S-USFS R4

TAXONOMY
General
Placed in genus FELIS by some authors. Some authors regard L. LYNX, L. CANADENSIS, and L. PARDINUS as conspecific (see Tumlison 1987). Jones et al. (1992) treated L. CANADENSIS and L. LYNX as conspecific. Wozencraft (in Wilson and Reeder 1993) listed CANADENSIS, LYNX, and PARDINUS as separate species.

DESCRIPTION

Medium-sized, short-bodied cat with prominent ear tufts and a flared facial ruff. Paws are disproportionately large and the legs are long. Winter pelage is dense with grayish-brown/buff on back and grayish-white on belly, legs, and feet. Summer pelage is reddish to gray-grown. The tail is short, with a completely black tip. Total length 67-82 cm; tail 10-15 mm; hind foot ca 20-35 mm; ear 6-10 mm; weight 9-12 kg (Clark and Stromberg 1987). Males are slightly larger than females. Similar Species: The bobcat is very similar in appearance, but has proportionally shorter legs and smaller paws. Its tail is slightly longer and, importantly, lacks a complete black tip (Ruggiero et al. 1994).

DISTRIBUTION

Rangewide

Throughout Alaska and Canada (except arctic islands) south through the Rocky Mountains, northern Great Lakes region, and northern New England. Also northern Eurasia if regarded as conspecific with LYNX LYNX (=FELIS LYNX). ^See U.S. Fish and Wildlife Service (1998) for information on distribution and relative abundance in the contiguous U.S. Considered historically resident in 16 states represented by five ecologically distinct regions: Cascade Range (Washington, Oregon), northern Rocky Mountains (northeastern Washington, southeastern Oregon, Idaho, Montana, western Wyoming, northern Utah), southern Rocky Mountains (southeastern Wyoming, Colorado), northern Great Lakes (Minnesota, Wisconsin, Michigan), and northern New England (Maine, New Hampshire, Vermont, New York, Pennsylvania, Massachusetts). Resident populations currently exist only in Maine, Montana, Washington, and possibly Minnesota; considered extant but no longer sustaining self-support populations in Wisconsin, Michigan, Oregon, Idaho, Wyoming, Utah, and Colorado; may be extirpated from New Hampshire, Vermont, New York, Pennsylvania, and Massachussets (U.S. Fish and Wildlife Service 1998). ^See Stardom (1988 COSEWIC report) for information on distribution and relative abundance in Canada, where still widespread and relatively abundant in most of historic range. ^See USFWS (2000) for a state-by-state review of historical and current distribution.

Wyoming

Lynx have a typical boreal distribution, with southern extensions along major mountain ranges. A population was recently reintroduced into central Colorado. In Wyoming, lynx are currently confined to the western forests, with occasional and often unverified sightings in the Bighorn Mountains. At one time, they also occurred in the Laramie Range and perhaps the Black Hills and Medicine Bow Mountains. Extant records exist from Fremont, Lincoln, Park, Sublette, Teton, and Uinta counties, but Teton, Sublette, Lincoln, and Park counties have by far the most records (Reeve et al. 1986). The Wyoming Gap Analysis Project (Merrill et al. 1996) predicts potential habitat throughout the mountain ranges on the west side of the state, including the Uinta Range. Also, the Wyoming Natural Diversity Database has produced a habitat map for lynx that predicts a similar distribution of high-quality habitat (G. Beauvais, unpublished data). Although breeding residents likely occur at low densities in Wyoming, many individuals may be dispersing into the state from breeding centers to the north and west. One individual recently released in central Colorado traveled across the Laramie Mountains in southeastern Wyoming before moving farther east, where it was eventually killed. Wyoming is on the southern periphery of its range, which is primarily in Canada and Alaska, where populations are abudundant.^It is possible that records in Wyoming represent transient individuals passing through the state, not a permanent population. Wyoming lynx are replenished by movement of individuals from the north.

Abundance

The Wyoming Game and Fish Department lists this species as "Resident, rare" (1996).

Migration

May migrate in response to food shortages.

HABITAT

Rangewide

Generally occurs in boreal and montane regions dominated by coniferous or mixed forest with thick undergrowth, but also sometimes enters open forest, rocky areas, and tundra to forage for abundant prey. When inactive or birthing, occupies den typically in hollow tree, under stump, or in thick brush. Den sites tend to be in mature or old growth stands with a high density of logs (Koehler 1990, Koehler and Brittell 1990). ^U.S. Forest Service et al. (1993) listed three primary habitat components for lynx in the Pacific Northwest: (1) foraging habitat (15-35-year-old lodgepole pine) to support snowshoe hare and provide hunting cover, (2) denning sites (patches of >200-year-old spruce and fir, generally less than 5 acres, and (3) dispersal/travel cover (variable in vegetation composition and structure). ^Major limiting

factor is abundance of snowshore hare, which in turn is limited by availability of winter habitat (in the Pacific Northwest, primarily early successional lodgepole pine with trees at least 6 feet tall) (U.S. Forest Service et al. 1993).

Wyoming
Requires a mosaic of timber of various ages, including early successional tracts, maturing stands of conifers, old-growth forest, and corridors between suitable habitat (Madson, 1995). Often found in areas where deep snow accumulates in winter. In northwestern Wyoming, occurs most frequently in Engelmann spruce-subalpine fir forest, less often in lodgepole pine. In southwestern areas such as the Wyoming Range, over half of lynx observations were in spruce-fir/lodgepole pine forest (Merrill et al. 1996). For denning, females select dense, mature forest habitats with large woody debris, such as fallen trees or upturned stumps. Den sites tend to be in mature or old growth stands with a high density of logs (Koehler 1990, Koehler and Brittell 1990). In Wyoming, lynx have been observed using sagebrush habitats below lower timberline for short periods in the spring, presumably to prey on rodent and lagomorph young. U.S. Forest Service et al. (1993) listed three primary habitat components for lynx in the Pacific Northwest: (1) foraging habitat (15-35-year-old lodgepole pine) to support snowshoe hare and provide hunting cover (2) denning sites (patches of 200-year-old spruce and fir, generally less than 5 acres (3) dispersal/travel cover (variable in vegetation composition and structure). The major factor limiting populations is the abundance of snowshore hare, which in turn is limited by availability of winter habitat (U.S. Forest Service et al. 1993). In general, habitat in Wyoming is only marginally suitable (Ruggiero et al. 1994), and the relationship between early-seral forest and snowshoe hares may not be as strong as in more mesic northwestern forests (Beauvais in press).

PHENOLOGY
Rangewide
Mainly nocturnal. Most active from 2 hours after sunset to one hour after sunrise (Banfield 1974).

Wyoming
Maximum longevity ca 15 years (Clark et al., 1989).

FOOD HABITS
Rangewide
Eats primarily small mammals and birds, particularly LEPUS AMERICANUS. Occasionally feeds on squirrels, small mammals, beaver, deer, moose, muskrat, and birds; some taken as carrion. May cache food for later use.

Food Habits
Wyoming
Eats primarily small mammals, particularly snowshoe hares, and birds. Occasionally feeds on squirrels, mice, voles, beaver, deer, muskrat, and carrion. May cache food for later use. Springtime use of low-elevation shrub habitats in Wyoming suggests a seasonal dependence on rodent and lagomorph young.

REPRODUCTION
Rangewide
Breeds in late winter-early spring in North America. Gestation lasts 62-74 days. Litter size averages 3-4; adult females produce one litter every 1-2 years. Young stay with mother until next mating season or longer. Some females give birth as yearlings, but their pregnancy rate is lower than that of older females (Brainerd 1985). Prey scarcity suppresses breeding and may result in mortality of nearly all young (Brand and Keith 1979).

Wyoming
May ovulate following copulation in March or early April. Gestation lasts 62-74 days. The young are born in late May and early June (Clark and Stromberg 1987a). Litter size averages 3-4, and females produce one litter every 1-2 years. The young stay with their mother until the next mating season or longer. Some females give birth as yearlings, but their pregnancy rate is lower than that of older females (Brainerd 1985). Prey scarcity suppresses breeding and may result in mortality of nearly all young (Brand and Keith 1979).

ECOLOGY
Rangewide

Home range increases, and individuals may become nomadic, when prey is scarce (Ward and Krebs 1985, Saunders 1963, Mech 1980). Range of male (average often about 15-30 sq km, but up to hundreds of sq km in Alaska and Minnesota) is larger than that of female. Spatial organization observed prior to low hare densities in Northwest Territories may be described as a land-tenure system, based on prior residency, and may have served to regulate density during peak prey levels (Poole 1995). Long distance dispersal movements of up to several hundred kilometers have been recorded. ^Population density usually is less than 10 (locally up to 20) per 100 sq km, depending on prey availability. Mean densities range between 2 and 9 per 100 sq km (McCord and Cardoza 1982). ^Usually solitary.

Wyoming

Lynx and snowshoe hare populations at the southern periphery of their range do not undergo the cyclical variations that they do in northern populations. Since other carnivores also use hares as prey, southern populations of hares persist at lower levels than northern populations. Lynx populations are kept low by their specialization on prey species that are also used by coyote, bobcat, and several species of raptor, which are prey generalists. Lynx reduce competition with these species by exploiting prey in areas with deep snow, which bobcat and coyote avoid. Maintained roads and trails may reduce this avoidance and negate this competitive strategy (Ruggiero et al. 1994). When prey is scarce, home range increases and individuals may become nomadic (Ward and Krebs 1985, Saunders 1963, Mech 1980). Long distance dispersal movements of up to several hundred kilometers have been recorded. Ranges of males averages about 15-30 sq km in the continental U.S. Population density usually is less than 10 (locally up to 20) per 100 sq km, depending on prey availability. Mean densities range between 2 and 9 per 100 sq km (McCord and Cardoza 1982). Lynx are usually solitary creatures with a maximum longevity ca 15 years (Clark et al. 1989). They are most active at night from 2 hours after sunset to one hour after sunrise (Banfield 1974).

TRENDS IN WYOMING

Trends are unknown, but there are indications of range and population decline in the contiguous U. S. Current populations are probably lower than during pre-settlement times due to trapping, loss of habitat, and predator control (Finch 1992). The Wyoming population may depend largely on sub-adults dispersing from breeding centers to the north and west.

MANAGEMENT CONSIDERATIONS

Research has been initiated by the Wyoming Game and Fish Department (1997) to: identify regional population distributions and core refugia; identify prey choices and dependence; monitor snowshoe hare population trends; determine habitat preferences; determine rates of dispersal; determine the cyclical nature of populations; determine degree of interspecific niche partitioning; and assess the relatedness of populations. Lynx depend strongly on snowshoe hare populations. In northern areas, regenerating clearcuts provide good snowshoe hare habitat. In the lower Rocky Mountains, however, some evidence suggests that late-seral forests produce more hares than regenerating stands (Beauvais in press). Timber management that creates patchy habitat containing small clearcuts of different ages, adequate stands of old-growth, and roadless areas, may improve habitat. Ruggiero et al. (1994) suggest that management efforts in the southern periphery of the range should be directed at more viable populations than those in Wyoming. Roads and trails that are plowed or snow-packed in the winter may depress populations by allowing generalist carnivores (e.g., coyotes, bobcats) to extend their ranges upward, thus competing with lynx.

Threats

Habitat availability has declined and populations have not rebounded to former levels (Finch 1992). Because populations are isolated and recruitment is low, forest fragmentation, roadbuilding, and other potential threats may have significant impacts (Ruggiero et al. 1994). Road construction in forests may increase lynx mortality by facilitating access to hunters and trappers and encouraging accidental trapping, vehicle mortality, and lynx displacement. Also, roads that are used for snowmobiling allow coyotes and bobcats greater access into what was formerly exclusively lynx winter range, which reduces the amount of prey available for lynx.

Protection Status

Thirty-one records are protected in Yellowstone and Grand Teton National Parks. The Shoshone National Forest has 15 occurrences, 6 of which are in the Northern Absaroka, Absaroka Beartooth, and Fitzpatrick wilderness areas. The Bridger-Teton National Forest has 50 occurrences, 6 of which are in the Gros Ventre Wilderness and 5 of which are in the Teton Wildnerness. The Targhee has 7 records, the Bighorn National Forest has 5 records (one in the Cloud Peak

Wilderness), the Wasatch-Cache has 2 records, and the Medicine Bow has one record. Other occurrences are scattered across state and Bureau of Land Management land.

INFORMATION NEEDS

Inventory Needs

Information on basic life history, distribution, habitat requirements, and population sizes are needed for Wyoming. In particular, the effects of timber management on snowshoe hare production in Wyoming and Colorado needs to be addressed. Also, the degree to which roads and trails increase competition between lynx and generalist carnivores in the winter needs to be explored.

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MYOTIS EVOTIS
LONG-EARED MYOTIS

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:
Widespread distribution in western North America; over 100 occurrences rangewide; apparently occurs regularly in low numbers across range; through much of range considered moderately to not very threatened.

Wyoming
WYNDD State Rank: S1B,S1?N
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: A somewhat common reident species with no known major threats, but threatened by disturbance at roost sites.

State Status
Uncommon; Wyoming Game and Fish Department Species of Special Concern 2. Protected from intentional take by Wyoming Game and Fish Commission Regulation^U.S. Fish and Wildlife Service former C2.

US Forest Service
Management Status:

TAXONOMY
General
van Zyll de Jong and Nagorsen (1994) provisionally interpreted the very close morphologically similarity between M. KEENII and M. EVOTIS in British Columbia and the adjacent northwestern United States as overlapping intraspecific variation rather than intergradation between the taxa; they noted the need for molecular data to resolve the situation.

Sub-Species
MYOTIS EVOTIS EVOTIS

DESCRIPTION
The fur is long and brown above, paler below. The black ears are the longest of any American Myotis. Body 87-96 mm long; tail 39-43 mm; hind foot 9-11 mm; ear 17-25 mm; forearm 36-41 mm.

DISTRIBUTION
Rangewide
Western North America, from central British Columbia, southern Alberta, and southern Saskatchewan south along the Pacific Coast to Baja California, east through Montana and Idaho to the western Dakotas, and from Nevada, Utah, Wyoming and Colorado to New Mexico and Arizona. From near sea level along the Pacific Coast to about 2,830 meters in Wyoming (Manning and Jones 1989).

Wyoming
The main range is western North America ranging up into southwest Canada. Wyoming is close to the eastern periphery of its range. Clark and Stromberg (1987a) indicated that this species was distributed statewide, with records in Park, Bighorn, Teton, Platte, Fremont, Sublette, Natrona, Sweetwater, Carbon and Laramie Counties. In sagebrush steppe habitat, such as Sweetwater County, they are probably limited to small copses of conifers. The Wyoming Gap Analysis

Project atlas (Merrill et al. 1996) shows additional habitat possible throughout the state. However, they also note that their mapping technique does not take into account the availability of necessary habitat features such as roosting sites and conifers, so the distribution of possible habitat may be overestimated.

Abundance
Abundance is unknown. The Wyoming Game and Fish Department lists this species as "uncommon".

Migration
Banfield (1974) suggests that this species is probably migratory, but it may hibernate in Wyoming (Wyoming Game and Fish 1997). The winter range is not known.

HABITAT
Rangewide
Mostly forested areas, especially those with broken rock outcrops; also shrubland, over meadows near tall timber, along wooded streams, over reservoirs. Often roosts in buildings, also in hollow trees, mines, caves, fissures, etc. Small maternity colonies of 12-30 individuals have been found in buildings in British Columbia, and a group of adults and young were found in an uninhabited ranch house in Colorado (Barbour and Davis 1969). See Vonhof and Barclay (1996) for information on characterisitcs of roost trees in British Columbia.

Wyoming
Found primarily in coniferous forests, especially ponderosa and juniper, although it will occasionally use cottonwood-riparian, basin-prairie shrublands, sagebrush-grasslands, spruce-fir, sand dunes, and greasewood flats (Wyoming Game and Fish 1992; Krutzsch and Heppenstall 1955; Clark and Stromberg 1987a; Gerhart and Olson 1982). Roosts in caves, abandoned mines, and buildings (Wyoming Game and Fish Department 1996; Barbour and Davis 1969).

PHENOLOGY
Rangewide
Reportedly emerges late in evening to feed, though other authors report earlier emergence (see Manning and Jones 1989).

Wyoming
Surveys show only a few individuals at any given locality, which suggests that this species naturally occurs in low densities (Clark and Stromberg 1987a). It has been found foraging with M. volans, Eptesicus fuscus, Lasionycteris noctivagans, and L. cinereus, and will share roosting sites with several other bat species (Wyoming Game and Fish Department 1996). Small maternity colonies of up to 30 bats are formed

FOOD HABITS
Rangewide
Insectivorous. Forages over water or among trees. Usually feeds by picking prey from surface of foliage, tree trunks, rocks, or ground; may fly slowly around shrub searching for emerging moths or perhaps nonflying prey. See Manning and Jones (1989).

Food Habits
Wyoming
Insectivorous. Forages over water or among trees, usually by picking prey from surfaces of foliage, tree trunks, rocks, or ground; may also fly slowly around shrubs searching for emerging moths or perhaps nonflying prey (Manning and Jones 1989).

REPRODUCTION
Rangewide
Litter size is 1. Births have been recorded in mid-July in western Washington. Young and lactating females were recorded in late July in New Mexico. Female and newborn young were recorded in late June in California. Male young-of-year about adult size were observed in early August in South Dakota.

Wyoming
Breeding probably occurs in August or September. Pregnancy has been observed from mid-June to mid-July. One young is produced and small maternity colonies of up to 30 bats are formed. In South Dakota, nearly adult-sized young were captured in early August. Little else is known (Clark and Stromberg 1987).

ECOLOGY
Rangewide
Widespread, not uncommon, but little is known about habits. It has been found foraging with M. VOLANS, EPTESICUS FUSCUS, LASIONYCTERIS NOCTIVAGANS, and L. CINEREUS.

Wyoming
Surveys show only a few individuals at any given locality, which suggests that this species naturally occurs in low densities (Clark and Stromberg 1987a). It has been found foraging with M. volans, Eptesicus fuscus, Lasionycteris noctivagans, and L. cinereus, and will share roosting sites with several other bat species (Wyoming Game and Fish Department 1996). Small maternity colonies of up to 30 bats are formed

TRENDS IN WYOMING
Assumed stable.

MANAGEMENT CONSIDERATIONS
Primary concerns include significant loss of habitat due to abandoned mine reclamation; inadequate management of caves and abandoned mines to protect bat habitat; a lack of historical data and current information on population trends; and poor public image. Management needs to conduct surveys of caves and abandoned mines, monitor known populations, mitigate habitat loss, develop management plans for recreational caves to mitigate disturbance, and evaluate insect control measures in bat feeding areas to avoid poisoning bats with pesticides or decimating their prey base (Wyoming Game and Fish Department 1996).

Threats
Cave roosts threatened by human disturbance, especially during hibernation; habitat declining (Wyoming Game and Fish Department 1996).

Protection Status
Two occurrences are in Grand Teton and Yellowstone National Parks. All of the remaining records are on lands managed for multiple use.

INFORMATION NEEDS
Inventory Needs
Information on basic life history, distribution, habitat use, and population information are needed for Wyoming.

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MYOTIS VOLANS
LONG-LEGGED MYOTIS

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:
Widespread distribution in western North America; apparently large number of populations; considered locally abundant; state and province ranks indicate secure populations throughout much of range.

Wyoming
WYNDD State Rank: S3B,SZN
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: A somewhat common resident species with no known major threats, but threatened by disturbance at roost sites.

State Status

US Forest Service
Management Status:

TAXONOMY
General
M. V. VOLANS (Baja California) may be specifically distinct (it occurs in different habitat and differs morphologically) from the three mainland subspecies. If this is correct, the correct name for the three mainland species is M. LONGICRUS.

DISTRIBUTION
Rangewide
Western North America from extreme southwestern Alaska, British Columbia, and Alberta south to Baja California and central Mexico (Jalisco, Veracruz, Nuevo Leon). Throughout the western United States from the Pacific coast to western North Dakota and extreme western Texas (Barbour and Davis 1969, Western Bat Working Group 1998, Bat Conservation International 1998).

Wyoming
Clark and Stromberg (1987) indicated that this species was distributed statewide, with records in: Park, Bighorn, Teton, Fremont, Hot Srings, Lincoln, Converse, Niobrara, Natrona, Sweetwater, and Albany Counties; they probably occur in all of the remaining counties. They have been reported from the following LAT/LONG blocks: 3, 4, 5, 6, 7, 8, 9, 10, 11, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27 and 28.

Abundance
The Wyoming Game and Fish Department lists this species as "Residency undetermined, abundance unknown".

HABITAT
Rangewide
Primarily in montane coniferous forests at 2000-3000 m; also riparian and desert (Baja California) habitats. May change habitats seasonally. Uses caves and mines as hibernacula, but winter habits are poorly known. Roosts in abandoned

buildings, rock crevices, under bark, etc. In summer, apparently does not use caves as daytime roost site. In some areas hollow trees are the most common nursery sites, but buildings and rock crevices are also used. See Vonhof and Barclay (1996) for information on characterisitcs of roost trees in British Columbia.

Wyoming
Oak, ponderosa pine, and mixed deciduous-coniferous forests (B87CLA65WYUS). Also basin-prairie and mountain-foothills shrublands, riparian areas (N92WGF65WYUS). Douglas fir, subalpine meadow, juniper-black sage steppe (N91WOR65WYUS).

PHENOLOGY
Rangewide
Active throughout most of the night. Peak activity occurs during the first 3-4 hours after sunset (Warner and Czaplewski 1984).

FOOD HABITS
Rangewide
Feeds primarily on moths. Also consumes a wide variety of invertebrates: fleas, termites, lacewings, wasps, small beetles, etc. (Warner and Czaplewski 1984). Follows prey for relatively long distances around, through, over forest canopy, forest clearings, and over water. In New Mexico, forages primarily in open areas, feeds mainly on small moths (Black 1974).

REPRODUCTION
Rangewide
In New Mexico, copulation was noted to begin in late August; sperm stored overwinter in female reproductive tract; ovulation occurred March-May, parturition May-August (Black 1974). Births probably occur in June or early July in Texas (Schmidly 1991). Litter size: 1. Nursery colonies may include up to several hundred individuals.

ECOLOGY
Rangewide
In many areas this MYOTIS may be the most abundant species; it is the common MYOTIS in the western U.S. Life span of 21 years recorded in the wild.

TRENDS IN WYOMING
Populations are believed to be stable.

MANAGEMENT CONSIDERATIONS

Threats
Cave roosts threatened by human disturbance.

Protection Status
Probably some protected EO's on U.S. Forest Service, National Park Service and Burea of Land Management administered lands.

INFORMATION NEEDS
Inventory Needs
Basic life history, detailed distribution, habitat use and population information are needed for Wyoming.

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NUMENIUS AMERICANUS
LONG-BILLED CURLEW

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:
Considered Moderately High Priority on 1998 Watch List (Carter et al. 1998). Considered of High Priority on 1996 WatchList (Carter et al. 1996).

Rangewide
Global Rank: G5
Comments:

Wyoming
WYNDD State Rank: S3B,SZN
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Uncommon to rare; specialized habitat requirements; some threats.

State Status
Wyoming Game and Fish Department Species of Special Concern 3^USFS Region 2 Sensitive Species^USFWS former C3.

US Forest Service
Management Status: S-USFS R2

TAXONOMY
General
May constitute a superspecies with N. ARQUATA (AOU 1998).

Sub-Species
None.

DESCRIPTION
Largest indigenous shorebird. Adults have long, decurved bills ranging from 11.4 - 22cm long. Body length is 53-66cm and wingspread is 91-101cm. Adults weigh about 28 - 32 ounces. Females are larger than males, especially in bill length, and have lower-pitched calls. Adult plumage is brown with a distinctive cinnamon color on underwing coverts and axillaries; the crown streaked and lacks stripes.

DISTRIBUTION
Rangewide
BREEDING: southern British Columbia, southern Alberta, southern Saskatchewan, southern Manitoba south to eastern Washington, northeastern California, Nevada, Utah, southern Colorado, New Mexico, and northern Texas east to southwestern Kansas. Probably extirpated in southern Manitoba and southeastern Saskatchewan (De Smet 1992). NON-BREEDING: central California, southern Arizona (rarely), extreme northern Mexico, southern Texas, southern Louisiana, coastal South Carolina south to southern Mexico (Oaxaca, Veracruz, Yucatan Peninsula) and northern Gulf Coast east to Florida, irregularly to Guatemala, Honduras, Costa Rica, Venezuela. See De Smet (1992) for further details.

Wyoming

Breeds in western-interior North America. Wyoming forms a large part of the core breeding range, and the species occurs statewide in all counties. The Wyoming Gap Analysis Project atlas (Merrill et al. 1996) estimates additional habitat near existing locations in the Green River Basin and on the grasslands in the east side of the state, particularly in Crook, Campbell, Weston, Niobrara, and Converse counties.

Abundance
Listed as "Summer resident, uncommon" by the Wyoming Game and Fish Department.

Migration
Arrives late April and departs in August.

HABITAT
Rangewide
BREEDING: Prairies and grassy meadows, generally near water (AOU 1983). Nests in dry prairies and moist meadows. Nests on ground usually in flat area with short grass, sometimes on more irregular terrain, often near rock or other conspicuous object. In Wyoming, often nests near manure pile if available (Cochran and Anderson 1987). In northern Utah, nests tended to be in small patches of short vegetation near barren ground (Paton and Dalton 1994). See De Smet (1992) and Pampush and Anthony (1993) for further details. NON-BREEDING: in migration and winter occurring also on beaches and mudflats (AOU 1983).

Wyoming
Requires open habitats with low vegetation under 30 cm. Tall vegetation hinders foraging, encourages predation, and reduces reproductive success. During the breeding season, birds frequent prairies and grasslands, plowed fields, meadows, and pastures, often near rocks or other conspicuous objects. In Wyoming, often nests near a manure pile if available (Cochran and Anderson 1987). The winter range includes grasslands and fields (Clark et al. 1989b). They do not nest in agricultural areas, although they often feed there.

PHENOLOGY
Rangewide
On breeding grounds, activity may begin about a half hour before dawn, ends at dark as birds arrive at roost site (Allen 1980).

Wyoming
Territories are relatively large (30-50 acres) and are used by both members of a pair for feeding and nesting. Unmated males perform conspicuous flight displays around the perimeter of the territory. Juveniles remain on wintering grounds until they are almost 2 years old, when they migrate north (Clark et al. 1989b).

FOOD HABITS
Rangewide
Fairly opportunistic. Feeds on various insects (grasshoppers, beetles, caterpillars, etc.). Eats some berries. During migration also feeds on crayfishes, crabs, snails, and toads. Grasshoppers and carabid beetles are dominant in the chick diet in Idaho (Redmond and Jenni 1985). May obtain insect larvae by probing into loose soil (Allen 1980). Predation on nestling birds has been observed. Picks food from ground or water, probes with bill in sand or mud in or near shallow water, plucks berries.

Food Habits
Wyoming
Small invertebrates such as easrthworms, spiders, beetles, caterpillars, and grasshoppers (Clark et al. 1989).

REPRODUCTION
Rangewide
Egg laying begins in April in Washington, by early May in Saskatchewan. Clutch size is 3-5 (usually 4); eggs are laid over 4-7 days. Incubation lasts 28-30 days, by both sexes (Redmond and Jenni 1986). Nestlings are precocial. Young are tended by both parents, brooded at night for several days after hatching. Females usually depart when young are 2-3

weeks old; males tend young until fledging at 41-45 days. Age of first breeding probably is 2-3 years for females, 3-4 years for males. One brood per year. Does not renest if clutch is lost. Fledging success is greater for early nesters (Redmond and Jenni 1986). Annual productivity is low. See Allen (1980) for details on nesting and brooding behavior. Often nests in loose colonies. Reported breeding density up to one pair per 24 ha; sometimes only one pair per several hundred ha. Breeding density was about 5-7 males per 100 ha in Idaho (Redmond and Jenni 1986), 1 pair per 6-7 sq km in Saskatchewan, up to 15 territories in 10.4 sq km in Washington (Allen 1980), 0-9 nests per ha in Oregon (Pampush and Anthony 1993), 0.64-2.36 males per sq km in northern Utah (Paton and Dalton 1994). In Oregon, nest success was 0.65-0.69 (Pampush and Anthony 1993). In Utah, 2 of 10 monitored nests were successful (Paton and Dalton 1994).

Wyoming
Arrives on upland breeding grounds in April. Pairs with previous breeding experience may arrive together and begin breeding early, often nesting in loose colonies. Fledging success is greater for early nesters. An average of four eggs are laid in a grass-lined depression on the ground. Birds produce one brood per year and do not renest if clutch is lost. Annual productivity is low. Reported breeding density is up to one pair per 24 ha, but may be as low as one pair per several hundred ha. Adults depart breeding grounds in late June or early July, but chicks remain until the end of August when they form staging flocks and migrate. Age of first breeding probably is 2-3 years for females, 3-4 years for males. (Redmond and Jenni 1986).

ECOLOGY

Wyoming
Territories realively large (30-50 acres) and are used by both members of a pair for feeding and nesting. Unmated males perform conspicuous flight displays around perimeter of territory. ^Juveniles remain on wintering grounds until they are almost 2 years old, when they migrate north. Females begin breeding at age 3, but males may not acquire a territory and mate until age 4 or 5 (Clark et al., 1989).

TRENDS IN WYOMING

Suspected to be stable or declining due to habitat loss, but there is no evidence for this.

MANAGEMENT CONSIDERATIONS

Breeding grounds have been fragmented and reduced. Although some populations may be increasing, remaining nesting areas must be protected.

Threats
Threatened by overgrazing by livestock and conversion of habitat to agricultural land; also threatened by haying operations prior to fledging of young.

Protection Status
Two breeding occurrences, one feeding area, and 2 observations are found on the Grand Teton National Park. Aother observation occurs on the private Big Goose Creek conservation easement. All other locations are on lands managed for multiple use: 12 are on state land, two each on land administered by the Medicine Bow and Bridger-Teton National Forests, one on Pathfinder Reservoir, and 17 on BLM land.

INFORMATION NEEDS

Inventory Needs
Detailed distribution, habitat use and population information are needed for Wyoming.

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ONCORHYNCHUS CLARKI BOUVIERI
YELLOWSTONE CUTTHROAT TROUT

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G4T2
Comments:
Restricted range, mainly in the upper Yellowstone River and upper Snake River drainages in Montana, Wyoming, and Idaho; high risk of genetic introgression; large decrease in range and numbers.

Wyoming
WYNDD State Rank: S2
Comments:
1996: Rank assigned with the help of zoologists at CO NHP.

State Status
Remote, inaccessible high-elevation locations on public land have helped preserve pure populations.

US Forest Service
Management Status: S-USFS R2

TAXONOMY
General
Hybrids between this subspecies and rainbow trout may not be detectable using morphological/meristic traits alone (e.g., see Kruse et al. 1996). Forbes and Allendorf (1991) found that mitochondrial genotypes had no detectable effects on meristic traits in interbreeding trouts of the subspecies LEWISI (westslope) and BOUVIERI (Yellowstone), which exhibit substantial genetic divergence. ^Introductions have led to hybridization with westslope cutthroat trout and rainbow trout. ^Management actions in the first half of the 1900s, largely in the Yellowstone Lake system, led to the potential mixing of up to 68 historically distinct genetic entities (Gresswell 1995).

Sub-Species
O.C. BOUVIERI; O.C. PLEURITICUS; O.C. LEWISI; O.C. UTAH; O.C. ssp. 2 (undescribed subspecies); O.C. STOMIAS (extirpated).

DESCRIPTION
Body elongate, 12-15 inches long. Head short, snout blunt, mouth large. Yellowish brown and dark olive-green or silvery on back; sides lighter. Belly yellow to beige. Reddish cast along middel of side typically becomes darker from the caudal fin toward the head. Spots medium in size, conspicuous, rounded, often concentrated in the caudal peduncle. Paired fins uniformly brown or purplish. Red slash on lower jaw characteristic. (Clark et al., 1989; Baxter and Stone, 1995).^SIMILAR SPECIES: Distinguished from rainbow trout by its lack of white borders on paired fins and smaller scales, and from other subspecies of cutthroats by the large black spots concentrated in the caudal peduncle and relatively drab colors (Baxter and Stone, 1995).

DISTRIBUTION
Rangewide
Native to the Snake River system above Shoshone Falls (except for waters between Jackson Lake and Palisades Reservoir), Yellowstone River drainage downstream to the Tongue River, and to two (now extirpated) isolated populations in Waha Lake, Idaho, and Crab Creek, Washington (Behnke 1992). Lakes with large populations include

Yellowstone Lake and Henry's Lake; the latter population is slightly hybridized (Behnke 1992). In tributaries of the Yellowstone River downstream from Yellowstone Park, has been largely replaced by non-native and/or hybrid trout (Behnke 1992). In the upper Snake River drainage, persists in Heart Lake and other waters above Jackson Lake, and in some tributaries between Shoshone Falls and Palisades Reservoir (Behnke 1992). Over the past several decades, millions have been stocked outside the native range, especially in the native range of the westslope cutthroat trout (Behnke 1992).

Wyoming
Streams immediately below and above Yellowstone Lake are the global stronghold for this taxon. It is native to the Yellowstone River drainage downstream to the Tongue River, including the Big Horn / Wind and Clarks Fork River drainages. Also found west of the Continental Divide in the Snake River drainage below Palisades Reservoir in Idaho and in Pacific Creek and other tributaries of the Snake River above the Gros Ventre River. It has been introduced to waters east of the Continental Divide (Baxter and Stone 1995). Recorded from Teton, Park, Sheridan, Johnson, and Big Horn counties. Populations on the Bighorn National Forest are small and isolated from populations to the west.

Abundance
Varley (1979) estimated pure forms existed in ca 95,000 acres of lakes and 1500 miles of streams.

Migration
In Yellowstone lake, migrates to spawn in inflowing streams; migrations begin in May, peak in early June and continue through July (Baxter and Stone, 1995). Older and larger spawners are first to migrate each spring. In Idaho, migration begins when water temperatures approach 5 degrees C (Thurow and King, 1994).

HABITAT
Rangewide
Rivers, creeks, beaver ponds, large lakes; optimum water temperature generally may be 4.5-15.5 C, but tolerance of much warmer temperatures probably occurred historically in larger rivers (now mostly extirpated), and warm-water populations occur currently in some geothermally heated streams, though the fishes there may rely on thermal refugia (see Gresswell 1995). Resident populations generally spawn within their home range in lotic systems; may migrate but do not enter tributary streams; after emergence, fry may move upstream or downstream or remain near the redd (Gresswell 1995). Fluvial populations migrate from larger streams into tributaries to spawn; juveniles may emigrate as fry or spend 1-3 years in natal tributaries before returning to the mainstem (Gresswell 1995). Adfluvial populations live in lakes and ascend inlets or descend outlets to spawn; young may move into the lake shortly after emergence, or they may remain in their natal stream for one or more years if the habitat is suitable; spawners may remain in breeding habitat about 1-3 weeks or up to many months (Gresswell 1995). Fry generally use areas of low water velocity. In Yellowstone Lake, juveniles apparently are primarily pelagic. ^Spawning streams generally are perennial with groundwater and snow-fed water sources and a gradient usually less than 3%; some spawning in intermittent streams does occur (Gresswell 1995). Spawning sites generally have gravel 12-85 mm in diameter, a water depth of about 9-30 cm, and a water velocity of 14-73 cm/sec (see Gresswell 1995). Spawns usually in the natal stream. See Gresswell (1995) for further details on habitat.

Wyoming
Found in rivers, creeks, beaver ponds, and large lakes. Optimum water temperature generally may be 4.5-15.5 C, but tolerance of much warmer temperatures probably occurred historically in larger rivers. Warm-water populations occur in some geothermally heated streams (Gresswell 1995), including some at least 81 degrees F in Yellowstone National Park (Clark et al. 1989a). Resident populations in lotic systems generally spawn within their home range. They may migrate but do not enter tributary streams. Fluvial populations migrate from larger streams into tributaries to spawn. Adfluvial populations live in lakes and ascend inlets or descend outlets to spawn. Spawners may remain in the breeding habitat from one week to many months. Spawning streams generally are perennial with groundwater and snow-fed water sources and a gradient usually less than 3%, because fry generally need areas of low water velocity. Some spawning may also occur in intermittent streams. Spawning sites generally have gravel sizes ranging from 12-85 mm in diameter, a water depth of about 9-30 cm, and a water velocity of 14-73 cm/sec. (Gresswell 1995) In Yellowstone Lake, juveniles apparently are primarily pelagic. Fry emerge from gravels in late summer and early fall, and may move downstream into the lake immediately or remain in the stream and enter the lake as fingerlings the following year

(Clark et al., 1989a). Spawning occurs over a seven month period, with a peak from March through August. Timing depends on latitude, altitude, water temperature, and runoff conditions (Thurow and King 1994).

PHENOLOGY
Rangewide
Active feeding may occur at water temperatures as low as 0-4 C (Gresswell 1995).

Wyoming
In Yellowstone Lake, fry emerge from gravels in late summer and early fall. Some fry move downstream into the lake immediately and otehrs remain in the stream and enter the lake as fingerlings the following year (Clark et al., 1989). Spawning occurs over a seven month period, with a peak from March through August. Time depends on latitude, altitude, water temperature, and runoff conditions (Thurow and King, 1994). Life expectancy may extend to 11 years in favorable habiat (Clark et al., 1989).

FOOD HABITS
Rangewide
Appears to feed on fishes more so than does the westslope cutthroat (Behnke 1992). Highly piscivorous in some lacustrine habitats but feeds opportunistically on zooplankton, larger crustaceans, and aquatic insects in other situations, including some lakes (Gresswell 1995).

Food Habits
Wyoming
In Yellowstone Lake, Benson (1961) found that zooplankton and freshwater shrimp were predominant, followed by midge larvae. Other insects, a few molluscs, and very few trout were also found. Most fish in lakes are planktivorous prior to maturity.

REPRODUCTION
Rangewide
Spawner abundance generally increases as water temperature rises and discharge decreases from spring runoff peak; spawns generally between March and August, with migrations beginning when temperatures approach 5 C and peaking at 10-20 C (varies with location) (see Gresswell 1995). Spawning often peaks in June in many areas. Eggs hatch generally in 25-49 days, and juveniles emerge from the gravel 2 weeks later (see Gresswell 1995). Age of spawners varies geographically; youngest spawners generally are 3-5 years old. Average age of spawners in a Yellowstone Lake tributary increased from 3.9 years to 5.6 years after mortality due to angling was reduced; the increase was due mainly to an increase in the number of repeat spawners (see Behnke 1992). Growth rate generally increases as elevation decreases (Gresswell 1995). In different populations, maximum age varies from about 8 to 11 years. Repeat spawning, in consecutive or alternate years, is common, though it may be infrequent where angler harvest is relatively high (Gresswell 1995).

Wyoming
Spawning fish in Yellowstone Lake ranged from 3 - 7 years old, but most were 4 or 5 (Clark et al. 1989a). The average age of spawners in a Yellowstone Lake tributary increased from 3.9 years to 5.6 years after angling mortality was reduced, mainly due to an increase in repeat spawners (Behnke 1992). Spawning generally increases as water temperature rises and discharge from spring runoff decreases (Gresswell 1995). Repeat spawning, in consecutive or alternate years, is common, though it may be infrequent where angler harvest is relatively high (Gresswell 1995). A 5-year study found 13% post-spawning mortality in a tributary of Yellowstone Lake. A typical female from Yellowstone Lake will deposit ca 1300 eggs. Eggs hatch in 25-30 days and juveniles emerge ca 2 weeks later (Clark et al. 1989a, Gresswell 1995). Growth rate generally increases as elevation decreases (Gresswell 1995). In different populations, maximum age varies from about 8 to 11 years.

ECOLOGY
Rangewide
Predators include white pelicans, bald eagles, and grizzly bears. Introduced longnose sucker, redside shiner, and lake chub have had no detectable effect on the cutthroat population in Yellowstone Lake (see Behnke 1992 and Gresswell

1995). In Yellowstone Lake, tapeworm infection is common and there is evidence that human infection from eating infected fishes is possible (see Gresswell [1995] for further information on parasites and diseases).

Wyoming
In Yellowstone Lake, 94% of fish had eye fluke disease, which probably came in with the introduction of lake trout (Inchausty et al. 1997). In Yellowstone Lake, tapeworm infection is common and there is evidence that human infection from eating infected fishes is possible (Gresswell 1995). Predators include white pelicans, bald eagles, river otters, and grizzly bears. Introduced longnose sucker, redside shiner, and lake chub have had no detectable effect on the cutthroat population in Yellowstone Lake (Behnke 1992; Gresswell 1995), but lake trout are significant predators and competitors.

TRENDS IN WYOMING
Historically abundant throughout the Yellowstone basin, including the Big Horn / Wind and Tongue rivers. Now restricted to headwaters of these systems.

MANAGEMENT CONSIDERATIONS
Populations should be screened for genetic purity; protect pure populations by removing non-native species and creating barriers to prevent their return; introduce populations into appropriate areas and supplement existing populations with new genetic stock; rehabilitate hybrid populations with multiple introductions of genetically pure fish; restore and protect habitat, especially that on National Forests and Parks because long-term preservation of aquatic ecosystems will depend on federal land (Duff, 1996; Varley and Gresswell, 1988). Also increase stream flows.

Threats
Declines are primarily attributed to hybridization and competition with exotic salmonids, although overharvest and habitat degradation are other factors. Overall, very little current habitat is in excellent condition; most is good to poor because of channel dewatering and modification, limited amounts of large wood in streams, and increased stream sediment caused by grazing, mining, logging, road construction, and agriculture (Duff 1996). The greatest decline in populations occurred at third order or larger streams at lower elevations where human activities are concentrated (Varley and Gresswell 1988). Illegally introduced lake trout pose a major threat to cutthroat in Yellowstone Lake.

Protection Status
Many high quality subpopulations are protected within Yellowstone National Park. However, the Yellowstone Lake population is now threatened by an illegally introduced population of lake trout. Two occurrences are on the Bridger-Teton National Forest in the Teton Wilderness. Eight records are reported from the Bighorn National Forest, one of which is from the Mann Creek potential Research Natural Area. Several populations likely occur in wilderness areas on the Shoshone National Forest. Five occurrences occur on BLM land managed for multiple use.

INFORMATION NEEDS
Inventory Needs
Important factors that will help monitor the ecological status such as abundance, recruitment, age and size structure, quality and condition of habitat, etc. would provide a more complete picture of the overall stability of this subspecies in Wyoming. Need to locate additional relatively pure populations by surveying potential habitat. Populations protected by a barrier or those with good phenotypic characteristics should be genetically tested (Young et al., 1996).

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ONCORHYNCHUS CLARKI SSP 2
FINE-SPOTTED SNAKE RIVER CUTTHROAT TROUT

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G4T1T2Q
Comments:

Wyoming
WYNDD State Rank: S1
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Idaho's SRANK is "S1" (4/95).

State Status

US Forest Service
Management Status: S-USFS R4

TAXONOMY
General
Also known as "Snake River cutthroat trout." Heavy stocking of rainbow trout and Yellowstone cutthroat trout has occurred within the range of the finespotted cutthroat, and finespotted cutthroat have been introduced into the range of the Yellowstone cutthroat; hence, it can be assumed that some hybridization has occurred (Behnke 1992). However, finespotted cutthroats and Yellowstone cutthroats exist without significant hybridization in a puzzling, intermingled natural distribution in certain areas of the Snake River drainage (Behnke 1992). May not be genetically distinctive; under study by Leary and Allendorf at University of Montana.

Sub-Species
The snake river cutthroat trout is a "minor" subspecies that was derived from the yellowstone subspies (Oncorhynchus clarki bouvieri). It has never been assigned a subspecific name (Baxter and Stone, 1995).

DESCRIPTION
None available

DISTRIBUTION
Rangewide
Snake River between Jackson Lake and Palisades Reservoir, Wyoming and Idaho; tributaries of the Snake River from the Gros Ventre River to the Salt River; occurs throughout the Gros Ventre River drainage except in headwater streams where the Yellowstone cutthroat trout occurs; consists of many reproductively isolated stocks; extensively stocked outside native range in Wyoming, Colorado, and Utah (Baxter and Simon 1970, Spahr et al. 1991, Behnke 1992).

HABITAT
Rangewide

Large rivers with swift current; requires clear, cool, well-oxygenated water; adapts well to lakes and reservoirs. Migratory populations move from main rivers to small streams to spawn; resident populations occur in small streams. ^Spawns in cold, spring-fed streams less than 12 inches deep with a clean gravel bottom (Spahr et al. 1991). Some fingerlings move to the main river in January or February; others may the shift at age 1 year or older (Spahr et al. 1991).

FOOD HABITS
Rangewide
Diet includes insects obtained on the bottom or at the surface; large individuals also eat small fishes such as sculpins and crayfish. Opportunistic; able to exploit benthic, limnetic, and surface food sources (Behnke 1992).

REPRODUCTION
Rangewide
Native populations spawn in April-May; most spawners are 3-4 years old (Spahr et al. 1991). Some hatchery stocks have been selectively bred for earlier spawning (e.g., December).

INFORMATION NEEDS
Inventory Needs
Basic life history, detailed distribution, habitat use and population information are needed for Wyoming.

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OTUS FLAMMEOLUS
FLAMMULATED OWL

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G4
Comments:
Widespread distribution in western North America; population data are inadequate for trend assessment, but loss of mature forest habitat suggests that populations may be declining.

Wyoming
WYNDD State Rank: SA?B
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Rare; distribution limited by specialized habitat requirements; a peripheral species; status unknown.

State Status
Rare accidental; Wyoming Game and Fish Department Neotropical Migrant; U.S. Forest Service Region 2 and Region 4 Sensitive Species.

US Forest Service
Management Status: S-USFS R2
S-USFS R4

TAXONOMY
General
O. SCOPS and O. FLAMMEOLUS have been considered conspecific by some authors (Terres 1980).

Sub-Species
None.

DESCRIPTION
Small North American owl, 15-17 cm long. Small, often indistinct ear tufts; variegated red and gray plumage, in Wyoming more gray than red (National Geographic Society, 1987). Females slightly larger than males. SIMILAR SPECIES: Only small owl with dark eyes. Small size and short ear tufts distinguish it from other OTUS species. Low-pitched, faint, hoarse, and ventriloquial mono- or disyllabic hoots throughout breeding season rule out all other forest owls except Long-eared owl (McCallum, 1994).

DISTRIBUTION
Rangewide
BREEDING: locally from southern British Columbia, north-central Washington, eastern Oregon, Idaho, western Montana, and northern Colorado south to southern California, southern Arizona, southern New Mexico, western Texas, southeastern Coahuila, and Nuevo Leon (AOU 1983) (to 3700 m, Contreras-Balderas 1992); locally in central Mexico (Sibley and Monroe 1990, McCallum 1994). ^NON-BREEDING: central Mexico south in highlands to Guatemala and El Salvador, casually north to southern California (AOU 1983).

Wyoming

Scattered throughout the state. Observations have been recorded for Teton, Natrona, Big Horn, Fremont, and Albany counties. The Wyoming Gap Analysis Atlas (Merrill et al. 1996) shows additional habitat near existing sites in the eastern Bighorn Range and the western edge of the state in the Targhee and Bridger-Teton National Forests.

Abundance
Listed as "Accidental, rare" by the Wyoming Game and Fish Department. Secretive habits make it difficult to find, so population estimates are not available.

Migration
Rare migrant; peaks occur in early May and September/October (Dorn and Dorn 1999).

HABITAT
Rangewide
BREEDING: Montane forest, usually open conifer forests containing pine, with some brush or saplings (typical of the physiognomy of pre-European settlement ponderosa pine forests). Shows a strong preference for yellow pine, i.e. ponderosa pine (PINUS PONDEROSA) and Jeffrey pine (P. JEFFREYI), throughout its range (McCallum 1994b). Prefers mature growth with open canopy; avoids dense young stands. Found in cooler, semi-arid climate, with high abundance of nocturnal arthropod prey and some dense foliage for roosting (McCallum 1994a). Absent from warm and humid pine forests and mesic ponderosa pine/Douglas-fir (McCallum 1994a, Wright et al. 1997). Most often found on ridges and upper slopes (Bull et al. 1990, Groves et al. 1997). ^In British Columbia, uses dry interior Douglas-fir (PSEUDOTSUGA MENZIESII) where ponderosa pine may be a codominant, but pure ponderosa pine is avoided. Also sometimes in pure aspen and, locally, in spruce/fir and lodgepole pine (PINUS CONTORTA)/red fir (ABIES MAGNIFICA). Prefers old-growth more than 100 years old. Highest densities found in 140 year-old to more than 200 year-old forests; owls were restricted to forests with multi-layered canopies with an abundance of large, well-spaced trees interspersed with grassy openings up to 2 hectares in size, and where cavity-bearing snags were "moderately common" (Howie and Ritcey 1987). A study in the Kamloops area that tested a habitat model in Douglas-fir/ponderosa pine found three variables to be significant predictors for occupied habitat: elevation (between 850 and 1,150 meters), age class (older stands), and canopy closure (40 to 50 percent; Christie and van Woudenberg 1997). ^In California, breeds in conifer habitats from ponderosa pine up to red fir forests (Verner and Boss 1980. In Idaho, found mostly in stands of ponderosa pine, Douglas-fir, or mixtures of the two, occasionally in stands of pure Douglas-fir or aspen where ponderosa pine absent; 65 percent of detections on upper slopes or ridges; tree densities approximately 500 per hectare; mean dbh for all trees 32 centimeters (Groves et al. 1997). In Montana, associated with mature and old-growth xeric ponderosa pine/Douglas-fir stands (Holt and Hillis 1987, Wright et al. 1997); and in landscapes with higher proportions of suitable forest and forest with low to moderate canopy closure (Wright et al. 1997). ^In Colorado, shows strong preference for old-growth ponderosa pine and Douglas-fir, using older trees for foraging and singing (Reynolds and Linkhart 1992, Linkhart and Reynolds 1997). Territories consistently occupied by breeding pairs were those containing largest portion (more than 75 percent) of old-growth (200-400 years), whereas territories occupied by unpaired males and rarely by breeding pairs contained 27-68 percent old-growth (Linkhart and Reynolds 1997). Aspen (POPULUS TREMULOIDES) often a component of nesting habitat in Colorado and Nevada (Reynolds and Linkhart 1987b, McCallum 1994b). In northern Utah, successfully nested in nest boxes in montane deciduous forests dominated by aspen with some scattered firs (Marti 1997). Will use pinyon-juniper stands on Colorado Plateau (McCallum 1994b). In southwest, associated mainly with ponderosa or Jeffrey pine, often intermixed with aspen or oaks (QUERCUS). ^NEST: Most often nests in an abandoned tree cavity made by pileated woodpecker (DRYOCOPUS PILEATUS), flicker (COLAPTES sp), sapsucker (SPHYRAPICUS sp.) or other large primary cavity nester, at heights from 1 to 16 meters (Reynolds et al. 1989). Uses dead, large-diameter pine, Douglas-fir or aspen tree; occasionally uses natural cavity or nest box. Nearly always nests in open conifer forest with large old trees, scattered thickets of shrubs/saplings, and clearings (McCallum 1994a). Closely associated with large, mature trees for nesting (Bull and Anderson 1978; Reynolds and Linkhart 1984, 1987a, 1987b; McCallum and Gehlbach 1988). In New Mexico, prefers nesting areas that have low shrub density, high canopy height, and high importance of mature pinyon pine (PINUS EDULIS); nest sites had fewer shrubs in front of than behind cavity entrance; vegetation characteristics apparently more limiting than nest-tree characteristics (McCallum and Gehlbach 1988). Nest sites usually were within 50 meters of grassland; most adults did not nest in the same tree cavity in successive years despite previous success (McCallum et al. 1995). In Colorado, territories with contiguous old-growth were occupied 12 consecutive years; territories with less than 75 percent old-growth only occupied by original male (Goggans 1986, cited in McCallum 1994a). ^For 33 nests studied in northeastern Oregon by Bull et al. (1990), 91 percent were in dead trees and 70 percent were in ponderosa pine. Of the 33 nests, 67

percent were created by pileated woodpeckers, 27 percent by northern flickers (COLAPTES AURATUS), and 6 percent by decay. Used pileated woodpecker cavities significantly more than expected based on availability. Also: (1) average dbh of nest trees was 72 centimeters and height of nest cavity was 12 meters; (2) owls used large-diameter nest trees large enough at least for northern flicker cavities; (3) nests were located on ridges and upper slopes with east or south aspects; and (4) nests were in stands of more than 50 centimeter dbh ponderosa pine mixed with Douglas-fir or Grand fir (ABIES GRANDIS). See Bull et al. (1990) for information on nesting habitat in Oregon. ^FORAGING: Prefers yellow pine and/or Douglas-fir for foraging, and these forest types apparently support a particular abundance of favored lepidopteran prey (McCallum 1994b). In Oregon, forage in ponderosa pine and Douglas-fir types with low to medium stem density, but show particularly preference for forest/grassland ecotone (Goggans 1986). In Colorado, preferred to forage in old-growth (more than 200 years), which was related both to an abundance of lepidopteran prey and to the open crowns and park-like spacing of trees which allowed greater room to maneuver for the owls (Reynolds et al. 1989). May focus foraging in a few "intensive foraging areas" within home range, averaging 1 hectare per range (Linkhart 1984, cited in McCallum 1994b). ^ROOST: In dense vegetation, thickets, or mistletoe that provide shade and protection from predators; often roosts close to trunks in fir or pine trees, or in cavities (McCallum 1994b, USDA Forest Service 1994). In Oregon, uses mixed coniferous forest rather than pure ponderosa pine (Goggans 1986, cited in McCallum 1994a). In Colorado, uses large Douglas-firs or pines with spreading form (Linkhart 1984, cited in McCallum 1994a). Roosts close to nest (20 - 25 meters) during nestling stage and just before fledging, farther away before and after (McCallum 1994a). In British Columbia, roosted in regenerating thickets (Howie and Ritcey 1987). ^MIGRATION: In wooded areas in lowlands and mountains, including riparian areas and breeding habitat (McCallum 1994a).

Wyoming
Obligate cavity nester (Reynolds and Linkhart 1987b) in open ponderosa pine and Douglas-fir stands that support a relatively high density and diversity of nocturnal arthropod prey (Hayward and Verner, 1994). Nests usually in an abandoned woodpecker hole, often in a dead, large-diameter aspen or pine tree. In Colorado, individuals generally occupied the same breeding territory in successive years (males more so than females) (Reynolds and Linkhart 1987a). May also use nest boxes, including those erected for kestrels, Abert's squirrels, or those especially designed for owls (see Voous and Cameron 1989).

PHENOLOGY
Rangewide
During nesting period in Colorado, foraging activity peaked 15-30 min after sunset and 1-1.5 hr before sunrise; ceased activity during snow or rain (Reynolds and Linkhart 1987).

Wyoming
7 to 8 years (Reynolds and Linkhart, 1990).

FOOD HABITS
Rangewide
Mainly hunts at night and eats nocturnal arthropods (McCallum 1994a and 1994b). Marshall (1957, cited in USDA Forest Service 1994) reported that most hunting activity occurs at dawn and dusk; McCallum (1994a, 1994b) reported that species hunts exclusively at night. Feeds on various insects (e.g., moths, beetles, grasshoppers, crickets, caterpillars; McCallum 1994a, 1994b). Moths (esp. NOCTUIDAE and GEOMETRIDAE) and beetles are especially important (Reynolds and Linkhart 1987b; Marshall 1957, cited in USDA Forest Service 1994). Possibly responds to spruce budworm outbreaks (see McCallum 1994b). May occasionally eat small mammals or birds (Bull 1978; Holt 1996), but frequency is debated (McCallum 1996). See McCallum (1994a, 1994b) for detailed information on diet composition. ^Foraging tactics include hawk-gleaning, hawking, hover-gleaning, and drop-pouncing; will also glean insects from trunks and branches (Reynolds and Linkhart 1987; Zeiner et al. 1990, cited in USDA Forest Service 1994). Most foraging in Oregon and New Mexico occurred along the interface between forest or woodland and grassland (see McCallum et al. 1995). In New Mexico, sit-and-wait foraging occurred 3-50 meters from nests (McCallum et al. 1995).

Food Habits
Wyoming
Hunts exclusively at night (Hayward and Verner, 1994). Feeds on various insects (e.g., moths, beetles, grasshoppers, crickets, caterpillars); rarely eats small mammals or birds. Foraging tactics include hawk-gleaning, hawking, hover-gleaning, and drop-pouncing (Reynolds and Linkhart 1987).

REPRODUCTION

Rangewide

Has low reproductive rate (McCallum 1994b). Clutch size is two to four (usually two to three); incubation lasts 21-26 nights, by female (male brings food); nestling period reported as 22-24 nights and 21-23 days; fledglings are tended by both parents (divide brood, Colorado), independent about 1 month after fledging. See Johnsgard (1988) for review of egg dates. Fledging occurs in July-August. Brood size most often is two. Maximum longevity in the wild is about 7-8 years (Reynolds and Linkhart 1990). In California, breeds May through October with peak activity in June and July (Zeiner et al. 1990, cited in USDA Forest Service 1994). Rates of nest success and productivity generally unknown.

Wyoming

Monogamous. Exhibits nest-site fidelity. Nest abandonment is rare, and hatching success is high. Has lowest clutch size of North American owls (Hayward and Verner, 1994; McCallum, 1994).

ECOLOGY

Rangewide

Individuals occupy same breeding territory in successive years (Reynolds and Linkhart 1987a, McCallum 1994a). Territory size about 5.2 square kilometers; males show strong territory fidelity but females may disperse to adjacent territories (dispersal distance averaged 474 meters; Reynolds and Linkhart 1987a). Territory size usually remains same from year to year, even if adjacent territories unoccupied (McCallum 1994a). Territorial boundaries often occur along ridgetops (Reynolds 1987). ^Singing owls move widely within home range. Male foraging, territorial defense, resting and day-roosting were confined to the home range in a Colorado study; home range size appeared to be influenced by canopy volume and range shape by topography (Linkhart 1984, cited in McCallum 1994b). Nesting home ranges vary from 5.5 to 24.0 hectares, and may diminish in size during the breeding season (McCallum 1994b). In Colorado averaged 14 hectares; foraging activity concentrated in 1-4 areas within home range (Reynolds and Linkhart 1987a). Both sexes make extra-range movements during the breeding season (Reynolds and Linkhart 1990). ^Generally fewer than 4 singing males per 40 hectares in Oregon, British Columbia, and Colorado. Density of 5.3 males per square kilometer reported from California (Johnsgard 1988). Densities of singing males in Idaho averaged 0.41 per 40 hectares (Atkinson and Atkinson 1990); and 0.28 to 0.52 males per 40 hectares (Groves et al. 1997). Nests per 100 hectares averaged 2.9 in New Mexico, 2.1 in Colorado, and 1.4 in Oregon (not significantly different; see McCallum et al. 1995). In New Mexico, nest sites averaged 260 meters from the nearest neighbor (McCallum et al. 1995). Territories remain same size in successive years and rarely expand when a neighbor is absent (Reynolds and Linkhart 1990).

Wyoming

TERRITORIALITY: In Colorado, home ranges averaged 14.4 hectares. Territory includes nest, roost sites, and intensive foraging areas. Territorial defense not strong (Hayward and Verner, 1994). COMMUNITY INTERACTIONS: Logging may increase contact between great horned and flammulated owls, leading to greater predation. Red squirrels, cats, bears may also be predators. Bats may compete with owls for food.^Depends on woodpeckers to create nest cavities. Nest-site competition with mammals and larger birds is an important threat, and populations may be limited by nest-site availability (Hayward and Verner, 1994).^BEHAVIOR: Semi-colonial; very tolerant of humans, nests near occupied areas (Hayward and Verner, 1994).

TRENDS IN WYOMING

Undetermined.

MANAGEMENT CONSIDERATIONS

Species does not appear in danger of extinction, but information on nesting biology, density, and habitat requirements is insufficient and should be studied (Reynolds and Linkhart 1987b). Conducting audio call/ playback surveys in likely habitat is the preferred survey method. Clusters of owls have been found surrounded by largely unoccupied habitat, which indicates that either these owls are colonial or the unoccupied areas are suboptimal habitat. It is important to determine habitat needs, such as the level of requirement for old-growth forest. A suggested alternative is artificially providing the aspects of old growth the species requires, such as nest sites, roost sites, and foraging substrate (McCallum 1994).

Threats
Prefers to settle and forage in old-growth (> 200 years old) ponderosa pine-Douglas fir stands, depends on cavities for nesting, and is not found in cutover forests. Threatened by clearcutting old-growth ponderosa and Douglas-fir stands, which removes cavities for nesting and also may negatively impact the woodpecker population, on which the owls depend for nest sites. Insect prey may be reduced by timber cutting and aerial insecticides. Also threatened by habitat fragmentation, which increases nest failure by increasing access to edge-associated predators and brood parasites and increasing competition for nest-sites (Hayward and Verner, 1994).

Protection Status
One observation is protected on the Bighorn Canyon National Recreation Area; two are on state land, one is on the Rawlins District of the Bureau of Land Management, and one is on private land near the Medicine Bow National Forest.

INFORMATION NEEDS
Inventory Needs
Detailed distribution, habitat use and population information are needed for Wyoming. Conduct audio call/ playback surveys in likely habitat.

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OTUS KENNICOTTII
WESTERN SCREECH OWL

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:

Wyoming
WYNDD State Rank: S2
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Uncommon; distribution limited by specialized habitat requirements; status unknown; some threats to habitat; peripheral species.

State Status

US Forest Service
Management Status:

TAXONOMY
General
Prior to 1982 regarded as conspecific with O. ASIO. Populations in northwestern Mexico have been treated as separate species (O. VINACEUS) by some authors. Mixed pairs and overlap of ASIO and KENNICOTTII in Colorado and Texas is attributed to long-distance dispersal in marginally poor habitat. Sympatry without interbreeding with ASIO reported for western Edwards Plateau (Dixon 1989).

DISTRIBUTION
Rangewide
RESIDENT: from south-coastal and southeastern Alaska, coastal and southern British Columbia, northern Idaho, western Montana, southeastern Colorado and extreme western Oklahoma south to southern Baja California, northern Sinaloa, in Mexican highlands to Distrito Federal, and to western Texas (AOU 1983). Apparently has expanded north into southern Alberta.

Wyoming
Refer to Oakleaf et al. (1992) and Dorn (1990) for distribution by LAT/ LONG block. Occurs west of the Continental Divide; associated with cottonwood-riparian and deciduous woodland habitats.

Abundance
Listed as "Resident, common" by the Wyoming Game and Fish Department; probably should be "Resident, uncommon".

HABITAT
Rangewide
Woodland, especially oak and riparian woodland, and scrub (Subtropical and Temperate zones) (AOU 1983). Usually found at lower elevations where range overlaps with whiskered screech-owl (National Geographic Society 1983).

^Nests in natural tree cavity or an abandoned woodpecker hole, including holes in saguaro cactus. May nest in a bird house.

FOOD HABITS
Rangewide
Feeds mainly on small mammals (mice and shrews), insects, birds; sometimes also other small vertebrates. Diet may vary seasonally and geographically, depending on local prey abundance.

REPRODUCTION
Rangewide
Clutch size averages 3-4. Incubation about 26 days.

ECOLOGY
Rangewide
In central Idaho, home ranges of 2 radio-tagged birds reported as 3-9 ha and 29-58 ha based on 75% and 95% contour intervals, respectively. Distance between adjacent pairs ranges from ca. 50 up to a few hundred meters (see Johnsgard 1988).

TRENDS IN WYOMING
Undetermined, but suspected to be stable.

MANAGEMENT CONSIDERATIONS
Threats
May be threatened by degredation of cootnwood riparian habitats due to overgrazing by livestock and flood control, both of which may prevent cottonwood regeneration.

Protection Status
May be somewhat protected on small portions of U.S. Forest Service administered lands; probably protected in Grand Teton and Yellowstone National Parks.

INFORMATION NEEDS
Inventory Needs
Detailed distribution, habitat use and population information are needed for Wyoming. Conduct audio call/ playback surveys in likely habitat.

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PANDION HALIAETUS
OSPREY

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:
Very large range; increasing population trend in many areas where formerly depleted by effects of pesticides; benefiting from active management in many areas; pesticide-related problems still exist in some areas.

Wyoming
WYNDD State Rank: S3B,SZN
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Relatively widespread with few threats; but nesting habitat is limited; low overall numbers.

State Status
Uncommon summer resident; USFS Region 2 Sensitive Species.

US Forest Service
Management Status: S-USFS R2

DESCRIPTION
Brown to blackish-brown above, white below, head white with broad brown eye stripe and dark crown. In flight, long, narrow wings are bent back at the wrist; dark patch on wrists visible in flight, wing tips dark, tail banded, wings arched when soaring (National Geographic Society, 1987; Dorn and Dorn, 1990). SIMILAR SPECIES: Light phase Buteo hawks with banded tails have prominent markings on the breast or belly and less white on head (Dorn and Dorn, 1990).

DISTRIBUTION
Rangewide
BREEDS: cosmopolitan (except South America). In New World: northwestern Alaska to northern Saskatchewan, Labrador, and Newfoundland, south to Baja California, Tres Marias Islands, Sinaloa, Arizona, (formerly New Mexico and Texas), coast and islands of Yucatan Peninsula, Belize, Guatemala, Gulf Coast, Florida, and West Indies (Bahamas, small cays off Cuba, Virgin Islands). WINTER: California, Gulf Coast, and Bermuda south through Central America to South America; rare but regular in Hawaii. In the U.S., primary wintering areas include central California, southern Texas, the Gulf coast, and southern Florida, though the winter range also includes other areas in the southern and southeastern U.S. and various inland sites (Root 1988). Also widespread in Old World (AOU 1983, Sibley and Monroe 1990).

Wyoming
Resident breeder, typically breds on large snags/manmade structures (i.e. telephone poles) near rivers and large lakes. Breeding records known from Sublette, Sweetwater, Teton, Lincoln, Carbon, and Albany Counties. Merrill et al., (1996) show occurrences in all counties.Breeds in scattered locations throught the state, but most pairs are in the western 1/4 of the state. The Wyoming Gap Analysis Atlas (Merrill et al., 1996) predicts additional habitat near existing sites along the Bighorn, Powder, North Platte, and Wind Rivers and the Pathfinder and Boysen Reservoirs. Additionally, the Wyoming Game and Fish is building nest platforms along the Flaming Gorge Reservoir to attract ospreys.

Abundance

Listed as "Summer resident, common" by the Wyoming Game and Fish Department; should be listed as "Summer resident, uncommon".

Migration
Arrives in late April and departs in September; earliest record is March 21 and latest is December 27 (Dorn and Dorn 1990).

HABITAT
Rangewide
Primarily along rivers, lakes, reservoirs, and seacoasts, occurring widely in migration, often crossing land between bodies of water (AOU 1983). ^Nests in dead snags, living trees, cliffs, utility poles, wooden platforms on poles, channel buoys, chimneys, windmills, etc.; usually near or above water. Nests often used in successive years.

Wyoming
Found in Lodgepole pine, Douglas fir, spruce-fir, and cottonwood-riparian habitats. Nests on exposed rock in the Grand Canyon of the Yellowstone and artifical nesting platforms in the Black Hills, Pindedale, and Yellowstone National Park (Merrill et al., 1996).

PHENOLOGY
Wyoming
Delays in clutch initiation, such as those caused when Canada geese occupy nest sites, may cause a reduction in reproductive output.

FOOD HABITS
Rangewide
Eats almost exclusively fishes (usually live) caught by feet-first plunge into shallow water, usually by flight hunting, sometimes from perch (see Palmer 1988 for detailed account of food). Species composition of diet may vary greatly from one area to another. Sometimes eats rodents, birds, other small vertebrates, or crustaceans.

Food Habits
Wyoming
Eats fish almost exclusively. Hunts by plunging feet-first into shallow water, usually in flight but sometimes from a perch (Palmer 1988). However, also sometimes eats rodents, birds, other small vertebrates, or crustaceans. Ospreys in Yellowstone Lake preferred immature cutthroat trout and foraged over the deep water habitat where they occur. Species composition of the diet may vary greatly from one area to another (Swenson 1978).

REPRODUCTION
Rangewide
Nests may contain eggs in winter and early spring in Florida and Mexico, mainly in mid- to late spring in temperate regions of the U.S. and Canada. Clutch size is 1-4 (most often 3). Incubation lasts 4.5-5.5 weeks, usually mainly by female; male provides food. Young first fly at 44-59 days, dependent on parents for up to 6 weeks or more (less in north). First breeds usually at 3 years, sometimes at 4-5 years. Delays in clutch initiation, such as caused when Canada geese occupy nest sites, may cause a reduction in reproductive output (Steeger and Ydenberg, 1993, Can. J. Zool. 71:2141-2146). Number of young fledged increases with increased abundance of food resources. Large numbers may nest in a relatively small area when food resources are adequate and nesting sites are plentiful.

Wyoming
In Yellowstone National Park, nests in lodgepole pine, Engelmann spruce, or subalpine fir with broken tops. Ospreys also readily colonize reservoirs (Swenson 1981b). Clutch size is 1-4 (most often 3). First breeds usually at 3 years, sometimes at 4-5 years. The number of young fledged increases with increased abundance of food resources. Large numbers may nest in a relatively small area when food resources are adequate and nesting sites are plentiful.

ECOLOGY

Rangewide
Nest predation usually is not a problem.

Wyoming
Delays in clutch initiation, such as those caused when Canada geese occupy nest sites, may cause a reduction in reproductive output.

TRENDS IN WYOMING
Populations declined in the 1950-1960's, but appear to have now recovered.

MANAGEMENT CONSIDERATIONS
Swenson (1979) recommends that visitors in Yellowstone National Park be directed away from nest sites, since human disturbance decreases reproductive success. The Wyoming Department of Game and Fish is constructing nesting platforms along Flaming Gorge Reservoir to attract ospreys.

Threats
Historically, this species was threatened by bio-acumulation of environmental contaminants. Currently may be somewhat threatened by the logging of snags and large trees.

Protection Status
Thirteen breeding locations lie within the Bridger-Teton National Forest, and two lie within the Medicine Bow National Forest. One breeding location is protected in Yellowstone National Park. Three breeding sites occur around Fontenelle Dam on Bureau of Reclamation withdrawals from BLM land.

INFORMATION NEEDS
Inventory Needs
Detailed distribution, habitat use and population information are needed for Wyoming.

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PELECANUS ERYTHRORHYNCHOS
AMERICAN WHITE PELICAN

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G3
Comments:
About 70 breeding colonies, with most in Canada. Many of the breeding colonies in the U.S. and Canada seem highly threatened by habitat loss and water level problems.

Wyoming
WYNDD State Rank: S1B,SZN
Comments:
Specialized breeding habitat required and not very many breeding sites in Wyoming, or the world; some threats; GRANK of "G3".

State Status

US Forest Service
Management Status:

DISTRIBUTION
Rangewide
BREEDING: locally, now primarily in Prairie Provinces (Alberta, Saskatchewan, and Manitoba), also adjacent eastern British Columbia and western Ontario, south through California, Nevada, Utah, Colorado, South Dakota, and Minnesota; also coastal Texas and coastal Tamaulipas; sporadically in Durango, Mexico (Johnsgard 1993, Evans and Knopf 1993). Over half of the breeding population nests in Saskatchewan and Manitoba. ^NON-BREEDING: Florida, Gulf of Mexico coast to Tabasco and Yucatan, and central California south to southern Baja California and west-central mainland Mexico, sometimes south to Guatemala, Nicaragua, and Costa Rica (AOU 1983, Evans and Knopf 1993). In North America, the highest winter density occurs in southern Texas (Root 1988); other important areas include the Gulf coast and Everglades region of Florida. In summer, sometimes wanders north of usual range.

Wyoming
While distributed virtually statewide during migration (B), it only breeds at a few suitable lakes; also, foraging sites are relatively limited. Refer to Oakleaf et al. (1992) and Dorn (1990) for distribution by LAT/ LONG block.

Abundance
Listed as "Summer resident, uncommon" by the Wyoming Game and Fish Department. Widespread during migration and while foraging (B), but very few suitable nesting sites.

HABITAT
Rangewide
Rivers, lakes, reservoirs, estuaries, bays, marshes; sometimes inshore marine habitats. Rests on islands and peninsulas. Nests usually on islands or peninsulas in brackish or freshwater lakes, isolated from mammalian predators. Nests on the ground in a slight depression or on a mound of earth and debris 24-36 inches across, 15-20 inches high (Terres 1980). Usually on low flat, or gently sloping terrain. May use dredge spoil or natural islands. Usually nests in open area, but often near vegetation, driftwood, or large rocks (Spendelow and Patton 1988).

PHENOLOGY
Rangewide
Feeding activity generally peaks in morning and late afternoon or evening. In some areas, forages at night as well as diurnally (McMahon and Evans 1992).

FOOD HABITS
Rangewide
Feeds mainly on fishes of little commercial value (e.g., carp, perch, catfish, suckers, sticklebacks, minnows) (Terres 1980), also locally trout, centrarchids, tiger salamanders, or crayfishes. Locally, tiger salamanders may be important as food for chicks. Often forages in shallow water. Sometimes fishes cooperatively, forming a semicircle and herding fishes.

REPRODUCTION
Rangewide
Egg laying occurs May-July in Texas, late April-June (mainly before June) in Utah. In Canada, nesting begins in May or June; hatching in the first nests sometimes precedes initiation of the last clutches. In Manitoba, flocks first flew over colony sites 34-38 days before hatching. Clutch size commonly 2, but rarely fledges more than one young. Incubation averages 31-32 days, by both adults. Young tended by adults, leave nest in about 21-28 days, join other young in group, fledge at 9-10 weeks. Sexually mature usually at 3 years. Mortality of eggs and chicks generally is high. Generally does not renest following clutch loss.

ECOLOGY
Rangewide
Gregarious. Significant predators at various breeding sites include gulls, coyotes, and probably large corvids and other mammals. ^Maximum distance between nesting site and breeding season foraging area was 100 km, 120 km, 160 km, and about 300 km in four studies (see Johnsgard 1993).

TRENDS IN WYOMING
Historically, only bred at Molly Lakes in Yellowstone National Park. Several new breeding sites in recent years. Population slowly increasing. Increase is relatively recent trend due to increase in water (precipitation, availability) in the past couple years. Trend assigned with the help of Tim Britt, former WyGF employee (retired).

MANAGEMENT CONSIDERATIONS
Threats
Nesting sites vulnerable to human disturbance; one of the two sites has been the site of a multi-year gull study. There has been recent public concern that the pelicans may be harming exotic trout fisheries in the state.

Protection Status
One nesting site in Yellowstone National Park and two on U.S. Fish and Wildlife Service Refuges (but one of these sites is not of high quality, due to draw down of the reservoir for irrigation during the nesting season.

INFORMATION NEEDS
Inventory Needs
Detailed analysis/ documentation of foraging/ loafing sites.

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PHALAROPUS TRICOLOR
WILSON'S PHALAROPE

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:
Large breeding range, mainly in the interior portion of western North America and the Great Lakes region; Breeding Bird Survey data indicate a significant population decline (41%) between 1984 and 1993, though the BBS may not be a good technique for determining the status of this species.

Wyoming
WYNDD State Rank: S3B,S3N
Comments:
Relatively widespread; limited habitat; no major threats; uses staging/ stopover areas during migration.

State Status

US Forest Service
Management Status:

TAXONOMY
General
Often placed in monotypic genus STEGANOPUS (AOU 1983). Based on allozyme data, clearly genetically distinct from other phalaropes; may not be part of monophyletic phalarope group (Dittman et al. 1989). However, combined allozyme, morphologic, and mtDNA data suggest that Wilson's phalarope evolved shortly after the phalarope lineage itself arose and that the phalaropes are monophyletic (Dittman and Zink 1991).

DISTRIBUTION
Rangewide
BREEDING: coastal British Columbia, southern Yukon, northern Alberta, central Saskatchewan, central Manitoba, southern Ontario, southern Quebec, northeastern New York, and New Brunswick, south to east-central California, central Nevada, central Utah, eastern Arizona, northern New Mexico, northern Texas, central Kansas, western Nebraska, eastern South Dakota, northern Iowa, northern Illinois, northern Indiana, and northern Ohio. Nonbreeders recorded in summer north to central Alaska, central Mackenzie, northern Saskatchewan, and Nova Scotia (McAlpine et al. 1988, AOU 1998). ^NON-BREEDING: mainly in saline lakes of highlands of western and southern South America, from Peru, Bolivia, Paraguay, and Uruguay south through Chile and Argentina, casually north to central California, Utah, central New Mexico, southern Texas, southwestern Louisiana, and Florida (Colwell and Jehl 1994, AOU 1998).

Wyoming
Refer to Oakleaf et al. (1992) and Dorn (1990) for distribution by LAT/ LONG block. Occurs at scattered locations statewide in small ponds with still water.

Abundance
Listed as "Summer resident, common" by the Wyoming Game and Fish Department.

HABITAT
Rangewide

BREEDING: Shallow freshwater marshes and wet meadows (AOU 1998). Nests on the ground in wet meadows, grassy marshes, and along edges of shallow inland waters. The nest is a well-concealed scrape, lined with grass. Uses both fresh and alkali wetlands with three characteristics: open water, emergent vegetation, and open shoreline (Saunders 1914, Hohn 1967, Stewart 1975, Prescott et al. 1995, Naugle 1997). Nesting habitat varies widely, including wetlands, wet meadows, upland grasslands, and road rights-of -way (Bent 1927, Roberts 1932, Hohn 1967, Stewart 1975, Murray 1983, Bomberger 1984, Colwell 1987, Colwell and Oring 1990, Einemann 1991, Faanes and Lingle 1995, Dinsmore and Schuster 1997). Occasionally occur in Conservation Reserve Program (CRP) fields and dense nesting cover (Johnson and Schwartz 1993; Prescott et al. 1993; D.H. Johnson, unpubl. data). ^In North Dakota, densities were highest in undifferentiated tillage wetlands (wetlands with frequently tilled soils), followed by temporary, seasonal, semipermanent, fen, alkali, and permanent wetlands (Kantrud and Stewart 1984). Often occupied the peripheral low prairie and wet-meadow areas of most classes of wetlands in North Dakota. In South Dakota, occurrence was associated positively with the presence of seasonal and semipermanent wetlands, stock ponds, and intermittent streams; area of alfalfa (MEDICAGO SATIVA) hayland; area of surface water; and the percentage of grazed shoreline (Weber 1978, Weber et al. 1982). In eastern South Dakota, the probability of occurrence in semipermanent wetlands was related positively to the proportion of untilled uplands and the number of emergent hydrophyte species (e.g., willow [SALIX spp.]) composing > 10% of the vegetated wetland area; were associated negatively with wetlands dominated by thick-stemmed plants (e.g., cattail [TYPHA spp.] and river bulrush [SCIRPUS FLUVIATILIS]) (Naugle 1997). Within seasonal wetlands, the probability of occurrence was related negatively to wetlands dominated by thick-stemmed plants (Naugle 1997). ^Nest site selection varies seasonally. Nests in upland vegetation early in the breeding season and wet-meadow vegetation later in the season (Colwell and Oring 1990). Usually nests less than 100 meters from shoreline (Hohn 1967, Hatch 1971, Colwell and Oring 1990, Eldridge in prep.). Nest sites in Nebraska were in wet sedge (CAREX) meadows (Faanes and Lingle 1995). In North Dakota and Iowa, nested in wetlands associated with river floodplains (Murray 1983, Koenig 1984). In Alberta, Saskatchewan, and North Dakota nested in grasses of various heights on islands or in wet-meadow zones around lakes and wetlands; in Saskatchewan, brood rearing occurred in patches of foxtail barley (HORDEUM JUBATUM) (Bent 1927, Hohn 1967, Kagarise 1979, Colwell 1987). In Saskatchewan, Colwell and Oring (1990) found that nest sites had taller, denser, and more homogeneous vegetation and less bare ground than randomly selected sites. However, in the Nebraska sandhills, nest sites had shorter vegetation than random sites (Bomberger 1984). ^NON-BREEDING: on lake shores, mudflats, salt marshes, freshwater marshes, alkaline ponds; rarely along seacoasts; stages on salt lakes (Colwell and Jehl 1994, AOU 1998). Also at sewage ponds; rarely reported at sea.

FOOD HABITS
Rangewide
Eats insects (larvae and adults), especially mosquitoes and crane flies. On salt flats may feed on alkali flies, brine shrimps, seeds of aquatic plants. Feeds as it walks along muddy shores, wades in shallow water, or swims in whirls.

REPRODUCTION
Rangewide
In the central and northern Great Plains (Minnesota, Nebraska, and North Dakota), arrives on the breeding grounds from mid-April to early May and departs from mid-August to early September (Roberts 1932, Howe 1972, Johnsgard 1980, Murray 1983). In Alberta, Manitoba, and Saskatchewan, arrives on breeding grounds from late April to early May and is observed until early September (Hohn 1967; Maher 1974; Reynolds et al. 1986; Colwell 1987; Colwell and Oring 1988a,b). Females arrive on the breeding grounds earlier than males (Reynolds et al. 1986, Colwell 1987), and commonly depart from breeding areas earlier than males, usually from early June to early July (Hohn 1967; Howe 1972; Colwell 1987; Colwell and Oring 1988a,b). ^May renest after nest failure, and females are capable of laying multiple clutches (Colwell and Jehl 1994). Polyandry was first documented in Saskatchewan, where a color-banded female laid two clutches with two individual males (Colwell 1986a, Colwell 1987). Philopatry is uncommon, although males return to breeding areas in successive years more often than females (Colwell 1987, Colwell and Oring 1988b). Of 154 adult male phalaropes banded over four years in Saskatchewan, 16 percent returned to their previous breeding area in successive years, whereas only 2 percent of 69 banded adult females returned (Colwell 1987).

ECOLOGY
Rangewide

Reproductive success varies greatly (17-56%); most clutch failures result from predation (Colwell 1992). Exhibits annual variation in nest site selection, moving to deeper, more permanent wetlands in dry years (Hohn 1967, Colwell 1991).

TRENDS IN WYOMING

Suspected to be stable, but unknown.

MANAGEMENT CONSIDERATIONS

Threats

No known major threats.

Protection Status

Probably somewhat protected on some lowland protected areas with appropriate habitat.

INFORMATION NEEDS

Inventory Needs

Detailed distribution, habitat use and population information are needed for Wyoming.

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PICOIDES TRIDACTYLUS
THREE-TOED WOODPECKER

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:
Protected as a non-game species by the Migratory Bird Treaty Act. Protection of non-game species includes prohibition of taking this species without permission from the state Game, Fish and Parks Department. Protected in Montana, South Dakota, and New York. On the Watch List in the Navajo Nation and Colorado. A special concern species in Vermont and Idaho. In Utah, a "sensitive" species that is protected from hunting.

Rangewide
Global Rank: G5
Comments:
Extensive Holarctic distribution; numerous occurrences, but uncommon in all areas; threatened in some areas by timber harvest and incompatible forestry practices; more information is needed.

Wyoming
WYNDD State Rank: S3
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Uncommon; limited habitat; some threats.

State Status
Wyoming Game and Fish Department - no status. USFS Regions 2 and 4 Sensitive Species.

US Forest Service
Management Status: S-USFS R2
S-USFS R4

TAXONOMY
General
Populations on Asian and North American sides of Beringia exhibit mtDNA differentiation consistent with species-level distinctness (Zink et al. 1995); because sample sizes were small, Zink et al. did not recommend a formal taxonomic change.

Sub-Species
The Rocky Mountain form is P. TRIDACTYLUS DORSALIS. The type specimen was collected by F.V. Hayden near Laramie Peak in 1857 (McCreary, 1937).

DESCRIPTION
NON-TECHNICAL DESCRIPTION: Inconspicuous, little-known woodpecker with three toes on each foot, black and white barring at the sides and down the center of the back, and a yellow cap on the male and most juveniles. TECHNICAL DESCRIPTION: The Rocky Mountain form, DORSALIS, which occurs in the Greater Yellowstone Ecosystem, has very little barring on the back. The male three-toed woodpecker is about 8.75 inches (22 centimeters) in length and weighs ca 2 ounces (70 grams). Females are slightly smaller (Clark et al., 1989). SIMILAR SPECIES: Oten has a more extensive yellow cap than black-backed woodpecker, which also has a completely black back; adult hairy and downy woodpeckers lack barred sides, and male and immatures have red nape or crown patch (National Geographic Society, 1987; Dorn and Dorn, 1990).

DISTRIBUTION
Rangewide

RESIDENT: often locally, in North America from northern Alaska across Canada through northern Saskatchewan to north-central Labrador and Newfoundland, south to western and southern Alaska, southern Oregon, eastern Nevada, central Arizona, southern New Mexico, and the Black Hills of South Dakota; and to central Alberta and Saskatchewan, southern Manitoba, northeastern Minnesota, northern Michigan, central Ontario, northern New England, and southern Quebec. In Eurasia south of tree line from Scandinavia and Siberia to southern Europe (local), western China, northern Mongolia, northern Korea, and Japan. Wanders irregularly or casually north and south (AOU 1998).

Wyoming
Occurs throughout the state in Albany, Big Horn, Carbon, Crook, Fremont, Johnson, Platte, Sheridan, Teton, and Uinta counties. Dorn and Dorn (1997) report the Unita Mountains, Powder River Road in the Big Horn Mountains, Laramie Peak, and the north boundary of Grand Teton National Park are good places to find these birds.

Abundance
Listed as "Resident, uncommon" by the Wyoming Game and Fish Department.

Migration
Resident.

HABITAT
Rangewide
Coniferous forest (primarily spruce), less frequently mixed forest. Optimal habitat includes areas with 42-52 snags per 100 acres, with snags occurring in clumps, measuring 12-16 inches dbh and 20-40 feet tall, and mostly with bark still present (Spahr et al. 1991). Cavity nests placed in dead (occasionally live) tree (commonly conifer or aspen). Sometimes nests in utility poles. ^Prefers coniferous forest, primarily spruce and balsam fir in the East. It inhabits areas where dead timber remains after fires or logging. It is found less frequently in mixed forest, and occasionally in willow thickets along streams. Also found in high elevation aspen groves, bogs, and swamps. ^In New York, is a rare breeder in the conifer forests and bogs of the Adirondacks. In Oregon, occurs in lodgepole pine forests, sometimes mixed with fir or other conifers and characterized by abundance of old or dead trees. Found in mixed conifer composed of Rocky Mountain fir (ABIES LASIOCARPA), and Engelmann's spruce (PICEA ENGELMANNII) (Ryan, pers. comm.) in the Navajo Nation area. ^The black-backed woodpecker favors open forest, especially flooded or burned areas, where it feeds on dead or fallen trees. Also prefers dense stands of spruce-larch where it feeds on dead and live trees (Yunick 1985).

Wyoming
Also found in ponderosa pine and spruce-tamarack bogs. Frequently forage in newly burned areas, and may have been affected by the Yellowstone fires in 1988 (Clark et al., 1989). In Wyoming forests, fragmented by clearcuts, this woodpecker was found only in large, unbroken stands of mature spruce-fir and lodgepole pine (Keller, 1987). From ca 8500 feet to timberline (McCreary, 1937).

PHENOLOGY
Rangewide
Diurnal.

FOOD HABITS
Rangewide
Eats mainly insects obtained by chipping off pieces of tree bark. Seventy-five percent of its diet consists of wood-boring beetles and caterpillars that attack dead or dying conifers (Oatman 1985). It eats a few ants, weevils, spiders, berries, acorns, cambium, and sap (Terres 1980). This woodpecker taps softly when feeding, and generally uses an angular bill motion to strip or flake bark pieces from conifers. In Vermont, birds have been seen tapping straight into the wood (Oatman 1985). Forages most often on dead (including fire-killed) trees.

Food Habits
Wyoming

Eats mainly insects. Seventy-five percent of its diet consists of wood-boring beetles and caterpillars that attack dead or dying conifers (Oatman 1985). This woodpecker taps softly when feeding, and generally uses an angular bill motion to strip or flake bark pieces from conifers. Forages most often on dead (including fire-killed) trees.

REPRODUCTION

Rangewide

Nesting occurs in May and June, young can be found in the nest into July (Oatman 1985, Brewer et al. 1991, Adams pers. comm.). In Montana, nest building is observed in June, with the young out of the nest by early August (Davis 1961). One broods per year. Clutch size usually is four. Incubation, by both sexes, lasts 12-14 days. During incubation birds are rather quiet. Male roosts nightly in nest throughout incubation (Ehrlich et al. 1988). Young are tended by both parents, fledge in 22-26 days, remain with adults for at least a month after fledging. Nesting may be somewhat colonial where food is abundant. Pair bond sometimes lasts multiple years. Nesting times are very similar for the three-toed and black-backed woodpeckers.

Wyoming

Pair-bonding, courtship, and territorial drumming begin in mid- to late April. Nest cavities are excavated in threes with heartrot, typically recently dead trees (Clark et al., 1989).

ECOLOGY

Rangewide

IRRUPTIONS: Periodic irruptions occur, presumably due to a failure of the food supply. Sympatric with Black-backed Woodpecker (PICOIDES ARCTICUS) but irruptions do not coincide possibly due to difference in dependence on live and dead wood insects (Yunick 1985). Less likely to wander in the winter than the black-backed woodpecker. Interspecific competition may be reduced by taking advantage of different foraging heights and having differently sized bills (Peterson 1988). ^Forest fire may lead to local increases in woodpecker populations 3-5 years after a fire (Spahr et al. 1991). In the northeastern U.S., territory size of 74 acres and density of 3 pairs per 247 acres (with increases after fire) have been recorded.

Wyoming

TERRITORIALITY: Home ranges for three birds during the breeding season in Oregon ranged from ca 130-750 acres (Clark et al., 1989).^.COMMUNITY INTERACTIONS: Generally subdominant to P. ARCTICUS (Short, 1974).^.Because they forage by flaking away tree bark, rather than excavating, they associate with species with scaly bark, such as spruce and lodgepole pine (Clark et al., 1989).^. Preyed on by large avian predators such as goshawks and great horned owls. Eggs and young may be preyed on by tree squirrels (Clark et al., 1989). Abandoned nest holes are used by a wide variety of secondary cavity-nesting birds.^.DEMOGRAPHICS: Populations increase after a forest fire for 3-5 years in burned stands, then decline to pre-fire population levels (Finch, 1992). Since insects comprise a large part of the diet, populations tend to increase in response to pine bark beetle outbreaks (Crockett and Hansley, 1998). Although concentrations and temporary range extensions often correspond with concentrations of wood-boring insects, more so than other woodpecker species, populations are less irruptive than the black-backed woodpecker (Clark et al., 1989).

TRENDS IN WYOMING

Undetermined, but suspected to be stable; may be some declines due to logging.

MANAGEMENT CONSIDERATIONS

Large tracts of decadent forest stands may be requred to support individuals. May be susceptible to local extirpation by forest management that leaves low numbers of dead or decaying trees. Until more information is available, large tracts of unlogged, decadent habitat should be identified. In intensively managed forests, populations should be monitored (Clark et al., 1989).

Threats

Low population densities, dependence on snags, and a need for burned forests and large stands of old-growth conifers make this species susceptible (Finch, 1992). Clearcutting and management to reduce pine-beetle outbreaks are threats.

Protection Status
No occurrences are on lands with special protection. 15 locations are on USFS lands, and one is on BLM land.

INFORMATION NEEDS
Inventory Needs
Detailed distribution, habitat use and population information are needed for Wyoming.

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PLEGADIS CHIHI
WHITE-FACED IBIS

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:
Secure due mainly to large range; locally fairly common; relatively small number of breeding areas; vulnerable to habitat alteration, disturbance during nesting, and pesticide contamination.

Wyoming
WYNDD State Rank: S1B,SZN
Comments:
Rank assigned with the help of zoologists at CO NHP. Rare; specialized breeding habitat required; few nesting sites; low population size; specialized foraging habitat; some threats.

State Status
Region 2 Sensitive Species; Wyoming Game and Fish Priority 3 species

US Forest Service
Management Status: S-USFS R2

TAXONOMY
General
P. FALCINELLUS and P. CHIHI are sometimes considered conspecific (AOU 1998). Oberholser (1974) used the name P. MEXICANA, but P. CHIHI is the name accepted by others (Banks and Browning 1995).

DESCRIPTION
Dark brown medium-sized bird with a long neck, long, decurved bill, and long legs. Total length: 46-56 cm; weight 450-525 grams. Black bill, legs, and toes. In breeding plumage, bare facial skin becomes reddish purple and white feathers appear on head. Distinguished from breeding Glossy Ibis by red iris, red legs, reddish bill, and border of white feathers. Non-breeding adults of White-faced Ibis distinguished from non-breeding Glossy Ibis by red versus brown iris and dark facial skin with no border of white feathers (Kaufman, 1990).

DISTRIBUTION
Rangewide
BREEDS: locally from central California, eastern Oregon, southern Idaho (Taylor et al. 1989), Montana, southern North Dakota, and (formerly) southwestern Minnesota south into Mexico (to Colima, Zacatecas, state of Mexico, Veracruz), Texas, and southwestern Louisiana, southern Alabama, Florida (occasionally or formerly); also locally in South America in Bolivia, Paraguay, Uruguay, southern Brazil, northern and central Chile, and northern and central Argentina. The world's largest nesting aggregation occurs probably in the marshes around the Great Salt Lake, Utah (D. Paul, in Paton et al. 1992). NORTHERN WINTER: north to southern California, Baja California, southern Texas, and Louisiana, south through lowlands to Guatemala and El Salvador, and in generally in breeding range in South America. In the U.S., the highest winter densities occur near San Diego in California and on the coast of Texas and western Louisiana (Root 1988). Wanders outside usual range; rare straggler to Hawaii.

Wyoming

Breeding range is largely restricted to the western U.S., with some breeding in Mexico. Western and southeast Wyoming regularly support breeders. Observed statewide during migration. Nesting sites are limited to small areas in the south edge of the state in Albany and Sweetwater counties.

Abundance
Uncommon summer resident with relatively few suitable nesting sites; very low numbers overall (Wyoming Game and Fish Department 1997).

Migration
Summer resident. Arrives early May and departs in September.

Estimated Number of Occurrences
WYNDD has four breeding records. The Wyoming Gap Analysis project (Merrill et al. 1996) summarized records from several sources. Total records- 295, with no breeding records and 11 courtship record. Recorded as breeding in 4 LAT/ LONG blocks and observed in 26.

HABITAT
Rangewide
Marshes, swamps, ponds and rivers, mostly in freshwater habitats (Tropical to Temperate zones) (AOU 1983). Nests in marshes; in low tree, on the ground in bulrushes or reeds, or on a floating mat.

Wyoming
Shallow marshes with emergent vegetation, lakes with vegetated shorelines, mudflats (Merrill et al. 1996). Often surrounded by sagebrush-grassland or saltbush communities.

PHENOLOGY
Wyoming
Highly gregarious; forages and travels in flocks, roosts communally, and nests in colonies. Individuals defend individual space, but apparently don't hold fixed territories in foraging areas. Both members of a pair defend nest sites. Flocks of up to at least 290 have been observed, but generally they are much smaller. Competes with gulls and grackles for food and defends nesting territory from them. Attacked by coots in coot territories (Ryder and Manry 1994).

FOOD HABITS
Rangewide
Typically feeds in freshwater marshes on: crayfishes, frogs, fishes, insects, newts, earthworms, crustaceans, etc. (Terres 1980).

Food Habits
Wyoming
Feeds on aquatic and moist-soil insects, crustaceans, and earthworms in shallow pond margins and marshes (Ryder and Manry 1994).

REPRODUCTION
Rangewide
Clutch size usually is 3-4. Incubation lasts 21-22 days.

Wyoming
Dorn and Dorn (1999) report breeding only in the southeast part of the state. Nests in emergent vegetation or low trees and shrubs over shallow water. Clutches of 3-4 (2-5) eggs are laid from late April through mid-June. Young are altricial; both sexes brood and feed young (Ryder and Manry, 1994).

ECOLOGY
Rangewide
Gregarious; flocks of up to at least 290 have been observed, but generally they are much smaller.

Wyoming
Highly gregarious, forages and travels in flocks, roosts communally, and nests in coloniesIndividuals defend individual space, but apparently don't hold fixed territories in foraging areas. Nest sites are defended by both members of a pair.INTERSPECIFIC INTERACTION: Competes with gulls and grackles for food and defends nesting territory from them. Attacked by coots in coot territories (Ryder and Manry 1994).

TRENDS IN WYOMING
Unknown.

MANAGEMENT CONSIDERATIONS
Conserve wetland habitat and avoid diversion of water supply.

Threats
Human disturbance during breeding may cause abandonment of the nesting area. Habitat deterioration caused by water level draw downs during the irrigation season affects nesting success. Very few breeding sites are used over a period of years because fluctuating water levels inhibit consistent use.

Protection Status
Two breeding sites occur the Hutton Lake and Bamforth Lake National Wildlife Refuges, one occurs on the Old Eden Reservoir on BLM land, and another was found on state land.

INFORMATION NEEDS
Inventory Needs
Basic life history, detailed distribution, habitat use and population information are needed for Wyoming.

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RANA LUTEIVENTRIS
COLUMBIA SPOTTED FROG

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:
Apparently nearly extinct in western Oregon and Washington due to introduction of bullfrog. Has declined in areas inhabited by northern leopard frog. Decline also probably related to loss and degradation of breeding habitat. Not likely to be at risk from present acidification inputs in the Rocky Mountains (Corn and Vertucci 1992).

Rangewide
Global Rank: G4
Comments:
Moderately large range in the Pacific Northwest and Rocky Mountains; still common in British Columbia and the Rocky Mountains; southern, disjunct populations in the Great Basin are declining and face major threats, including habitat loss/degradation (especially dewatering), exotic species, and possibly global climate change; a recent conservation agreement has improved the status of the Wasatch Front and West Desert populations.

Wyoming
WYNDD State Rank: S2S3
Comments:
While locally abundant at many of the breeding ponds where it is found within the primary portion of its range, the Bighorn Mountain population is vulnerable to extirpation due to its very limited distribution. The Bighorn Mountain population may be genetically distinct and regardless if it is or not, this population should be ranked as "S1", while the primary population should be ranked as "S4".

State Status
Wyoming Game and Fish Department Native Species Status 4.^.U.S. Forest Service Region 2 and Region 4 Sensitive Species.^.Baxter and Stone (1980) list this species as common in Wyoming; however, it may be declining in the Rocky Mountian region (S. Corn, USFWS, PNDCOR01WYUS). BIGHORN POPULATION: Disjunct population only known from four sites. Could be considered Federally Threatened under the assessment criteria in Section 3 and 4 of the Endangered Species Act (Garber, 1995).

US Forest Service
Management Status: S-USFS R2
S-USFS R4

TAXONOMY
General
Formerly included in RANA PRETIOSA. Green et al. (1996) examined allozyme and morphometric variation in R. PRETIOSA from 26 and 38 localities, respectively, and concluded that at least two species were represented, referred to as species A (southwestern Washington and Oregon Cascades) and species B (remainder of range). Morphometrically, the two species are "almost indistinguishable." The authors could not fully delineate the dividing line between the ranges of species A and species B. The two species were not assigned latin names because of a nomenclatural problem arising from the fact that specimens from the vicinity of the type series for RANA PRETIOSA Baird and Girard could not be assigned to either species A or species B, and the type locality lies geographically between the known ranges of A and B. [If the types are species A, then the name for species A would be R. PRETIOSA and the name for species B would be R. LUTEIVENTRIS. If the types are species B, then the name for species B would be R. PRETIOSA and a new name would be needed for species A. This assumes that only two species are to be recognized.] Within species B, four somewhat distinctive subdivisions were identified: northern (Yukon to Wyoming), Great Basin (Nevada, southwestern Idaho, and eastern Oregon), Provo River (part of Wasatch Mountains population in Utah), and Snake Valley (western Utah). ^Green et al. (1997) determined that frogs from the vicinity of the type locality of RANA

PRETIOSA are conspecific with the species residing in south-central Washington and and the Cascade Mountains of Oregon (species A). Hence, they concluded that populations from southwestern British Columbia, western Washington, western and central Oregon, and northeastern California are RANA PRETIOSA (Oregon spotted frog) and that spotted frogs from the remainder of the range are RANA LUTEIVENTRIS (Columbia spotted frog). RANA LUTEIVENTRIS was regarded as possibly comprising multiple weakly differentiated species.

DESCRIPTION
Females are 70 mm long; males 60 mm long. Snout is pointed and legs are short. Dorsolateral folds are present but inconspicuous. Frog is brown with irregular black spots that sometimes have light centers. Has face mask and light upper jaw stripe. Throat and upper belly speckled with black; lower belly and undersides of legs red. Similar Species: In Wyoming, the red coloration on ventral surfaces is distinctive. The distribution and shape of spots on the northern leopard frog are more regular. The wood frog is smaller and less glandular. Rounded skin glands are apparent in spotted frog, giving the skin a warty appearance relative to other Wyoming frogs (Baxter and Stone 1985).

DISTRIBUTION
Rangewide
Extreme southeastern Alaska, southwestern Yukon, northern British Columbia, and western Alberta south through Washington east of the Cascades, eastern Oregon, Idaho, and western Montana to Nevada (disjunct, Mary's, Reese, and Owyhee river systems), southwestern Idaho (disjunct), Utah (disjunct, Wasatch Mountains and west desert), and western and north-central (disjunct) Wyoming (Stebbins 1985; Green et al. 1996, 1997). Disjunct populations occur on isolated mountains and in arid-land springs. Sea level to about 10,000 ft (Stebbins 1985). ^West Desert (Bonneville) population occurs mainly in two large spring complexes, with several additional concentrations in smaller nearby springs; extiprated from the northern portions of the range. ^Wasatch Front population now occurs in small, fragmented populations in high elevation wetlands in Juab, Sanpete, Summit, Utah, and Wasatch counties; the largest known concentration is in the Heber Valley; no longer occurs in the Salt Lake Valley or in tributaries to the Great Salt Lake.

Wyoming
Wyoming is on the eastern edge of the range. Primary population is in the northwest part of the state; contiguous with populations in Idaho and Montana. Known from Park, Teton, Lincoln, Fremont, and Sublette Counties. The Wyoming Gap Analysis Project atlas (Merrill et al., 1996) shows additional potential habitat near existing locations in the Wind River, Absaroka, Wyoming, and Salt River Ranges and Yellowstone National Park. A second, disjunct population occurs in the Bighorn Mountains.MOVE THE FOLLOWING TO THE BIGHORN SPOTTED FROG ESR. State Range = "A". Glacial disjunct population in the central Bighorn Mountains about 100 miles to the east of the primary, contiguous population (A77DUN02WYUS). Confined to the headwaters of of the South Tongue River drainage and its tributaries in Sheridan County (Garber, 1992). Baxter and Stone (1985) show this population extending into Montana, but no records exist to confirm this (B82THO00WYUS).

Abundance
Baxter and Stone (1985) lists this species as "common". While its breeding ponds are widely scattered, it appears to be locally abundant where it is present. Most common amphibian in the Absaroka and northern Wind River mountains (Garber 1995). It appears to be less common in the southern portion of its range in the Wind River mountains. Garber (1995) found them at 37% of the 69 sites surveyed in the Absaroka/ Wind River Mountains between 1991-1994, where they were the most common amphibian encountered.

HABITAT
Rangewide
Highly aquatic; rarely found far from permanent quiet water; usually occurs at the grassy margins of streams, lakes, ponds, springs, and marshes (Hodge 1976, Licht 1986). May disperse into forest, grassland, and brushland during wet weather. Breeds usually in shallow water in ponds or other quiet waters, often in mountane areas near cold streams, lakes, pools, springs.

Wyoming
Habitat: Foothills and montane zones usually in the vicinity of permanent water such as ponds, sloughs, small streams, and beaver ponds; may avoid areas with warm stagnant water and dense cattails. Found in most riparian types above the foothills zone. Breeds in old oxbow ponds in which fish are absent, with emergent sedges in wet meadows at the edge of lodgepole pine forests (Garber 1994). May disperse into forest, grassland, and shrubs during wet weather.

PHENOLOGY
Rangewide
May move overland in spring and summer after breeding. Inactive in winter in north.

Wyoming
In Yellowstone National Park, this species is documented as emerging in early may, lays eggs in late May and June, larva transform in August and early September (B80BAX01NAUS).

FOOD HABITS
Rangewide
Opportunistic. Eats a wide variety of insects as well as different mollusks, crustaceans, and arachnids. Larvae eat algae, organic debris, plant tissue, and minute organisns in water.

REPRODUCTION
Rangewide
Breeds in February at sea level in British Columbia, mid-March at 1395 m in Utah, May-June at 2377 m in Wyoming; generally as early as winter thaw permits. Females may lay egg masses in communal clusters. Eggs hatch in 3-21 days, depending on temperature. Metamorphosis occurs by fall or tadpoles may overwinter and metamorphose the following spring. Sexually mature in 2-6 years, depending on location and elevation (matures at greater age at high elevations). In Wyoming, individual females breed yearly at low elevations, every 2-3 years at high elevations (Nussbaum et al. 1983).

Wyoming
In Yellowstone National Park, emerges in early May and lays eggs in late May and June. Larvae transform in late August and early September; some tadpoles may overwinter and transform the following summer. Eggs are laid in masses of 206-769. Calls are faint and may be drowned out by boreal chorus frog; "bursts of 4 to 30 short croaks occuring at a rate of 3-4 per second with individual bursts seperated by about 3 seconds". Females may not breed in successive summers (Turner, 1958, 1960, 1972).

ECOLOGY
Wyoming
Frogs may move overland in spring and summer after breeding. Inactive in winter.

TRENDS IN WYOMING
Populations appear to be stable in the primary portion of its range, but the disjunct population in the Bighorn Mountains is very limited in distribution and vulnerable to extirpation.

MANAGEMENT CONSIDERATIONS
The rapid and inexplicable decline of amphibian populations worldwide increases the management priority of this species. The effects of logging and clear-cutting need to be explored. Stocking non-native fish in first and second order streams and beaver ponds within those streams should probably be reduced in areas occupied by spotted frogs. Mesic dispersal corridors between known populations should be protected (Garber 1994, 1995a). Immediate protection of all of the Bighorn populations is needed, and the management of this species should be addressed in the Bighorn National Forest management plan. Further surveys within the known and suspected range are needed. In addition, the degree of threat posed by trout to the Sibley Lake population should be assessed (Garber 1994). This population could be petitioned for protection under the U. S. Endangered Species Act; active management and protection of existing sites could preclude listing (Garber 1995a).

Threats
In addition to the precipitous, inexplicable population declines experienced by amphibians globally, these populations are also threatened by predation by non-native fish, water level manipulation, and habitat degradation from logging. Diseases such as red leg and chytrid fungus may be substantial sources of mortality.

Protection Status
Thirty-six records are protected in Yellowstone and Grand Teton National Parks, one is on the John D. Rockefeller Parkway, and one is on the National Elk Refuge. Eleven additional populations lie within the Teton Wilderness (Bridger-Teton National Forest), three in the Washakie Wilderness and one in Swamp Lake Special Botanical Area (Shoshone National Forest). Three occurrences are in the Targhee National Forest. The three known records on the Bighorn National Forest are outside of any special management area.

INFORMATION NEEDS
Inventory Needs
Additional surveys are needed to monitor population trends and to determine if other populations exist near known sites. Potential habitat should be identified and protected. General population and phenology information is needed. Because the Bighorn population has been isolated for several thousand years, it may be genetically unique and studies should be undertaken to assess this.

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RANA PIPIENS
NORTHERN LEOPARD FROG

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:
Large range throughout much of the U.S. and southern Canada; still common in many areas and in a diverse array of pristine and disturbed habitats; populations have declined in some areas due to habitat loss and degradation, overexploitation, interactions with non-native species, and unknown causes, but the overall range remains essentially undiminished.

Wyoming
WYNDD State Rank: S3
Comments:
While locally abundant at many of the breeding ponds where it is found, most recent sightings are of just a few individuals without evidence of reproduction. Documented declines.

State Status
Wyoming Natural Diversity Database Native Species Status 4.^.U.S Forest Service Region 2 Sensitive Species.

US Forest Service
Management Status: S-USFS R2

TAXONOMY
General
Relationships and taxonomic status of leopard frogs have not yet been fully resolved. Much published information on "RANA PIPIENS" actually pertains to other species that have been described or recognized since the early 1970s.

DESCRIPTION
Adults 70 mm long; snout pointed. Color is dark brown to light green, usually with 12-13 oval, white-edged spots between the dorsolateral folds. The hind limbs are barred or spotted. Ventral surfaces are white. Has several calls. Principal breeding call is a distinctive low-pitched "chuckle"; also has a low guttural snore lasting about 3 seconds, followed by several clucking notes.^SIMILAR SPECIES: Juvenile bullfrogs lack dorsolateral folds; the spotted frog has small, black, irregular spots rather than large round ones, and also has red on the belly and ventral surface of the legs (Baxter and Stone, 1985).

DISTRIBUTION
Rangewide
Great Slave Lake and Hudson Bay, Canada, south to Kentucky and New Mexico. Spotty distribution in west, where it has been introduced in many localities.

Wyoming
Ranges across the northern U.S., extending south along the Rockies. Wyoming is at the core of the range (Fertig and Beauvais 1999), and it is common in Wyoming except in the northwest corner of the state. Known from every county, although Albany and Fremont counties have the most records. The Wyoming Gap Analysis Project Atlas (Merrill et al. 1996) shows potential habitat nearly throughout the state, except northern Park and Teton counties around Yellowstone National Park.

Abundance
Although breeding ponds are scattered, it is locally abundant at some lowland sites. It appears to be rare in most of the mountains of Wyoming with the exception of the Laramie Range and Black Hills, where it is locally common.

Migration
In fall, will move from larger bodies of water to shallow stream and lakes to hibernate.

HABITAT
Rangewide
Springs, slow streams, marshes, bogs, ponds, canals, flood plains, reservoirs, and lakes; usually permanent water with rooted aquatic vegetation. In summer, commonly inhabits wet meadows and fields. Takes cover underwater, in damp niches, or in caves when inactive. Overwinters usually underwater. ^Eggs are laid and larvae develop in shallow, still, permanent water (typically), generally in areas well exposed to sunlight. Generally eggs are attached to vegetation just below the surface of the water. In northern Minnesota, successful reproduction in acidic bog water either does not occur or is a rare event (Karns 1992).

Wyoming
Found near permanent water in plains, foothills and montane zones throughout the state in deciduous forest riparian, shrub and graminoid riparian, and wetland meadows. Prefers swampy cattail marshes on the plains and beaver ponds in the foothills and montane zones. Not as aquatic as the bullfrog (Baxter and Stone 1985). Takes cover underwater, in damp niches, or in caves when inactive; usually overwinters underwater.

PHENOLOGY
Rangewide
Inactive in cold weather in winter.

Wyoming
In Laramie, emerges in mid-April from bottoms of ponds, lakes, streams, or springs, often after water temperatures had warmed to 50 degrees F. The tadpole stage lasts two months. At lower elevations, such as the city of Laramie, most tadpoles have emerged by early August, but in the Laramie Mountains at 8500 feet elevation, large tadpoles with well-developed hind legs may be found in September. Many may fail to transform in time (Baxter and Stone, 1995).^Primarily nocturnal (Behler and King, 1979; cited in Bighorn National Forest, 1996).

FOOD HABITS
Rangewide
Metamorphosed frogs eat various small invertebrates obtained along water's edge or in nearby meadows or fields; rarely eats small vertebrates. Larvae eat algae, plant tissue, organic debris, and probably some small invertebrates.

Food Habits
Wyoming
Opportunistic feeder.

REPRODUCTION
Rangewide
The time of egg deposition varies with latitude and elevation. Egg deposition occurs typically in April in southern Quebec, New York, and the Great Lakes region, late April to late May farther north in Manitoba and Nova Scotia (see Gilbert et al. 1994). In Colorado, eggs are laid mainly in early spring at low elevations, in late spring in the mountains (Hammerson 1982). Breeding often peaks when water temperatures reach about 10 C. At a particular site, egg deposition generally occurs within a span of about 10 days. Egg masses include several hundred to several thousand ova. Aquatic larvae usually metamorphose in summer, may overwinter in some areas. Females are sexually mature usually in two years in most areas, three years in high elevation populations. Density of egg masses often reaches a few hundred per ha in favorable habitat, sometimes >1000/ha.

Wyoming
Initiation of breeding may be influenced by warming temperatures; Fitch (1992) reports that breeding is opportunistic and can take place whenever conditions are favorable. Corn and Livo (1989) observed a total of 48 egg masses in five small glacial kettle ponds at Long Lake and 6 egg masses at Evans Creek, both in the Medicine Bow National Forest. Masses have several hundred eggs each. Females probably produce one clutch per season; clutch size is positively correlated with body size (Baxter and Stone, 1995).

ECOLOGY
Rangewide
In Michigan, the average nightly movement during rain was 36 m, occasionally moved more than 100 m.

Wyoming
Remains near water margins and leaps into water when alarmed (Baxter and Stone, 1985).

TRENDS IN WYOMING
Declines have been documented in the Laramie Plains area since the 1970's (Garber and White 1991), and the population in the Laramie Range appears to have declined as well. Garber (1995a) only found frogs at 3% of 537 sites surveyed in montane habitat in Wyoming between 1991-1994. Long-term data conducted by Idaho State University suggest severe population reductions in the Yellowstone region as well. May also be declining in the montane populations in Colorado.

MANAGEMENT CONSIDERATIONS
Additional surveys should be conducted to establish population ranges and trends, and monitoring programs need to be implemented to document changes in numbers and to establish baselines from which to assess success of management activities. The factors influencing population decline are unknown and may be numerous, and research should be conducted to try to determine local causes. In the meantime, management should try to prevent further declines with what measures are at hand. For example, it can minimize habitat degradation and loss and block assess of non-native fish to populations.

Threats
Major known threats include stocking and management of non-native fish and water level manipulation in reservoirs and stockponds. In addition, predation and competition by introduced bullfrogs, red-leg disease, insecticides, and possibly logging in montane habitats may play a role in population decline, but nothing has been definitively shown to cause the decline (Fitch 1992; Garber 1995).

Protection Status
2 EOs are protected in Grand Teton National Park and one is in the Cloud Peak Wilderness on the Bighorn National Forest, which has 3 additional records on forest land. The Medicine Bow National Forest has 15 EOs, the Shoshone National Forest has 8, the BLM has 2, 3 occur on state land, and the towns of Medicine Bow and Badwater have one record each.

INFORMATION NEEDS
Inventory Needs
Additional surveys are needed in both montane and lowland habitats to evaluate sites for monitoring population trends.

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REGULUS SATRAPA
GOLDEN-CROWNED KINGLET

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:
Widespread and common.

Wyoming
WYNDD State Rank: S3
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Uncommon but relatively widespread species; some threats to habitat.

State Status
Wyoming Game and Fish Department Uncommon Resident.^.USFS Region 2 Sensitive Species.

US Forest Service
Management Status: S-USFS R2

TAXONOMY
General
Formerly in family Muscicapidae; returned to Regulidae by AOU (1997). See Banks and Browning (1995) for brief comments on generic nomenclature.

Sub-Species
Five (or six) subspecies are recognized, two of which occur in Wyoming: REGULUS SATRAPA SATRAPA and R.S. APACHE (syn. R.S.AMOENUS).

DESCRIPTION
Tiny, plump bird 8-11 cm long, weighing 4.0-7.7 grams. Orange crown patch of male is bordered in yellow and black; female's crown is yellow with black borders. Upperparts grayish-olive; underparts whitish; two white wing bars. Call is a series of high, thin notes, usually given in threes. Song is an almost inaudibly high series of notes accelerating into a trill (National Geographic Society 1983). Both sexes olive above, paler below with 2 white wing bars; orange crown-patch of male bordered by yellow and black; yellow crown patch of female bordered by black. Orange portion of male crown patch concealed or absent in juveniles (Ingold and Galati 1997). Similar Species: Tiny size distinguishes this species from all other North American songbirds of similar plumage. Additionally, the prominent crown patch, bold black facial markings, striped crown, and paler underparts distinguish Golden-crowned Kinglet from Ruby-crowned Kinglet. Other Subspecies in Wyoming: Five (or six) subspecies are recognized, two of which occur in Wyoming: Regulus satrapa satrapa and R. s. apache (syn. R .s .amoenus).

DISTRIBUTION
Rangewide
BREEDING: southern Alaska to Newfoundland, south to central California, southern Utah, southeastern Arizona, southern New Mexico, southern Manitoba, northern Wisconsin, northern Ohio, New York, in mountains to eastern Tennessee and western North Carolina, northern Maryland, northern New Jersey, and southern Maine; also in highlands through Mexico to western Guatemala; isolated populations in South Dakota, Illinois, and Indiana (Ingold and Galati

1997, AOU 1998). ^NON-BREEDING: south-coastal Alaska and southern Canada south to northern Baja California, southwestern U.S., Guatemala, central Tamaulipas, Gulf Coast, and Florida (AOU 1998).

Wyoming
Occurs state-wide during winter; most breeding takes place in coniferous forest (old growth/ mature) in the western portion of the state and in the Medicine Bow Mountains. Somewhat peripheral as a breeding species. Occurs across the state in Crook, Natrona, Laramie, Albany, Carbon, Sheridan, Johnson, Big Horn, Washakie, Park, Teton, Lincoln, and Sweetwater counties. Additional potential habitat may be found near existing records in Yellowstone National Park and the Shoshone, Bridger-Teton, Targhee, and Bighorn National Forests (Merrill et al. 1996).

Abundance
Listed as "Resident, uncommon" by the Wyoming Game and Fish Department.

Migration
Resident. Vertical migration takes place in spring and fall (Downing 1990).

HABITAT
Rangewide
Coniferous forest and woodland (especially spruce), in migration and winter also deciduous woodland, scrub and brush (AOU 1983). Nests usually in an evergreen, most often in crown 9-18 m above ground; average about 15 m in northern Minnesota (Terres 1980, Galati 1991).

Wyoming
Golden-crowned kinglets breed primarily in remote, dense spruce or fir forests. Will nest in logged or burned areas. They winter in coniferous forests and occasionally in deciduous woodland scrub and brush. In summer, it is found at elevations above 7000 feet (Bighorn National Forest 1996).

PHENOLOGY
Wyoming
Territory is established by the male through song and pursuit of intruders. Often forms intraspecific flocks and joins mixed-species flocks in winter (Ingold and Galati 1997). There are few data on predators, but Sharp-shinned Hawks and bobcats are known to have taken Golden-crowned Kinglets in other western states. Red squirrels, Blue Jays, and Gray Jays take eggs and nestlings. Uncommon host to Brown-headed Cowbird (Ingold and Galati, 1997). Subdominant species in groups; other species may force kinglets to forage lower in deciduous trees or, in mixed forests, out of the conifers and into deciduous trees (Ingold and Galati 1997). Population declines occur after exceptionally cold winters. Commonly associates with chickadees, brown creepers, and downy woodpeckers during the nonbreeding period.

FOOD HABITS
Rangewide
Feeds primarily on insects and their eggs (e.g., bark beetles, scale insects, aphids). Also drinks tree sap (Terres 1980) and eats some fruit and seeds (rare according to Galati 1991). Young are fed various insects and other small arthropods and sometimes small snails (Galati 1991). In Maine, winter diet appeared to consist primarily of geometrid caterpillars (Heinrich and Bell 1995, Wilson Bulletin 107:558-561). Forages among branches of trees, gleaning from foliage and bark. Often obtains prey while clinging to or hanging from foliage (Keast and Saunders 1991). Sometimes uses short flight to capture flying insect.

Food Habits
Wyoming
Golden-crowned Kinglet forages over leaves, branches, and trunks, of trees, almost never on the ground. It feeds almost entirely on insects such as bark beetles, aphids, scale insects, and their eggs. They also drink tree sap (Terre 1991). In summer, they feed mainly on flying insects (Bighorn National Forest 1996). Golden-crowned Kinglet is adapted for hanging on to tips of conifer branches as indicated by the grooved soles of its feet (Ingold and Galati 1997).

REPRODUCTION

Rangewide

In northern Minnesota, begins nesting in mid-May; second clutch may be initiated in late June-early July (Galati 1991). Clutch size 5-11 (usually 8-9) (Terres 1980). Female incubates, about 14-15 days. Males feeds incubating female and fledglings from first brood. Young tended by both parents (both are required for successful nest), fledge at 18-19 days (may climb out of nest a couple days earlier), become independent about 2 months after egg laying; single pair may raise two broods in a single season (Galati 1991).

Wyoming

Nest is small, only three to four inches aross and three to four inches deep. Made of mosses and lichens and lined with soft bark, rootlets, and feathers. Nests are hung from branches near the truck of a conifer and protected by overhanging foliage. Five to ten eggs are laid between April and July (Terres 1980). The young tended by both parents (both are required for a successful nest), fledge at 18-19 days (may climb out of nest a couple days earlier), and become independent about 2 months after egg laying; a single pair may raise two broods in a season (Galati 1991).

ECOLOGY

Rangewide

Territory size in northern Minnesota was 2.1-6.2 acres (mean 4.1 acres) (Galati 1991). Hatching and fledging success were high in Minnesota; the most frequent sources of nesting mortality were predation on nests (e.g., by red squirrel or gray jay), starvation of nestings due to loss of one or both parents, and faulty or infertile eggs (Galati 1991). Population declines occur after exceptionally cold winters. Commonly associates with chickadees, brown creepers, and downy woodpeckers during the nonbreeding period.

Wyoming

TERRITORIALITY: Territory is established by the male through song and pursuit of intruders. COMMUNITY INTERACTION: Often forms intraspecific flocks and joins mixed-species flocks in winter (Ingold and Galati, 1997). There are few data on predators, but Sharp-shinned Hawks and bobcats are known to have taken Golden-crowned Kinglets in other western states. Red squirrels, Blue Jays, and Gray Jays take eggs and nestlings. Uncommon host to Brown-headed Cowbird (Ingold and Galati, 1997). Foraging sites may be affected by other species which force this species to forage lower in deciduous trees or, in mixed forests, out of the conifers and into deciduous trees (Ingold and Galati, 1997).

TRENDS IN WYOMING

Unknown, but suspected to be declining slightly due to loss of old growth/ mature coniferous forests.

MANAGEMENT CONSIDERATIONS

Adversely affected by logging (Ingold and Galati 1997) and intolerant to changes on nesting grounds (Merrill et al. 1996).

Threats

Some threats from logging of old growth/coniferous forests.

Protection Status

Five observation records occur on the Bighorn National Forest, one of which is in the Cloud Peak Wildnerness. A survey record is reported on the Medicine Bow National Forest. Also recorded from Grand Teton and Yellowstone National Parks, but WYNDD does not have that information.

INFORMATION NEEDS

Inventory Needs

Detailed distribution, habitat use and population information are needed for Wyoming.

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SOREX NANUS
DWARF SHREW

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G4
Comments:
Distributed locally from Montana and South Dakota to Arizona and New Mexico; not currently known from many sites, but this may be the result of difficulty in capturing the species; recent pitfall trapping has substantially increased the number of known sites; no known threats.

Wyoming
WYNDD State Rank: S2S3
Comments:
Widespread, but apparently has specific micro-habitat requirements; no known major threats to species survival.

State Status
Wyoming Game and Fish Department Species of Special Concern 3^U.S. Forest Service Region 2 Sensitive Species

US Forest Service
Management Status: S-USFS R2

TAXONOMY
General
See George (1988) for an electrophoretic study of systematic relationships among SOREX species. Apparently diverged only recently from S. TENELLUS and may not yet be a separate species (George 1988). However, George (1988), Jones et al. (1992), and Hutterer (in Wilson and Reeder 1993) listed NANUS and TENELLUS as separate species.

Sub-Species
None.

DESCRIPTION
Small, grayish-brown above, lighter below. 83-105 mm long, 1.8-3.2 grams. Long (27-45 mm) tail slightly darker above than below. Third upper unicuspid smaller than the fourth. Both the third and fifth unicuspids easily visible. Hind foot less than 11 mm. Skull usually less than 15 mm long, with a flat profile.^SIMILAR SPECIES: Difficult to distinguish from other shrews, especially vagrant shrew. Habitat and skull information is necessary (Clark et al. 1989). Masked and Merriam's shrews have distinctly bicolored tails. Third and fifth unicuspids difficult to see in the pygmy shrew. In vagrant shrew, hind foot over 11 mm (Whitaker 1980; Clark and Stromberg 1987). Skull usually greater than 15 mm long, with a convex profile (Lechleitner 1969).

DISTRIBUTION
Rangewide
Apparently locally across central Montana to northwestern Wyoming; southeastern Montana; southeastern South Dakota; the Rocky Mountains from southeastern Wyoming, south across western Colorado and southeastern Utah to south-central New Mexico; in the the Kaibab Plateua, San Francisco Peaks, and White Mountains in Arizona (Hoffmann and Owens 1980, MacCracken et al. 1985, Berna 1990, George 1990).

Wyoming

Restricted to the Rocky Mountains from Montana to New Mexico and Utah to South Dakota, although this range is not continuous. Wyoming forms part of the core of its range. Known from relatively small, isolated, relict populations in the Medicine Bows and the Bighorn Range and in northwest Wyoming (Albany, Carbon, Park, Johnson, and Teton counties). Considerable habitat also exists in Yellowstone National Park and the Shoshone National Forest (Clark et al. 1989b). Clark and Stromberg (1987a) expect that the range includes most of Wyoming except the basins of northeast Wyoming and the southeast grasslands. The Wyoming Gap Analysis Project atlas (Merrill et al. 1996) shows possible additional habitat throughout Park, Teton, Lincoln, Sublette, Unita, Sweetwater, Carbon, Albany, Laramie, Platte, Converse, Natrona, and Fremont counties. Other factors probably would preclude actual colonization of this habitat, however. Also, possible habitat may be overestimated in the atlas because rock talus, an important habitat feature for this species, was not mapped (Merrill et al. 1996).

Abundance
Rare regional endemic (Clark and Stromberg 1985; Fitch, 1992); locally abundant in rocky alpine habitats (Spencer and Pettus 1966; Brown 1967). Distribution is widespread but patchy. Rarity may be an artifact of undersampling, since they are difficult to detect.

Migration
Resident.

HABITAT
Rangewide
Various habitats including rocky areas in alpine tundra and partly into subalpine coniferous forest, other types of rocky slopes (e.g., with ponderosa pine, George 1990), sedge marsh, subalpine meadow, dry brushy slopes, arid shortgrass prairie, dry stubble fields, and pinyon-juniper woodland.

Wyoming
Riparian areas, alpine tundra, fellfields, talus, and moist communities that support a large variety of invertebrates and small mammals in high elevation subalpine and alpine areas (MacCracken et al., 1985; Hoffman and Taber, 1960; Thompson, 1977). Also uses pinyon-juniper, forests, stubble fields, sagebrush-grassland, alkaline sagebrush flats, and shortgrass prairie in other parts of its range.

PHENOLOGY
Rangewide
Active throughout the year.

FOOD HABITS
Rangewide
Feeds primarily on insects, spiders, and other small invertebrates (worms, molluscs, centipedes, etc.). May also consume vegetable matter as well as some small vertebrates (salamanders, etc.). Active hunter.

Food Habits
Wyoming
Active hunter; feeds primarily on insects, spiders, and other small invertebrates (worms, molluscs, centipedes, etc.). May also consume vegetable matter as well as some small vertebrates (salamanders, etc.).

REPRODUCTION
Rangewide
At high elevation, breeding probably begins in late June-early July; first litters are produced in late July-early August; second litters are born in late August-early September; embryo counts averaged 6.5 for second litters; females breed in their second year. At lower elevations, breeding may begin earlier and litter size and frequency may be greater (Clark and Stromberg 1987).

Wyoming
Nests in burrows (Wyoming Game and Fish Department 1997). At high elevations, breeding probably begins in late June-early July. First litters are produced in late July-early August, and second litters are born in late August-early September. Females breed in their second year. At lower elevations, breeding may begin earlier and litter size and frequency may be greater (Clark and Stromberg 1987a).

ECOLOGY
Rangewide
In some areas sympatric with S. MONTICOLUS.

Wyoming
Spencer and Pettus (1966) did not find a yearly cyclic popuation flutuation. Apparently does not compete with S. CINEREUS or S. MONTICOLUS, although sympatric with them, as well as with S. HOYI and S. MERRIAMI. Preyed upon by barn owls (Hoffmann and Owen 1980; Clark et al. 1989).

TRENDS IN WYOMING
Population status is unknown.

MANAGEMENT CONSIDERATIONS
Difficult to make management recommendations because so little is known about habitat requirements and life history. Maintenance of existing habitat around collection sites is desirable. Only small areas (5 acres) necessary to support viable populations (Stromberg, pers.comm.). Sample with pitfall traps (they can escape snap traps) baited with sufficient meat to prevent starvation (Stromberg, pers.comm.).

Threats
May be subject to local extinctions due to low population levels.

Protection Status
Three occurrences lie within the Medicine Bow National Forest. One is in the Medicine Bow Peak Special Interest Area and another is in WYNDD's Snowy Range site. The Shoshone National Forest has two records, both in WYNDD's Beartooth Plateau site, and Grand Teton National Park has one site. Protected from intentional take by the Wyoming Game and Fish Commission Regulation since 1994.

INFORMATION NEEDS
Inventory Needs
Basic life history, detailed distribution, habitat use and population information are needed for Wyoming. Pitfall traps should be routinely used in environmental assessments to better assess shrew populations.

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STRIX NEBULOSA
GREAT GRAY OWL

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:
Large circumboreal range; no decline is evident in the vast majority of the range, but few data are available for most areas.

Wyoming
WYNDD State Rank: S2
Comments:
Uncommon; threatened by logging; a peripheral species.

State Status
Rare yearlong resident. Wyoming Game and Fish Department Species of Special Concern 4/Native Species Status 4. U.S. Forest Service Region 4 Sensitive Species.

US Forest Service
Management Status: S-USFS R4

TAXONOMY
Sub-Species
S.N. NEBULOSA

DESCRIPTION
Our largest owl. Lacks ear tufts, prominent gray concentric circles on the large facial disk, mottled plumage, yellow eyes, white "bowtie" below beak. Females larger than males. Body length 21-26 inches (54-67 cm) for females, 18-24 inches (47-62 cm) for males.^SIMILAR SPECIES: Barred owl has dark eyes; other large owls either have ear tufts or lack a bowtie (Dorn and Dorn, 1990).

DISTRIBUTION
Rangewide
BREEDS: central Alaska to northern Ontario, south locally in mountains to California (vicinity of Yosemite), Idaho, Montana, Wyoming, central Saskatchewan, northern Minnesota, and south-central Ontario. WINTERS: generally throughout breeding range, wandering south irregularly to northern U.S. Also in Old World. Usually uncommon, but sometimes may be locally abundant.

Wyoming
Has a boreal distribution with southward extensions along major mountain ranges. Wyoming is at the edge of its southern range. Known from Carbon, Fremont, Sublette, and Teton counties and Yellowstone National Park. Most occurrences and all breeding records are from the mountains of the western half of the state. The Wyoming Gap Analysis Atlas (Merrill et al. 1996) show potential and predicted additional habitat near existing sites in the Shoshone, Bridger-Teton, and Targhee National Forests.

Abundance

Listed as "Resident, abundance undetermined" by the Wyoming Game and Fish Department. Starvation is common. Food supply likely the critical factor regulating numbers (Bull and Duncan 1993).

Migration
Resident. May migrate to lower elevations in winter to avoid deep snow, which reduces prey availability (Clark et al., 1989).

HABITAT
Rangewide
Dense coniferous and hardwood forest, especially pine, spruce, paper birch, poplar; also second growth, especially near water, foraging in wet meadows; boreal forest and spruce-tamarack bogs in far north, coniferous forest and meadows in mountains. ^Nests in top of large broken-off tree trunks (especially in south), in old nests of other large birds (e.g., hawk nest) (especially in north), or in debris platforms from dwarf mistletoe; frequently near bogs or clearings. Nests frequently reused (Franklin 1988). Same pair often nests in same area in successive years.

Wyoming
Habitat: Inhabits mid- to late-successional stages of Douglas-fir/lodgepole pine/aspen forests and meadows in mountains. In a study in western Wyoming forests (Franklin 1988), all nests had some amount of clearcuts or natural meadows associated with them. Those in fir/spruce snags were more productive and stable than nests in lodgepole pine, perhaps because they had a larger nesting surface area, were relatively inaccessible to predators, and were more durable. Nests in top of large broken-off tree trunks, in old nests of other large birds (e.g., goshawks or red-tailed hawks), or in debris platforms from dwarf mistletoe. Nests are frequently reused, and the same pair often nests in the same area in successive years. Survival of fledged young probably depends on the availability of roosts that allow them to sit high enough to avoid ground predators. Also require forested habitat within a 500 meter radius around the nest. The Yellowstone fires of 1988 probably increased foraging habitat but effects on nesting habitat are unknown (Franklin 1988; Clark et al. 1989b).

PHENOLOGY
Rangewide
In winter, hunts primarily in early morning and from late afternoon until dusk. When nesting, may hunt day or night.

Wyoming
May live at least 13 years (Bull and Duncan, 1993).

FOOD HABITS
Rangewide
Diet in North America dominated by pocket gophers and voles. Forages usually in open area where scattered trees or forest margin provides suitable sites for visual searching; also uses sound to locate prey under snow cover.

Food Habits
Wyoming
Northern pocket gophers and Microtus species. The amount of pocket gophers in the diet may be directly proportional to the amount of clearcut around the nest (Franklin, 1988).

REPRODUCTION
Rangewide
Egg dates: late March-May in Alberta, late April-early June in Ontario, peak mid-April to late May in California, mean date of first egg 5 May in southern Idaho and northwestern Wyoming; eggs laying may be delayed in years with deep snow (Franklin 1988). Clutch size is 2-5 (usually 2-3 or 3-4). Incubation lasts 28-29 days, by female (male brings food). Young begin to leave nest at 3-4 weeks (4 weeks in Idaho/Wyoming), fly well at 5-6 weeks (6 weeks in Idaho/Wyoming), independent at about 4-5 months (Idaho/Wyoming: Franklin 1988). Usually first breeds at 3-4 years. Pair bond is not maintained outside breeding season, but bond may reform if both birds return to the same breeding territory. Some pairs may not breed in years of low prey abundance.

Wyoming
Monogamous. Exhibits fidelity to nesting area (Clark et al. 1989b). Mean date of first egg is 5 May in northwestern Wyoming, but egg laying may be delayed in years with deep snow (Franklin 1988). Clutch size can be 2-5 (usually 2-3 or 3-4)(Franklin, 1988). Young begin to leave nest at 4 weeks in Wyoming, can fly well at 6 weeks, and are independent at about 4-5 months (Franklin 1988). Pair bond is not maintained outside breeding season, but bond may reform if both birds return to the same breeding territory. Breeds most commonly at age 3 (Groves and Zehntner, 1990), but if prey is scarce in spring, may not breed at all (Clark et al., 1989b).

ECOLOGY
Rangewide
Some may remain on breeding territory all year; others may move irregularly in search of favorable foraging conditions. In Oregon, radio-tagged juveniles moved 9-31 km from nest over period of 1 year, adults moved 3-43 km during same period (see Johnsgard 1988). Predation by great horned owl was greatest known mortality factor in northern Minnesota and southeastern Manitoba (Duncan 1987).

Wyoming
TERRITORIALITY: Begin territorial calling between the end of March and the beginning of April on the Targhee National Forest (Groves and Zehntner, 1990).^COMMUNITY INTERACTION: Great-horned owls and northern goshawks appeared to cause most juvenile mortality (Groves and Zehntner, 1990). Common raven often preys on eggs and young. Little dietary overlap with other owls. Immediate vicinity of nest site actively defended against other Great gray owls and other species; does not appear to defend foraging areas. Mobbed by diurnal birds, particularly American robins and jays.^BEHAVIOR: Hunts diurnally during nesting. Detects prey by listening for it and then plunging into snow to capture it.

TRENDS IN WYOMING
Undetermined, but suspected to be declining due to loss of nesting habitat from logging. Circumstantial evidence suggests a decline on the Targhee National Forest (Groves and Zehntner, 1990).

MANAGEMENT CONSIDERATIONS
Craig and Zehntner (1990) suggest using radiotelemetry to study owl movements, home range, and hunting behavior in stands of different age classes to determine the impacts of clearcutting and selective logging on foraging and nesting habitat. Could combine this information with data on small mammal densities, biomass in different aged stands, and nesting habitat requirements to develop a model to explain what impacts different forest management practices might have on populations. Owls may only persist on forests if actively managed by protecting nest sites, erecting artifical nesting platforms, ensuring supply of hunting perches, reducing activity during nesting period, and maintaining prey availability. Best way to monitor populations is to locate nesting territories and monitor these each year, although this requires an intensive survey effort. Hard to monitor population trends by measuring responses to taped owls calls because too many factors influence responses and may not be an accurate reflection of population (Craig and Zehntner 1990). Many suitable nest trees are harvested during timber cuts, including those with mistletoe. Broken-topped dead trees are often cut for firewood (Clark et al. 1989b).

Threats
Threatened by logging; prey base within foraging habitat (open meadows) may be negatively impacted by overgrazing of livestock.

Protection Status
Yellowstone National Park: One road kill and one observation record^Grand Teton National Park: One observation record^ National Elk Refuge: One roosting site and one observation record^ Bridger-Teton National Forest: 10 observations, including two in the Gros Ventre Wilderness^ Medicine Bow, Bighorn, and Shoshone National Forests: One observation each^ Rock Springs District of the BLM: One observation record

INFORMATION NEEDS
Inventory Needs

Detailed distribution, habitat use and population information are needed for Wyoming. Conduct audio call/ playback surveys in likely habitat.

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TROGLODYTES TROGLODYTES
WINTER WREN

STATUS
US Endangered Species Act
US Fish & Wildlife Service:
Comments:

Rangewide
Global Rank: G5
Comments:

Wyoming
WYNDD State Rank: S1B,SZN
Comments:
1996: Rank assigned with the help of zoologists at CO NHP. 1995: Rare, peripheral breeder.

State Status

US Forest Service
Management Status:

TAXONOMY
General
Composed of two groups: HIEMALIS of North America (Winter Wren) and TROGLODYTES of the Palearctic (Northern Wren) (AOU 1998).

DISTRIBUTION
Rangewide
BREEDS: southern Alaska, northern British Columbia, northern Alberta, and central Saskatchewan, east across Canada to southern Labrador and Newfoundland, south to central California, Idaho, western Montana, southwestern Alberta, southeastern Manitoba, Minnesota, Wisconsin, southern Ontario, north-central Ohio (probably), southern Appalachians, and New Jersey. Winters from southern Alaska and southern Canada south to southern California, Texas, Gulf coast, Florida. Also widespread in Old World.

Wyoming
Refer to Oakleaf et al. (1992) and Dorn and Dorn (1990) for distribution by LAT/ LONG block. A rare, peripheral species, with possible breeding taking place in the NW corner of the state. Scattered records throught the state in forested habitat.

Abundance
Listed by the Wyoming Game and Fish Department as "Migrant, rare"; should be "Summer resident, peripheral, rare".

HABITAT
Rangewide
Coniferous forest, primarily with dense understory and near water, and in open areas with low cover along rocky coasts, cliffs, islands, or high mtn. areas, logged areas with large amounts of slash; in winter and migration also in deciduous woods with understory, thickets, brushy fields. Nests in various sorts of hollows, cavities, and holes, most often on side of tree, wall, or steep bank, to height of about 3 m.

FOOD HABITS
Rangewide
Eats almost entirely insects (beetles, Diptera, caterpillars) and spiders obtained from substrates within 3 m of ground (and including the ground).

REPRODUCTION
Rangewide
Clutch size is 4-7 (commonly 5-6). Incubation, by female, lasts 14-17 days. Young are tended by both parents, leave nest in 15-20 days.

INFORMATION NEEDS
Inventory Needs
Information on basic life history, distribution, habitat use, and population information are needed for Wyoming.

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URSUS ARCTOS
GRIZZLY OR BROWN BEAR

STATUS
US Endangered Species Act
US Fish & Wildlife Service: LT
Comments:
Listed by USFWS as Threatened in the 48 coterminous States and Endangered in Italy (subspecies ARCTOS), China/Tibet (subspecies PRUINOSUS), and Mexico (subspecies NELSONI). ^Recently, USFWS was petitioned to delist the grizzly bear populations in the Northern Continental Divide ecosystem, the Cabinet-Yaaak ecosystem, the Selkirk ecosystem, and the North Cascades ecosystem; USFWS (1993) found that the petitioner did not supply substantial information to indicate that the petitioned action may be warranted. ^USFWS (Federal Register, 2 July 1997) proposed the reintroduction of the grizzly bear into east-central Idaho and a portion of adjacent western Montana; this population would be classified as XN (nonessential experimental). ^Mexican populations are included in CITES Appendix 2.

Rangewide
Global Rank: G4
Comments:
Has disappeared over much of Holarctic range, and continues to decline in the face of habitat alienation, alteration, and loss, as well as increased human access to wilderness; low reproductive rate limits recovery rate; stable populations occur in some large wilderness areas; protection and management are necessary for long-term survival.

Wyoming
WYNDD State Rank: S2
Comments:
Restricted to about 10% of its former range in Wyoming; several threats; wide-ranging carnivore.

State Status
Rare; Wyoming Game and Fish Department "trophy game" animal, currently with a moratorium on hunting.^U.S. Fish and Wildlife Service Threatened Species.

US Forest Service
Management Status:

TAXONOMY
General
Hoffmeister (1986) expressed the opinion that the conspecificity of New World and Old World brown bears has not been well documented and that URSUS HORRIBILIS may be the proper name for the North American grizzly bear. Subspecies MIDDENDORFFI formerly was regarded as a distinct species. Among the many other specific names that have been used for this species, HORRIBILIS is the most common. Electrophoretic data indicate that the Kodiak Island population is reproductively isolated from the mainland Alaska population; the former population evidently warrants subspecific recognition (Allendorf et al. 1992). Cronin et al. (1991) found low to moderate divergence in mtDNA among populations in Montana and Alaska; also, the two morphological forms of U. ARCTOS, grizzly and coastal brown bears, do not cluster as distinct mtDNA lineages. Bears from Yellowstone National Park have less genetic variation than do all other North American populations except for the Kodiak Island population. There are significant genetic differences between Cabinet-Yaak-Selkirk and Northern Continental Divide Ecosystem bears, but not between Yellowstone and Northern Continental Divide populations (Allendorf et al. 1992). Western and eastern populations of brown bears in Europe comprise two distinct lineages that diverged about 850,000 years ago (Dorozynski, 1994, Science 263:175). Various kinds of evidence (fossils, protein, mitochondrial DNA) indicate that the brown bear and polar bear are sister taxa, more closely related to each other than either is to the black bear (see Shields and Kocher 1991, Cronin et al. 1991).

Sub-Species
URSUS ARCTOS HORRIBILIS

DESCRIPTION
Pelage varies from black to nearly white. Long hairs on shoulders may have gray or white tips. Lower legs usually darker and pelage on back may change slightly from summer to fall. Total length 1.8-2.7 meters (6-9 feet); 1-1.2 meters (3-4 feet) at the shoulder. Females 132-145 kg (290-320 lbs), males 182-223 kg (400-490 lbs).^SIMILAR SPECIES: Distinguished from black bears by its larger skull with the second molar longer than 30mm, prominent shoulder hump (may not be obvious), front feet with an indentation in the pad just behind the outer toe and relatively straight edge along front of the pad, and the claws which are typically longer than 5 cm (Clark and Stromberg, 1987).

DISTRIBUTION
Rangewide
Formerly throughout western North America, north from northern Mexico; northwestern Africa, all of the Palearctic from western Europe, Near and Middle East through the northern Himalayas to western and northern China and Chukot (Russia) and Hokkaido (Japan) (Wozencraft, in Wilson and Reeder 1993); see Pasitschniak-Arts (1993) for additional details. ^In North America, present range includes Alaska, northern and western Canada, northern Continental Divide in Montana, Cabinet/Yaak mountains in Montana/Idaho, Selkirk Mountains in Idaho/Washington, Northern Cascades in Washington, and Yellowstone area, Wyoming/Montana/Idaho. Some bears in the Cabinet-Yaak ecosystem of Montana and Idaho and Selkirk ecosystem of Idaho and Washington mingle in the Purcell Mountains in southern British Columbia, and movement data indicate that the Cabinet-Yaak and Selkirk populations are connected to a much larger population (several hundred bears) extending north into British Columbia (USFWS 1999). However, the listed distinct population segment is confined to the U.S. portion of these ecosystems. ^Common only in Alaska, parts of the Yukon, northern and coastal British Columbia, and portions of the northern Rocky Mountains. USFWS has proposed reintroduction in the Bitterroot ecosystem of east-central Idaho and adjacent Montana. ^In Europe, apart from northern Europe, distribution has shrunk to a few isolated populations in the Pyrenees, the Apenines, the Alps, the Balkan Peninsula, and the Carpathians (see Hartl and Hell 1994).

Wyoming
Large range contraction in the last 150 years; free-ranging populations are now restricted to northwest Wyoming northward through Montana, Idaho, Canada, and Alaska. Current Wyoming distribution is in the northwestern mountains in Park, Teton, and portions of Sublette and Fremont Counties (Clark and Stromberg 1987a). Formerly found statewide, with historical records from Carbon, Crook, Fremont, Goshen, Park, Sublette, and Teton counties. Wyoming formed the core of its historical range, but is now on the southern periphery. Merrill et al. (1996) predict additional habitat in the foothills of the northwest mountains, with the exception of the southern Wind River and Wyoming/Salt River ranges. Population is expanding, and dispersing subadults are increasingly occurring in the Absaroka foothills and upper Green River areas.

Abundance
The Wyoming Game and Fish Department lists this species as "Resident, rare".

HABITAT
Rangewide
Now found mostly in arctic tundra, alpine tundra, and subalpine mountain forests. Once found in a wide variety of habitats including: open prairie, brushlands, riparian woodlands, and semidesert scrub. Ranges widely at the landscape level. Most populations require huge areas of suitable habitat. Common only where food is abundant and concentrated (e.g., salmon runs, caribou calving grounds). Typically digs own hibernation den, usually on steep northern slope where snow accumulates. See LeFranc et al. (1987). ^Young are born in den in cave, crevice, hollow tree, hollow dug under rock, or similar site. Use of summit or ridge for mating (in May-June) reported for Banff National Park, Alberta, but not elsewhere (Hamer and Herrero 1990). ^In Spain, remnant deciduous forests and upland creek drainages were prime feeding areas (Clevenger et al. 1992).

Wyoming

Non-forested valley and plateau grasslands with Idaho fescue and hairgrass, subalpine and alpine grasslands, riparian areas, wet meadows, rigetops, and forested areas (Clark and Stromberg, 1987). Prefer relatively open, undisturbed areas with good cover and perennial succulent herbs and/or fruit-bearing shrubs (Mealey et al., 1977).

PHENOLOGY
Rangewide
Tends to be predominantly crepuscular with the least activity during midday, but much individual variation. Dormant in winter. In North America, usually enters den in October or November, emerges usually in April-May (some in late March in south).

FOOD HABITS
Rangewide
Opportunistic omnivore. In all areas, vegetal matter is a dominant portion of the diet. Feeds on carrion, fish (especially coastal populations), large and small mammals, insects, fruit, grasses, bark, roots, mushrooms, and garbage. May cache food (and guard it). In the Yellowstone region, ungulate remains were a major portion of early season scats; graminoids dominated in May and June, and whitebark pine seeds were most important in late season scats; berries composed a minor portion of scats in all seasons (Mattson et al. 1991). May feed on insect aggregations (e.g., army cutworm moths, ladybird beetles); in Shoshone National Forest, Yellowstone ecosystem, alpine insect aggregations are an important source of food, especially in the absence of high-quality foraging alternatives in July and August of most years (Mattson et al. 1991). In Waterton Lakes National Park, Alberta, main food was roots of HEDYSARUM SULPHURESCENS in spring and autumn, ERYTHRONIUM GRANDIFLORUM corms and green vegetation (mainly umbellifers) from June through early August; VACCINIUM fruits were important in late July and August (see Hamer et al. [1991] for further details). Sometimes preys on black bear and conspecifics (Mattson et al., 1992, J. Mamm. 73:422-425).

REPRODUCTION
Rangewide
Breeds in late spring and early summer. Implantation is delayed; gestation lasts about 184 days. Litter size is 1-4 (average 2). Young are born in winter, remain with mother usually the first two winters. Breeding interval generally is 2-4 years. In North America, first parturition occurs at 5-6 years in the south, 6-9 years in the north. A few live as long as 20-25 years. Long life span, late sexual maturity, protracted reproductive cycles.

Wyoming
Polygamous. In the Yellowstone ecosystem, mating occurs from mid-May to mid-July. Females produce first litter at 5 years old and then may have litters every 3 years (Clark and Stromberg, 1987).

ECOLOGY
Rangewide
Home range exhibits much variation among different individuals, areas, and seasons; male range generally is larger than that of female; annual range varies from less than 25 sq km (Kodiak Island) to more than 2000 sq km (see LeFranc et al. 1987), generally several hundred sq km (Banci 1991, Pasitschniak-Arts 1993). ^May congregate in areas with abundant food; otherwise solitary except when breeding or caring for young. Density estimates range from 1/1.5-4 sq km (Kodiak Island) to 1/50 sq km (Yellowstone) to 0.6-7.9/1000 sq km (Norway). ^In the Yellowstone region, lack of berries and large fluctuations in the size of pine seed crops were major factors limiting bear density (Mattson et al. 1991). ^In British Columbia-Montana, survivorship of adult and subadult females was the most important variable in estimating population trend.

Wyoming
Does not become torpid during denning.^In the Greater Yellowstone Area, uses well-defined seasonal ranges separated by long migratory corridors. Home ranges vary with age and sex, but sizes from 55-324 square km are common. Overnight movements of 24 km are known. Extensive movements are related to the absence of defined territories and a socially linear hierarchy, which allows travel and resource use over a wide-ranging area (Clark and Stromberg 1987).

TRENDS IN WYOMING

Stable, increasing slightly in recent years (Eberhardt and Knight, 1996).

MANAGEMENT CONSIDERATIONS

Need corridors linking the Yellowstone Recovery area with other recovery areas in Idaho and Montana to maintain genetic diversity.^Logging, road building, and grazing have negative effects on forage. Impacts minimized when disturbances kept small and cover vegetation is maintained. A "let burn" policy increases the availability of shrubs and other vegetation for forage when areas re-vegetate after fire (Mealey et al. 1977).^Minimize interaction between humans and bears, especially the association of humans with food, to reduce bear mortality. Requires public education in bear behavior and backcountry skills. Try to prevent poaching by patrolling and increasing fines and jail time for offenses. Maintain habitat.

Threats

There is political pressure to delist, although there is also support for maintaining current status. Threatened by habitat loss and resultant conflicts with humans, which may lead to bear mortality. Logging and roads in national forests, developments on private lands near forest and park boundaries, and increased recreation all decrease habitat.^Poaching is also a problem.

Protection Status

14 EOs are protected in Yellowstone and Grand Teton National Parks and the John D. Rockefeller Jr. Memorial Parkway. The Bridger-Teton National Forest has 11 records, 6 of which occur in the Teton Wilderness Area and 1 in the Gros Ventre Wilderness Area. Another 7 occurrences are on the Shoshone National Forest, with 3 in the Washakie Wilderness Area and one on the Northern Absaroka Wilderness Area. The Targhee National Forest has 2 records, with one in the Jedediah Smith Wilderness. Black Hills National Forest also has two records, and the Casper, Rawlins, and Worland Districts of the BLM have four records total. In addition, the Forest Service has Grizzly bear "Management areas".

INFORMATION NEEDS

Inventory Needs

Population continues to be intensively monitored.

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Plant Species Abstracts

AGOSERIS LACKSCHEWITZII

PINK AGOSERIS
ASTERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:USFS Region 2: Sensitive; USFS Region 4: Sensitive

Heritage Rank:
Global: G4State: S3
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Pink agoseris is a perennial forb with milky juice and flowering stems 6-49 cm tall. Leaves are thin, glabrous, oblanceolate, 6-20 cm long, and arranged in a basal rosette. Leaf margins are usually entire, but can have widely-spaced teeth. Flowering heads occur singly at the tip of the stem and consist entirely of ray flowers (tubular disk flowers are absent). The rays are light pink, but may dry to dark pink or purple. Involucre bracts are blunt-tipped, long-hairy, purple-spotted, and non-glandular. Mature fruit gradually taper into an elongate beak 4.2-6.6 mm long and have white, hair-like pappus bristles (USDA Forest Service 1989; Henderson et al. 1990; Fertig et al. 1994).

Synonyms:

Similar Species:
Agoseris aurantiaca has burnt orange ray flowers, pointed involucre bracts and achenes with beaks 5-10 mm long, and tends to grow in drier habitats. A. glauca var. dasycephala typically has yellow flowers and beakless or short-beaked (1-3 mm) achenes. Taraxacum spp. can be distinguished by their drooping set of outer involucre bracts. Species of Microseris and Nothocalais differ in having feather-like or scaly pappus bristles (Fertig et al. 1994).

Flowering/Fruiting Period:
Flowering/fruiting: Mid July-August.

Distribution:
Regional endemic of SW Montana, EC Idaho, and N Wyoming. In Wyoming, known from the Beartooth, Wind River, Gros Ventre, and Bighorn Mountains and Yellowstone Plateau.

Habitat:
Perennially wet montane and subalpine meadows and swales; in Yellowstone it occurs on what seems to be the ecotone between meadow and Abies lasiocarpa/Picea engelmannii forest. Soils usually derived from granitic parent material, although occasionally from mixed sedimentary and granitic soils. Occurs at 8000-10600 feet elevation.
Populations in the Bighorn Range occur 47% of the time in DESCHAMPSIA CESPITOSA/Forb Community Type and 50% of the time in DESCHAMPSIA CESPITOSA/SENECIO SPHAEROCEPHALUS Community Type. Average cover in both Community Types is 0.5% of total herbaceous cover (described in the Classification of Riparian Communities on the Bighorn National Forest, Draft 1995). Has also been found in an early seral stage of a burn area at the edge of wet meadow with a high ground cover of liverworts. Can occur in pristine or moderately to highly disturbed riparian meadows.

Associated Rare Species:

Occurrences in Wyoming:
Known from at least 45 extant occurrences (over 40 of which have been discovered or relocated since 1991) and one historical record. This species was not known to occur in Wyoming until 1993, when herbarium material was determined to be A. lackschewitzii by the late Dr. Doug Henderson of the University of Idaho. The species was first collected in the state in 1951 by C.L. Porter.

Abundance:

Population estimates are lacking for many occurrences, but those which have been sampled typically average 25-50 individuals in small areas of sufficiently wet habitat. The largest known populations have several thousand plants.

Range:
Regional endemic of EC Idaho, SW Montana, and NW Wyoming. In Wyoming, it is known from the Beartooth, Wind River, Gros Ventre, and Bighorn ranges and the Yellowstone Plateau in Big Horn, Fremont, Johnson, Park, Sheridan, Sublette, Teton, and Washakie counties.

Trends:
Trend data are lacking for nearly all occurrences, but are probably stable at the present time. Long-range trends, however, are probably downward given the amount of historical loss of riparian habitats.

Protection status:
15 occurrences are protected within designated Wilderness Areas (North Absaroka, Cloud Peak, Gros Ventre, and Bridger) or in Yellowstone and Grand Teton National Parks. Populations also occur within the potential McLain Lake, Line Creek/Twin Lakes, Beartooth Butte, and Lake Creek Research Natural Areas on Bighorn and Shoshone National Forest. This species is designated Sensitive in Forest Service Regions 2 and 4.

Threats:
Threats are probably low. Some Wind River and Bighorn Range populations are found near trails where trampling by hikers and horses is a potential threat. Populations in the Bighorns have been observed to persist in disturbed areas. Grazing by livestock is also a potential threat in some areas.

Managed Areas:
Since first being reported for the state, the number of collections and reports of this taxon has climbed to over 40. Identifications can be tricky, however, especially without diagnostic fruit characters (the beak of A. lackschewitzii is intermediate in length between the long-beaked A. aurantiaca and beakless A. glauca). The seemingly distinctive pink ligulate flowers of A. lackschewitzii are also not always diagnostic, as individuals may also have whitish flowers and dried specimens of other Agoseris species may turn pinkish. Some researchers have concluded that A. lackschewitzii may not warrant taxonomic status, but definitive breeding and genetic studies have not yet been completed. In Wyoming, this species occurs in Bridger-Teton, Bighorn, and Shoshone National Forests, the JDR Parkway, and Grand Teton and Yellowstone National Park.

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Author:
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Updated:
00-06-06

AGROSTIS OREGONENSIS

OREGON BENTGRASS
POACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G4State: S1
WYNDD Plant List: DISJUNCT

Description:
Oregon bentgrass is a tufted perennial graminoid with culms 30-80 cm tall. Leaf blades are mostly 2-4 mm wide, flat, and minutely scabrous. Ligules are blunt to acute, 2-4 mm long, and ciliate to lacerate on the margins. The inflorescence is a multi-branched, open panicle 10-30 cm long consisting of short, stiffly-spreading to ascending, whorled branches that are forked and spikelet-bearing below the middle and near the base. Spikelets are straw-colored to green or purplish, with a single, unawned floret that is shorter than the scabrous-margined, 2.5-3 mm long glumes. A palea is present, but very short (usually less than 0.4 mm). Anthers are about 0.4-0.6 mm long (Dorn 1992; Harvey 1993; Hitchcock 1950; Hitchcock et al. 1969)

Synonyms: none

Similar Species:
Agrostis scabra has a diffusely-spreading inflorescence of numerous narrow floret-bearing stalks that branch near their tips (or at least above the middle of the branch). A. idahoensis has culms typically under 30 cm tall, glumes 1.5-2.5 mm long, and leaves 2mm or less wide. Other Agrostis species in Wyoming have better-developed paleas, an annual growth form, or contracted (non-spreading) inflorescences with crowded spikelets (Dorn 1992; Harvey 1993; Hitchcock 1950).

Flowering/Fruiting Period:
July-August.

Distribution:
Southern British Columbia to California and Nevada, east to western Montana and northwest Wyoming. In Wyoming, known from historical records in the Teton Range (Teton County) and a recent report from the Absaroka Range (Park County) (Evert 1991).

Habitat:
Stream margins, wet meadows , and boggy areas in the mountains (Hitchcock et al. 1969). Wyoming populations occur at 6100-8000 feet.

Associated Rare Species: none

Occurrences in Wyoming:
Confirmed from 2 historical records in Wyoming, the most recent dating from 1900. Recently reported from one location in Park County by Erwin Evert.

Abundance:
Reported as "rare" by Evert (1991). Historical populations may not be extant.

Range:
Disjunct. Known from the Gros Ventre and Lewis river drainages in Teton Co. and Yellowstone National Park. Reported from the Absaroka Range in Park County by Evert (1991).

Trends:
No trend data available. May be extirpated at historical sites.

Protection status:
One occurrence is protected within Yellowstone National Park.

Threats:
Not known.

Managed Areas:
Known from Yellowstone National Park. Reported from Bridger-Teton and Shoshone National Forests and Grand Teton National Park.

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Author:
Walter Fertig

Updated:
01-01-26

ANDROSACE CHAMAEJASME SSP CARINATA

SWEET-FLOWERED ROCK JASMINE
PRIMULACEAE

Status:
US Fish & Wildlife Service:
Agency Status:Bridger-Teton National Forest: Sensitive. Targhee National Forest: Sensitive.

Heritage Rank:
Global: G5T4State: S1S2
WYNDD Plant List: PERIPHERAL

Description:
Sweet-flowered rock jasmine is a low, perennial herb rarely exceeding 5 cm in height. The oblanceolate leaves are grayish-hairy and restricted to a rosette at the base of a single, soft-hairy flowering stem. The aromatic flowers are white or cream-colored with a yellow, orange, or pink "eye" at the center. Flowers are clustered in head-like involucral bracts. The fruit is a few-seeded capsule.

Synonyms: none

Similar Species:
Androsace septentrionalis is an annual with branched flowering stems, small flowers, and a single tap-root.

Flowering/Fruiting Period:
Flowers late May-July, depending on snow melt.

Distribution:
Alaska and W Canada south to Colorado. In Wyoming, known from the east slope of the Wind River Range, eastern Absaroka Mountains, and Owl Creek Mountains in Fremont, Park, and Hot Springs Counties. An historical record is also known from Yellowstone National Park.

Habitat:
Rock crevices and on rocky soils derived from limestone or dolomite in mountains. May be found in open or in patches of juniper or bearberry. Wyoming populations occur at 8500-10800 feet.
Populations range in size from several hundred to tens of thousands.

Associated Rare Species: none

Occurrences in Wyoming:
Known from 6 extant occurrences in Wyoming and 1 historical report from Yellowstone National Park (last observed in 1892). All extant populations have been relocated since 1991.

Abundance:
Surveyed populations range in size from several hundred to tens of thousands of individuals.

Range:
Peripheral; Found in the NE Wind River Range (Fremont Co.), eastern Absaroka Range (Park Co.), Owl Creek Mountains (Hot Springs Co.), and west slope of the Teton Range (Teton Co.) and reported from Yellowstone National Park.

Trends:
Trend data are mostly lacking, but populations appear to be stable.

Protection status:

Three occurrences are found within the Fitzpatrick and North Absaroka wilderness areas and one is within the proposed Bald Ridge Research Natural Area. Two other occurrences are within potential RNAs on Shoshone National Forest (Pat O'Hara Mountain and Arrow Mountain). One other occurrence was located in the Targhee National Forest (Markow 1999). An historical record may also occur in Yellowstone National Park. This species is listed as Sensitive by Bridger-Teton and Targhee National Forests.

Threats:
Most populations are secure due to rugged terrain. Low elevation sites near wet meadows may be impacted by grazing or recreation.

Managed Areas:
Extant populations are found in Shoshone National Forest and reorted from the BLM Worland District. Although listed as Sensitive on the Bridger-Teton and Targhee National Forests, no populations have ever been documented from these areas.

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Author:
Walter Fertig

Updated:
01-01-26

ANTENNARIA AROMATICA

AROMATIC PUSSYTOES
ASTERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G4State: S2S3
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Aromatic pussytoes is a low, mat-forming, perennial herb 2-6 cm tall from a woody rootstalk. Stems and leaves are covered with dense, white, tangled hairs, and are glandular (sometimes obscurely so) which, when crushed, often smell like orange peels or citronella. The basal leaves are wedge or diamond shaped and 5-10 mm long. Upper leaves are narrower and often have brown, membranous tips. The inflorescence consists of 2-5 clustered heads. Involucres are 4-7 mm long and have loose, woolly, glandular, blunt-tipped bracts with brown or dark greenish, membranous tips. Induvidual plants are unisexual (Evert 1984; Marriott 1988).

Synonyms:

Similar Species:
Antennaria media has sharp-tipped, blackish-green involucre bracts and lacks glands. A. umbrinella has nonglandular, oblanceolate basal leaves and umber or brownish involucre bracts.

Flowering/Fruiting Period:
July-early August.

Distribution:
Regional endemic of southwest Montana and northwest Wyoming. Reports from elsewhere in northwest North America have largely proven to be false. In Wyoming, this species is known from the Absaroka, Beartooth, Bighorn, Gros Ventre, Wind River, Wyoming, and Salt River Ranges.

Habitat:
Along sparsely vegetated ridges and summits at and above timberline in crevices, scree, and rocky soils derived from limestone at 4500-10800 feet.

Associated Rare Species:
ANDROSACE CHAMAEJASME, AQUELEGIA JONSII, KELSEYA UNIFLORA, SHOSHONEA PULVINATA, PARRYA NUDICAULIS, SAUSSUREA WEBERI.

Occurrences in Wyoming:
Known from over 27 occurrences in Wyoming, 21 of which have been observed since 1988 (most recently in 1999).

Abundance:
May be locally abundant when found, although sometimes colonies can be mixed with other Antennaria taxa and censusing can be difficult.

Range:
Regional endemic of SW Montana and NW Wyoming. Reports from elsewhere in NW North America have largely proven to be false. In Wyoming, the species is known from the Absaroka, Beartooth, Bighorn, Wind River, Gros Ventre, and Wyoming/Salt River ranges (Big Horn, Fremont, Lincoln, Park, Sublette, and Teton counties).

Trends:
Although trend data are lacking for most occurrences, there appears to be little evidence of decline in numbers or range.

Protection status:
At least 10 populations are known to occur in designated Wilderness areas (Gros Ventre, Fitzpatrick, Absaroka-Beartooth, North Absaroka, and Bridger) and Grand Teton National Park. Populations are also found in the Osborn Mountain and Swift Creek research natural areas and in the proposed Bald Ridge and potential Beartooth Butte, Arrow Mountain, and Pat O'Hara Mountain RNAs.

Threats:
Threats are minimal due to the ruggedness and inacessibility of the species' alpine habitat.

Managed Areas:
Known occurrences are found on lands managed by Bighorn, Bridger-Teton, and Shoshone National Forests, Grand Teton NP, and the BLM Cody Field Office.

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Author:
Walter Fertig

Updated:
00-06-14

ANTENNARIA MONOCEPHALA

SINGLE-HEAD PUSSYTOES
ASTERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G4G5State: S1
WYNDD Plant List: DISJUNCT

Description:
Single-head pussytoes is a dwarf, mat forming perennial herb with leafy stems 2-5 cm or more long that conspicuously exceed the basal rosette. The green basal leaves are 1 cm long, thinly woolly-tomentose, and linear to narrowly spoon-shaped, while the upper leaves have thin, blackish to brownish-green membranous tips. The heads are always solitary on each stem and have 4 mm long involucre bracts with thin blackish or brownish-green pointed tips. The achenes are glabrous or papillose (Dorn 1992, Porsild and Cody 1980; Scott 1997, Fertig 1992).

Synonyms:

Similar Species:
Antennaria dimorpha has short flowering stems that barely exceed the basal leaves and occurs in low elevation basin and foothills habitats. A. flagellaris has slender, naked stolons. A. aromatica, A. media, A. umbrinella, and A. microphylla typically have 2-several flower heads per stem. Occasional specimens of A. media [A. alpina] growing in exposed environments may have a single head, but these specimens can be distinguished by their broadly spoon-shaped and densely white-woolly basal leaves, and lower stem leaves that lack membranous tips.

Flowering/Fruiting Period:
July-August.

Distribution:
Alaska and Yukon to Greenland and south in the Rocky Mountains to northwestern Montana and northern Wyoming. Wyoming populations occur in the Wind River, Absaroka, Bighorn, and Teton ranges.

Habitat:
Species inhabits wind-swept, open slopes and ridges in alpine or subalpine tudra. Areas are often dominated by forbs and bunchgrass with occasional patches of whitebark pine and Engelmann spruce. (Markow 1993, Fertig 1992). Populations in the arctic are found chiefly on Precambrian rocks in snow patch vegetation, ravines, and avalanche patches (Porsild and Cody 1980).
Little population data are available, but known occurences tend to be limited in area and probably contain few individuals.

Associated Rare Species:

Occurrences in Wyoming:
Known from 6 occurrences in Wyoming, all located since 1985 (4 have been discovered since 1991).

Abundance:
Little population data are available, but known occurrences tend to be limited in area and probably contain very few individuals.

Range:
Disjunct; in Wyoming known from the Wind River, northern Absaroka, Bighorn, and Teton ranges in Fremont, Johnson, Park, Sublette, and Teton counties.

Trends:
Not known, but probably stable.

Protection status:
At least 4 occurrences are found within established Wilderness Areas (North Absaroka, Bridger, Fitzpatrick, and Cloud Peak). Other occurrences are on public lands managed for multiple use. A previous report from Bridger-Teton National Forest has recently been redetermined as a stunted specimen of A. media.

Threats:
Threats low due to rugged, alpine scree habitat.

Managed Areas:
Found in Bighorn, Bridger-Teton, Shoshone, and Targhee National Forests.

References:

Markow, S. 1994. A floristic survey of the Targhee National Forest and vicinity, East-Central Idaho and West-Central Wyoming. Unpublished Master's Thesis, Department of Botany, University of Wyoming, Laramie, WY.

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Author:
Walter Fertig

Updated:
00-10-30

ARABIS WILLIAMSII VAR WILLIAMSII

WILLIAM'S ROCKCRESS
BRASSICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G3QT3QState: S3
WYNDD Plant List: STATE ENDEMIC

Distribution:
Endemic to northwest and west central Wyoming (Absaroka Mountains, Wind River Range, east flank Wyoming Range).

Associated Rare Species:

Occurrences in Wyoming:
Reported from 25 occurrences, although several of these probably should be combined due to their close proximity.

Abundance:
Colonies tend to be large, ranging from ca 100 to several hundred individuals. Total population may be from 2000-5000.

Range:
State endemic; found primarily in the Wind River and Absaroka ranges, but one population also occurs on the east flank of the Wyoming Range.

Trends:
Probably stable.

Protection status:
At least 4 occurrences are protected in the Fitzpatrick, North Absaroka, and Washakie Wilderness areas on Shoshone National Forest.

Threats:
Not known.

Managed Areas:
This taxon is considered a synonym of A. PENDULOCARPA VAR SAXIMONTANA by Dorn (1988). Most populations consist of hybrid swarms with other related taxa, suggesting that the species may not be valid. Occurs on lands managed by Shoshone and Bridger-Teton National Forests and the BLM Rock Springs Field Office.

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Author:
Walter Fertig

Updated:
99-08-19

ASPLENIUM TRICHOMANES-RAMOSUM

GREEN SPLEENWORT
ASPLENIACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G4State: S2
WYNDD Plant List: DISJUNCT

Description:
Green spleenwort is a perennial fern with short, creeping, rhizomes covered with blackish scales. Leafstalks are 1-6 cm long, reddish-brown at the base, green above, and clustered. Leaf blades are 2-8 cm long, 0.7-1.2 cm wide, once pinnately compound, and glabrous. The leaflets are roundish to ovate and round-toothed. Sori are straight with a thin, entire, whitish indusium (Scott 1997, Lellinger 1985).

Synonyms:

Similar Species:
ASPLENIUM TRICHOMANES has reddish-brown leafstalks. A. SEPTENTRIONALE has grass-like, linear leaf blades (Dorn 1992).

Distribution:
Alaska to Newfoundland south to northern California, Colorado, South Dakota, Michigan, and New England. In Wyoming, known from the Bighorn, Medicine Bow, Gros Ventre, and Teton ranges in Carbon, Sheridan, Sublette, Teton, and Washakie counties.

Habitat:
In Wyoming, this species occurs mainly on limestone outcrops located in Engelmann spruce-subalpine fir forest at 5800-9900 feet. It is usually found in crevices of north-facing cliffs in moist montane environments (Scott 1997, Penskar 1993).

Associated Rare Species:

Occurrences in Wyoming:
Known from 9 extant and 2 historical records in Wyoming. Seven occurrences have been discovered or relocated since 1985.

Abundance:
Individual populations are often small and highly localized, with fewer than 50 clusters of plants. Evert (no date), however, reports that this can be "the most frequently encountered fern of mesic limestone crevices in the Teton-Darby Canyon area" of the western Teton Range.

Range:
Disjunct; in Wyoming known from the Medicine Bow, Teton, Bighorn, and Gros Ventre ranges in Carbon, Sheridan, Sublette, Teton, and Washakie counties.

Trends:
Not known.

Protection status:

Three occurrences are protected within the Gros Ventre Wilderness Area (Bridger-Teton NF) and two are within the potential Tensleep Canyon and Tongue River Research Natural Areas on Bighorn NF. All other known populations occur on public lands managed for multiple use.

Threats:
May be impacted by logging, trampling, or over-collection.

Managed Areas:
Occurs on Bighorn, Bridger-Teton, Medicine Bow, and Targhee National Forests.

References:
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Author:
Walter Fertig

Updated:
00-11-24

ASTER MOLLIS

SOFT ASTER
ASTERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:USFS Region 2: Sensitive. USFS Region 4: Sensitive.

Heritage Rank:
Global: G3State: S3
WYNDD Plant List: STATE ENDEMIC

Description:
Soft aster is a perennial, multi-stemmed herb averaging 30-50 cm high. The leaves and stems are covered with soft, multi-celled, wavy, non-glandular hairs, giving the entire plant a grayish appearance. Leaves are entire, alternate, and largest near the base, with blades up to 10 cm long and 2.5 cm wide. The lower leaves are long-petioled, while those higher on the stem are clasping. The sparsely-leafy, broad inflorescence is composed of numerous heads with violet or purple ray flowers surrounding yellowish disk flowers. The 8-9 mm involucre consists of 4-5 rows of overlapping, grayish-hairy bracts that are purple and green at the tips and whitish at the thickened base. Fruits are achenes 2.5-3.5 mm long with soft, white pappus bristles (Dorn 1992; Fertig et al. 1994; Jones 1984; Marriott 1992; Fertig 1999).

Synonyms:

Similar Species:
Erigeron spp. have a single row of non-overlapping and uniformly green involucre bracts. Aster ascendens, A. foliaceus, and A. occidentalis have glabrous leaf surfaces. Hybrids between A. mollis and these species can be recognized by their sparse leaf pubescence (Fertig et al. 1994).

Flowering/Fruiting Period:
Flowering/fruiting occurs from late July to mid September.

Distribution:
Soft aster is a Wyoming endemic restricted to the Bighorn Range (Big Horn, Johnson, Natrona, Sheridan, and Washakie counties) and Cliff Creek/Hoback Canyon area of Sublette County (Fertig et al. 1994). Jones (1984) also reports a specimen of ASTER ASCENDENS from Fremont County "with possible influence of A. MOLLIS". Potential habitat may extend into Montana at the far northern end of the Bighorn Range (Crow Indian Reservation).

Habitat:
Aster mollis occurs primarily on deep, rocky calcareous soils in dry mountain big sagebrush or shrubby cinquefoil grasslands and mountain meadows bordered by aspen or conifer woods at 6400-8500 feet. Populations have also been documented from limestone outcrops and redbeds. Common associated species include Festuca idahoensis, Elymus trachycaulus, Stipa nelsonii, Leucopoa kingii, Erigeron subtrinervis, Eriogonum umbellatum, Aster foliaceus, Potentilla arguta, and Penstemon procerus.
Populations vary in size, with the largest occurring on deep, limestone soils. Small populations (1-3 plants) often are on rocky sites. Has been observed to come back vigorously on sites that have been burned (M. Girard, ecologist Bighorn NF).

Associated Rare Species:

Occurrences in Wyoming:
Known from 34 extant and 2 historical in Wyoming, 32 of which have been discovered or relocated since 1990 (most recently in 1999).

Abundance:

Many populations are locally abundant, containing several thousand individual plants. Accurate censuses have been difficult to attain at some sites, however, due to the presence of hybrid individuals and other difficulties in making positive identifications.

Range:
Endemic to Wyoming. Restricted to the Bighorn Range in Big Horn, Johnson, Natrona, Sheridan, and Washakie Counties and Hoback Canyon (Gros Ventre Range) in Sublette County.

Trends:
Probably stable, although trend data are lacking for most populations.

Protection status:
Three occurrences are protected in The Nature Conservancy's Tensleep Preserve. One population also occurs within the Bull Elk Park Research Natural Area. Ten populations are found within the potential Devil Canyon, Dry Fork, Elephant Head, Pete's Hole, McLain Lake, Poison Creek, Tongue River, and Mann Creek Research Natural Areas. This species is listed as Sensitive in US Forest Service Regions 2 and 4 and was formerly a C2 candidate for listing under the Endangered Species Act.

Threats:
Grazing and trampling have been identified as potential threats, although low levels of herbivory or disturbance do not appear to have a negative impact.

Managed Areas:
Found on lands managed by Bighorn and Bridger-Teton National Forests and the BLM Buffalo, Casper, and Worland Field Offices.

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Author:
Walter Fertig

Updated:
00-06-14

ASTRAGALUS PAYSONII

PAYSON'S MILKVETCH
FABACEAE

Status:
US Fish & Wildlife Service:
Agency Status:Listed as Sensitive by USFS Region 4. Formerly a C2 candidate for listing under the Endangered Species Act.

Heritage Rank:
Global: G3State: S2
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Payson's milkvetch is an upright, multi-stemmed perennial herb growing to 50 cm tall. Stem leaves are 4-9 cm long and pinnately compound with 7-15 oval to wedge-shaped leaflets. Stipules are free to the base. The small, pea-like flowers are white with a tinge of lilac and are borne in numerous, loose, axillary racemes. Fruit pods are crescent-shaped, 10-17 mm long, and glabrous or white-hairy. Each fruit has a distinct groove on the upper side and has two separate locules. At maturity, fruits are straw-colored and deflexed (USDA Forest Service 1991; Dorn 1992; Fertig and Marriott 1993; Fertig et al. 1994).

Synonyms: none

Similar Species:
Astragalus canadensis has cream or pale yellow flowers, a congested inflorescence, and erect fruit. A. alpinus has black-haired fruit and fused stipules. In the absence of fruits or flowers, Hedysarum spp. can be distinguished by their united stipules and conspicuously veiny leaflets (Dorn 1992; Fertig and Marriott 1993; Fertig et al. 1994).

Flowering/Fruiting Period:
Flowers from June to August. Fruit produced from July-October.

Distribution:
Regional endemic of the Clearwater Mountains of north-central Idaho, the Palisades Reservoir area of east-central Idaho, and the Wyoming, Salt River, and Gros Ventre ranges of western Wyoming (Lincoln, Teton, and Sublette counties).

Habitat:
Occurs primarily in disturbed areas such as recovering burns, clear cuts, road cuts, and blow downs. Usuaully found on sandy soils with low cover of forbs and grasses. Elevation 6700-9600 feet (Fertig amd Marriott 1993).
This species historically was dependent on periodic disturbances to maintain and create open habitats for colonization. In the absence of natural fires, Payson's milkvetch now occurs primarily along roadcuts and in 15 year old or older recovering clearcuts. Periodic distrubances are probably necessary for the long-term survival of the species.

Associated Rare Species: none

Occurrences in Wyoming:
Known from 36 occurrences in the state, 30 of which have been discovered or observed since 1992 (most recently in 1995).

Abundance:
Average occurrences are extremely small and restricted in area, often with fewer than 20 plants in 1/2 acre of habitat. Only 3-4 Wyoming occurrences are notably large, containing over 100 plants.

Range:

Regional endemic of east-central Idaho and western Wyoming. In Wyoming, it is known from the Wyoming, Salt River, and Gros Ventre ranges (Lincoln, Sublette, and Teton counties).

Trends:
Historically, this species is probably in decline due to fire suppression in western National Forests. Most populations are very small and probably are unable to persist over long periods of time without some form of disturbance. Today, the plants thrive best in human-disturbed sites, such as road cuts and recovering clear-cuts.

Protection status:
One occurrence is protected within the Fall Creek Special Botanical Area (Bridger-Teton NF). All other occurrences are on National Forest lands that receive no special management.

Threats:
Threatened primarily by succession which makes habitats unsuitable for long-term persistence. This species requires periodic disturbances to create new habitat or keep competing late-seral species or weeds at bay.

Managed Areas:
Found in Bridger-Teton and Targhee National Forests.

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Author:
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Updated:
01-02-09

ASTRAGALUS SHULTZIORUM

SHULTZ'S MILK-VETCH
FABACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G3QState: S3
WYNDD Plant List: STATE ENDEMIC

Occurrences in Wyoming:
Known from 25 occurrences in Wyoming, all of which have been surveyed or discovered since 1987 (most recently in 1998).

Abundance:
Individual populations may be extremely abundant locally or cover large areas of suitable ridge-top alpine habitat.

Range:
Endemic to Wyoming; known from the Salt River, Wyoming, Teton, and Wind River ranges in Lincoln, Sublette, and Teton counties. Dorn (1988) includes this species with A. molybdenus, a regional endemic of Colorado.

Trends:
Trend data are lacking, but most populations appear to be stable.

Protection status:
At least 3 occurrences are protected within the Bridger and Gros Ventre Wilderness Areas (Bridger-Teton NF), and parts of 4 other occurrences are within Grand Teton National Park. All other reports are from public lands managed for multiple use.

Threats:
Sheep grazing may be a potential threat at some sites, but most occurrences are at sufficiently high elevation and in physically protected sites that receive little use or impacts.

Managed Areas:
Known occurrences are on lands managed by Bridger-Teton and Targhee NFs and Grand Teton NP.

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Author:
Walter Fertig

Updated:
00-06-14

ASTRAGALUS TERMINALIS

RAILHEAD MILKVETCH
FABACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G3State: S1
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Railhead milkvetch is a perennial herb from a woody, forked caudex with several erect, leafy stems 5-30 cm high. Foliage is ashy-gray with short, appressed, dolabriform hairs (hairs are attached at the middle and have 2 free ends, like a short "T"). Leaves are 5-17 cm long and divided into 11-21 oblong-elliptic, blunt-tipped leaflets. Stipules are lance-shaped, 3-5 mm long, and not fused on the side of the stem opposite the petiole. The inflorescence is a compact raceme of 10-30 nodding pea-like flowers borne on a peduncle 6-20 cm long. The banner and wing petals are 11-16 mm long, whitish to cream-colored, and often suffused with pale lilac, while the blunt-tipped keel is creamy white with a purple spot at the tip and 8.5-10.5 mm long. The calyx is 4-7 mm long, asymmetrical, and has short triangular teeth. Fruits are erect, narrowly oblong pods up to 1.7 mm long and have 2 locules. The pods are green and fleshy when young, but become leathery-woody at maturity (Barneby 1989; Culver and Marriott 1989; Fertig 1998).

Synonyms: none

Similar Species:
ASTRAGALUS MISER has a sharp-pointed keel, stipules fused on the side of the stem opposite the petiole, greenish leaves, and fruits with a single locule. A. CANADENSIS has stipules fused on the side of the stem opposite the petiole (Dorn 1992).

Flowering/Fruiting Period:
June-August.

Distribution:
Railhead milkvetch is a regional endemic of central Idaho, southwestern Montana, and northwestern Wyoming. All known Wyoming occurrences are from Jackson Hole and the surrounding foothills of the Gros Ventre Range.

Habitat:
Occurs in gravelly outwash terraces, stony or grassy hillsides, and cushion plant-bunchgrass communities on summit flats of brownish-sandy clay soil with abundant surface gravel.

Associated Rare Species: none

Occurrences in Wyoming:
Known from 5 extant and 2 historical records in Wyoming, three of which have been relocated or discovered since 1995. Several of the records are in close proximity and may need to be combined with additional study.

Abundance:
Population size is not known, although the species appears to be restricted to narrow corridors of river cobblestone habitat. Shaw (1976) refers to Grand Teton NP populations as "common".

Range:

Regional endemic of C Idaho, SW Montana, and NW Wyoming. In Wyoming, known only from Jackson Hole and the foothills of the Gros Ventre Range (Teton County).

Trends:
Trend data are lacking, but populations appear to be stable.

Protection status:
At least 4 occurrences are found in Grand Teton National Park or the National Elk Refuge. Other records are from public lands managed for multiple use.

Threats:
Populations outside of the park may be potentially threatened by gravel quarrying.

Managed Areas:
Known from Bridger-Teton NF, Grand Teton NP, and the National Elk Refuge.

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Author:
Walter Fertig

Updated:
00-06-14

ATHYRIUM DISTENTIFOLIUM VAR AMERICANUM

AMERICAN ALPINE LADY FERN
DRYOPTERIDACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G4G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
American alpine lady fern is a clump-forming perennial with short, stout rhizomes densely covered by remnant leafstalk bases from previous years. The closely tufted leaves (fronds) are 20-80 cm long, oblong-lanceolate, and thrice pinnately compound (the primary leaflets are divided into secondary leaflets with are themselves pinnately lobed). Leafstalks (stipes) are much shorter than the leaf blades and have brown or blackish membranous scales. The longest leaflets are 2.5-8 cm long and are often folded or rolled, giving the plant a dried up appearance. The clusters of spore-containing sporangia (fruit dots or sori) are round, less than 1 mm wide, and borne on the underside of the leaflets along the margins. The sori lack a membranous cover (indusium) (Harrington 1954; Hitchcock et al. 1969; Marriott 1993; Fertig 1993).

Synonyms:

Similar Species:
ATHYRIUM FILIX-FEMINA differs in having larger fronds with elongate sori and a curved or horseshoe-shaped indusium. CYSTOPTERIS FRAGILIS appears to lack an indusium when the sporangia are fully mature, but can be distinguished by its twice-compound leaves and absence of persistant leafstalk bases. WOODSIA ssp. differ in having twice compound leaves and finely pubescent leafstalks (Dorn 1992).

Flowering/Fruiting Period:
July-August.

Distribution:
In Wyoming this species is known from the Teton Range (Teton County) and the Snowy Range (Medicine Bow Mountains, Albany County).

Habitat:
Occurs on rocky talus slopes and along rushing streams from 8300-11400 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from 5 locations, all of which have been discovered or relocated since 1991.

Abundance:
Populations relatively small in Grand Teton NP, although not all of the potential habitat has been surveyed (Marriott 1993). Previously thought to be extirpated in Medicine Bow NF (Fertig 1993), but a small population was relocated there in 1996 (62 years after being last observed).

Range:
Peripheral in Wyoming. Known from the Teton Range (Teton County) and the Medicine Bow Mountains (Albany County).

Trends:
Trends not known.

Protection status:
3 occurrences are protected in Grand Teton National Park and one is protected in the Medicine Bow Peak Special Botanical Area (Medicine Bow NF). Previous reports from Yellowstone National Park are based on a misidentified specimen (Jennifer Whipple, personal communication).

Threats:
Threats are low due to plant's rugged habitat. Potentially threatened by trampling if trails are routed through its habitat. Overcollection for specimens may have reduced the Medicine Bow Peak population (many more sheets exist in various herbaria than are known to exist in the SBA!).

Managed Areas:
Known from Grand Teton National Park and Medicine Bow and Targhee National Forests.

References:

Marriott, H.J. 1993. Rare Plants of Grand Teton National Park, Final Report. Prepared for the National Park Service by the Wyoming Nature Conservancy.

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Author:
Walter Fertig

Updated:
00-11-24

BOTRYCHIUM VIRGINIANUM

RATTLESNAKE FERN
OPHIOGLOSSACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Rattlesnake fern is a perennial fern with a single leaf divided into a vegetative (sterile) segment and spore-bearing (fertile) segment, joined by a common leafstalk 10-31 cm long. The vegetative leaf segment is sessile (or essentially so) with a 3-4 times pinnately compound triangular blade 5-25 cm long and 7-30 cm wide. The blade has up to 12 pairs of sessile, sharp-tipped pinnae (leaflets). The fertile leaf segment is on an elongate stalk 4-17 cm long and has a multi-branched blade 2.5-15 cm long that greatly exceeds the vegetative leaf segment (Dorn 1992; Lellinger 1985; Hitchcock et al. 1969).

Synonyms:

Similar Species:
Botrychium multifidum has stalked vegetative leaf segments attached to the spore-bearing (fertile) segment at ground level. Other Botrychiumspecies have simple or twice-compound vegetative leaf blades. Gymnocarpium dryopteris has fertile and vegetative leaf blades that are morphologically identical with the lowest pair of leaflets stalked (Dorn 1992).

Flowering/Fruiting Period:
Produces spores in late summer.

Distribution:
Southern Alaska to Labrador, south to Oregon, Arizona, Texas, Kansas, and Florida. In Wyoming, known from the Black Hills, Bighorn, Absaroka, and Teton ranges in Crook, Park, Sheridan, and Teton counties. Recently reported from the Yellowstone Plateau (Jennifer Whipple, pers. comm.) based on a specimen at the Denver Botanical Garden Herbarium.

Habitat:
This species occurs in moist, shaded areas, in gulch bottoms, the understory of Spruce forests, and limestone cliffs. The substrate is often described as calcium rich.
Most of the known populations of this species in Wyoming are small in area and number of individuals. Populations in the Black Hills may be suseptible to habitat loss.

Associated Rare Species:

Occurrences in Wyoming:
Known from 6-7 occurrences in Wyoming, 4 of which have been observed or discovered since 1982. Reported from Yellowstone National Park by Jennifer Whipple based on a specimen at the Denver Botanical Garden herbarium (confirmation is still needed).

Abundance:
Most Wyoming populations are small in area and number of individuals. Reported as rare by Dorn, and not been relocated in either the 1985 or 1991 surveys(EO#2).

Range:

Peripheral; in Wyoming, known from the Black Hills (Crook Co.), Teton Range (Teton Co.), Bighorn Range (Sheridan Co.), and Absaroka Range (Park Co). Also reported for Yellowstone National Park.

Trends:
Trends are not known. Populations in the Black Hills may be vulnerable to habitat loss.

Protection status:
Known from the Swamp Lake Special Botanical Area (Shoshone National Forest) and Dugout Gulch Botanical Management Area (Black Hills National Forest). The Bighorn Range population is within the potential Mann Creek Research Natural Area. The species is reported to occur in Yellowstone National Park.

Threats:
May be threatened by forestry and road construction activities in the Black Hills and receational development in the Tetons.

Managed Areas:
Occurs on lands managed by Bighorn, Black Hills, Shoshone, and Targhee National Forests. Also reported from Yellowstone National Park.

References:

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Porter, C.L. 1962. A Flora of Wyoming, Part 1. Bulletin 402:1-39. Agricultural Experiment Station, University of Wyoming.
Colorado Native Plant Society. 1997. Rare Plants of Colorado, second edition. Falcon Press Publ., Helena, MT.

Author:
Walter Fertig

Updated:
00-11-24

BRAYA GLABELLA

BRASSICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:USFS Region 2 Sensitive.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List:

Description:
Arctic braya is a perennial herb with 1-many leafless stems 3.5-17 cm tall. Flowering stems and leaves are densely pubescent with simple or branched hairs. The somewhat fleshy basal leaves are entire or occasionally weakly-toothed, linear to broadly spoon-shaped, and 1-6 cm long. The inflorescence is a head-like cluster of white to purple-tinged, 4-petaled flowers 2.5-4.5 mm long. Frutis are oval to oblong, pubescent siliques 5-15 mm long with broad replum margins and a thick style 0.5-2 mm long (Rollins 1993; Spackman et al. 1997).

Synonyms:

Similar Species:
BRAYA HUMILIS has having leafy stems and narrow, linear fruits.

Flowering/Fruiting Period:
The flowering period for this species is from June to August (Rollins 1993).

Distribution:
Arctic braya occurs from Siberia to northern Canada south to Michigan and Alberta. Disjunct populations are found in northwest Wyoming (Gros Ventre Range in Sublette County) and central Colorado.

Habitat:
Rangewide, BRAYA GLABELLA is found in barren areas with gravelly, limey soils. In Wyoming, it occurs on barren cliff edges of calcareous rocky soils within a matrix of DRYAS OCTOPETALA-CAREX RUPESTRIS vegetation (cover less than 5%).
This species is known from one population in Wyoming that contains less than 5 individuals. The habitat that contains this population is highly protected and recieves little use, making this population relatively safe from chance disturbances.

Associated Rare Species:

Occurrences in Wyoming:
Known from 2 occurrences in Wyoming, both discovered since 1994 (most recently in 1998).

Abundance:
Populations are small and highly localized.

Range:
Disjunct; in Wyoming known only from the Gros Ventre Range in Sublette and Teton counties.

Trends:
Not known.

Protection status:
The entire state range is found within the Gros Ventre Wilderness Area in Bridger-Teton National Forest.

Threats:
Population size appears to be very small, making the species vulnerable to chance disturbances. Otherwise, the habitat is highly protected and receives little use.

Managed Areas:
Occurs on Bridger-Teton National Forest.

References:

Rollins, R.C. 1993. The Cruciferae of Continental North America, Systematics of the Mustard Family from the Arctic to Panama. Stanford Univ. Press, Stanford, CA. 976 pp.

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Fertig, W. 2000. Rare vascular plant species in the Wyoming portion of the Utah-Wyoming Rocky Mountains Ecoregion. Prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.

Colorado Native Plant Society. 1997. Rare Plants of Colorado, second edition. Falcon Press Publ., Helena, MT.

Author:
Walter Fertig

Updated:
00-11-24

CAREX CUSICKII

CUSICK'S SEDGE
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Cusick sedge is a coarse, densely clustered graminoid 3-12 dm tall. Basal leaves are poorly developed with very short or no blades. Stem leaves are long (often surpassing the stem), flat (3-6 mm wide), with conspicuous red dots. Sheaths are coppery colored near the apex. Spikes are short and numerous, with staminate flowers inserted above the pistillate ones. Perigynia are distinctly pear-shaped, 2.5-3.5 mm long, and strongly veined on at least one surface (Hitchcock and Cronquist 1969).

Synonyms:

Similar Species:
Carex diandra differs in having a shorter (2-3.5 cm) inflorescence, narrower leaves (1-3 mm wide), and sheaths which are not copper-colored. C. stipata has longer (4-5.2 mm) perigynia, and sheaths which have conspicuous horizontal folds (Dorn 1992).

Flowering/Fruiting Period:
June-Sept.

Distribution:
Southern British Columbia, Washington and Oregon, east to Montana, south to western Wyoming and Central Idaho. In Wyoming it is known to Yellowstone National Park, Grand Teton National Park, and the John D. Rockefeller Parkway, in Park and Teton Counties.

Habitat:
Throughout its range, Cusick sedge is found in marshes, wet meadows, and other low places, especially sphagnum bogs (Hitchcock and Cronquist 1969). In Wyoming, it occurs along creeks, on flood plains and along slow-moving rivers at 6400-7200 feet.

Associated Rare Species:

Range:
Peripheral; northwest Wyoming.

References:

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Hermann, F.J. 1970. Manual of the CARICES of the Rocky Mountains and Colorado Basin. Agriculture Handbook 374: 1-397. USDA Forest Service, Washington DC.

Hurd, E.G., N.L. Shaw, J. Mastrogiuseppe, L.C. Smithman, and S. Goodrich. 1998. Field Guide to Intermountain Sedges. Rocky Mountain Research Station General Technical Report RMRS-GTR-10.

Hitchcock, C.L., A. Cronquist, and M. Owenbey. 1969. Pt. 1. Vascular Cryptograms, Gymnosperms, and Monocotyledons, IN: Hitchcock, C.L., A. Cronquist, M. Owenbey, and J.W. Thompson (eds). Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(1): 1-914.

Author:
MARRIOTT, H.

Updated:
01-03-15

CAREX DEWEYANA VAR BOLANDERI

BOLANDER'S SEDGE
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5T5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Bolander's sedge is a loose to densely tufted perennial graminoid with short rhizomes and weakly ascending, roughened culms 20-100 cm tall. Leaves are borne on the lower half of the stem but may exceed the inflorescence and have light to yellowish green, flat blades 2-5 mm wide. The 2-8 cm long inflorescence consists of 4-10 loosely aggregated greenish, sessile spikes, each 7-20 mm long and bearing erect-ascending pistillate flowers above the staminate ones. The lowest spike is subtended by a short, sheathless bract. Pistillate scales are oblong to ovate, with whitish-brown membranous margins and a firm green midrib that extends to a sharp tip. The greenish to straw-colored perigynia are narrowly elliptic, 3.2-4.5 mm long, and taper to a serrate-margined, bi-toothed beak 0.8-2 mm long. Pistillate flowers have 2 stigmas and achenes are 2-sided and 1.5-2 mm long (Dorn 1992; Hurd et al. 1998, Cronquist et al. 1977; Hitchcock et al. 1969).

Synonyms:

Similar Species:
Carex deweyana var. deweyana has an inflorescence with 2-4 spikes, perigynia 4.5-5.5 mm long, and achenes to 2.5 mm long. C. laeviculmis has a perigynium beak 0.5-1 mm long and leaves 1-2 mm wide. Other Wyoming Carex spp. with 2 stigmas, wingless perigynia, and pistillate flowers above the staminate flowers have perigynia with shorter beaks or reddish brown to chestnut colored spikes (Dorn 1992).

Flowering/Fruiting Period:
June-August.

Distribution:
CAREX DEWEYANA occurs from the Northwest Territories and British Columbia to Labrador and south to Pennsylvania, Michigan, Iowa, Colorado, and California. VAR BOLANDERI is the cordilleran phase of the species, extending from British Columbia to California, Utah, and Colorado. In Wyoming, VAR BOLANDERI occurs in the Absaroka and Salt River ranges in Park and Lincoln counties and has been recently reported from the Teton Range (Teton County).

Habitat:
Forest openings, moist woodlands, and steambanks in the mountains.

Associated Rare Species:

Occurrences in Wyoming:
Known from 3 extant occurrences in Wyoming, all observed between 1976-1987. Also recently reported from the Grand Teton area.

Abundance:
Not known.

Range:

Peripheral; in Wyoming known only from the Salt River and Absaroka ranges in Lincoln and Park counties. May also occur in Teton County.

Trends:
Not known.

Protection status:
All known occurrences are on public lands managed for multiple use. One population is found within the proposed Swift Creek Research Natural Area on Bridger-Teton National Forest.

Threats:
May be impacted by changes in wetland habitats.

Managed Areas:
Occurs on lands managed by Bridger-Teton and Shoshone National Forests.

References:

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Hermann, F.J. 1970. Manual of the CARICES of the Rocky Mountains and Colorado Basin. Agriculture Handbook 374: 1-397. USDA Forest Service, Washington DC.

Fertig, W. 1998. The status of rare plants on Shoshone National Forest: 1995-97 survey results. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

Hurd, E.G., N.L. Shaw, J. Mastrogiuseppe, L.C. Smithman, and S. Goodrich. 1998. Field Guide to Intermountain Sedges. Rocky Mountain Research Station General Technical Report RMRS-GTR-10.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. Volume 6, The Monocotyledons. Intermountain Flora: Vascular Plants of the Intermountain West, USA. Columbia University Press, New York.

Author:
Walter Fertig

Updated:
99-11-30

CAREX DIANDRA

LESSER PANICLED SEDGE
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S2
WYNDD Plant List: PERIPHERAL

Description:
Lesser panicled sedge is a densely tufted perennial graminoid with sharply triangular, rough-edged stems (culms) 30-70 cm high. Leaves are 1-3 mm wide with red spots or streaks on their membranous sheaths. The linear, elongated inflorescence is 1.5-6 cm long and composed of numerous individual, but closely compressed, spikes. Pistillate scales are brownish with membranous (hyaline) margins, and are wider, but mostly shorter, than the perigynia. Perigynia are rounded on the back and glossy brown, with a prominently serrate-margined beak that has a distinct dorsal fold, and they are deciduous earlier than most other montane sedges. Achenes are lens-shaped with 2 stigmas (Fertig and Jones 1992; Hermann 1970).

Synonyms: none

Similar Species:
CAREX SIMULATA is rhizomatous. C. CUSICKII has a longer, less compacted inflorescence and leaf sheaths that are distinctly copper-colored at the tip (Dorn 1992; Hitchcock and Cronquist 1973).

Flowering/Fruiting Period:
July-August.

Distribution:
Circumpolar; in North America found from Newfoundland to the Yukon and south to New Jersey, Indiana, Colorado, and California (Hermann 1970). Peripheral in Wyoming, where it is known from the Beartooth, Medicine Bow and Absaroka ranges and Yellowstone Plateau.

Habitat:
On floating and non-floating moss mats, pond edges, and hummocks in open shrub and sedge meadows at 6100-8600 feet. Soils often influenced by limestone.

Associated Rare Species:
POTENTILLA PALUSTRIS.

Occurrences in Wyoming:
Known from 7-9 recent records (all observed since 1985) and 2 older reports prior to 1963. Several occurrences are in the same general area (although isolated by unsuitable habitat), and perhaps should be considered subpopulations of one larger metapopulation.

Abundance:
Individual populations often locally abundant within small areas of suitable habitat.

Range:
Peripheral. In Wyoming known from the Absaroka, Beartooth, and Medicine Bow ranges, Yellowstone Plateau, and Jackson Hole Valley in Albany, Park, and Teton counties.

Trends:
Extant populations appear to be stable to partly declining due to habitat loss.

Protection status:
3 populations are protected in the Swamp Lake Special Botanical Area, Grand Teton National Park, and Yellowstone National Park. Other occurrences are on public lands managed for multiple use.

Threats:
May be threatened by trampling, grazing, and development of wetland habitats.

Managed Areas:
Known from lands managed by Medicine Bow and Shoshone National Forests and Grand Teton and Yellowstone National Parks.

References:
Fertig, W. and G. Jones. 1992. Plant communities and rare plants of the Swamp Lake Botanical Area, Clarks Fork Ranger District, Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database.

von Ahlefeldt, J. 1993. Medicine Bow National Forest Sensitive plant species (Region 2 list) and species of special concern (Nature Conservancy). Unpublished report prepared by Medicine Bow National Forest. 35 pp.

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Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Fertig, W. 1997. Plant species of special concern on Shoshone National Forest: 1996 survey results. Unpublished report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

Hermann, F.J. 1970. Manual of the CARICES of the Rocky Mountains and Colorado Basin. Agriculture Handbook 374: 1-397. USDA Forest Service, Washington DC.

Hitchcock, C.L., A. Cronquist, and M. Owenbey. 1969. Pt. 1. Vascular Cryptograms, Gymnosperms, and Monocotyledons, IN: Hitchcock, C.L., A. Cronquist, M. Owenbey, and J.W. Thompson (eds). Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(1): 1-914.

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Porter, C.L. 1965. A Flora of Wyoming: Part IV. Bulletin 434:1-88. Agricultural Experiment Station, University of Wyoming.

Author:
Walter Fertig

Updated:
00-11-25

CAREX LAEVICULMIS

SMOOTH-STEMMED SEDGE
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Smooth-stemmed sedge is a densely clustered but weak and slender graminoid 3-7 dm tall. Leaves are concentrated near the base, about as long as the stems or a little shorter, 1-2 mm wide. The 3-8 spikes are very short (4-8 mm), widely spaced along the rachis, and mostly with just pistillate (female) flowers (except for the terminal spike which has both staminate [male] and pistillate flowers). Perigynia are convex on one side, 2.5-4 mm long, lightly nerved on both sides, and tapering to a sharp beak 1/4 to 1/3 the length of the body (Herman 1970).

Synonyms:

Similar Species:
Carex canecens is a more robust plant with leaves 2-4 mm wide, and with longer spikes, each having 10-30 perigynia. C. brunnescens has perigynia which are more abruptly contracted to a very short beak (less than 1/4 length of the body) (Hitchcock and Cronquist 1969). Carex disperma has spikes on which the staminate (male) flowers are attached above the pistillate (female) ones, and with only 2-5 perigynium per spike, the perigynium very rounded and with a very short beak (Herman 1970).

Flowering/Fruiting Period:
July-September.

Distribution:
Alaska, south to Washington, Oregon, and California, east to southeast British Columbia, Montana and northwest Wyoming. In Wyoming it is known only to Grand Teton National Park and the John D. Rockefeller Parkway in Teton County.

Habitat:
Herman (1970) describes the habitat as boggy banks of streams, grassy borders of woods, edges of springs, or in moist woods at 1200-6000 feet. In Wyoming, the species is found along lake shores and streamsides at 6300-7100 feet.

Associated Rare Species:

Occurrences in Wyoming:
Based on distribution maps at Rocky Mountain Herbarium, University of Wyoming.

Range:
Peripheral; northwest Wyoming.

References:

Hermann, F.J. 1970. Manual of the CARICES of the Rocky Mountains and Colorado Basin. Agriculture Handbook 374: 1-397. USDA Forest Service, Washington DC.

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Author:
MARRIOTT, H.

Updated:
01-03-15

CAREX LEPTALEA

BRISTLY-STALK SEDGE
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S2
WYNDD Plant List: PERIPHERAL

Description:
Bristly-stalk sedge is a densely tufted graminoid with slender, weakly ascending to arching triangular stems 15-70 cm long. Leaves are generally 2 per culm, flat, deep green, 0.5-1.3 mm wide, and shorter than the inflorescence. The bractless inflorescence consists of a single linear-oblong spike 4-16 mm long and 2-3 mm wide with the inconspicuous staminate flowers above the 1-10 pistillate flowers. Pistillate scales are yellowish-green to pale brown, ovate to orbicular (with a short awn on the upper scales), early deciduous, and shorter than the perigynia. The erect, finely-nerved, pale green to yellowish perigynia are 2.5-5 mm long, 1-1.5 mm wide, and rounded at the tip. Achenes are oblong-ovoid, 3-sided, and glossy yellowish-brown. Stigmas 3, short (Dorn 1992; Hermann 1970; Hurd et al. 1998).

Synonyms:

Similar Species:
CAREX GEYERI has perigynia over 5 mm long and 2 mm wide and has a prominent staminate portion of the spike. C. GYNOCRATES has flowers with 2 stigmas.

Flowering/Fruiting Period:
Flowers and fruits produced from June-early September.

Distribution:
Labrador to Alaska and south to Florida, Texas, Utah, Colorado, and northern California (Hermann 1970). In Wyoming, bristly-stalk sedge is known from the Absaroka, Beartooth, and Teton ranges, Yellowstone Plateau, and Jackson Hole in Park and Teton counties.

Habitat:
Wet meadows, bogs, and swamp forests (Hitchcock et al. 1969). In Wyoming, populations occur in white spruce or Engelmann spruce swamp forests on mossy hummocks or in CAREX ROSTRATA/C. AQUATILIS and CAREX BUXBAUMII swamps.

Associated Rare Species:

Occurrences in Wyoming:
Known from at least 11 extant occurrences and 2 historical records in Wyoming, 9 of which have been observed since 1992.

Abundance:
Census data are lacking for most occurrences. Recently observed colonies in the Beartooth Range consist of widely scattered, but densely clustered tussocks restricted to small areas.

Range:
Peripheral; Known from the Absaroka, Beartooth, and Teton ranges, Yellowstone Pleateau, and the Jackson Hole Valley in Park and Teton Counties and Yellowstone NP.

Trends:

Extant populations appear to be stable at present, but long-term trends may be down due to loss or degradation of wetland forest habitats.

Protection status:
At least 9 occurrences are found in the Absaroka-Beartooth Wilderness Area, Swamp Lake Special Botanical Area, and Grand Teton and Yellowstone National Parks. Several Grand Teton park records are old, however, and may not be extant. Also occurs in the potential Lake Creek Bogs RNA.

Threats:
Populations may be threatened by logging, grazing, or recreational impacts on its wetland habitat.

Managed Areas:
Occurs on lands managed by Shoshone and Targhee National Forests and Grand Teton and Yellowstone National Parks.

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Colorado Native Plant Society. 1997. Rare Plants of Colorado, second edition. Falcon Press Publ., Helena, MT.

Porter, C.L. 1965. A Flora of Wyoming: Part IV. Bulletin 434:1-88. Agricultural Experiment Station, University of Wyoming.

Author:
Walter Fertig

Updated:
00-11-25

CAREX LIVIDA

LIVID SEDGE
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:USFS Region 2: Sensitive.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: DISJUNCT

Description:
Livid sedge is a rhizomatous or loosely tufted perennial 10-40 cm tall. Leaves are 1-4 mm wide, deeply grooved down the middle, waxy-bluish-green, and found only on the lower 1/3 of the stem. The uppermost flowering spike is entirely staminate, 1-2.5 cm long, and on a long stalk. The 1-3 lateral spikes are 1-2.5 cm long, all pistillate, and nearly sessile. The bract subtending the lowest spike is leaf-like and up to 7 cm long. Pistillate flower scales are oval with a broad, green midrib stripe, brown marginal stripes, and white-membranous edges. The perigynia are oblong-ovate and taper to the tip, waxy-green (glaucous), and minutely bumpy on the surface. The achenes are three-sided with 3 stigmas (Fertig et al. 1994; Fertig and Jones 1992; Hermann 1970; Hitchcock et al. 1969; Moss 1983).

Synonyms:

Similar Species:
CAREX AQUATILIS has long-stalked spikes and flowers with 2 stigmas. CAREX BUXBAUMII has pistillate flowers at the tip of the terminal spike and long-tapering (awned) scales. C. LIMOSA has drooping spikes on slender stalks (Dorn 1992).

Flowering/Fruiting Period:
Flowering and fruiting in June-August.

Distribution:
Southern Alaska to Newfoundland, south to California, northwest Montana, Michigan, and New Jersey. Disjunct in Colorado and the Absaroka Mountains and Yellowstone Plateau of Wyoming (Fertig et al. 1994).

Habitat:
Floating mats, bogs, fens, and marls dominated by CAREX species, often on wet hummocks. Elevation 6460-6600 ft.

Associated Rare Species:
CAREX BUXBAUMII, C. LIMOSA, KOBRESIA SIMPLICIUSCULA, SCHEUCHZERIA PALUSTRIS, GENTIAMOPSIS SIMPLEX, ASTER JUNCIFORMIS.

Occurrences in Wyoming:
Known from 5 extant occurrences in Wyoming, all of which have been discovered or relocated since 1991 (most recently in 1999).

Abundance:
Populations can be locally abundant, although suitable habitat is sometimes limited.

Range:
Disjunct; in Wyoming, known only from the Yellowstone Plateau and Absaroka Range in Park and Teton counties. County).

Trends:

Probably stable.

Protection status:
At least 4 occurrences are protected within Yellowstone National Park and the Swamp Lake Special Botanical Area. This species is listed as Sensitive in USFS Region 2.

Threats:
Some occurrences in Yellowstone NP could be impacted by road construction and expansion.

Managed Areas:
Occurs on lands managed by Shoshone National Forest and Yellowstone National Park.

References:

Fertig, W. and G. Jones. 1992. Plant communities and rare plants of the Swamp Lake Botanical Area, Clarks Fork Ranger District, Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database.

Fertig, W. 1994. Guide to Sensitive Wyoming plants of US Forest Service Region 2 (with emphasis on plants of Bighorn, Medicine Bow, and Shoshone National Forests). Unpublished report prepared as a handout for the TES species identification workshop conducted for US Forest Service Region 2 in Laramie, WY, 11 May 1994.

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Lesica, P. & J. S. Shelly. 1991. Sensitive, Threatened and Endangered Vascular Plants of Montana. Montana Natural Heritage Program, Occ. Publ. No. 1. Helena, MT.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.
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Mills, S. and W. Fertig. 1996. Field guide to rare and Sensitive plants of the Shoshone National Forest. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

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Colorado Native Plant Society. 1997. Rare Plants of Colorado, second edition. Falcon Press Publ., Helena, MT.

Author:
Walter Fertig

Updated:
00-11-24

CAREX LUZULINA VAR ATROPURPUREA

BLACK AND PURPLE SEDGE
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:USFS R4: Sensitive.

Heritage Rank:
Global: G5T3State: S2
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Black and purple sedge is a tufted perennial with stems (culms) 15-60 cm high. The leaves are crowded near the base, shorter than the culms, flat, and 2-4 mm wide. The The uppermost spike has all staminate flowers or staminate flowers located above the pistillate and is mostly 1-2 cm long. Lower spikes number 3-5 and are entirely pistillate, 1-3 cm long, and borne on erect stalks. The pistillate scales are blackish to brownish-purple and pointed at the tip. Perigynia are hairy, lanceolate, mostly 3-5 mm long, 1-1.5 mm wide, distinctly compressed, and have 2 prominent marginal nerves. Achenes are three-sided with 3 stigmas (Hitchcock et al. 1969; Dorn 1992; Fertig et al. 1991; Fertig et al. 1994).

Synonyms:

Similar Species:
Carex luzulina var. ablata has wider leaf blades and round-tipped, greenish, straw-colored, or reddish-brown pistillate flower scales. C. misandra has drooping spikes on slender stalks, and pistillate flowers located above the staminate ones (Fertig et al. 1994). C. atrata has hairless perigynia.

Flowering/Fruiting Period:
Flowering and fruiting July-August.

Distribution:
Regional endemic of eastern Idaho, southwestern Montana, and western Wyoming. In Wyoming it is known only from the Wind River and Gros Ventre ranges in Fremont, Sublette, and Teton counties.

Habitat:
Subalpine moist rocky sedge or willow-dominated meadows along creek banks and ponds at 10000-10600 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from 10 occurrences in Wyoming, 6 of which have been discovered since 1990.

Abundance:
Size of individual populations is unknown.

Range:
Regional endemic of western Wyoming and Montana; in Wyoming known from the Wind River and Gros Ventre ranges in Fremont, Sublette, and Teton counties.

Trends:
Not known.

Protection status:

All known occurrences are found in designated Wilderness areas (Bridger, Gros Ventre, and Popo Agie). This species is listed as Sensitive in USFS Region 4.

Threats:
Potential threats include grazing (most likely by sheep) and habitat disturbance.

Managed Areas:
Occurs on Bridger-Teton and Shoshone National Forests.

References:

Fertig, W., R.L. Hartman, and B.E. Nelson. 1991. General floristic survey of the west slope of the Wind River Range, Bridger-Teton National Forest, 1990. Report prepared by the Rocky Mountain Herbarium, University of Wyoming, for the Bridger-Teton National Forest, 30 April 1991.

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Heidel, B. 1996. Noteworthy Collections - Montana. Madrono 43: 436-440.

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Fertig, W. 2000. Rare vascular plant species in the Wyoming portion of the Utah-Wyoming Rocky Mountains Ecoregion. Prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.

Author:
Walter Fertig

Updated:
00-06-15

CAREX PRESLII

PRESL SEDGE
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G4State: S1
WYNDD Plant List: PERIPHERAL

Associated Rare Species:

Occurrences in Wyoming:
Based on distribution maps at Rocky Mountain Herbarium, University of Wyoming.

Range:
?; northwest Wyoming.

Trends:

Managed Areas:
This taxon is included in C. pachystachya by some authors.

Author:
MARRIOTT, H.

Updated:
88-02-23

CAREX PROPOSITA

SMOKY MOUNTAIN SEDGE
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G4State: SH
WYNDD Plant List:

Associated Rare Species:

Occurrences in Wyoming:
Known from a single historical record in Wyoming, last observed in 1899.

Abundance:
Not known.

Range:
Regional endemic of north-central Washington, central Idaho, and northwest Wyoming; in Wyoming known only from the Teton Mountains (Teton County).

Trends:
Not known.

Protection status:
The single Wyoming occurrence may be from Grand Teton National Park.

Threats:
Not known. This is mostly a high elevation species that may be relatively unthreatened.

Managed Areas:
This occurrence may also be from Bridger-Teton NF lands (or possibly the Targhee NF). C. PROPOSITA is thought to be of hybrid origin between CAREX HAYDENIANA and C. PHAEOCEPHALA.

References:

Hitchcock, C.L., A. Cronquist, and M. Owenbey. 1969. Pt. 1. Vascular Cryptograms, Gymnosperms, and Monocotyledons, IN: Hitchcock, C.L., A. Cronquist, M. Owenbey, and J.W. Thompson (eds). Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(1): 1-914.

Hurd, E.G., N.L. Shaw, J. Mastrogiuseppe, L.C. Smithman, and S. Goodrich. 1998. Field Guide to Intermountain Sedges. Rocky Mountain Research Station General Technical Report RMRS-GTR-10.

Author:
Walter Fertig

Updated:
99-03-11

CAREX SCIRPOIDEA VAR SCIRPIFORMIS

CANADIAN SINGLE-SPIKE SEDGE
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5T4QState: S1
WYNDD Plant List: PERIPHERAL

Description:
Canadian single-spike sedge is a tufted perennial with stems 20-45 cm high. The stems originate from vegetative shoots of the current year and have scaly bases that are not hidden by dried, tattered leaves remaining from the previous year. Each stem has 2-6 somewhat channeled leaves that are 2-3 mm wide. Spikes are solitary, erect, and unisexual. Pistillate spikes are linear, 2-4 cm long, 4-5 mm wide, and have 30-80 flowers. Perigynia are oblong-ovoid, obscurely 3-sided, greenish to yellowish brown, abruptly contracted to a 2-toothed beak, and stiffly short-pubescent. The pubescent pistillate and staminate flowering scales are purplish-black with a lighter center stripe and broad white-hyaline margins (nearly 1/2 width of the scale). Achenes are sharply trigonous, brownish-yellow, and short-stalked (Hermann 1970; Fertig and Jones 1992; Dorn 1992; Fertig 1998).

Synonyms:

Similar Species:
CAREX SCIRPOIDEA VAR SCIRPOIDEA has flowering bracts with more narrowly hyaline margins (white membranous edge is only 1/4 or less the width of the bract). CAREX PARRYANA VARS PARRYANA and UNICA have glabrous perigynia with minutely-toothed margins and flowering bracts with green midribs (Dorn 1992; Fertig 1998).

Flowering/Fruiting Period:
June-August.

Distribution:
Occurs from Manitoba to Alberta and south to North Dakota, northern Wyoming, and Utah (Hermann 1970). In Wyoming, known from the Northern Absaroka Range and Jackson Hole.

Habitat:
Occurs in open, sunny sites, often at the edge of wet meadows, on calcareous substrates (Hermann 1970). At Swamp Lake, it has been observed on semi-moist hummocks in marly TRIGLOCHIN-ELEOCHARIS communities and on floating mats of CAREX SIMULATA/CALAMAGROSTIS INEXPANSA (Fertig and Jones 1992). Populations on the National Elk Refuge are mostly on exposures of dry to moist marl-clay near seep springs and dried stream channels.

Associated Rare Species:

Occurrences in Wyoming:
Known from 2 occurrences in Wyoming, both observed since 1992.

Abundance:
Census data are lacking, but known populations appear to be restricted to small areas (ca 5-10 acres or less) and specialized microhabitats.

Range:
Peripheral; in Wyoming known only from Jackson Hole and the Clarks Fork Valley in Park and Teton counties.

Trends:
Not known.

Protection status:
Both known occurrences are within special management areas: Swamp Lake SBA and the National Elk Refuge.

Threats:
May be impacted by changes in water levels in its wetland habitat.

Managed Areas:
Occurs on lands managed by Shoshone National Forest and the National Elk Refuge (US Fish and Wildlife Service).
Dunlop and Crow (1999) consider VAR SCIRPIFORMIS to be a synonym of SSP SCIRPOIDEA.

References:

Fertig, W. and G. Jones. 1992. Plant communities and rare plants of the Swamp Lake Botanical Area, Clarks Fork Ranger District, Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database.

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Dunlop, D.A. and G.E. Crow. 1999. The taxonomy of CAREX section SCIRPINAE (Cyperaceae). Rhodora 101:163-199.

Author:
Walter Fertig

Updated:
99-07-25

CRYPTOGRAMMA STELLERI

FRAGILE ROCKBRAKE
PTERIDACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: DISJUNCT

Description:
Fragile rockbrake is a perennial fern with leaves scattered along a creeping, scaly rhizome. Leaves are of 2 types, with separate and morphologically distinct vegetative (sterile) and sporangia-bearing (fertile) forms. Vegetative leaves have long, glabrous, reddish-brown leafstalks and thin, once to twice compound, lance-shaped to elliptic glabrous blades 3.5-9 cm long and 2-5.5 cm wide. Leaflets are broadly ovate with smooth or rounded-toothed margins. Fertile leaves have long stalks equalling to twice as long as the twice-pinnate, lance-shaped, 2.5-14 cm long blade. Leaf segments are nearly linear with inrolled margins covering the round sori and have blunt tips. (Dorn 1992; Hitchcock et al.1969; Lellinger 1985).

Synonyms:

Similar Species:
Cryptogramma acrostichoides has clustered leaves with thick, leathery blades and persistent leaf stalks. Aspidotis densa has leaflets of the fertile blade with sharp, pointed tips (Dorn 1992).

Flowering/Fruiting Period:
The spore producing period is from July to August (Hartman et al 1991).

Distribution:
Alaska to Labrador south to Oregon, Montana, Iowa, Michigan, and West Virginia, with disjunct populations in Wyoming, New Mexico, and Utah. In Wyoming, known from the Wind River, Teton, Wyoming, and Bighorn ranges and Yellowstone Plateau in Fremont, Park, Sheridan, and Teton counties.

Habitat:
Found in moist, protected locations. Occurs in thin, mossy soil in shady limestone cliffs near water at 6600-8700 feet. Little census data are available for this species. However, this species appears to be extremely uncommon and restricted to small sites within a specialized habitats. This species may be threatened by logging activity or road construction in its habitat.

Associated Rare Species:

Occurrences in Wyoming:
Known from 5 extant occurrences, 3 of which have been located since 1990 (most recently in 1996) and 1 historical record.

Abundance:
Little census data are available, but this species appears to be extremely uncommon and restricted to small microsites within a specialized habitat (ledges with thin mossy soil in shady limestone cliffs near water).

Range:
Disjunct; in Wyoming, known from the Wind River, Teton, Wyoming, and Bighorn ranges and Yellowstone Plateau (Fremont, Sheridan, Park, and Teton counties).

Trends:
Not known.

Protection status:
The only protected occurrence in the state is in Yellowstone National Park. One occurrence is located within the potential Mann Creek Research Natural Area on Bighorn National Forest. All other populations are on public lands managed for multiple use.

Threats:
May be threatened by logging activity or road construction in its habitat.

Managed Areas:
Occurs on Bighorn, Bridger-Teton, Shoshone, and Targhee National Forests and Yellowstone National Park.

References:
Evert, E.F. No Date. Rare Plants: Teton-Darby Canyon Area. Unpublished report.
Hartman, R.L., B.E. Nelson, and W. Fertig. 1991. General floristic/sensitive plant species surveys of Fish Creek/Moccasin Basin Implementation Area, Gros Ventre Burn Areas, and Willow Creek Implementation Area on Bridger-Teton National Forest, 1990. Unpublished report prepared for the Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

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Author:
Walter Fertig

Updated:
00-11-24

DESCURAINIA TORULOSA

WYOMING TANSYMUSTARD
BRASSICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:USFS Region 2: Sensitive; USFS Region 4: Sensitive; BLM Rock Springs Field Office: Special status; USFWS: former C2.

Heritage Rank:
Global: G1State: S1
WYNDD Plant List: STATE ENDEMIC

Description:
Wyoming tansymustard is a multiple-stemmed biennial or short lived perennial herb growing to 15 cm tall. Finely divided, star-shaped (stellate) hairs give the stem, leaves, and fruit a gray-green appearance. The leaves are pinnately divided, 2-3 cm long, and located mainly at the base of the plant. Flowers are yellow, four-petaled, and 1.5 mm long. The fruits are 8-15 mm long, strongly constricted between the seeds (torulose), long-tapering to the tip, and borne on stalks less than 3 mm long and closely appressed to the inflorescence axis (Fertig 1992; Fertig et al. 1994).

Synonyms:

Similar Species:
Varieties of Descurainia incana have hairless fruits or glandular-hairy stems and leaves. D. pinnata has hairless, club-shaped fruit (Fertig et al. 1994).

Flowering/Fruiting Period:
Flowering and fruiting July-September.

Distribution:
Endemic to the northwest Absaroka Mountains and Rock Springs Uplift in Wyoming.

Habitat:
Grows in sandy soil at the base of cliffs composed of volcanic breccia or sandstone, under slight overhangs, in cavities in the volcanic rock, or on ledges (Marriott 1991). Elevation 7700-10500 ft.

Associated Rare Species:
HULSEA ALGIDA

Occurrences in Wyoming:
Known from 8-11 occurrences in Wyoming, several of which are in the same general area and might be better treated as metapopulations rather than individual occurrences. One population at Carter Mountain (Park County) may not represent this species (Dorn 1989). Rollins (1993) recognizes only the type population (Brooks Lake, Fremont County) as authentic.

Abundance:
The total population of this species probably numbers less than 1500 (Marriott 1991, 1992, Fertig 1997). Most populations average less than 40 individuals and may be restricted to a single ledge. Numbers may vary from year to year (Dorn 1989).

Range:
State Endemic; known from the southern Absaroka Range (Fremont, Park, and Teton counties) and Rock Springs Uplift (Sweetwater County).

Trends:

Generally considered to have fluctuating population sizes, although overall the species is probably stable. Recent follow-up surveys in the BLM Rock Springs Field Office suggest at least a severe short-term decline (B. Amidon, personal comm.).

Protection status:
Two occurrences in the BLM Rock Springs Field Office are protected within Special Status Plant ACECs (established under the Green River Resource Area Management Plan in 1997). Two populations in the Absaroka Range are in the North Absaroka and Washakie Wilderness Areas. A taxonomically questionable population is found in the BLM's Carter Mountain ACEC. All other occurrences are on public lands managed for multiple use. This species was formerly a C2 candidate for listing under the Endangered Species Act. It is listed as Sensitive by US Forest Service Regions 2 and 4 and is managed as a "Special Status" plant species by the BLM Rock Springs District.

Threats:
Anthropogenic threats are minimal due to the plants rugged habitat, although some sites could potentially be impacted by exotics.

Managed Areas:
Occurs on lands managed by Bridger-Teton NF (Buffalo RD), Shoshone NF (Wapiti and Wind River RDs), and the BLM Rock Springs Field Office. Reports from the BLM Cody Field Office are based on a questionable specimen. ^The Denver Botanic Garden is maintaining a seedbank for this species.^1998 DNA sequencing study by Bricker and Brown of the University of Wyoming suggests that D. torulosa is similar genetically to D. incana, and should be recognized as a variety of the latter.

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Author:
Walter Fertig

Updated:
01-01-08

DODECATHEON JEFFREYI

JEFFREY'S SHOOTING STAR
PRIMULACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5State: S1
WYNDD Plant List:

Description:
Jeffrey's shooting star is a robust perennial herb 1-6 dm tall growing in clumps connected by slender rhizomes. Leaves are all basal, .5-4 dm long, rounded at the apex, and long-tapering to a slender petiole. Flower stems are 1-6 dm tall, each with 3-20 flowers. These flowers are mostly 2-4 cm long, the 4-5 corolla lobes usually purple to lavendar (occasionally white or yellow), and strongly reflexed, exposing the 5 stiffly erect, basally united anthers. The stigma is enlarged, about twice the diameter of the style at mid-length. Fruit is a 1-chambered, papery capsule which splits lengthwise into 5 segments at maturity (Hitchcock and Cronquist 1959).

Synonyms:

Similar Species:
Dodecatheon conjugens and D. pulchellum are generally smaller plants without rhizomes (or with very short ones), and with non-capitate stigmas which are less than twice the diameter of the style.

Flowering/Fruiting Period:
June-August.

Distribution:
Alaska south through the mountains to California, east to Idaho, Montana and Wyoming (Hitchcock and Cronquist 1959). In Wyoming, it is reported for a single location west of Jackson Lake in Teton County.

Habitat:
On wet ground, usually associated with meadows or streambanks, at 6800-7200 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from a single report in Wyoming.

Abundance:
Not known.

Range:
Peripheral; In Wyoming, known only from the Teton Range in Teton County.

Trends:
Not known.

Protection status:
One occurrence is within Grand Teton National Park.

Threats:

Not known.

Managed Areas:

References:

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Author:
Walter Fertig

Updated:
01-03-19

DRABA BOREALIS

BOREAL DRABA
BRASSICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:Listed as Sensitive in Bridger-Teton National Forest.

Heritage Rank:
Global: G4State: S2
WYNDD Plant List: DISJUNCT

Description:
Boreal draba is a rosette-forming perennial herb with one to several erect to drooping, leafy stems 5-40 cm tall. The stem and basal leaves are mostly oval and coarsely toothed. Stems and leaves are pubescent with spreading, simple, forked or branched hairs. The flowers have four white petals. The pubescent fruits are 7-14 mm long, sometimes twisted, borne on hairy pedicels over 3.5 mm long, and have styles 0.5-1.0 mm long (Dorn 1992; Fertig et al. 1994).

Synonyms: none

Similar Species:
Draba aurea has yellow flowers, entire leaves (occasionally with a few teeth) and a smaller stature. D. praealta has styles less than 0.3 mm long. D. incerta has yellow flowers and leafless stems (Fertig and Marriott 1993; Fertig et al. 1994).

Flowering/Fruiting Period:
Flowers mid-June to mid-August. Fruits July to early September (USDA Forest Service 1989; USDA Forest Service 1991).

Distribution:
Found from Asia to northern Alaska, and Alberta. Disjunct in Colorado and the western mountains of Wyoming. In Wyoming, it is known from the southwestern Absaroka, western Wind River, Gros Ventre, Salt River and Wyoming Ranges. Two historical populations are known from Grand Teton National Park (Fertig et al. 1994).

Habitat:
North-facing limestone, dolomite or volcanic slopes, cliffs, and riparian areas. Substrate ranges from moist talus, to loamy alluvium, to mossy mats (Fertig and Marriott 1993). Elevation 6200-8550 ft.

Associated Rare Species:
none

Occurrences in Wyoming:
Known from 12 extant and 2 historical records in Wyoming, 9 of which have been discovered or relocated since 1991.

Abundance:
Populations typically number 100-1000 individuals (Fertig and Marriott 1993). The total population is probably less than 5000 plants.

Range:
Disjunct; in Wyoming, known from the Gros Ventre, Wind River, Salt River, Wyoming, and Absaroka ranges, Jackson Hole, and the Yellowstone Plateau (Lincoln, Park, Sublette and Teton counties and Yellowstone NP).

Trends:

Not known, but probably stable.

Protection status:
Six occurrences are in special management areas: Grand Teton and Yellowstone National Parks, the National Elk Refuge, and Bridger, Gros Ventre, and Washakie Wilderness Areas. At least 2 populations are found in the proposed Swift Creek and Gros Ventre (Horse Creek) Research Natural Areas on Bridger-Teton National Forest. This species is listed as Sensitive by Bridger-Teton NF.

Threats:
Threats low for most populations due to rugged cliff habitat. Plants in more accessible wetland sites are potentially threatened by grazing or loss of habitat.

Managed Areas:
Occurs in Bridger-Teton and Shoshone National Forests, Grand Teton and Yellowstone National Parks, and the National Elk Refuge.

References:

Fertig, W. 1992. Checklist of the Vascular plant flora of the west slope of the Wind River Range and status report on the sensitive plant species of Bridger-Teton National Forest. Unpublished report prepared for the Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

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Author:
Walter Fertig

Updated:
99-08-04

DRABA CRASSA

THICK-LEAF WHITLOW-GRASS
BRASSICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G3State: S2
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Thick-leaf whitlow-grass is a perennial forb with weak or recurved flowering stems 5-15 cm tall from a fleshy rootcrown. Basal leaves are long-petioled with oblanceolate, fleshy, entire blades 2-8 cm long and 5-10 mm wide. Leaves are glabrous except for long cilia on the margins. Stem leaves are 1-2 cm long, sessile, ovate, and entire to toothed. The inflorescence is a raceme of 4-25 yellow, 4-petaled flowers. Fruits are elliptic, glabrous siliques 10-16 mm long and 3-5 mm wide with thick styles ca 0.75 mm long (Hitchcock & Cronquist 1964; Rollins 1993; Scott 1997).

Synonyms:

Similar Species:
DRABA CRASSIFOLIA is an annual or biennial with mostly basal, linear leaves. D. GLOBOSA, D. DENSIFOLIA, and D. FLADNIZENSIS VAR. PATTERSONII have leaves 2-10 mm long and 0.5-3 mm wide (Dorn 1992).

Flowering/Fruiting Period:
July-August.

Distribution:
Regional endemic of SC Montana, W Wyoming, NE Utah, and Colorado. In Wyoming, known from the Absaroka, Wind River, Teton, and Gros Ventre ranges in Park, Teton, Fremont, and Sublette counties.

Habitat:
Alpine fellfields, talus, scree and cliffs derived from granite, limestone, or volcanic rocks.

Associated Rare Species:

Occurrences in Wyoming:
Known from 14 occurrences in Wyoming, 8 of which have been documented since 1988.

Abundance:
Populations may be locally abundant, although often restricted to suitable microhabitats.

Range:
Regional endemic of the central Rocky Mountains from southern Montana to Colorado and the Uinta Mountains of Utah. In Wyoming, known from the Absaroka, Teton, and Wind River ranges in Fremont, Park, Sublette, and Teton counties.

Trends:
Assumed to be stable.

Protection status:
Most occurrences are in designated wilderness areas (Bridger, Gros Ventre, North Absaroka, and Washakie) or Grand Teton National Park.

Threats:
Threats low due to rugged habitat.

Managed Areas:
Found on lands managed by Bridger-Teton and Shoshone National Forests and Grand Teton National Park.

References:

Fertig, W. 1992. Checklist of the Vascular plant flora of the west slope of the Wind River Range and status report on the sensitive plant species of Bridger-Teton National Forest. Unpublished report prepared for the Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

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Author:
Walter Fertig

Updated:
99-12-08

DRABA GLOBOSA

ROCKCRESS DRABA
BRASSICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:USFS Region-4: Sensitive

Heritage Rank:
Global: G3State: S2
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Rockress draba is a mat forming perennial herb with stems 0.5-3 cm tall. Leaves are lance-shaped, 3-6 mm long, less than 3 mm wide, and crowded in a basal rosette. The leaves are glabrous except for the margins which have unbranched (simple) hairs. The inflorescence consists of 2-5 yellow (rarely white) flowers with 4 petals. The fruits are egg shaped and glabrous with styles less than 0.5 mm long (Dorn 1992; Fertig et al. 1994; Stone 1995).

Synonyms:DRABA APICULATA, D. DENSIFOLIA VAR APICULATA

Similar Species:
DRABA DENSIFOLIA VAR. DENSIFOLIA usually has hairy fruits with styles over 0.5 mm long. D. CRASSA has leaves over 10 mm long and 5 mm broad. Other alpine DRABA spp. in Wyoming have more densely pubescent leaves with forked or pectinate (comb-like) hairs.

Flowering/Fruiting Period:
Flowers June-August. Fruits present in August.

Distribution:
Regional endemic of southwestern Montana, central Colorado, northern Utah and western and southern Wyoming. In Wyoming it is known from the Absaroka, Teton, Wind River, Medicine Bow, and Beartooth Mountains.

Habitat:
Moist, gravelly alpine meadows, slopes, summits, swales, talus, and tundra, often on limestone derived soils.

Associated Rare Species:
ERIGERON RADICATUS

Occurrences in Wyoming:
Known from 17 extant occurrences in Wyoming, 9 of which have been documented since 1990 (most recently in 1998). Also known from 3-4 vague historical records cited by Hitchcock (1941).

Abundance:
Few populations have been surveyed. Fertig and Welp observed two large populations in the Bridger-Teton National Forest that numbered 500-3000 plants. Individual colonies may contain 10-30 plants in small clusters.

Range:
Regional endemic of N Utah, W Wyoming, C Idaho, SW Montana, and C Colorado. In Wyoming, known from the Absaroka, Teton, Wind River, Beartooth, Medicine Bow, Gros Ventre, and Salt River ranges in Albany, Fremont, Lincoln, Park, Sublette, and Teton counties.

Trends:
Trend data are lacking for most sites, although populations are assumed to be stable due to low threats.

Protection status:
At least 13 occurrences are found in designated Wilderness Areas (Bridger, North Absaroka, Gros Ventre, and Popo Agie), Grand Teton National Park, and the Osborn Mountain Research Natural Area (Bridger-Teton NF). An additional population is in the potential Beartooth Butte RNA (Shoshone NF). All other populations are on public lands managed for multiple use. This species is listed as Sensitive in USFS Region 4, although it was recommended for de-listing by Stone (1995).

Threats:
Protected from human threats by its inaccessible habitat. Past impacts from sheep grazing at high elevations are poorly known.

Managed Areas:
Found in Bridger-Teton, Medicine Bow, Shoshone, and Targhee National Forests and Grand Teton NP.

References:
Fertig, W. 1992. Checklist of the Vascular plant flora of the west slope of the Wind River Range and status report on the sensitive plant species of Bridger-Teton National Forest. Unpublished report prepared for the Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

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Author:
Walter Fertig

Updated:
00-06-15

DRABA PAYSONII VAR PAYSONII

PAYSON'S DRABA
BRASSICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5T3?State: S2
WYNDD Plant List:

Description:
Payson's draba is a matted perennial forb from a branched caudex with coarsely hairy, unbranched flowering stems 0.5-3 (6) cm tall. Leaves are linear to spoon-shaped, 4-14 mm long, and pubescent with simple and biforked hairs on the upper surface and 3-branched hairs on the lower surface. The inflorescence is a raceme of 3-10 4-petaled yellow flowers on pubescent stalks. Fruits are coarsely hairy, ovate siliques 5-8 mm long with styles 0.8-1.8 mm long (Rollins 1993; Dorn 1992; Scott 1997).

Synonyms:

Similar Species:
Draba paysonii var. treleasii has fruits 3-5 mm long and 2.5-3.8 mm wide with styles under 0.8 mm long. D. ventosa has leaf blades over 2 mm wide covered with 3-branched hairs. Other alpine Draba spp. in Wyoming have white flowers, glabrate leaves (although margins may be ciliate), or leaves with doubly-pectinate hairs (hairs appear like two combs placed back to back) (Dorn 1992).

Flowering/Fruiting Period:
July-August.

Distribution:
Regional endemic of W Montana and W Wyoming (also reported for Alberta by Mulligan, 1971). In Wyoming, known from the Absaroka, Beartooth, Wind River, and Wyoming ranges in Fremont, Lincoln, Park, and Sublette counties.

Habitat:
This species is found on fellfields and other rocky places on hardpan clay and sand. Also located on dry alpine turf in rocky areas and on bare rock talus slopes on sandstone (Scott 1997, Rollins 1993). Wyoming populations occur at 10,000-12,600 feet.
This species is known from 6 extant populations in Wyoming which are very small (numbering in the low 100's) and restricted to specialized microsites. Threats are assumed to be minor due to the rugged and poorly accesible habitat of this species.

Associated Rare Species:

Occurrences in Wyoming:
Known from 6 extant populations in Wyoming, all of which have been observed or discovered since 1978 (4 have been observed since 1993). Also known from 2 vague historical reports, one of which may be from a known, extant, occurrence.

Abundance:
Known colonies are very small (numbering in the low 100s) and restricted to specialized microsites.

Range:

Regional endemic of Montana and NW Wyoming (although also reported for Alberta by Mulligan). In Wyoming, known only from the Beartooth, Absaroka, Wyoming, and Wind River ranges in Fremont, Lincoln, Park, and Sublette counties.

Trends:
Presumed to be stable due to lack of threats and rugged habitat.

Protection status:
All or parts of 4 populations occur within wilderness areas (Absaroka-Beartooth, Bridger, and Fitzpatrick) or the Osborn Mountain Research Natural Area. An additional population is within the potential Beartooth Butte RNA.

Threats:
Not known, but assummed to be minor due to the plants rugged and poorly accessible habitat.

Managed Areas:
Occurs on lands managed by Bridger-Teton and Shoshone National Forests.

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Author:

Walter Fertig

Updated:
00-06-15

DRABA PORSILDII VAR PORSILDII

PORSILD'S WHITLOW-GRASS
BRASSICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G3G4T3T4State: S1
WYNDD Plant List: PERIPHERAL

Description:
Porsild's whitlow-grass is a tufted perennial herb with glabrous to sparsely pubescent stems 2-6.5 cm tall. Leaves are mostly basal, linear to obovate, 2-10 mm long, and covered in many-branched, long-stalked hairs. The inflorescence consists of 2-10 flowers with 4 white petals arranged in an elongate raceme. Fruits are 4-8 mm long, narrowly ovate, hairless, occur on stalks 3-4 mm long, and have styles approximately 0.25 mm long (Clark and Dorn 1979; Rollins 1993).

Synonyms:

Similar Species:
DRABA PORSILDII VAR BREVICULA has a less elongate, umbel-like infructescence with fruit stalks that are less than 2 mm long. D. LONCHOCARPA has linear or oblong fruits longer than 7 mm, and short-stalked leaf hairs. D. FLADNIZENSIS has leaves that are glabrous on the upper surface. Other tufted alpine DRABA species in Wyoming have yellow (at least when fresh) flowers or longer styles (Dorn 1992).

Flowering/Fruiting Period:
Flowering and furiting June-July.

Distribution:
Yukon and the Northwest Territories south to Colorado in the high Rocky Mountains (Rollins 1993). In Wyoming it is known from the northern Absaroka and northern Wind River Ranges.

Habitat:
On scree and in grassy meadows, along ridges, slopes, and summits in the alpine zone.

Associated Rare Species:

Occurrences in Wyoming:
Known from 5 occurrences in Wyoming, three of which have been discovered or revisited since 1983 (most recently in 1994). Formerly reported from several additional sites, but these records have proven to be misidentified.

Abundance:
Not known.

Range:
Peripheral; in Wyoming known from the Absaroka Range in Park County and the northwestern Wind River and Gros Ventre mountains in Sublette County.

Trends:
Not known.

Protection status:

Two occurrences may be protected on the Shoshone National Forest. One population occurs in the potential Pat O'Hara Mountain Research Natural Area and may extend into the North Absaroka Wilderness. Another is found in or near the Washakie Wilderness. Two populations are protected within the Bridger-Teton National Forest in the Osborn Mountain Research Natural Area and the Gros Ventre Wilderness.

Threats:
Threats are low due to poor accessibility of most sites.

Managed Areas:
Occurs on Bridger-Teton and Shoshone National Forests.

References:

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Author:
Walter Fertig

Updated:
00-01-09

DROSERA ANGLICA

ENGLISH SUNDEW
DROSERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S2
WYNDD Plant List: PERIPHERAL

Description:
English sundew is an insectivorous perennial herb with stems 6-18 cm tall. Leaves have oblong to spoon-shaped blades 1-3 cm long by 3-4 mm wide, petioles 2-6 cm long, and are covered by long reddish, glandular-tipped hairs which snare insects. The inflorescence is a one-sided raceme of 1-10 flowers with 5 white petals 3-7 mm long. The fruit is a 3-5 valved capsule (Hitchcock et al. 1961; Moss 1983; Marriott 1991).

Synonyms:DROSERA LONGIFOLIA.

Similar Species:

Flowering/Fruiting Period:
July-August.

Distribution:
Eurasia and Alaska to California, east to Idaho, Wyoming, and the Great Lakes. In Wyoming, known only from the Yellowstone Plateau, Jackson Hole, and the Beartooth Range.

Habitat:
Floating bogs, swamps, and sedge meadows, with soils that are saturated or in very shallow standing water.

Associated Rare Species:
CAREX LIMOSA, C. BUXBAUMII, ERIOPHORUM GRACILE, POTENTILLA PALUSTRIS.

Occurrences in Wyoming:
Known from at least 9 extant occurrences in Wyoming (7 of which have been discovered or relocated since 1991, and most recently in 1997) and 1 historical record. Additional populations may occur along the WY/MT border in the Absaroka-Beartooth Wilderness (Sabine Mellmann-Brown, personal comm.).

Abundance:
Populations are often reported to be locally abundant, at least within small areas of suitable habitat. Densities as high as 15-19 plants per square foot have been observed in favorable sites.

Range:
Peripheral; in Wyoming known from the Yellowstone Plateau, Jackson Hole valley, and Beartooth Mountains in Park and Teton counties.

Trends:
Presumed to be stable, although trend data are not available. Some areas of suitable habitat have probably been lost in the past century.

Protection status:

At least 9 occurrences are in Grand Teton and Yellowstone National Parks, the JDR Parkway, or the Absaroka-Beartooth Wilderness Area. One occurrence is within the potential Lake Creek Research Natural Area.

Threats:
The floating mat habitat of this species is extremely sensitive to trampling by people or livestock. Overcollection of this carnivorous plant fpr cultivation could be a potential problem.

Managed Areas:
Known occurrences in Wyoming are found in Grand Teton and Yellowstone National Parks, the John D. Rockefeller Parkway, and Shoshone National Forest.

References:
Marriott, H.J. 1991. Rare plants of Grand Teton National Park, annual report. Unpublished report prepared for the National Park Service by the Wyoming Natural Diversity Database, Laramie, WY.

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Author:
Walter Fertig

Updated:
00-02-14

DRYOPTERIS EXPANSA

SPREADING WOODFERN
DRYOPTERIDACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Spreading woodfern is a perennial with clumped, semi-evergreen leaves from an ascending or suberect rhizome. Leaf blades are oval to triangular (widest near the base), 20-60 cm long, 15-30 mm wide, and twice to thrice pinnately compound. The basal pinnae of the lowermost leaflets are conspicuously longer (2-3 x) on the bottom half of the leaflet than the top half. Leafstalks are 10-40 cm long and have pale brown scales with darker centers. Spore clusters (sporangia) are covered by a membranous indusium with a distinct cleft at the middle (Dorn 1992, Gleason 1991, Lellinger 1985).

Synonyms:DRYOPTERIS ASSIMILIS; D. CARTHUSIANA.

Similar Species:
DRYOPTERIS FILIX-MAS has twice-compound leaves that are widest near the middle. POLYSTICHIUM spp. have evergreen, leathery, once to twice pinnately compound leaves with spiny margined leaflets and uncleft indusia (Dorn 1992).

Flowering/Fruiting Period:

Distribution:
Rangewide, DRYOPTERIS EXPANSA occurs in 4 main areas: NW North America from Alaska to Alberta and south to N California and Colorado; Minnesota to Greenland and south to S Quebec; Scandinavia to central Europe; and Manchuria, Kamchatka, and Japan (Carlson and Wagner 1982). In Wyoming, this species is restricted to the Yellowstone Plateau and Absaroka and Teton ranges in Park and Teton counties.

Habitat:
This species inhabits moist woods and rocky soils. It is often found in wet soils under or associated with conifers (Gleason 1991).
Wyoming populations are typically reported as "rare". One population in Yellowstone National Park had fewer than 100 plants in 1997.

Associated Rare Species:

Occurrences in Wyoming:
Known from 3 extant occurrences in Wyoming, the most recent observed in 1997.

Abundance:
Populations typically reported as "rare". One colony in Yellowstone National Park had fewer than 100 plants in 1997.

Range:
Peripheral; in Wyoming, known from the Yellowstone Plateau, and Absaroka and Teton ranges in Park and Teton counties.

Trends:

Not known.

Protection status:
All known occurrences are found in protected areas (North Absaroka Wilderness and Yellowstone and Grand Teton National Parks).

Threats:
Not known.

Managed Areas:
Occurs on Shoshone National Forest and Grand Teton and Yellowstone National Parks.

References:

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Colorado Native Plant Society. 1997. Rare Plants of Colorado, second edition. Falcon Press Publ., Helena, MT.

Author:
Walter Fertig

Updated:
01-03-06

ELEOCHARIS FLAVESCENS VAR THERMALIS

WARM SPRINGS SPIKERUSH
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5T2T3QState: S2
WYNDD Plant List: DISJUNCT

Description:
Warmsprings spikerush is a low-growing graminoid with compact rhizomes and slender, clustered stems 3-10 cm tall, often with a large amount of dead material from previuos years growth at the base. Leaves are all near the base of the stems, and reduced to sheaths with no blades. Flowering spikes are terminal on the stems, 2-4 mm long, with 5-20 flowers per spike. Flowers consist of 5 or 6 bristles (perianth parts), 3 stamens, and an ovary which develops into a lens-shaped achene with an enlarged style base (Hitchcock and Cronquist 1969).

Synonyms:

Similar Species:
Eleocharis pauciflora usually has taller (10-30 cm) stems with spikes 4-8 mm long, and achenes which are 3-angled.

Flowering/Fruiting Period:
July-September.

Distribution:
Northwestern Wyoming and southwestern Montana. In Wyoming known only to Yellowstone National Park and the John D. Rockefeller Parkway in Teton and Park Counties.

Habitat:
Confined to margins of thermal streams and pools at 6750 to 7900 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from 13 extant occurrences, all discovered or relocated since 1988 (most recently in 1998) and 1 historical record in Wyoming.

Abundance:
Populations typically contain several hundred individual plants in patches of several square meters. Plants form tightly intermingled mats which makes censusing difficult (J. Whipple, personal communication).

Range:
Disjunct; Restricted to thermal areas within the Yellowstone plateau in Park and Teton counties.

Trends:
Unknown, but suspected to be stable.

Protection status:
14 occurrences are protected in Yellowstone National Park and the JDR Parkway.

Threats:

Potentially threatened by pollution from surface runoff on highways and degradation of habitat related to heavy recreational activity.

Managed Areas:
Occurs in Yellowstone National Park and the John D. Rockefeller Parkway. Past reports from Grand Teton National Park have been erroneous.

References:

Whipple, Jennifer J. Botanist, Yellowstone National Park, Herbarium, Mammoth. (307) 344-2226.

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Author:
Walter Fertig

Updated:
01-03-19

EPIPACTIS GIGANTEA

GIANT HELLEBORINE
ORCHIDACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G4State: S1
WYNDD Plant List: PERIPHERAL

Associated Rare Species:

Occurrences in Wyoming:
Known from 3 extant occurrences in Wyoming (all of which have been discovered or relocated since 1991) and 1 historical record (last observed in 1896).

Abundance:
State population estimated at 1100-3200 plants in less than 10 acres of total habitat at 3 main sites.

Range:
Peripheral; in Wyoming known only from the Yellowstone Plateau, Jackson Hole, and eastern Bighorn Basin in Big Horn and Teton counties.

Trends:
Populations in the Jackson Hole area are probably declining. The Bighorn Basin population has not been relocated in over 100 years and may be extirpated. Appears to be stable in Yellowstone National Park.

Protection status:
Two occurrences are protected in Yellowstone and Grand Teton National Parks (although the Grand Teton site is being impacted by grazing according to Marriott, 1991). Other known populations are on private lands. This species is listed as Sensitive in USFS Region 2.

Threats:
Populations may be impacted by grazing and heavy recreational use of riparian habitats (Marriott 1991).

Managed Areas:
Occurs on lands managed by Grand Teton and Yellowstone National Parks.

References:

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Author:
Walter Fertig

Updated:
00-11-25

EQUISETUM FLUVIATILE

WATER HORSETAIL
EQUISETACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Water horsetail has sterile and fertile stems that are similar in size and appearance, both growing up to 1 meter tall from long-creeping, reddish rootstalks. Stems are annual, greenish, 2.5-9 mm in diameter, and have 9-24 shallow longitudinal ridges. The central cavity of stem joints are over 4/5 the diameter of the stem. Sheaths are green, 4-9 mm long, and tipped with persistent, sharp, separate black teeth. Stem branches, if present, are whorled and simple. Cones (strobili) are 12-20 mm long, rounded at tip, and borne on short stalks (Cobb 1956; Hitchcock et al. 1969; Lellinger 1985; Dorn 1992).

Synonyms:

Similar Species:
EQUISETUM ARVENSE has dimorphic stems, with the green sterile stems having numerous whorled branches and central cavities less than 1/2 the diameter of the main stem and the fertile stems being unbranched and pale yellowish-brown. E. LAEVIGATUM has unbranched stems, sheath with deciduous black teeth, and cones with sharp-pointed tips. E. HYEMALE has unbranched perennial stems and sheaths with a pair of black bands. E. SYLVATICUM has twice-branched stem branches and sheath teeth united into 2-5 reddish-brown clusters (Hitchcock et al. 1969; Dorn 1992).

Flowering/Fruiting Period:
Stems annual, June-late August.

Distribution:
Ranges from Labrador to Alaska south to Virginia, Illinois, NW Wyoming, N Idaho, and Washington. In Wyoming, known only from the Yellowstone Plateau, Jackson Hole, and the Beartooth Mountains in Park and Teton counties.

Habitat:
Muddy shores of swamps and in shallow water of small ponds. The Beartooth Mountain population is found on moist, clay-rich, deep soils in a dried pond dominated by CAREX ROSTRATA.
Populations may be locally abundant within small areas of suitable habitat. Population estimated difficult due to the rhizomatous habit of the plant.

Associated Rare Species:

Occurrences in Wyoming:
Known from 2 extant occurrences in Wyoming, most recently observed in 1996. One historical record (1899) from Jackson Lake may be extirpated.

Abundance:
Found to be locally abundant at one recently discovered site in Park County, but restricted to less than 5 acres of habitat. Yellowstone National Park population is also small (ca 100 stems) according to Dorn.

Range:
Disjunct; in Wyoming known from the Yellowstone Plateau, Jackson Hole, and the Beartooth Range in Park and Teton counties.

Trends:
Not known.

Protection status:
Two populations are found in Yellowstone and Grand Teton National Parks and the third is within the Absaroka-Beartooth Wilderness Area on Shoshone National Forest. The latter population may be within the potential Lake Creek Bogs RNA.

Threats:
One population is thought to be extirpated due to dam construction on Jackson Lake.

Managed Areas:
Known Wyoming populations are found in Yellowstone and Grand Teton National Parks and Shoshone National Forest (Clarks Fork RD).

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Author:
Walter Fertig

Updated:
00-11-24

ERIGERON HUMILIS

LOW FLEABANE
ASTERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G4State: S2
WYNDD Plant List: DISJUNCT

Description:
Low fleabane is a perennial herb with loose, soft-hairy stems 1-3 cm high. The basal leaves are 1-2.5 cm long and narrowly oblanceolate, while the stem leaves are reduced and linear. The flower heads are solitary with numerous erect, white (sometimes pink) ray flowers 3.5-6 mm long and 0.5-1 mm wide. The involucre and stem are covered with loose, purplish-black hairs with prominent cross-walls. The pappus consists of 20-30 bristles. (Cronquist 1994; Dorn 1992; Duft and Moseley 1989; Moseley 1989).

Synonyms: ERIGERON UNALASCHENSIS

Similar Species:
ERIGERON MELANOCEPHALUS has broader, spreading ray flowers 7-15 mm long. E. RYDBERGII and E. SIMPLEX have primarily white-woolly involucre bracts.

Flowering/Fruiting Period:
July-August.

Distribution:
Circumpolar, in North America south to central Idaho, northwest Montana, northern Wyoming, and Colorado (Duft and Moseley 1989). In Wyoming it is known from the Wind River, Beartooth, Bighorn, Gros Ventre, and Absaroka Mountains.

Habitat:
Montane granite and limestone cliff faces, talus slopes, alpine meadows and tundra. Often in mossy, moist microsites.

Associated Rare Species:
CAREX INCURVIFORMIS VAR DANAENSIS

Occurrences in Wyoming:
Known from 9 records in Wyoming, 8 of which are recent and presumed extant (the oldest known record dates from 1955). Three sites have been located since 1990 (most recently in 1998).

Abundance:
Known populations are small in number and occupied area. Surveys in 1996 in the Beartooth Mountains reported colonies of 10-25 plants.

Range:
Sparse; in Wyoming known from the Wind River, Beartooth, Bighorn, Gros Ventre, and Absaroka ranges in Big Horn, Park, and Sublette counties. Reports from the Medicine Bow Range (Albany County) are probably based on immature specimens of ERIGERON MELANOCEPHALUS.

Trends:
Presumed to be stable at present, although no trend data are available.

Protection status:
8 of the 9 known occurrences are protected within designated wilderness areas (Bridger, Gros Ventre, Absaroka-Beartooth, North Absaroka, Cloud Peak, and Washakie).

Threats:
Not known, but presumed to be low.

Managed Areas:
Known from the Bighorn, Bridger-Teton, and Shoshone National Forests.

References:

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Author:
Walter Fertig

Updated:
00-11-24

ERIOPHORUM GRACILE

SLENDER COTTON-GRASS
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Slender cottongrass is a grass-like perennial with stems (culms) 20-60 cm high arising singly from a slender rhizome. The leaf blades are less than 2 mm wide and triangularly channeled for their entire length. The inflorescence consists of 2-5 heads (spikelets) on short, drooping stalks that often exceed the single green, leafy inflorescence bract. Scales are greenish-brown to blackish with a slender midrib. The perianth consists of numerous cottony, white bristles. Fruits are straw-colored achenes. (Marriott 1992; Hitchcock and Cronquist 1969).

Synonyms:SCIRPUS ARDEA

Similar Species:
ERIOPHORUM POLYSTACHION and E. VIRIDICARINATUM have leaves that are flattened at the base and have 2 or more leafy inflorescence bracts. E. CHAMISSONIS, E. CALLITRIX, and E. SCHEUZERI have single spiklets at the tip of the stem.

Flowering/Fruiting Period:
Mid-June through August.

Distribution:
Circumboreal south to Pennsylvania, Iowa, Colorado, Idaho, and central California (Hitchcock et al. 1969). In Wyoming, it is known from the Jackson Hole area and the Beartooth Plateau.

Habitat:
Sedge meadows and floating bogs in saturated soil to shallow standing water.

Associated Rare Species:
SALIX CANDIDA, CAREX LIMOSA, C. BUXBAUMII, DROSERA ANGLICA, POTENTILLA PALUSTRIS.

Occurrences in Wyoming:
Known from 5-6 extant and 1 historical records in Wyoming. All of the extant populations have been located since 1991 (most recently in 1999).

Abundance:
The known populations in Wyoming range in size from 30 to nearly 1000 stems in a total area of ca 12 acres (Marriott 1991; Mills and Fertig 1996; Fertig 1996 census data).

Range:
Peripheral; in Wyoming, known only from the Beartooth Range and Jackson Hole in Park and Teton counties.

Trends:
Trend data are lacking. Populations may be relatively stable at present, although they may be in decline in the past century due to loss or degradation of its wetland habitat.

Protection status:
2-3 populations are protected in Grand Teton National Park and the Absaroka-Beartooth Wilderness Area. One occurrence is located within the potential Lake Creek Research Natural Area. All other populations are on public lands managed for multiple use.

Threats:
May be threatened by livestock grazing, trampling, and recreational use of its habitat.

Managed Areas:
Found on lands managed by Grand Teton NP and Shoshone and Targhee National Forests. May also occur on Bridger-Teton NF.

References:

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Author:
Walter Fertig

Updated:
00-11-25

ERIOPHORUM VIRIDICARINATUM

GREEN KEELED COTTON-GRASS
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Green-keeled cottongrass is a rhizomatous perennial with 3-angled stems 2-9 dm tall. Leaves are 2-6 mm wide, flat (except at the very tip), and borne along the stem and in a basal cluster. The inflorescence consists of 3 or more drooping spikelets arranged in an umbel-like cyme and subtended by 2-3 leafy green bracts. Each flower of the spikelet has a drab greenish to blackish scale with a prominent pale midrib running its full length and expanding at the distal tip. Perianth bristles are cottony, white, and greatly exceed the scales and fruit in length, giving the fruiting heads a cotton-ball appearance. Fruits are blackish, 2-3 mm long achenes (Hitchcock et al. 1969; Moss 1983; Fertig 1998).

Synonyms:

Similar Species:
ERIOPHORUM POLYSTACHION has tawny brown scales (occasionally blackish) with a slender midrib that does not reach the tip of the scale and anthers longer than 2 mm. Other ERIOPHORUM species in Wyoming differ in having a single spikelet or leafy bract per stem or in having triangular and deeply channeled leaf blades.

Flowering/Fruiting Period:
This species produces mature fruits from late June until August (Lesica 1991).

Distribution:
Newfoundland to Alaska south to New York, Michigan, Colorado, and N Idaho. In Wyoming, known from Jackson Hole, the Yellowstone Plateau, and the northern Absaroka Range in Park and Teton counties.

Habitat:
This species inhabits boggy woods and wet meadows in foothills and montane zones. It is found on deep, flooded, or saturated, loamy soils (Fertig & Jones 1992, Lesica 1991).
This species is known from 4 extant populations in Wyoming, 2 of which have been relocated since 1992. Exact population size is not known, but populations may be locally abundant but are typically restricted to small microsites. This species is primarily threatened by changes in water availability such as flooding or draining of its wetland habitat.

Associated Rare Species:

Occurrences in Wyoming:
Known from 4 occurrences in Wyoming, 2 of which have been discovered or relocated since 1992 (most recently in 1999).

Abundance:
Populations may be locally abundant, but are typically limited to small microsites.

Range:
Peripheral; in Wyoming known only from the Yellowstone Plateau, Teton Range, Jackson Hole, and Clarks Fork Valley in Park and Teton counties and Yellowstone NP.

Trends:

Not known.

Protection status:
4 populations are protected in the Swamp Lake Special Botanical Area, Grand Teton and Yellowstone National Parks, and the National Elk Refuge.

Threats:
Threatened primarily by changes in water availability (flooding or draining of its wetland habitat).

Managed Areas:
Occurs on lands managed by Shoshone National Forest, Grand Teton and Yellowstone NPs and the National Elk Refuge.

References:

Fertig, W. and G. Jones. 1992. Plant communities and rare plants of the Swamp Lake Botanical Area, Clarks Fork Ranger District, Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database.

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Author:
Walter Fertig

Updated:
00-08-09

GAYOPHYTUM HUMILE

LOW GROUND-SMOKE
ONAGRACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Low ground-smoke is an annual herb with unbranched or basally branched stems 5-20 cm tall. The stems are glabrous to minutely hairy and leafy above. The entire leaves are linear to narrowly spoon-shaped, 5-30 mm long, and 1-2 mm wide. The flowers are nearly sessile and borne in crowded spikes. Sepals and petals are both ca 1 mm in length. The fruit is a glabrous or glandular capsule 7-15 mm long and slightly torulose (indented around the seeds) to club-shaped. At maturity, the capsule splits along 4 valves, but 2 of the segments remain attached to the central column of the fruit. Seeds are 0.5-0.7 mm long and lack cottony pubescence (Dorn 1992; Lewis and Szweykowski 1964; Cronquist et al 1997).

Synonyms:

Similar Species:
GAYOPHYTUM DIFFUSUM and G. RAMOSISSIMUM are branched throughout and have long-stalked capsules. G. RACEMOSUM has glabrous or hairy fruits that split into 4 separate valves at maturity. EPILOBIUM spp. have seeds with cottony pubescence (Dorn 1992).

Flowering/Fruiting Period:
Cronquist et al (1997) lists the flowering and fruiting period for this species as May through September. However, this period may be shortened in Wyoming due to environmental factors related to elevation.

Distribution:

Habitat:
This species inhabits moist to dry spaces in open or woody areas (Cronquist et al 1997).
This species is known from 4 extant occurences and 1 historical record in Wyoming. The known populations in Wyoming could perhaps be considered locally abundant, however, they are typically restricted to extremely small areas and microhabitats. Threats to this species are relatively low due to the extremely rugged habitat it inhabits.

Associated Rare Species:

Occurrences in Wyoming:
Known from 6 extant occurrences and 1 historical record. The extant populations have all been located since 1984 (most recently in 1997).

Abundance:
Populations in Wyoming may be locally abundant, but are typically restricted to very small areas and specialized microhabitats.

Range:
Peripheral; in Wyoming known only from the Absaroka Range and Yellowstone Plateau in Park and Fremont counties and Yellowstone National Park.

Trends:

Not known.

Protection status:
At least 4 occurrences are found within special management areas (Yellowstone National Park and the North Absaroka and Washakie Wilderness Areas). One population is also within the potential Sheep Mesa Research Natural Area.

Threats:
Habitats for this species are typically in extremely rugged areas that receive some natural protection.

Managed Areas:
Occurs on Shoshone National Forest and in Yellowstone National Park.

References:

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Author:
Walter Fertig

Updated:
01-01-30

GENTIANOPSIS SIMPLEX

HIKER'S GENTIAN
GENTIANACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G4State: S1
WYNDD Plant List: PERIPHERAL

Associated Rare Species:
CAREX LIVIDA

Occurrences in Wyoming:
Known from 2 occurrences in the Yellowstone area, both discovered by Jennifer Whipple since 1991.

Abundance:
Not known.

Range:
Peripheral; In Wyoming, known only from the Yellowstone Plateau in Teton County.

Trends:
Not known.

Protection status:
All known Wyoming occurrences are protected within Yellowstone NP.

Threats:
Not known.

Managed Areas:
Occurs in Yellowstone National Park.

References:
Lesica, P. & J. S. Shelly. 1991. Sensitive, Threatened and Endangered Vascular Plants of Montana. Montana Natural Heritage Program, Occ. Publ. No. 1. Helena, MT.

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Author:
Walter Fertig

Updated:
99-08-08

GYMNOCARPIUM DRYOPTERIS

OAK FERN
DRYOPTERIDACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: DISJUNCT

Description:
Oak-fern is a delicate perennial fern with scattered leaves along a slender, elongated, scaly rhizome. Leafstalks are 7-30 cm long, straw-colored, and with reddish-tan scales near the base. Leaf blades are ca 18 cm long x 25 cm wide, broadly triangular, and thrice-pinnate. The lowest pair of leaflets (pinnae) are longer and broader than the other leaflet pairs and slightly isolated from them. Sori are round to elliptic, lack a protective membrane (indusium), and are borne on the leaflet veins (away from the margin) (Hitchcock and Cronquist 1969; Lellinger 1985).

Synonyms:

Similar Species:
Pteridium aquilinum has leafstalks that are shorter than the blades and marginal sori (spore clusters) covered by the inrolled edge of the leaf. Botrychium virginianum has leaf blades divided into separate sterile and fertile (sori-bearing) segments.

Flowering/Fruiting Period:
Spores produced from June-August.

Distribution:
Circumboreal, extending south to Oregon, Arizona, Iowa, and Virginia. In Wyoming it is known to the Black Hills, Medicine Bow Range, and Teton Mountains.

Habitat:
Moist forests, streamside, wet cliffs. In Wyoming, populations may occur in moist, mossy swales and streambanks in Engelmann spruce/subalpine fir forests.

Associated Rare Species:

Occurrences in Wyoming:
Known from 4 extant and 3 historical locations in Wyoming (4 occurrences have been located since 1992; most recently in 1999).

Abundance:
Most populations are small, often numbering 200-1000 fronds in areas of 0.1 acre. Clusters of fronds may only represent 1 or a few genetically distinct ramets.

Range:
Disjunct; in Wyoming, known from the Teton Range, Sierra Madre, and Black Hills in Carbon, Crook, and Teton counties.

Trends:
Populations are either stable or possibly declining.

Protection status:

4 populations (2 of which are historic) are protected in Grand Teton National Park. An additional occurrence is found within the Geis Springs Late Successional Landscape on Black Hills National Forest. All other populations are on public lands managed for multiple use.

Threats:
Some populations in Grand Teton NP are threatened by trail expansion, weed invasion, and trampling. Black Hills colonies may be threatened by logging.

Managed Areas:
Occurs in Black Hills and Medicine Bow National Forests and Grand Teton National Park.

References:
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Author:
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Updated:
00-11-24

HAPLOPAPPUS MACRONEMA VAR LINEARIS

NARROWLEAF GOLDENWEED
ASTERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:USDA Forest Service R4: Sensitive

Heritage Rank:
Global: G4G5T3State: S2
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Narrowleaf goldenweed is a shrub with mostly creeping, white-woolly or glandular-hairy, leafy stems 15-40 cm long. Leaves are entire, linear, 1-3 cm long, 1-2.5 mm wide, and white woolly or greenish-glandular. Flower heads number one to a few per branch. Involucres are 8-15 mm high with glandular bracts arranged in a single row. Disk flowers are yellow and 8-11 mm long. Ray flowers are not present. (Hall 1928; Cronquist 1955; Lesica and Shelly 1991; Fertig et al. 1994).

Synonyms:

Similar Species:
Chrysothamnus parryi and C. nauseosus have erect stems, smaller and more numerous flower heads, and involucre bracts in 5 vertical rows. Haplopappus suffruticosus has yellow ray flowers and glandular, non-woolly twigs (Fertig et al. 1994).

Flowering/Fruiting Period:
Flowering and fruiting July-September, fruits persist into October.

Distribution:
Regional endemic of southwest Montana and northwest Wyoming. In Wyoming it is known from the Yellostone Plateau, southern Absaroka and northern Wind River ranges, and Overthrust Belt in Fremont, Lincoln, Park, Sublette, and Teton counties.

Habitat:
In wyoming, Narrowleaf goldenweed is found primarily on dry, clay-rich or cobblestone terraces above large streams. These sites may be dominated by communities of Artemisia cana, A. tridentata var. vaseyana, Chrysothamnus viscidiflorus, and Poa secunda. Populations are also found on sandy-gravel bars and shores, stream terraces at the ecotone of sagebrush and Pinus contorta stands, and on steep, whitish clay slopes (Fertig 1996). Montana populations have been reported from lower mountain slopes, alluvial terraces, and glacial valleys.
Populations vary from 30-500 individuals, usually forming dense, prostrate mats often to the exclusion of other species (Fertig 1992, U92FER02WYUS).

Associated Rare Species:
IPOMOPSIS CREBRIFOLIA

Occurrences in Wyoming:
Known from at least 18 extant occurrences in Wyoming, all of which have been discovered or relocated since 1981 (most recently in 1999). Also known from at least 6 historical records, several of which are too vague to be located.

Abundance:
Census data are lacking for most occurrences, but those populations that have been surveyed are usually very small in number and area. Populations in the Gros Ventre River drainage typically contain 12-2000 individuals in areas of 0.5-10 acres.

Range:
Regional endemic of western Wyoming and southwestern Montana. In Wyoming, known only from the Absaroka and Wind River ranges, Gros Ventre drainage, Yellowstone Plateau, and Overthrust Belt in Fremont, Lincoln, Park, Sublette, and Teton counties.

Trends:
Apparently stable, although trend data are lacking for most occurrences.

Protection status:
At least 5 occurrences are known from the Washakie and Teton Wilderness Areas and two or more populations are protected in Yellowstone National Park. All other populations are on public lands managed for multiple use. Listed as Sensitive by US Forest Service Region 4 (although recommended for downlisting by Fertig 1996).

Threats:
Threats are probably low at sites on Bridger-Teton National Forest. The species is not preferred browse and may benefit from low level disturbance associated with recreational activities. Some populations could be impacted by mineral exploration and development on erosive soils.

Managed Areas:
Found on lands managed by Bridger-Teton and Shoshone NF, Yellowstone NP, Wind River Indian Reservation, and BLM Kemmerer Field Office.

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Author:
Walter Fertig

Updated:
00-06-15

HETEROCODON RARIFLORUM

WESTERN PEARL-FLOWER
CAMPANULACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Associated Rare Species:

Occurrences in Wyoming:
Known from a single record in Wyoming, last observed in 1956.

Abundance:
Not known.

Range:
Peripheral; in Wyoming, known only from the west slope of the Teton Range (Teton County).

Trends:
Not known.

Protection status:
The single known occurrence is on public lands managed for multiple use.

Threats:
Not known, but may be impacted by recreational activities.

Managed Areas:
Occurs on Targhee National Forest.

References:

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Author:
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Updated:
99-08-08

HETEROTHECA DEPRESSA

TETON GOLDEN-ASTER
ASTERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G3State: S2
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Teton golden-aster is a multi-branched, often somewhat prostrate, perennial herb with leafy stems 7-20 cm long from a woody rootstalk. Leaves are 7-14 mm long, narrowly elliptic to spoon-shaped, and densely grayish-pubescent (having a smooth appearance). Leaf blades may also have small glands. Heads are borne singly on narrow, mostly leafless or short-leafy stalks often over 1 cm long. The flower stalks and involucres are densely pubescent with appressed, smooth-looking hairs. Flower heads are 7-10 mm high, and have 3 overlapping sets of linear, sharp-tipped bracts. Ray flowers are yellow. The flattened, hairy fruits are topped by slender pappus bristles (Coulter and Nelson 1909; Rydberg 1917; Cronquist 1955; Dorn 1992).

Synonyms:HETEROTHECA VILLOSA VAR DEPRESSA, CHRYSOPSIS DEPRESSA.

Similar Species:
HETEROTHECA VILLOSA has sessile flower heads, and somewhat spreading, ragged pubescence on the stem and leaves. H. HORRIDA has coarser, more obviously glandular pubescence and broadly scale-like outer pappus segments (Dorn 1992).

Flowering/Fruiting Period:
Flowering and fruiting mid-July to late August (possibly even into September).

Distribution:
Regional endemic of NW Wyoming and adjacent Montana. In Wyoming, known from the Snake River and Gros Ventre river drainages, Yellowstone Plateau, and northeast Absaroka Mountains in Park and Teton counties. Semple (1996) also reports this species from Lincoln County.

Habitat:
Gravel bars along mid-sized streams, disturbed areas, and around hot springs, on sandy, gravelly soils which can be derived from volcanics.
Appears to favor gravelly floodplain habitats with coarse river cobbles anchoring a sandy substrate. These sites are moist, but not flooded (at least during the late summer). Scouring by floodwaters may be important for maintaining this species' habitat by creating new river terraces or removing competing vegetation.

Associated Rare Species:

Occurrences in Wyoming:
Known from at least 20 extant occurrences in Wyoming and at least 3-5 historical records.

Abundance:
Populations may be locally abundant along gravel stream terraces in the Snake River/Gros Ventre River drainage or around thermal areas in Yellowstone National Park.

Range:

Regional endemic of NW Wyoming and adjacent Montana. In Wyoming, known from the Snake River and Gros Ventre river drainages, Absaroka Range, and Yellowstone Plateau in Park and Teton counties. Also reported for Lincoln County by Semple (1996).

Trends:
Trend data are lacking for nearly all occurrences. Those in the Gros Ventre River valley have been found to be persistent, at least in the short term. Some habitat loss has probably taken place since white settlement.

Protection status:
Most occurrences are protected within Yellowstone or Grand Teton National Parks. At least one population is also found on the National Elk Refuge. Other known sites are on public lands managed for multiple use.

Threats:
Some occurrences may be threatened by quarrying of river gravel deposits.

Managed Areas:
Known from Bridger-Teton and Shoshone National Forests, Yellowstone and Grand Teton National Parks, the BLM Pinedale Field Office, and the National Elk Refuge.

References:
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Author:
Walter Fertig

Updated:
00-06-15

IPOMOPSIS CREBRIFOLIA

COMPACT GILIA
POLEMONIACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G3G4State: S3
WYNDD Plant List: REGIONAL ENDEMIC

Occurrences in Wyoming:
Known from 23 extant records in Wyoming, 20 of which have been discovered or relocated since 1990.

Abundance:
Poorly known, although many occurrences appear to be at least locally abundant.

Range:
Regional endemic of SW Montana, W Wyoming, and W Utah and N New Mexico (although many Utah populations may represent a different taxon according to Welsh et al. 1993). In Wyoming, known from the Great Divide and Green River basins, and the foothills of the Wind River and Wyoming ranges in Fremont, Lincoln, Sublette, Sweetwater, and Teton counties.

Trends:
Trend data are mostly lacking

Protection status:
At least 5 populations occur in the Oregon Buttes, Steamboat, and White Mountain Petroglyphs ACECs. An occurrence is also in the Oregon Buttes Wilderness Study Area. Other populations are on public lands managed for multiple use.

Threats:
Threats mostly low, although road construction or other disturbances associated with mineral development could be a threat.

Managed Areas:
Occurs on lands managed by Bridger-Teton NF and the BLM Kemmerer, Pinedale, and Rock Springs Field Offices.

References:
Lesica, P. & J. S. Shelly. 1991. Sensitive, Threatened and Endangered Vascular Plants of Montana. Montana Natural Heritage Program, Occ. Publ. No. 1. Helena, MT.

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Author:
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Updated:
00-06-15

JUNCUS FILIFORMIS

THREAD RUSH
JUNCACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Thread rush is a perennial graminoid with slender, round stems about 1 mm or less thick and 5-45 cm cm tall from long-creeping rhizomes. Leaves are clustered near the base of the stem and consist of brown, greenish, or straw-colored, truncated sheaths without blades or with a bristle-like tip. Although technically terminal, the inflorescence appears to be lateral and borne at or below the middle of the main stem due to the similar color and thickness of the lowest inflorescence bract and the stem. The inflorescence is a compact to slightly open panicle up to 2 cm long consisting of 5-20 sessile or short-stalked greenish flowers. Each flower is subtended by a pair of small bracts and consists of 6 unequal, sharp-pointed, lance-shaped tepals 3-4.5 mm long and 6 stamens with anthers 0.4-0.8 mm long that are equal to or shorter than their filaments. Fruiting capsules are oval, shorter than the perianth, and contain numerous, tailess seeds less than 0.5 mm long (Cronquist et al. 1977; Dorn 1992; Hitchcock et al. 1969).

Synonyms:

Similar Species:
Juncus balticus is typically taller (30-90 cm) and has thicker stems (often over 1.5 mm), a longer and multi-branched inflorescence, longer anthers (over 1 mm), and larger seeds (over 0.6 mm). J. compressus has blunt perianth segments 1.5-2.5 mm long. Other Juncus species with "lateral" inflorescences in Wyoming have much shorter inflorescence bracts, fewer flowers, long-tailed seeds, or occur in alpine habitats (Hitchcock et al. 1969; Dorn 1992).

Flowering/Fruiting Period:
July-September.

Distribution:
Circumboreal; in North America extends from Alaska to southern Greenland, south to Pennsylvania, Michigan, southern Wyoming, northeast Utah, and Oregon. In Wyoming, known from the Sierra Madre, Yellowstone Plateau, and Jackson Hole in Carbon, Park, and Teton counties.

Habitat:
Occurs on moist, sandy to gravelly banks of streams, lakes, and rivers or in seepage areas in sedge and graminoid-dominated meadows at elevations of 6700-8400 feet. Populations in Yellowstone National Park may occur in thermally-influenced areas.
Individual populations may be small (30 plants in 0.1 acres observed at one site by S. Markow).

Associated Rare Species:

Occurrences in Wyoming:
Known from 6 extant (last observed in 1997) and 3 historical records in Wyoming.

Abundance:
Individual populations often small. Markow observed 30 plants in a 0.1 acre site in 1995.

Range:

Peripheral; in Wyoming known from the Yellowstone Plateau, Jackson Hole, Absaroka Range, and the Sierra Madre in Carbon, Park, and Teton counties.

Trends:
Not known.

Protection status:
At least 4 extant populations and 3 historical records are from Grand Teton or Yellowstone National Parks. Other populations are found on public lands managed for multiple use.

Threats:
May be threatened by development of wetlands.

Managed Areas:
Occurs in Medicine Bow and Targhee National Forests and Grand Teton and Yellowstone National Parks.

References:
Markow, S. 1994. A floristic survey of the Targhee National Forest and vicinity, East-Central Idaho and West-Central Wyoming. Unpublished Master's Thesis, Department of Botany, University of Wyoming, Laramie, WY.

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Porter, C.L. 1965. A Flora of Wyoming: Part IV. Bulletin 434:1-88. Agricultural Experiment Station, University of Wyoming.

Author:
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Updated:
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JUNCUS TWEEDYI

TWEEDY'S RUSH
JUNCACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G3QState: S2
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Tweedy's rush is a tufted graminoid with stems 2-4 dm tall and tending to have a reddish or bright pink base. Leaves are both basal and cauline, with blades 1-2.5 mm wide, hollow, and with faintly visible horizontal partitions. Auricles are membranous and well-developed (1-2 mm long). Flowers are in 2-8 head-like clusters, each cluster with 3-8 flowers. Each flower has 6 brownish, sharp-pointed tepals 3-4 mm long, and 3 stamens, with anthers shorter than filaments. Seeds have short appendages, about 1/2 the length of the body (Hitchcock and Cronquist 1969).

Synonyms:

Similar Species:
Juncus alpinoarticulatus and J. articulatus are rhizomatous, have 6 stamens, and seeds which lack appendages. J. nevadensis has 6 stamens with anthers longer than filaments, rounded capsules, and seeds lacking appendages. Juncus longistylis has rhizomes, 6 stamens, rounded capsules, and seeds lacking appendages.

Flowering/Fruiting Period:
July-September.

Distribution:
Southwest and southcentral Montana, south through western Wyoming to northeast Utah (Hitchcock and Cronquist 1969). In Wyoming it is known to Grand Teton National Park and Yellowstone National Park in Teton and Park Counties.

Habitat:
Lakeshores, streambanks and hot springs in mountains from 6500-7900 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from ca 15-20 locations in Wyoming (J. Whipple, personal communication).

Abundance:
May be locally abundant within wetland areas of Yellowstone National Park.

Range:
Regional endemic; in Wyoming known only from the Teton Range and Yellowstone Plateau in Park and Teton counties.

Trends:
Not known, but probably stable.

Protection status:
Nearly all known occurrences are protected within Grand Teton and Yellowstone National Parks.

Threats:
May be impacted by developments along riparian areas (roads and recreation).

Managed Areas:
Occurs in Grand Teton and Yellowstone National Parks.

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Markow, S. 1994. A floristic survey of the Targhee National Forest and vicinity, East-Central Idaho and West-Central Wyoming. Unpublished Master's Thesis, Department of Botany, University of Wyoming, Laramie, WY.

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Author:
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Updated:
00-11-25

KELLOGGIA GALIOIDES

MILK KELLOGGIA
RUBIACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Milk kelloggia is a glabrous, herbaceous perennial with clustered stems 10-60 cm tall arising from creeping rhizomes. The leaves are opposite, sessile, narrow, and 1.5-5 cm long by 2-15 mm wide. Flowers are 5-8 mm long, with 4 fused sepals and 4 pink or white fused petals arising from the top of the ovary. Fruits are ball-like, covered with hooked bristles, and break into 2 segments at maturity (Hitchcock et al. 1959; Scott 1997).

Synonyms:

Similar Species:
Galium spp. have whorled leaves (technically leafy stipules) short floral tubes, and lack calyx teeth. Members of the genera Silene, Cerastium, Stellaria and Pseudostellaria have sepals and petals attached below the ovary, and have fruits without hooked bristles.

Flowering/Fruiting Period:
June-August.

Distribution:
Washinton to California, east to Idaho, Wyoming, Utah and Arizona. In Wyoming it is known from the Yellowstone Plateau and Beartooth and Teton ranges, and reported for the Wind River and Salt River ranges (Scott 1997).

Habitat:
Woods and open slopes in mountains, from foothills to above timberline.

Associated Rare Species:

Occurrences in Wyoming:
Known from at least 3 extant populations and 2 historical records in Wyoming. The range map in Scott (1997) indicates that there may be 5-8 locations in the state.

Abundance:
Not known.

Range:
Peripheral; known from the Absaroka and Teton ranges and Yellowstone Plateau in Park and Teton counties. Also reported for Lincoln and Fremont counties in the Salt River and Wind River ranges by Scott (1997).

Trends:
Not known.

Protection status:
At least 4 populations are protected within Grand Teton and Yellowstone National Parks and the North Absaroka and Washakie wilderness areas.

Threats:
Not known. One population near Jackson could be impacted by expansion of a ski area.

Managed Areas:
Occurs on lands managed by Grand Teton and Yellowstone National Parks and Bridger-Teton and Shoshone National Forests.

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Author:
Walter Fertig

Updated:
00-10-27

LESQUERELLA CARINATA VAR CARINATA

KEELED BLADDERPOD
BRASSICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None. Formerly a Category 3 candidate for listing under the Endangered Species Act.

Heritage Rank:
Global: G3G4T3T4State: S1
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Keeled bladderpod is a densely pubescent perennial herb with decumbent stems to 15 cm long. The stem and basal leaves are silvery-pubescent and spoon-shaped. The 4-petaled flowers are yellow, 7.5-10 mm long, and arranged in a compact inflorescence. The pubescent fruits are oval, 5-9 mm long, flattened, and strongly keeled along the margins and partion, making them appear diamond-shaped in the cross-section (Rollins 1950, 1993; Rollins and Shaw 1973; Marriott 1990; Fertig et al. 1994; Fertig 1997).

Synonyms:

Similar Species:
Lesquerella paysonii has flattened fruits with rounded (non-keeled) margins and faces. L. fremontii has recurved fruit stalks and smaller flowers and styles. Other Lesquerella species in Wyoming differ in having inflated fruits. Physaria species can be distinguished by their 2-parted, balloon-like fruits, more rounded leaf blades, and typically more robust size (Dorn 1992; Fertig et al. 1994; Fertig 1997). 1992b).

Flowering/Fruiting Period:
Flowering and fruiting period: May-July.

Distribution:
In Wyoming, this taxon is restricted to the Jackson Hole valley and the adjacent foothills of the Gros Ventre and Teton ranges in Teton County (Marriott 1990; Fertig 1997).

Habitat:
Found primarily on sparsely vegetated outcrops of fine, pale whitish clay-sandy soil with a surface layer of grayish calcareous gravel and rubble on slopes and ridgecrests at 6800-7700 feet. These sites are often occupied by communities of scattered cushion plants and bunchgrasses, including Leucopoa kingii, Elymus spicatus, and Poa secunda. Artemisia tridentata var. vaseyana, Purshia tridentata, Chrysothamnus viscidiflorus and other shrubs may also be present in these communities, but usually shrubs are conspicuously absent from microsites inhabited by L. carinata. Total vegetative cover in these habitats ranges from 5-40%, with the average being 20%.
Populations of L. CARINATA in Wyoming range in size from 1500-30,000 plants. Individuals are often densely clustered, although clusters themselves may be widely scattered and patchy. Densities may be as high as 20-29 plants per square meter in favorable microsites. Reproductive plants have been observed to outnumber rosettes by a ratio of 4:1. Studies in Montana of VAR LANGUIDA suggest that population size and vigor may vary from season to season in response to moisture availability. L. CARINATA typically occurs in sites with low vegetative cover and little to no canopy. It does not appear to compete well in areas with dense or tall vegetation. Periodic disturbances, such as gopher activity or erosion from snowmelt, may be important in maintaining open habitats.

Associated Rare Species:

Occurrences in Wyoming:
Known from 5 extant occurrences in Wyoming, all of which have been relocated or discovered since 1990 (4 were found in a 1996 survey by Fertig). Two other historical records are known in the state, one of which is questionable (it may represent the closely related species L. paysonii).

Abundance:
1996 surveys estimated the state population at 50,000-60,000 individuals in 445 acres of habitat (Fertig 1997).

Range:
Regional endemic of NW Wyoming and EC Idaho. In Wyoming, known only from Jackson Hole and the adjacent Teton and Gros Ventre ranges in Teton County.

Trends:
Trend data are not available for most sites, but the species is thought to be stable at the present time. Some potential habitat has probably been lost as Jackson has expanded, suggesting that the species has experienced an historical decline.

Protection status:
Two populations are protected in Grand Teton National Park and 3 occur within the National Elk Refuge. Other populations on Bridger-Teton and Targhee National Forests occur on lands managed for multiple use. Formerly a C2 candidate for listing under the Endangered Species Act.

Threats:
May be impacted by recreation, grazing, competition from exotic plants, mineral development, and impacts from wildlife.

Managed Areas:
Occurs in Bridger-Teton and Targhee National Forests, Grand Teton National Park, and the National Elk Refuge.

References:
Marriott, H.J. 1990. Rare Plants of Grand Teton National Park, Annual Report. Prepared for the National Park Service by the Wyoming Natural Diversity Database, Laramie, WY.

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Keenlyne, K.D. 1977. Special Report Number 3: Endangered or Threatened Species in Wyoming. US Fish and Wildlife Service, Casper, WY. 48 pp.

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Author:
Walter Fertig

Updated:
00-06-15

LESQUERELLA MULTICEPS

WESTERN BLADDERPOD
BRASSICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:BLM Wyoming State Office: proposed Sensitive.

Heritage Rank:
Global: G3State: S1
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Western bladderpod is a low-growing, caespitose perennial herb 2-25 cm tall and densely pubescent with tiny star-like hairs imparting a grayish cast. Leaf blades are elliptic to ovate, 2-4 cm long, and gradually narrowed to slender petioles. Flowers are small (5-10 mm long) and yellow. Fruits are 3.5-5 mm long, dry, nearly globose, and elevated on s-shaped pedicels 3-10 mm long (Welsh 1993).

Synonyms:

Similar Species:
Lesquerella prostrata has leaf blades which are rhombic or deltoid in outline and abruptly narrowed to the petiole. L. alpina var. alpina has narrow, linear leaves and elongate, non-globose fruits. L. macrocarpa has fruits on recurved pedicels. All other Wyoming species of Lesquerella have either flattened fruits or recurved pedicels (Rollins 1993, Dorn 1992).

Flowering/Fruiting Period:
Flowers May-July, fruits present June-early August.

Distribution:
Regional endemic of northeastern Utah, southeastern Idaho, and western Wyoming (Welsh 1993). In Wyoming, it is known only from the Snake River Range and Overthrust Belt in Lincoln County.

Habitat:
Rangewide, this species is typically found on dry, gravelly limestone ridges and slopes with thin pockets of soil (Rollins 1993). Wyoming populations are reported from red sandy or stoney slopes at elevations of 8300-8600 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from 2 herbarium records, the most recent dating from 1964.

Abundance:
Unknown.

Range:
Regional endemic of NE Utah, SE Idaho, and SW Wyoming. In Wyoming, found only in the Snake River Range and Bear River Divide in Lincoln County.

Trends:
Trends unknown, but may be in decline since it is so rarely observed.

Protection status:
No occurrences are formally protected.

Threats:
Unknown.

Managed Areas:
Found in Targhee National Forest (the WY portion managed by Bridger-Teton NF) and possibly the BLM Kemmerer Field Office.

References:

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Author:
Walter Fertig

Updated:
01-02-15

LESQUERELLA PAYSONII

PAYSON'S BLADDERPOD
BRASSICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G3State: S3
WYNDD Plant List: REGIONAL ENDEMIC

Occurrences in Wyoming:
Known from 34 extant occurrences and 4 historical records in Wyoming. 25 populations have been discovered or relocated since 1990.

Abundance:
Censused populations range in size from 10-1500 individuals in areas between 1-30 acres. Total population is conservatively estimated at 20,000 individuals (Fertig 1997).

Range:
Regional endemic of west-central Wyoming, E Idaho, and SW Montana. In Wyoming, known from the Gros Ventre, Salt River, Snake River, Teton, Wind River, and Wyoming ranges, the northern Green River Basin, and Jackson Hole in Lincoln, Sublette, and Teton counties. Scott (1997) also reports populations from the east slope of the Wind River Range in Fremont County, but these may represent L. fremontii.

Trends:
Trend data are lacking for nearly all occurrences, but at least 3 are known to have persisted since the 1920s. Short-term observations suggest that population size may change notably from year to year based on climatic conditions (Fertig 1997).

Protection status:
Thirteen occurrences are found within the Gros Ventre Wilderness Area, Grand Teton National Park, Kendall Warm Springs Special Interest Area, and Afton Front Research Natural Area. Three other occurrences are found just outside of other RNAs and SIAs on Bridger-Teton National Forest. This species was formerly a C2 candidate for listing under the Endangered Species Act. It is also listed as Sensitive in USFS Region 4, but was recommended for downlisting by Moseley (1996) and Fertig (1997).

Threats:
Impacts from recreation (hiking and off-road vehicles), ski development, grazing, and mining are potential threats in lower elevation populations. Overall, however, threats are low to most occurrences.

Managed Areas:
Occurs on lands managed by Grand Teton NP, Bridger-Teton and Targhee NFs, and the BLM Pinedale Field Office.

References:
Marriott, H.J. 1993. Rare Plants of Grand Teton National Park, Final Report. Prepared for the National Park Service by the Wyoming Nature Conservancy.

Markow, S. 1994. A floristic survey of the Targhee National Forest and vicinity, East-Central Idaho and West-Central Wyoming. Unpublished Master's Thesis, Department of Botany, University of Wyoming, Laramie, WY.

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Author:
Walter Fertig

Updated:
00-06-15

LISTERA CONVALLARIOIDES

BROAD-LEAVED TWAYBLADE
ORCHIDACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Broad-leaved twayblade is a perennial herb, mostly 10-35 cm tall, with the stems glandular-pubescent above the leaves and glabrous below. Stems bear a single pair of broadly ovate to nearly round, opposite leaves. The inflorescence is a terminal raceme with 5-25 (up to 35) flowers. Individual flowers are small, yellow-green, with sepals and petals strongly curved back. The lowest petal (lip) has an expanded, blade-like base that strongly tapers to the base, ciliate margins, and two rounded bumps (rather than teeth) near the base (Hitchcock et al. 1969; Dorn 1992).

Synonyms:

Similar Species:
LISTERA BOREALIS has a lip which is little, if at all, narrowed toward the base. L. CAURINA has sepals and petals spreading or only slightly reflexed and a lip with two narrow, lateral teeth. L. CORDATA has leaves which are roughly heart-shaped at the base, and a lip that is deeply divided into two narrowly-triangular lobes.

Flowering/Fruiting Period:
July - September.

Distribution:
Alaska to Newfoundland, south to California, Arizona, Utah and Colorado. In Wyoming it is known from the Teton Mountains, Medicine Bow Mountains, Laramie Range and the Bighorn Mountains.

Habitat:
In Wyoming, found along streambanks, lake margins, and moist, shaded areas in coniferous forest and moist, grassy areas under aspen and alder at 6400-9000 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from 4 extant occurrences and 2 historical records.

Abundance:
Evert (EO 007) noted populations of several hundred individuals near Story in 1985. Census data are lacking for most other populations.

Range:
Peripheral; in Wyoming, known from the Laramie, Medicine Bow, Bighorn, and Teton ranges in Albany, Converse, Sheridan, and Teton counties.

Trends:
Not known.

Protection status:

Two populations are protected within Grand Teton National Park. Other known occurrences are on public or state lands managed for multiple use.

Threats:
May be threatened by overcollection, loss of moist forest habitat to logging, and impacts from recreation.

Managed Areas:
Occurs on Bighorn, Medicine Bow, and Targhee National Forests and Grand Teton National Park. An historical record from the Laramie Basin may be on lands managed by the BLM Rawlins Field Office.

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Porter, C.L. 1965. A Flora of Wyoming: Part IV. Bulletin 434:1-88. Agricultural Experiment Station, University of Wyoming.

Author:
Walter Fertig

Updated:
00-11-25

LUZULA GLABRATA VAR HITCHCOCKII

SMOOTH WOOD-RUSH
JUNCACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5T4State: S1
WYNDD Plant List: PERIPHERAL

Description:
Smooth wood-rush is a perennial graminoid with single or loosely clustered stems (culms) 15-50 cm tall from a short rhizome. Leaves are 2-6 cm long and have flat blades. Basal leaves are linear-lanceolate and glabrous, while stem leaves are more broadly lance-shaped and have long, soft hairs at the base of the blade. The inflorescence is an open panicle 3-8 cm long with thin, nodding to erect flower branches. Flowers consist of 6 sharp-tipped, purplish-brown to chestnut perianth segments 2.5-3.5 mm long. Each flower is subtended by a pair of irregularly-toothed bracts. Anthers are 0.8-1.2 mm long and are much longer than their filaments. Fruits are ovate capsules with a beak-like style ca 1 mm long (Hitchcock et al. 1969; Scott 1997).

Synonyms:LUZULA HITCHCOCKII

Similar Species:
LUZULA PARVIFLORA and L. WAHLENBERGII have perianth segments less than 2.5 mm long, styles under 0.5 mm long (fruits do not appear beaked), and anthers less than 1 mm long. L. SPICATA and L. CAMPESTRIS have flowers in head-like or elongate spikes.

Flowering/Fruiting Period:
July-September.

Distribution:
S British Columbia and SW Alberta to Oregon, N Idaho, and NW Wyoming. In Wyoming, known from the Beartooth and Teton ranges in Park and Teton counties.

Habitat:
Timberline meadows and montane meadows?

Associated Rare Species:

Occurrences in Wyoming:
Known from 4 extant occurrences in Wyoming (most recently observed in 1999) and 1 historical record.

Abundance:
Not known, although reported as "common" at Holly Cirque by R. Shaw (1976).

Range:
Peripheral; in Wyoming, known from the Beartooth Range (Park County) and Teton/Snake River ranges (Teton County). Also recently reported (1999) from SW Yellowstone National Park by J. Whipple.

Trends:
Not known.

Protection status:

2 of the 4 known occurrences are protected in Grand Teton NP. The Beartooth Mountains occurrence is probably located within the potential Beartooth Butte Research Natural Area.

Threats:
Not known.

Managed Areas:
Occurs in Shoshone, Bridger-Teton, and Targhee National Forests and Grand Teton National Park.

References:
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Author:
Walter Fertig

Updated:
00-11-25

MELICA SMITHII

SMITH MELIC GRASS
POACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G4State: SH
WYNDD Plant List: PERIPHERAL

Description:
Smith melic grass is a tufted perennial graminoid, 6-13 cm tall with sheaths closed nearly to the top, ligules 3-9 mm long, and flat, lax blades which are 5-10 mm wide. Panicle branches are solitary, widely spaced, and ususally spreading or drooping. Spikelets are few and out near the ends of the branchlets, each with 4-6 florets. Glumes are shorter than the lemmas. Lemmas are strongly 7-nerved, the nerves not converging at the lemma tips, and the lemma apex is distinctly 2-parted, with an awn 3-7 mm long.

Synonyms:

Similar Species:
Festuca subulata has open sheaths and lacks the 2-parted lemma apex. Bromus ciliatus has mostly larger spikelets (18-30 mm) and shorter (ca 1 mm) ligules, and lemmas which are densely hairy along the margins. Bromus vulgaris has clustered panicle branches, nerves converging at the tips of the lemmas, and lemma apices which are not 2-parted.

Flowering/Fruiting Period:
June-August.

Distribution:
Southern British Columbia to Oregon, east to Alberta, Montana and Wyoming. Also known to Ontario and Michigan. In Wyoming, known only from an historical collection made at Teton Cayon on the west side of the Teton Range.

Habitat:
Moist woods dominated by Abies lasiocarpa and Picea engelmannii at 7000 ft.

Associated Rare Species:

Occurrences in Wyoming:
Known from a single historical record in Wyoming, last observed in 1899.

Abundance:
Unknown; may be extirpated in the state.

Range:
Peripheral; in Wyoming known from a single report from the Teton Range (Teton County).

Trends:
Unknown; may be extirpated in Wyoming.

Protection status:
No EOs are known from a special management area.

Managed Areas:

May occur on Grand Teton NP or Targhee NF.

References:

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Evert, E.F. No Date. Rare Plants: Teton-Darby Canyon Area. Unpublished report.
Hitchcock, C.L., A. Cronquist, and M. Owenbey. 1969. Pt. 1. Vascular Cryptograms, Gymnosperms, and Monocotyledons, IN: Hitchcock, C.L., A. Cronquist, M. Owenbey, and J.W. Thompson (eds). Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(1): 1-914.

Hallsten, G.P., Q.D. Skinner, and A.A. Beetle. 1987. Grasses of Wyoming, 3rd Ed. Research Journal 202, Agricultural Experiment Station, University of Wyoming, Laramie.

Hitchcock, A. S. 1950. Manual of the Grasses of the United States, second edition, revised by Agnes Chase. USDA Miscellaneous Publications No. 200.

Author:
Stuart Markow

Updated:
01-02-14

MINUARTIA FILIORUM

THREAD-BRANCH STITCHWORT
CARYOPHYLLACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G3G4State: S1
WYNDD Plant List:

Associated Rare Species:

Occurrences in Wyoming:
Known from 4 extant occurrences in Wyoming, all dating since 1990.

Abundance:
Not known, but probably low.

Range:
Regional endemic of NW Wyoming, NE Utah, and C Colorado. In Wyoming, known from the Gros Ventre and NW Wind River mountains (Sublette and Teton counties).

Trends:
Presumed stable.

Protection status:
All known occurrences are found within designated wilderness areas (Bridger and Gros Ventre) and the Osborn Mountain Research Natural Area.

Threats:
Threats low in alpine scree habitat under current management.

Managed Areas:
Occurs in Bridger-Teton NF.

References:

Scott, R.W. 1997. The Alpine Flora of the Rocky Mountains. Volume 1 The Middle Rockies. University of Utah Press, Salt Lake City, UT. 901 pp.

Maguire, B. 1946. Studies in the Caryophyllaceae - I. Bulletin Torrey Botanical Club 73(3):326.

Maguire, B. 1946. Studies in the Caryophyllaceae - II. ARENARIA NUTTALLII and ARENARIA FILIORUM, section ALSINE. Madrono 8(8):258-263.

Maguire, B. 1958. ARENARIA ROSSII and some of its relatives in America. Rhodora 60:44-53.

Fertig, W. 2000. Rare vascular plant species in the Wyoming portion of the Utah-Wyoming Rocky Mountains Ecoregion. Prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.

Author:
Walter Fertig

Updated:
00-06-15

MUHLENBERGIA GLOMERATA

MARSH MUHLY
POACEAE

Status:
US Fish & Wildlife Service:
Agency Status:USFS Region 2: Sensitive

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Marsh muhly is a rhizomatous perennial graminoid with unbranched stems 20-50 cm high. Stems are minutely pubescent below the nodes. The upper leaf blades are flat, 2-5 mm wide and have slightly keeled sheaths. Ligules are minute and membranous. The inflorescence is a greenish or purplish compressed panicle 3-7 cm long. Spikelets have one floret with long-awned glumes. The hairs at the base of the floret are half as long as the lemma (Fertig and Jones 1992; Fertig et al. 1994).

Synonyms:Included in MULENBERGIA RACEMOSA by some authors.

Similar Species:
Muhlenbergia racemosa has glabrous internodes, strongly keeled sheaths, branched stems, and grows in drier sites. M. andina has long hairs at the base of the floret that equal or exceed the lemma (Fertig et al. 1994). Hybrids between M. andina and M. glomerata have been reported in Montana, but have not been found in Wyoming (Pohl and Mitchell 1965).

Flowering/Fruiting Period:
Flowering and fruiting July-September.

Distribution:
Newfoundland to the southern Yukon Territory and south to West Virginia, Iowa, Colorado and Nevada (Moss 1983). Sparse in Wyoming where it is known from the Black Hills, Absaroka Range, Yellowstone Plateau, upper Green River Basin, Jackson Hole, and a vague, historical record from the Eastern Plains.

Habitat:
Bogs, springs, peaty or calcareous meadows, floating mats, stream edges, and shores (Fertig et al. 1994).

Associated Rare Species:
ERIOPHORUM VIRIDICARINATUM, CAREX LIMOSA, PRIMULA EGALIKSENSIS, SALIX CANDIDA.

Occurrences in Wyoming:
Known from 5 extant records (most recently observed in 2000) and 2 historical reports in Wyoming.

Abundance:
Census data are lacking for most sites, but populations appear to be highly restricted to specialized habitats. Several thousand plants were observed on the National Elk Refuge in 1997. The late summer/early fall flowering period for this plant may help explain why it is infrequently collected (Jennifer Whipple, personal communication).

Range:
Sparse; in Wyoming, known from the Black Hills, Yellowstone Plateau, Southeastern Plains, Green River Basin, Clarks Fork Valley, and Jackson Hole (Crook, Goshen [?], Park, Sublette, and Teton counties). Previous reports from the Bighorn Range are now thought to be erroneous.

Trends:
Not known.

Protection status:
At least 3 occurrences are protected in the Swamp Lake Special Botanical Area, National Elk Refuge, and Yellowstone National Park. This species is listed as Sensitive in USFS Region 2.

Threats:
May be threatened by changes in hydrology, grazing, or exotics.

Managed Areas:
Occurs on lands managed by Black Hills and Shoshone National Forests, National Elk Refuge, Yellowstone National Park, and possibly the BLM Pinedale Field Office.

References:

Moseley, R.K., R. Bursik, and M. Mancuso. 1991. Floristic inventory of wetlands in Fremont and Teton Counties, Idaho. Unpublished report prepared for Targhee National Forest by the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. November 1991.

Fertig, W. and G. Jones. 1992. Plant communities and rare plants of the Swamp Lake Botanical Area, Clarks Fork Ranger District, Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database.

Fertig, W. 1993. Black Hills National Forest Sensitive Plant Field Guide. Unpublished report prepated for the Black Hills NF by the Wyoming Natural Diversity Database, Laramie, WY.

Markow, S. and W. Fertig. 1993. Report on a general floristic survey of vascular plants of Targhee National Forest and vicinity. Unpublished report prepared for Targhee National Forest by the Rocky Mountain Herbarium and the Wyoming Natural Diversity Database, Laramie, WY.

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Marriott, H. 1994. Sensitive plant species surveys on the Bear Lodge District, Black Hills National Forest. Unpublished report prepared for the Black Hills National Forest by The Wyoming Nature Conservancy.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Fertig, W. 1995. Report on the potential vulnerability of Shoshone National Forest Candidate and Sensitive plant species to livestock grazing. Unpublished report prepared for Shoshone National Forest by the Wyoming Natural Diversity Database, Laramie, Wyoming.

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Fertig, W. 1998. Plant species of special concern and vascular plant flora of the National Elk Refuge. Unpublished report prepared for the US Fish and Wildlife Service by the Wyoming Natural Diversity Database, Laramie, WY.
Hallsten, G.P., Q.D. Skinner, and A.A. Beetle. 1987. Grasses of Wyoming, 3rd Ed. Research Journal 202, Agricultural Experiment Station, University of Wyoming, Laramie.

Fertig, W., L. Welp, and S. Markow. 1998. The status of rare plants in southwest Wyoming. Report prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W. 1998. The status of rare plants on Shoshone National Forest: 1995-97 survey results. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W. 2000. Target plant species and potential plant conservation sites in the Wyoming portion of the Black Hills Ecoregion. Report prepared for The Nature Conservancy Midwest Science Division by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W. 2000. Rare vascular plant species in the Wyoming portion of the Utah-Wyoming Rocky Mountains Ecoregion. Prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.

Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.

Washington Natural Heritage Program. 2000. Field Guide to Washington's Rare Plants. Washington Dept. of Natural Resources and Spokane District, USDI Bureau of Land Management.

Hitchcock, C.L., A. Cronquist, and M. Owenbey. 1969. Pt. 1. Vascular Cryptograms, Gymnosperms, and Monocotyledons, IN: Hitchcock, C.L., A. Cronquist, M. Owenbey, and J.W. Thompson (eds). Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(1): 1-914.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. Volume 6, The Monocotyledons. Intermountain Flora: Vascular Plants of the Intermountain West, USA. Columbia University Press, New York.

Porter, C.L. 1964. A Flora of Wyoming, Part III. Bulletin 418:1-80. Agricultural Experiment Station, University of Wyoming.

Holst, D.J.B., R.W. Crook, and J.H. Hornbeck. 2001. Sensitive plant monitoring, Black Hills National Forest Year 2000. Prepared for the Wyoming Natural Heritage Program by Black Hills National Forest, Custer, SD.

Author:
Walter Fertig

Updated:
01-03-30

NAJAS GUADALUPENSIS

SOUTHERN NAIAD
NAJADACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Associated Rare Species:

Occurrences in Wyoming:
Known from one confirmed location in the state and reported from one additional locailty.

Abundance:
Population size is not known, but total range is less than 5 acres.

Range:
Peripheral; in Wyoming, known from one confirmed location in Jackson Hole (Teton County) and reported from Kendall Warm Springs on the west side of the Wind River Range (Sublette County).

Trends:
Not known.

Protection status:
One occurrence is found in Grand Teton National Park. May also occur within the Kendall Warm Springs Special Interest Area on Bridger-Teton National Forest.

Threats:
May be threatened by high recreation use of its habitat and competition from exotics.

Managed Areas:
Occurs in Grand Teton National Park and possibly in Bridger-Teton National Forest.

References:

Lesica, P. & J. S. Shelly. 1991. Sensitive, Threatened and Endangered Vascular Plants of Montana. Montana Natural Heritage Program, Occ. Publ. No. 1. Helena, MT.

Fertig, W. 1995. Biological report on the potential Kendall Warm Springs Special Management Area. Unpublished report prepared for Bridger-Teton National Forest by the Wyoming Natural Diversity Database, Laramie, Wyoming.

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Dorn, R.D. 1988. Vascular Plants of Wyoming. Mountain West Publ., Cheyenne.

Dorn, R.D. 1977. Manual of the Vascular Plants of Wyoming. 2 volumes. Garland Publ., INC., New York, NY.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. Volume 6, The Monocotyledons. Intermountain Flora: Vascular Plants of the Intermountain West, USA. Columbia University Press, New York.

Author:

Walter Fertig

Updated:
99-10-10

OROBANCHE CORYMBOSA VAR CORYMBOSA

FLAT-TOP BROOMRAPE
OROBANCHACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G4T4State: S1
WYNDD Plant List: PERIPHERAL

Description:
Flat-top broomrape is a fleshy, root-parasitic herb with reddish-purple to violet, glabrous or glandular stems 5-12 cm tall. The inflorescence is a short, densely-flowered corymb 2.5-5 cm long. Flowers are nearly sessile or borne on stalks less than 3 cm long and are subtended by 1-2 linear bracts and 1 broader bract. The calyx is 12-20 mm long and deeply divided into 5 subequal, narrow lobes. The tubular corolla is 18-28 mm long and is light purple with pink nectar guidelines or yellow blotches on the 3-6 mm long lobes. Anthers are woolly-pubescent. The fruit is a capsule 8-14 mm long (Heckard 1973; Cronquist et al. 1984; Dorn 1992).

Synonyms: none

Similar Species:
OROBANCHE LUDOVICIANA often has shorter corollas, shorter calyx lobes, an elongate spike-like inflorescence, and sessile flowers. O. FASCICULATA has flowers without subtending bracts that are borne on stalks often well over 3 cm long (Dorn 1992).

Flowering/Fruiting Period:
June-August.

Distribution:
E Washington to NW Wyoming, south to California, Nevada, and W Utah. In Wyoming, known from Jackson Hole (Teton County) and the Hoback Canyon area (Sublette County). Also reported from the Absaroka Range by Erwin Evert.

Habitat:
Occurs in sagebrush and juniper communities on plains and hills.
A root parasite of species of sagebrush (ARTEMISIA).

Associated Rare Species: none

Occurrences in Wyoming:
Known from at least 2 extant locations (most recently observed in 1998) and 2 historical populations in Wyoming.

Abundance:
Not known.

Range:
Peripheral; in Wyoming, known from the Absaroka Range, Hoback canyon, and Jackson Hole in Park, Sublette, and Teton counties.

Trends:
Not known.

Protection status:

1-2 populations are found in Grand Teton National Park. Other known populations occur on public lands managed for multiple use.

Threats:
Not known.

Managed Areas:
Occurs on lands managed by Bridger-Teton and Shoshone National Forest and Grand Teton National Park.

References:

Hartman, R.L. and B.E. Nelson. 1993. General floristic/sensitive plant species survey of the Wyoming and Salt River ranges, northern portions, Wyoming. Unpublished report prepared for Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

Hartman, R.L. and B.E. Nelson. 1994. General floristic/sensitive plant species survey of the Wyoming and Salt River ranges, southern portions, Wyoming and concluding remarks on the entire area. Unpublished report prepared for Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

Lesica, P. & J. S. Shelly. 1991. Sensitive, Threatened and Endangered Vascular Plants of Montana. Montana Natural Heritage Program, Occ. Publ. No. 1. Helena, MT.

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. 1984. Intermountain Flora. Vascular Plants of the Intermountain West, USA. Vol 4. Subclass Asteridae. New York Botanical Garden, Bronx, NY.

Fertig, W. 1998. The status of rare plants on Shoshone National Forest: 1995-97 survey results. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

Hitchcock, C.L., A. Cronquist, and M. Ownbey. 1959. Pt. 4. Ericaceae through Campanulaceae. In: C.L. Hitchcock, A. Cronquist, M. Ownbey, and J.W. Thompson. Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(4):1-510.

Author:
Walter Fertig

Updated:
00-02-15

OROBANCHE CORYMBOSA VAR CORYMBOSA

FLAT-TOP BROOMRAPE
OROBANCHACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G4T4State: S1
WYNDD Plant List: PERIPHERAL

Description:
Flat-top broomrape is a fleshy, root-parasitic herb with reddish-purple to violet, glabrous or glandular stems 5-12 cm tall. The inflorescence is a short, densely-flowered corymb 2.5-5 cm long. Flowers are nearly sessile or borne on stalks less than 3 cm long and are subtended by 1-2 linear bracts and 1 broader bract. The calyx is 12-20 mm long and deeply divided into 5 subequal, narrow lobes. The tubular corolla is 18-28 mm long and is light purple with pink nectar guidelines or yellow blotches on the 3-6 mm long lobes. Anthers are woolly-pubescent. The fruit is a capsule 8-14 mm long (Heckard 1973; Cronquist et al. 1984; Dorn 1992).

Synonyms: none

Similar Species:
OROBANCHE LUDOVICIANA often has shorter corollas, shorter calyx lobes, an elongate spike-like inflorescence, and sessile flowers. O. FASCICULATA has flowers without subtending bracts that are borne on stalks often well over 3 cm long (Dorn 1992).

Flowering/Fruiting Period:
June-August.

Distribution:
E Washington to NW Wyoming, south to California, Nevada, and W Utah. In Wyoming, known from Jackson Hole (Teton County) and the Hoback Canyon area (Sublette County). Also reported from the Absaroka Range by Erwin Evert.

Habitat:
Occurs in sagebrush and juniper communities on plains and hills.
A root parasite of species of sagebrush (ARTEMISIA).

Associated Rare Species: none

Occurrences in Wyoming:
Known from at least 2 extant locations (most recently observed in 1998) and 2 historical populations in Wyoming.

Abundance:
Not known.

Range:
Peripheral; in Wyoming, known from the Absaroka Range, Hoback canyon, and Jackson Hole in Park, Sublette, and Teton counties.

Trends:
Not known.

Protection status:

1-2 populations are found in Grand Teton National Park. Other known populations occur on public lands managed for multiple use.

Threats:
Not known.

Managed Areas:
Occurs on lands managed by Bridger-Teton and Shoshone National Forest and Grand Teton National Park.

References:

Hartman, R.L. and B.E. Nelson. 1993. General floristic/sensitive plant species survey of the Wyoming and Salt River ranges, northern portions, Wyoming. Unpublished report prepared for Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

Hartman, R.L. and B.E. Nelson. 1994. General floristic/sensitive plant species survey of the Wyoming and Salt River ranges, southern portions, Wyoming and concluding remarks on the entire area. Unpublished report prepared for Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

Lesica, P. & J. S. Shelly. 1991. Sensitive, Threatened and Endangered Vascular Plants of Montana. Montana Natural Heritage Program, Occ. Publ. No. 1. Helena, MT.

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

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Fertig, W. 1998. The status of rare plants on Shoshone National Forest: 1995-97 survey results. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

Hitchcock, C.L., A. Cronquist, and M. Ownbey. 1959. Pt. 4. Ericaceae through Campanulaceae. In: C.L. Hitchcock, A. Cronquist, M. Ownbey, and J.W. Thompson. Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(4):1-510.

Author:
Walter Fertig

Updated:
00-02-15

PARRYA NUDICAULIS

NAKED-STEMMED PARRYA
BRASSICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:USFS Region 2 Sensitive; USFS Region 4 Sensitive.

Heritage Rank:
Global: G5State: S2
WYNDD Plant List: DISJUNCT

Description:
Naked-stemmed parrya is a glandular, perennial herb with stems up to 20 cm high. The stout, woody rootstalk is branched and covered by old leaf bases. Leaves are mostly basal and have oblanceolate, entire to coarsely toothed, stalked blades 5-25 mm wide. The flowers have four pink to lavender (sometimes white) petals and four purple glandular or glabrous sepals, and are arranged in a raceme. The oblong, flattened fruits are usually over 2 cm long and constricted between the seeds (torulose) (Welsh 1979; Fertig 1994; Fertig et al. 1994; Fertig 1995).

Synonyms:Wyoming plants may be the same as PARRYA RYDBERGII.

Similar Species:
The fruits of PARRYA superficially resemble pea pods, but can be distinguished by the presence of an internal dividing membrane (replum). Utah plants have been referred to PARRYA RYDBERGII by Welsh et al. (1987). Wyoming material appears to be nearly identical with specimens from Utah.

Flowering/Fruiting Period:
Flowering and fruiting July-August.

Distribution:
Siberia to Alaska and northern Canada. It is disjunct in the Uinta Mountains in Utah and the Wind River, Gros Ventre, and Beartooth Ranges in Wyoming.

Habitat:
Typically found on steep, unconsolidated talus slopes of gray limestone or pinkish sandstone in the alpine or upper subalpine zones. These sites usually have very low vegetative cover (less than 25%) and are inhabited mostly by low cushion plants and alpine willow species. Occasionally, colonies can be found on moist grassy hummocks on low saddles.

Associated Rare Species:
ANTENNARIA AROMATICA, ERIGERON LANATUS, SAUSSUREA WEBERI

Occurrences in Wyoming:
Currently known from 8 extant occurrences (all observed or discovered since 1990), and one older record (from 1965).

Abundance:
Population data are available from only 4 occurrences, but these figures suggest that the species numbers at least 100,000 individuals in Wyoming in over 450 acres of habitat.

Range:
Disjunct; in Wyoming, known from the Wind River, Gros Ventre, and Beartooth ranges (Fremont, Park, Sublette, and Teton counties).

Trends:

Until recently, this species was thought to be much less common than surveys in 1994 indicated. These higher numbers are probably due to better sampling rather than a recent population increase.

Protection status:
All known occurrences are found within designated Wilderness Areas (Bridger, Absaroka-Beartooth, Popo Agie, Gros Ventre, and Fitzpatrick). One population also occurs within the proposed Osborn Mountain Research Natural Area, and two others occur in the potential Beartooth Butte and Arrow Mountain RNAs. This species is listed as Sensitive in USFS Regions 2 and 4.

Threats:
Habitat is adequately protected by management policy and rough terrain.

Managed Areas:
Known occurrences are found on lands managed by Bridger-Teton National Forest and Shoshone National Forest.

References:

Fertig, W. 1992. Checklist of the Vascular plant flora of the west slope of the Wind River Range and status report on the sensitive plant species of Bridger-Teton National Forest. Unpublished report prepared for the Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

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Fertig, W. 1998. The status of rare plants on Shoshone National Forest: 1995-97 survey results. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

Jones, G.P. and W. Fertig. 1999. Ecological evaluation of the potential Beartooth Butte Research Natural Area within the Shoshone National Forest, Park County, Wyomng. Unpublished report prepared for the Shoshone National Forest, USDA Forest Service by the Wyoming Natural Diversity Database, University of Wyoming. 57 pp.

Jones, G.P. and W. Fertig. 1999. Ecological evaluation of the potential Arrow Mountain Research Natural Area within the Shoshone National Forest, Fremont County, Wyomng. Unpublished report prepared for the Shoshone National Forest, USDA Forest Service by the Wyoming Natural Diversity Database, University of Wyoming. 65 pp.

Rosenthal, D.M. 1999. A floristic survey of selected areas in Shoshone National Forest, Wyoming. Master's Thesis, Department of Botany, University of Wyoming, Laramie, WY.

Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W. 2000. Rare vascular plant species in the Wyoming portion of the Utah-Wyoming Rocky Mountains Ecoregion. Prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.

Author:
Walter Fertig

Updated:
00-06-15

PELLAEA SUKSDORFIANA

SMOOTH CLIFF-BRAKE
PTERIDACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5T4?State: S1
WYNDD Plant List: PERIPHERAL

Description:
Smooth cliff-brake is a perennial fern with crowded fronds from a scaly, branched rhizome. Leafstalks are reddish brown to purplish, glabrous to sparsely hairy, and rarely have horizontal grooves. The oblong leaf blades are 2.5-10 cm long, 1.5-4 cm wide, once-pinnate above and twice pinnate at the base, and have a glabrous, brown rachis. The lowest pair of pinnae typically have 3-5 secondary leaflets on a very short, glabrate stalk that diverges at less than a 45 degree angle. Ultimate segments of the leaflets are glabrous, leathery, 5-20 mm long, and have inrolled margins forming a "false indusium" that covers the sporangia. Spores number 32 per sporangium (Dorn 1992; Windham 1993; Lellinger 1985).

Synonyms:

Similar Species:
Pellaea occidentalis has 3 or fewer secondary leaflets on the lowest, essentially sessile pinnae and 64 spores per sporangium. P. breweri has numerous persistent petiole bases marked with a series of horizontal grooves. P. atropurpurea and P. gastonyi have pubescent rachises, and twice pinnately compound leaves with the lowest pinnae borne on a hairy stalk at a 45 degree angle (Dorn 1992; Windham 1993).

Flowering/Fruiting Period:
Spores produced in late summer and fall.

Distribution:
British Columbia to Washington, Wyoming, and New Mexico. In Wyoming, known from the Black Hills in Crook County and Teton Range in Teton County.

Habitat:
Cliffs and ledges, usually on limestone.

Associated Rare Species:

Occurrences in Wyoming:
Known from 3 extant occurrences in Wyoming, most recently observed in 1984.

Abundance:
Not known.

Range:
Peripheral; in Wyoming known from the Black Hills and Teton Range in Crook and Teton counties.

Trends:
Not known.

Protection status:

All known populations are on public lands managed or multiple use.

Threats:
Not known.

Managed Areas:
Occurs on Black Hills and Targhee National Forests.

References:

Evert, E.F. No Date. Rare Plants: Teton-Darby Canyon Area. Unpublished report.

Markow, S. and W. Fertig. 1993. Report on a general floristic survey of vascular plants of Targhee National Forest and vicinity. Unpublished report prepared for Targhee National Forest by the Rocky Mountain Herbarium and the Wyoming Natural Diversity Database, Laramie, WY.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, and J.L. Reveal. 1972. Intermountain Flora, Volume 1: Geological and Botanical History of the Region, its Plant Geography and a Glossary. The Vascular Cryptogams and the Gymnosperms. The New York Botanical Garden, New York.

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Hitchcock, C.L., A. Cronquist, and M. Owenbey. 1969. Pt. 1. Vascular Cryptograms, Gymnosperms, and Monocotyledons, IN: Hitchcock, C.L., A. Cronquist, M. Owenbey, and J.W. Thompson (eds). Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(1): 1-914.

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Lellinger, D.B. 1985. A Field Manual of the Ferns and Fern Allies of the United States and Canada. Smithsonian Institution Press, Washington, D. C.

Harrington, H. D. 1954. Manual of the Plants of Colorado. Sage Books, Chicago, IL.

Welsh, S.L., N.D. Atwood, S. Goodrich, and L.C. Higgins, (eds). 1993. A Utah Flora, second edition, revised. Brigham Young University Print Services, Provo, UT.

Great Plains Flora Association. 1986. Flora of the Great Plains. Univ. Kansas Press, Lawrence, KS.

Author:
Walter Fertig

Updated:
00-10-27

POLYSTICHUM SCOPULINUM

MOUNTAIN HOLLY FERN
DRYOPTERIDACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5State: SH
WYNDD Plant List: PERIPHERAL

Associated Rare Species:

Occurrences in Wyoming:
Known from 2 historical records in Wyoming, the most recent dating from 1930.

Abundance:
Unknown. Species may not be extant in the state.

Range:
Peripheral; Known from the west slope of the Teton Range (Teton Co.) and SW Yellowstone National Park.

Trends:
Unknown; species may be extirpated in the state.

Protection status:
One occurrence is known from within Yellowstone National Park. The other is on public lands, but is not within a special management area.

Managed Areas:
Known occurrences are from Targhee National Forest and Yellowstone NP.

References:

Evert, E.F. No Date. Rare Plants: Teton-Darby Canyon Area. Unpublished report.
Lesica, P. & J. S. Shelly. 1991. Sensitive, Threatened and Endangered Vascular Plants of Montana. Montana Natural Heritage Program, Occ. Publ. No. 1. Helena, MT.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, and J.L. Reveal. 1972. Intermountain Flora, Volume 1: Geological and Botanical History of the Region, its Plant Geography and a Glossary. The Vascular Cryptogams and the Gymnosperms. The New York Botanical Garden, New York.

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Soltis, P. S., D. E. Soltis, and P. G. Wolf. 1991. Allozymic and chloroplast DNA analyses of polyploidy in Polystichum (Dryopteridaceae). I. The origins of P. californicum and P. scopulinum. Systematic Botany 16 (2): 245-256.

Soltis, P. S., D. E. Soltis, P. G. Wolf, and J. M. Riley. 1989. Electrophoretic evidence for interspecific hybridization in Polystichum. American Fern Journal 79 (1): 7-13.

Author:
W. Fertig

Updated:

95-10-15

POTAMOGETON FRIESII

FRIES PONDWEED
POTAMOGETONACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G4State: S1
WYNDD Plant List: PERIPHERAL

Description:
Fries pondweed is a submerged aquatic herb with flattened stems 3-10 dm long, arising from a short rhizome. The plants are unbranched in the lower 1/2, but become freely branched in the upper 1/2. Leaves are all submersed and similar in appearance, mostly 3-8 cm long and 1.5-2.5 mm wide, Blades are bright green, flat, typically 5 nerved, broadly acute at the tip, and have two small, yellow glands at the base. Stipules are whitish and typically shredded into slender fibers. The inflorescence is a terminal spike, consisting of 3-4 closely-spaced whorls of 2-3 flowers each. The flowers are small and greenish, and lack petals. Fruits are roughly egg-shaped, 2-2.5 mm long, and have a narrow keel (Cronquist et al. 1977; Dorn 1977, 1992)..

Synonyms:

Similar Species:
Potamogeton obtusifolius and P. pusillus have membranous stipules and 3 nerved leaves. P. strictifolius has inrolled leaf blades 0.5-2 mm wide and achenes that lack a keel. P. foliosus has 3-5 nerved leaves that lack basal glands and achenes with a wavy or toothed keel (Dorn 1992).

Flowering/Fruiting Period:
June - August

Distribution:
Alaska to Newfoundland, south to Washington, Utah, South Dakota, Indiana and Virginia. In Wyoming it is known from the Absaroka, Wind River, and Medicine Bow ranges and Jackson Hole in Carbon, Park, and Teton countes.

Habitat:
Aquatic rooted in shallow mud in ponds, lakes and reservoirs at 6300-8860 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from 2 extant and 2 historical records in Wyoming (most recently observed in 1990). An additional report from Teton County cited in Haynes (1974) needs to be confirmed.

Abundance:
Not known.

Range:
Disjunct; in Wyoming known only from the Absaroka, Wind River, and Medicine Bow mountains and Jackson Hole in Carbon, Park, and Teton counties.

Trends:
Not known.

Protection status:
At least one occurrence is found in Grand Teton National Park. Other populations are on public lands managed for multiple use or on private lands.

Threats:
May be impacted by competition from exotic weeds.

Managed Areas:
Occurs in the Bridger-Teton and Medicine Bow National Forests and Grand Teton National Park.

References:

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Haynes, R.R. 1974. A revision of North American POTAMOGETON Subsection PUSILLI (Potamogetonaceae). Rhodora. 76: 564-649.

Evert, E. F. 1991. Annotated checklist of the vascular plants of the North Fork Shoshone River Drainage, Northwestern Wyoming. Unpublished report. 64 pp.
Dorn, R.D. 1988. Vascular Plants of Wyoming. Mountain West Publ., Cheyenne.

Dorn, R.D. 1977. Manual of the Vascular Plants of Wyoming. 2 volumes. Garland Publ., INC., New York, NY.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. Volume 6, The Monocotyledons. Intermountain Flora: Vascular Plants of the Intermountain West, USA. Columbia University Press, New York.

Hitchcock, C.L., A. Cronquist, and M. Owenbey. 1969. Pt. 1. Vascular Cryptograms, Gymnosperms, and Monocotyledons, IN: Hitchcock, C.L., A. Cronquist, M. Owenbey, and J.W. Thompson (eds). Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(1): 1-914.

Welsh, S.L., N.D. Atwood, S. Goodrich, and L.C. Higgins, (eds). 1993. A Utah Flora, second edition, revised. Brigham Young University Print Services, Provo, UT.

Fertig, W. 2000. Rare vascular plant species in the Wyoming portion of the Utah-Wyoming Rocky Mountains Ecoregion. Prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.

Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.

Haynes, R.R. and C.B. Hellquist. 2000. Potamogetonaceae. In: Flora of North America Editorial Committee. Flora of North America North of Mexico. Volume 22 Magnoliophyta: Alismatidae, Arecidae, Commelinidae (in part), and Zingiberidae. Oxford Univ. Press, New York.

Porter, C.L. 1963. A Flora of Wyoming, Part II. Bulletin 404:1-16. Agricultural Experiment Station University of Wyoming.

Author:
Walter Fertig

Updated:
00-11-24

POTAMOGETON OBTUSIFOLIUS

BLUNT-LEAF PONDWEED
POTAMOGETONACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: DISJUNCT

Occurrences in Wyoming:
Known from 2 locations in Wyoming, last observed in 1963.

Abundance:
Not known.

Range:
Disjunct; in Wyoming known only from Jackson Hole and the adjacent Teton Range in Teton County.

Trends:
Not known.

Protection status:
All known Wyoming occurrences are protected in Grand Teton NP and the JDR Parkway.

Threats:
Not known.

Managed Areas:
Occurs in Grand Teton National Park and the John D Rockefeller Parkway.

References:

Lesica, P. & J. S. Shelly. 1991. Sensitive, Threatened and Endangered Vascular Plants of Montana. Montana Natural Heritage Program, Occ. Publ. No. 1. Helena, MT.

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Haynes, R.R. 1974. A revision of North American POTAMOGETON Subsection PUSILLI (Potamogetonaceae). Rhodora. 76: 564-649.

Fertig, W. 2000. Rare vascular plant species in the Wyoming portion of the Utah-Wyoming Rocky Mountains Ecoregion. Prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.

Haynes, R.R. and C.B. Hellquist. 2000. Potamogetonaceae. In: Flora of North America Editorial Committee. Flora of North America North of Mexico. Volume 22 Magnoliophyta: Alismatidae, Arecidae, Commelinidae (in part), and Zingiberidae. Oxford Univ. Press, New York.

Author:
Walter Fertig

Updated:
00-07-31

POTAMOGETON ROBBINSII

FLATLEAF PONDWEED
POTAMOGETONACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Flatleaf pondweed is a wholly submersed, multi-branched aquatic herb up to 20 dm long arising from a long, slender rhizome. Leaves are whorled along the stem (not in 2 distinct rows) and have slightly clasping, linear to lance-shaped blades 3-7 cm long and 3-4 mm wide with 20-60 nerves and minutely toothed margins. The leaves are not differentiated into distinct floating and submersed forms. Stipules are fused at the base of the leaf, forming a white clasping sheath with a membranous, shredding tip. The inflorescence is a loose spike 7-20 mm of inconspicous greenish or reddish paired flowers. Fruits are roughly egg-shaped, 3-4 mm long, and have a prominent keel (Cronquist et al 1977; Dorn 1977, 1992).

Synonyms:

Similar Species:
Potamogeton zosteriformis has leaves arranged in 2 distinct rows along the stem and smooth (untoothed) leaf margins. Other narrow-leaved, submerged Potamogeton species in Wyoming have leaf blades with 7 or fewer nerves (Dorn 1992).

Flowering/Fruiting Period:
August - September

Distribution:
British Columbia to Labrador, south to central Calif, Utah, Montana, Wyoming, Indiana and Pennsylvania. In Wyoming it is known from the Medicine Bow and Wind River ranges and Yellowstone Plateau in Carbon, Fremont, Sublette, and Teton counties.

Habitat:
Margins of ponds, lakes, and slow-moving streams at 7450-10360 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from 3 historical records and 1 extant population in Wyoming (last observed in 1968).

Abundance:
Current abundance unknown.

Range:
Disjunct; in Wyoming, known from the Medicine Bow Range (Carbon Co.), Yellowstone Plateau (Teton Co.), and Wind River Range (Fremont and Sublette Cos.).

Trends:
Unknown. Most occurrences are old or historical.

Protection status:

Two populations are protected in Yellowstone National Park and the Bridger Wilderness. One population is also found in the WY Game and Fish Department Whiskey Basin and Little Red Creek Wildlife Habitat Management Area. Other occurrences are on public lands managed for multiple use.

Threats:
Threats not known. May be sensitive to changes in water quality.

Managed Areas:
Occurs in Bridger-Teton and Medicine Bow National Forests and Yellowstone National Park.

References:

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Dorn, R.D. 1988. Vascular Plants of Wyoming. Mountain West Publ., Cheyenne.
Dorn, R.D. 1977. Manual of the Vascular Plants of Wyoming. 2 volumes. Garland Publ., INC., New York, NY.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. Volume 6, The Monocotyledons. Intermountain Flora: Vascular Plants of the Intermountain West, USA. Columbia University Press, New York.

St. John, H.A. 1916. A revision of the North American species of POTAMOGETON of the section COLEOPHYLLI. Rhodora 18(210) 121-138.

Gleason, H.A. and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Canada. New York Botanical Garden, Bronx, NY.

Welsh, S.L., N.D. Atwood, S. Goodrich, and L.C. Higgins, (eds). 1993. A Utah Flora, second edition, revised. Brigham Young University Print Services, Provo, UT.

Great Plains Flora Association. 1986. Flora of the Great Plains. Univ. Kansas Press, Lawrence, KS.

Harrington, H. D. 1954. Manual of the Plants of Colorado. Sage Books, Chicago, IL.

Fertig, W. 2000. Rare vascular plant species in the Wyoming portion of the Utah-Wyoming Rocky Mountains Ecoregion. Prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.

Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.

Haynes, R.R. and C.B. Hellquist. 2000. Potamogetonaceae. In: Flora of North America Editorial Committee. Flora of North America North of Mexico. Volume 22 Magnoliophyta: Alismatidae, Arecidae, Commelinidae (in part), and Zingiberidae. Oxford Univ. Press, New York.

Porter, C.L. 1963. A Flora of Wyoming, Part II. Bulletin 404:1-16. Agricultural Experiment Station University of Wyoming.

Author:
Walter Fertig

Updated:
00-11-24

POTAMOGETON ZOSTERIFORMIS

FLATSTEM PONDWEED
POTAMOGETONACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Associated Rare Species:

Occurrences in Wyoming:
Known from a single occurrence, last observed in 1955.

Abundance:
Unknown.

Range:
Disjunct in northwestern Wyoming; known only from one location in Jackson Hole in Teton County.

Trends:
Unknown.

Protection status:
Occurrence is within Grand Teton National Park.

Threats:
Unknown.

References:

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Dorn, R.D. 1988. Vascular Plants of Wyoming. Mountain West Publ., Cheyenne.

Dorn, R.D. 1977. Manual of the Vascular Plants of Wyoming. 2 volumes. Garland Publ., INC., New York, NY.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. Volume 6, The Monocotyledons. Intermountain Flora: Vascular Plants of the Intermountain West, USA. Columbia University Press, New York.

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Porter, C.L. 1963. A Flora of Wyoming, Part II. Bulletin 404:1-16. Agricultural Experiment Station University of Wyoming.

Author:
Walter Fertig

Updated:
00-11-24

RANUNCULUS FLABELLARIS

YELLOW WATER-CROWFOOT
RANUNCULACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5State: SH
WYNDD Plant List: PERIPHERAL

Associated Rare Species:

Occurrences in Wyoming:
Known from one possibly extant record (the date, 1955, is questionable) and one historical record (1932).

Abundance:
No data are available on abundance.

Range:
Peripheral; known from the Teton Range and the Green River Basin in Teton and Uinta counties.

Trends:
No populations have been located recently.

Protection status:
One EO is located in Grand Teton National Park. It is based on a literature report, which may be based on a collection at the Intermountain Herbarium. It is not recognized by Dorn as occurring in Teton County.

Managed Areas:
Occurs in land managed by Grand Teton National Park and by the Rock Springs District BLM (Kemmerer Resource Area).

References:

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Fertig, W., L. Welp, and S. Markow. 1998. The status of rare plants in southwest Wyoming. Report prepared for the Bureau of Land Management by the Wyoming Natural Diversity Database, Laramie, WY.

Whittemore, A.T. 1997. RANUNCULUS. In: Flora of North America Editorial Committee. Flora of North America North of Mexico. Volume 3 Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, NY.

Porter, C.L. 1972. A Flora of Wyoming: Part VIII. Research Journal 65:1-40. Agricultural Experiment Station, University of Wyoming.

Author:
Walter Fertig

Updated:
00-12-22

RUBUS ACAULIS

NAGOONBERRY
ROSACEAE

Status:
US Fish & Wildlife Service:
Agency Status:Sensitive in USFS Region 2.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
RUBUS ACAULIS is a low, rhizomatous, perennial herb with non-bristly/prickly stems to 15 cm high. The leaves are divided into three ovate to obovate leaflets with serrated margins. Flowers are usually solitary and have dark pink or rose-purple petals 10-15 mm long. Fruits are red, globose raspberries.

Synonyms:

Similar Species:
RUBUS PUBESCENS has smaller, white-petaled flowers and sharp-tipped leaflets. FRAGARIA species have white flowers and 5 sepals and 5 sepal-like bracts. Small, vegetative individuals of GEUM MACROPHYLLUM have pinnately compound leaves with 5 or more leaflets (terminal leaflet largest).

Flowering/Fruiting Period:
Mid June-July.

Distribution:
In Wyoming, known from the east slope of the Bighorn Mountains (Johnson Co.) and Yellowstone Plateau (Teton County).

Habitat:
In understory of moderate to dense canopy cover in spruce, spruce/willow, and occasionally willow dominated communities.(Boggy woods and marshes, mountain meadows, and alpine tundra. In WY?)

Associated Rare Species:

Occurrences in Wyoming:
Known from 3 extant records (all observed since 1995) and 1 vague historical report in Wyoming.

Abundance:
The Bighorn Range population contained hundreds of thousands of stems (representing an unknown number of genetically distinct individuals, due to the plants clonal nature) within a small geographic area in 1999. Reported as "relatively abundant" at one site in Yellowstone National Park by J. Whipple.

Range:
Peripheral; in Wyoming known from the Bighorn Range and Yellowstone Plateau (Johnson and Teton counties).

Trends:
Probably stable.

Protection status:
One occurrence is protected within Yellowstone NP. Populations in the Bighorn Range are on public lands managed for multiple use. Listed as Sensitive by USFS Region 2.

Threats:
May be impacted by reservoir development in Bighorns, logging, grazing, and high recreation use.

Managed Areas:
Occurs in Bighorn National Forest and Yellowstone National Park.

References:

Fertig, W. 1994. Guide to Sensitive Wyoming plants of US Forest Service Region 2 (with emphasis on plants of Bighorn, Medicine Bow, and Shoshone National Forests). Unpublished report prepared as a handout for the TES species identification workshop conducted for US Forest Service Region 2 in Laramie, WY, 11 May 1994.

Fertig, W., C. Refsdal, and J. Whipple. 1994. Wyoming Rare Plant Field Guide. Wyoming Rare Plant Technical Committee, Cheyenne Wyoming.

Spackman, S., B. Jennings, J. Coles, C. Dawson, M. Minton, A. Kratz, and C. Spurrier. 1997. Colorado Rare Plant Field Guide. Prepared for the Bureau of Land Management, US Forest Service, and US Fish and Wildlife Service by the Colorado Natural Heritage Program, Ft. Collins, CO.

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Hitchcock, C.L. and A. Cronquist. 1961. Pt.3. Saxifragaceae to Ericaceae. In: C.L Hitchcock, A. Cronquist, M. Ownbey, and J.W. Thomas. Vascular Plants of the Pacific Northwest. University of Washington Publication in Biology 17(12): 1-597.

Fertig, W. 2000. Ecological assessment and monitoring program for Northern blackberry in Bighorn National Forest, Wyoming. Report prepared by the Wyoming Natural Diversity Database, Laramie, Wyoming.

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Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.

Author:
Walter Fertig

Updated:
00-06-16

SALIX CANDIDA

HOARY WILLOW
SALICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S2
WYNDD Plant List: PERIPHERAL

Description:
Hoary willow is a low shrub 50-120 cm tall. The branches are light brown and mostly glabrous. Twigs of the current year are densely white pubescent. This pubescence may persist into the second year. The leaves are narrowly elliptic to narrowly ovate, 3-8 cm long, and with entire, inrolled margins. The upper leaf surface is dark green with scattered tufts of woolly hair, while the lower surface is densely white-tomentose. Catkins appear with the leaves and are borne on short leafy branchlets or are nearly sessile. Flower bracts are brownish and wavy-pubescent. Staminate catkins are 1.5-2.5 cm long with 2 stamens and reddish-purple anthers. Pistillate catkins are 2-5 cm long with tomentose, tawny capsules, styles 0.8-1.6 mm long, and stipes 0.5-1.2 mm long (Hitchcock and Cronquist 1964; Moss 1983).

Synonyms:

Similar Species:
SALIX DRUMMONDIANA is a taller shrub and has thin, silvery, appressed hairs on the leaves and inrolled leaf margins. (Dorn 1992). S. BRACHYCARPA has relatively small eliptic leaves that are densely gray-hairy on both sides. (Harrington 1954).

Flowering/Fruiting Period:
Early June-late July.

Distribution:
Ranges from Labrador to Alaska and south to the Great Lakes states, South Dakota, Colorado, and Idaho (Hitchcock and Croquist 1964). In Wyoming, known from the Absaroka, Beartooth, Laramie, and Medicine Bow ranges, Yellowstone Plateau, and upper Green River Basin.

Habitat:
Floating mats, bogs, fens, and willow thickets around ponds on wet to saturated, histic soils, sometimes influenced by limestone. Elevation 6600-9200 feet.
Occurs with other Salix species, ALNUS SPP., PICEA GLAUCA, CAREX SIMULATA, ELEOCHARIS SPP., TRIGLOCHIN SPP., and CAREX ROSTRATA.

Associated Rare Species:
CAREX MICROGLOCHIN, ARCTOSTAPHYLOS RUBRA

Occurrences in Wyoming:
Known from 10 extant occurrences and 1 historical record in Wyoming. Eight of these populations have been discovered or relocated since 1994 (most recently in 1999).

Abundance:
Known populations are mostly very small and restricted to specialized wetland habitats that are themselves very uncommon.

Range:

Sparse; in Wyoming, known from widely scattered locations in the upper Green River Basin, Jackson Hole, Yellowstone Plateau, and Laramie, Medicine Bow, Absaroka, Beartooth, and Wind River ranges in Albany, Park, Sublette and Teton counties.

Trends:
Not known. Some habitat may have been lost in the Laramie Valley since European settlement.

Protection status:
At least 5 occurrences are found in national parks, national wildlife refuges, or designated special interest areas (Yellowstone NP, National Elk Refuge, Swamp Lake SBA, Sheep Mountain Wildlife Refuge). Three other occurrences are within potential Research Natural Areas or Special Interest Areas on National Forest lands (Lake Creek Bogs, Sheep Mountain, Kendall Warms Springs).

Threats:
Populations may be threatened by grazing pressure on the National Elk Refuge.

Managed Areas:
Occurs on lands managed by Bridger-Teton, Medicine Bow, and Shoshone National Forests, Yellowstone National Park, the National Elk Refuge, and possibly the BLM Pinedale Field Office.

References:

Fertig, W. and G. Jones. 1992. Plant communities and rare plants of the Swamp Lake Botanical Area, Clarks Fork Ranger District, Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database.

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Author:
Walter Fertig

Updated:
00-12-22

SALIX ERIOCEPHALA VAR MACKENZIEANA

MACKENZIE'S WILLOW
SALICACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5T4State: S1
WYNDD Plant List: PERIPHERAL

Description:
Mackenzie's willow is a shrub up to 8 m tall with reddish-brown year old branchlets. Leaves are lance-shaped to elliptic, 2-8 cm long and 1.2-5 cm wide, and glaucous below and dark green above with entire to slightly toothed margins and petioles 3-12 mm long. Pistillate catkins are 1-6 cm long on short, leafy branchlets. Capsules are glabrous and borne on stalks 2-5 mm long amid densely white-woolly hairs. Flowering bracts are brown to black, glabrate, and persistent in fruit. Staminate catkins are 2-5.2 cm long with 2 stamens per flower (Dorn 1995; Fertig and Markow 1998).

Synonyms:SALIX PROLIXA; S. MACKENZIEANA

Similar Species:
Salix eriocephala var. watsonii has yellowish or greenish first-year branchlets, mature leaves less than 4 times as long as wide, and less elongate capsules. S. eriocephala var. ligulifolia has bluish-green foliage and capsule stalks less than 2 mm long. S. eriocephala var. famelica has long-attenutate leaves with consistently serrate margins and catkins with short, straight hairs. S. barclayi has catkins on long leafy flowering branchlets and broader leaves. S. pseudomonticola has broader leaves with rounded teeth and sessile catkins appearing before the leaves. S. farriae has glabrous leaves with entire margins and fine venation below. (Dorn 1992, 1995, 1997; Fertig and Markow 1998).

Flowering/Fruiting Period:
June-July.

Distribution:
Southern Yukon and the Northwest Territories south to northeastern California and northwestern Wyoming (northern Wyoming Range, southern Absaroka, Jackon Hole and upper Green River Basin).

Habitat:
Riverbanks and streamsides in foothill and lower montane areas at 5600-7400 feet.

Associated Rare Species: none

Occurrences in Wyoming:
Known from 4-5 extant occurrences (all observed since 1983) and 1 historical record (1926) in Wyoming. Three populations have been discovered since 1994.

Abundance:
Not known.

Range:
Peripheral; In Wyoming, known from the Wyoming and Absaroka ranges, Upper Green River Basin, and Jackson Hole in Fremont, Lincoln, Park, and Teton counties.

Trends:
Not known.

Protection status:
Two occurrences are found in Grand Teton National Park. All other known populations are on public lands managed for multiple use.

Threats:
Heavy grazing by ungulates may be a potential threat, as is development of riparian areas, but more research on threats is needed.

Managed Areas:
Found on Bridger-Teton and Shoshone National Forest, Grand Teton National Park, and the BLM Pinedale Field Office.

References:

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Author:
Walter Fertig

Updated:
99-08-23

SAUSSUREA WEBERI

WEBER'S SAW-WORT
ASTERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:USFS Region 4: Sensitive.

Heritage Rank:
Global: G3State: S2
WYNDD Plant List: REGIONAL ENDEMIC

Description:
Weber's saw-wort is a perennial herb from a thick rooststalk with leafy stems 4-20 cm tall. Stems and leaves are loosely pubescent with tangled, cobwebby hairs. Leaves are entire or wavy-toothed, narrowly to broadly lance-shaped, and sessile on the upper stem, but petioled on the lower stem. Flower heads are densely clustered, appearing as one large head 2-4 cm across (especially in fruit). Each head consists of an involucre of 2-3 overlapping rows of blunt, dark-tipped, oval bracts and numerous purple disk flowers (rays are lacking). The white pappus consists of long, feathery and simple bristles. Fruits are glabrous achenes (Fertig et al. 1994; Scott 1997; Hulten 1959; Marriott 1991).

Synonyms:SAUSSUREA DENSA

Similar Species:
CIRSIUM, CARDUUS, and CENTAUREA spp. have spiny or bristly leaves, stems, and involucres (Fertig et al. 1994).

Flowering/Fruiting Period:
July-August.

Distribution:
Regional endemic of southwest Montana, northwest Wyoming, and central Colorado. In Wyoming, Weber's saw-wort is restricted to the Gros Ventre and northern Wind River ranges in Sublette, Fremont, and Teton counties.

Habitat:
Occurs on alpine talus slopes and gravel fields, mostly on limestone-derived substrates.

Associated Rare Species:
ERIGERON LANATUS, PARRYA NUDICAULIS

Occurrences in Wyoming:
Known from 6 locations in Wyoming, all of which have been located since 1981 (most recently in 1998).

Abundance:
Populations often have thousands to tens of thousands of individuals, but are restricted to small areas of suitable habitat in the alpine.

Range:
Regional endemic of SW Montana, NW Wyoming, and C Colorado. In Wyoming, known only from the northern Wind River Range (Fremont and Sublette Cos.) and the Gros Ventre Range (Teton County).

Trends:
Populations are assumed to be stable.

Protection status:

All known occurrences are found within designated wilderness areas (Bridger, Fitzpatrick, and Gros Ventre Wilderness Areas). Populations are also found in the Osborn Mountain Research Natural Area and potential Arrow Mountain RNA. This species is listed as Sensitive in USFS Region 4.

Threats:
Occurs in relatively inaccessible alpine areas with no obvious disturbances aside from hikers.

Managed Areas:
Found in Bridger-Teton and Shoshone National Forests.

References:

Fertig, W. 1992. Checklist of the Vascular plant flora of the west slope of the Wind River Range and status report on the sensitive plant species of Bridger-Teton National Forest. Unpublished report prepared for the Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

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Fertig, W. 1998. The status of rare plants on Shoshone National Forest: 1995-97 survey results. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

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Author:
Walter Fertig

Updated:
00-11-24

SCHEUCHZERIA PALUSTRIS

POD-GRASS
SCHEUCHZERIACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: DISJUNCT

Associated Rare Species:
CAREX LIVIDA

Occurrences in Wyoming:
Known from one occurrence (with 2 small subpopulations) in Wyoming that was last observed in 1997.

Abundance:
Populations numbered 50 and 15 plants in 1997.

Range:
Disjunct; in Wyoming, known only from the Yellowstone Plateau in Teton County.

Trends:
Not known.

Protection status:
All known populations are protected in Yellowstone National park.

Threats:
Populations could be impacted by high recreation use in wetland habitats.

Managed Areas:
Occurs in Yellowstone National Park.

References:
Moseley, R.K., R. Bursik, and M. Mancuso. 1991. Floristic inventory of wetlands in Fremont and Teton Counties, Idaho. Unpublished report prepared for Targhee National Forest by the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. November 1991.

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Author:
Walter Fertig

Updated:
00-06-16

SCIRPUS ROLLANDII

ROLLAND BULRUSH
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:USFS Region 2: Sensitive

Heritage Rank:
Global: G3QState: S1
WYNDD Plant List: DISJUNCT

Description:
Pygmy bulrush is a low-growing tufted perennial with slender rhizomes. Stems are 5-10 cm tall, round in cross-section, green, and leafless. Leaf blades are 0.5-1 mm long and located near the base of the stem. The inflorescence consists of a single oval spikelet composed of 3-5 flowers borne at the tip of the stem. The smooth, 2-sided achenes are dark brown and subtended by 3-6 red bristles and short, white-membranous scales (Beetle 1941; Dorn 1992; Fertig et al. 1994).

Synonyms:SCIRPUS ROLLANDII

Similar Species:
Low-growing ELEOCHARIS spp. have a cap-like structure at the top of the achene (actually the enlarged base of the style), a feature absent in SCIRPUS species (Fertig et al. 1994). Other SCIRPUS spp in Wyoming have 2 or more spikelets per stem and leafy inflorescences or stems (Dorn 1992).

Flowering/Fruiting Period:
Flowers June-July. Fruits July-August.

Distribution:
Circumboreal with a disjunct population in Wyoming and other states. In Wyoming, it is known from the Absaroka and Gros Ventre ranges and Jackson Hole in Park and Teton counties.

Habitat:
Montane; fens, marl hummocks, and small pools, influenced by limestone.

Associated Rare Species:
CAREX MICROGLOCHIN, CAREX SCIRPOIDEA VAR SCIRPIFORMIS

Occurrences in Wyoming:
Known from 3 extant occurrences in Wyoming, all discovered or last observed since 1992 (most recently in 1999).

Abundance:
Populations may be locally abundant but are limited to highly specialized and restricted habitats.

Range:
Disjunct; known from the Jackson Hole and Gros Ventre River Valley area of Teton County and the Clarks Fork Valley in Park County.

Trends:
Presumed to be stable.

Protection status:
2 populations are protected in the National Elk Refuge and Swamp Lake Special Botanical Area. The third occurrence is found on Bridger-Teton NF lands managed for multiple use. This species is listed as Sensitive in USFS Region 2.

Threats:
May be impacted by water diversion or heavy trampling, but threats at present are minor.

Managed Areas:
Occurs on lands managed by the National Elk Refuge and the Shoshone and Bridger-Teton National Forests.

References:
Fertig, W. and G. Jones. 1992. Plant communities and rare plants of the Swamp Lake Botanical Area, Clarks Fork Ranger District, Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database.

Fertig, W. 1994. Guide to Sensitive Wyoming plants of US Forest Service Region 2 (with emphasis on plants of Bighorn, Medicine Bow, and Shoshone National Forests). Unpublished report prepared as a handout for the TES species identification workshop conducted for US Forest Service Region 2 in Laramie, WY, 11 May 1994.

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Beetle, A.A. 1941. Studies in the genus SCIRPUS L. II. The section BAEOTHYRON Ehrh. Amer. Bot. 28(6):469-476.

Evert, E.F., R.D. Dorn, R.L. Hartman, and R.W. Lichvar. 1986. Noteworthy collections, Wyoming. Madrono 33(4): 315-317.

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Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.

Colorado Native Plant Society. 1997. Rare Plants of Colorado, second edition. Falcon Press Publ., Helena, MT.

Author:
Walter Fertig

Updated:
00-11-24

SCIRPUS SUBTERMINALIS

WATER BULRUSH
CYPERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G4G5State: S1
WYNDD Plant List: DISJUNCT

Occurrences in Wyoming:
Known from a single occurrence in Wyoming, discovered by Jennifer Whipple in 1991.

Abundance:
Population estimated to contain "at least several hundred stems" in 1991 survey by Whipple.

Range:
Disjunct; in Wyoming, known only from southwestern Yellowstone National Park (in the Bechler area). Previous reports from other areas of Yellowstone National Park or Jackson Hole have proven to be misidentifications.

Trends:
Not known.

Protection status:
Single known occurrence is protected in Yellowstone National Park.

Threats:
Appears to be unthreatened at present.

Managed Areas:
Occurs in Yellowstone NP.

References:

Moseley, R.K., R. Bursik, and M. Mancuso. 1991. Floristic inventory of wetlands in Fremont and Teton Counties, Idaho. Unpublished report prepared for Targhee National Forest by the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. November 1991.

Markow, S. and W. Fertig. 1993. Report on a general floristic survey of vascular plants of Targhee National Forest and vicinity. Unpublished report prepared for Targhee National Forest by the Rocky Mountain Herbarium and the Wyoming Natural Diversity Database, Laramie, WY.

Lesica, P. & J. S. Shelly. 1991. Sensitive, Threatened and Endangered Vascular Plants of Montana. Montana Natural Heritage Program, Occ. Publ. No. 1. Helena, MT.

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Whipple, Jennifer J. Botanist, Yellowstone National Park, Herbarium, Mammoth. (307) 344-2226.

Author:
Walter Fertig

Updated:
00-11-25

SEDUM STENOPETALUM

NARROW-PETAL STONECROP
CRASSULACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G4G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Narrow-petal stonecrop is a low-growing perennial herb, tending to grow in clusters from creeping rhizomes. Leaves are alternate, the lower ones narrow and sharp pointed, 5-15 mm long, usually ascending to spreading, and usually falling by flowering time. Upper leaves are persistent and bearing bulbous masses of tissue in the axils. Flowers are crowded at the top of the stems, small (5-10 cm across), each with 5 lemon-yellow petals. Fruits consist of 4 follicles, all diverging at 180 degrees from each other (Hitchcock and Cronquist 1964).

Synonyms:

Similar Species:
Sedum lanceolatum has leaves which are blunt, fleshy, and mostly deciduous by flowering time, and fruits which are only slightly divergent. S. debile has blunt, opposite leaves, and fruits which are only slightly divergent (Dorn 1992, Hitchcock and Cronquist 1964).

Flowering/Fruiting Period:
June-September.

Distribution:
British Columbia and Alberta south to Colorado and California (Scott 1997). In Wyoming it is known only to the Jackson Hole area, the JDR Parkway, and Yellowstone NP. Populations appear to be closely tied to flood plains of the Snake River.

Habitat:
Sandy flood plains and gravel bars, often in sagebrush communities at 6200-6900 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from at least 3 extant records in Wyoming (last observed in 1998) and 1 historical record. Additional reports may be based on misidentified specimens of S. LANCEOLATUM.

Abundance:
Stuart Markow estimated a population of 100-200 plants at one site in Grand Teton National Park in 1998, and observed another population of similar size along the JDR Parkway just south of the Yellowstone National Park boundary in 2000.

Range:
Peripheral; known only from Jackson Hole and the Yellowstone Plateau in Teton County.

Trends:
Not known.

Protection status:

All known occurrences are in Grand Teton and Yellowstone National Parks and the JDR Parkway.

Threats:
May be threatened by hybridization with the more abundant S. LANCEOLATUM.

Managed Areas:
Occurs in Grand Teton and Yellowstone National Parks and the JDR Parkway.

References:

Scott, R.W. 1997. The Alpine Flora of the Rocky Mountains. Volume 1 The Middle Rockies. University of Utah Press, Salt Lake City, UT. 901 pp.
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Douglas, G., G. Straley, D. Meidinger and J. Pojar. 1998. Illustrated flora of British Columbia: vol. 2; Balsaminaceae through Cuscutaceae. British Columbia Ministry of Environment, Lands and Parks, and Ministry of Forests, Victoria.

Author:
Walter Fertig

Updated:
01-02-26

SELAGINELLA SELAGINOIDES

LOW SPIKE-MOSS
SELAGINELLACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Associated Rare Species:

Occurrences in Wyoming:
Known from 5 occurrences in Wyoming, 2 of which are extant (most recently observed in 1997) and 3 which are historical.

Abundance:
Populations are usually small and restricted to specialized microhabitats.

Range:
Peripheral; in Wyoming known from the upper Green River Basin, foothills of the Wind River Range, Teton Range, and Yellowstone Plateau in Sublette and Teton counties.

Trends:
Not known. Some wetland sites near the New Fork Lakes in the Wind River Range may have been destroyed during dam and campground construction in the 1930s.

Protection status:
One occurrence is protected in Yellowstone National Park. All other known sites are on public lands managed for mutliple use (primarily recreation and livestock grazing).

Threats:
Dam construction or habitat loss from subdivision are potential threats in the Upper Green River Basin.

Managed Areas:
Occurs in Bridger-Teton and Targhee National Forests, the BLM Pinedale Field Office, and Yellowstone National Park.

References:

Lesica, P. & J. S. Shelly. 1991. Sensitive, Threatened and Endangered Vascular Plants of Montana. Montana Natural Heritage Program, Occ. Publ. No. 1. Helena, MT.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, and J.L. Reveal. 1972. Intermountain Flora, Volume 1: Geological and Botanical History of the Region, its Plant Geography and a Glossary. The Vascular Cryptogams and the Gymnosperms. The New York Botanical Garden, New York.

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Hitchcock, C.L., A. Cronquist, and M. Owenbey. 1969. Pt. 1. Vascular Cryptograms, Gymnosperms, and Monocotyledons, IN: Hitchcock, C.L., A. Cronquist, M. Owenbey, and J.W. Thompson (eds). Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(1): 1-914.

Porter, C.L. 1962. A Flora of Wyoming, Part 1. Bulletin 402:1-39. Agricultural Experiment Station, University of Wyoming.
Colorado Native Plant Society. 1997. Rare Plants of Colorado, second edition. Falcon Press Publ., Helena, MT.

Author:
Walter Fertig

Updated:
00-11-24

SILENE REPENS VAR AUSTRALIS

CREEPING CAMPION
CARYOPHYLLACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5T?State: S1
WYNDD Plant List:

Description:
Creeping campion is a perennial herb 1-2 dm tall with densely short-hairy stems (usually several) arising from a branched, trailing base. Leaves are opposite, concentrated near the base, narrow and sharp pointed, those of the upper stem noticably smaller than those of the lower stem. Flowers mostly 4-10 per stem, subtended by conspicuous bracts. The calyx is tubular, 5-lobed, slightly to moderately glandular, and somewhat inflated, with 10 conspicuous nerves (Hitchcoch and Cronquist 1964).

Synonyms: none

Similar Species:
Silene dichotoma has course, stiff hairs on the leaves and calyx. S. antirrhina is an annual with a slender taproot and with bands of glandular hairs on the stem. S. drummondii has petals which are only shallowly cleft and somewhat expanded just below the apex. S. parryi has shorter petals (about 11 mm long) which are deeply 4-cleft (Dorn 1992, Hitchcock and Cronquist 1964).

Flowering/Fruiting Period:
June-August.

Distribution:
Endemic to southwestern Montana, east-central Idaho and northwestern Wyoming (Hitchcock and Cronquist 1964, Hitchcock and Maguire 1947). In Wyoming it is known only to the Hoback Canyon area in Sublette and Teton Counties.

Habitat:
Rocky slopes and ridges at medium to high elevation (6500-9800 ft.)

Associated Rare Species: none

Occurrences in Wyoming:
Known from one extant record (last observed in 1990) and one historical record in Wyoming.

Abundance:
Not known.

Range:
Regional endemic of NW Wyoming, EC Idaho, and SW Montana. In Wyoming known only from the Hoback Canyon area of Sublette and Teton counties.

Trends:
Not known.

Protection status:

All occurrences are on public lands managed for multiple use.

Threats:
Not known.

Managed Areas:
Occurs on Bridger-Teton National Forest.

References:
Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Hitchcock, C.L. and B. Maguire. 1947. A revision of the North American species of SILENE. University Washington Publ. Biology 13: 1-73.

Fertig, W. 2000. Rare vascular plant species in the Wyoming portion of the Utah-Wyoming Rocky Mountains Ecoregion. Prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.

Porter, C.L. 1972. A Flora of Wyoming: Part VII. Resource Journal #64. Agricultural Experiment Station, University of Wyoming, Laramie, WY.

Hitchcock, C.L. and A. Cronquist. 1964. Pt. 2. Salicaceae to Saxifragacea. In: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson. Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(1): 1-914.

Author:
Walter Fertig

Updated:
01-02-24

SPARGANIUM MINIMUM

SMALL BUR-REED
SPARGANIACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: PERIPHERAL

Description:
Small bur-reed is a fibrous-rooted perennial aquatic herb with floating or emersed stems 1-10 dm long (stems are longest when floating). Leaves are floating or erect, grass-like, and mostly 3-6 mm wide. The inflorescence is unbranched and consists of a single terminal staminate head (rarely 2 are present) and 1-2 pistillate heads. Anthers are 0.3-0.6 mm long on thread-like filaments. Pistillate heads are up to 12 mm thick when mature. Fruits have a single stigma, a terminal beak 1-1.5 mm long, and are elliptical with a constriction below the middle (Dorn 1992; Hitchcock et al. 1969).

Synonyms:

Similar Species:
Sparganium angustifolium has 2 or more staminate heads per inflorescence, anthers over 1 mm long, and achene beaks about 2 mm long. S. emersum typically has leaves over 6 mm wide with membranous margins near the base, 2 or more staminate heads per inflorescence, anthers over 1 mm long, and achene beaks over 3 mm long. S. eurycarpum has a branched inflorescence, top-shaped achenes, and 2 stigmas (Dorn 1992; Hitchcock et al. 1969).

Flowering/Fruiting Period:
July-August.

Distribution:
Circumboreal, south in North America to Oregon, New Mexico, Indiana, and Pennsylvania. In Wyoming, known from the Yellowstone Plateau, Jackson Hole, and Absaroka, Wind River, and Medicine Bow ranges in Carbon, Fremont, Park, and Teton counties.

Habitat:
Rangewide, this species is found in shallow water of montane lakes or rooted in wet mud. Wyoming populations occur in shallow pools, bogs, and fens rooted in mud and submerged or emergent at 6590-9000 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from 4 extant and 2 historic occurrences in Wyoming. Two populations have been discovered or relocated since 1992 (most recently in 1996).

Abundance:
Not known.

Range:
Peripheral; in Wyoming, known from the Absaroka, Medicine Bow, and Wind River ranges, Jackson Hole, and Yellowstone Plateau (Carbon, Fremont, Park, and Teton counties). Incorrectly reported for Albany instead of Carbon County in 1999 WYNDD species of special concern list.

Trends:

Not known.

Protection status:
At least 4 populations are protected in Yellowstone and Grand Teton National Park and the Swamp Lake Special Botanical Area. Other occurrences are on public lands managed for multiple use.

Threats:
May be threatened by water pollution or diversion.

Managed Areas:
Occurs on lands managed by Yellowstone and Grand Teton National Parks and Medicine Bow and Shoshone National Forests.

References:

Fertig, W. and G. Jones. 1992. Plant communities and rare plants of the Swamp Lake Botanical Area, Clarks Fork Ranger District, Shoshone National Forest. Unpublished report prepared for the Shoshone National Forest by the Wyoming Natural Diversity Database.

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Fertig, W. 1998. The status of rare plants on Shoshone National Forest: 1995-97 survey results. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

Gleason, H.A. and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Canada. New York Botanical Garden, Bronx, NY.

Harrington, H. D. 1954. Manual of the Plants of Colorado. Sage Books, Chicago, IL.

Nelson, B. E. 1984. Vascular Plants of the Medicine Bow Range. Jelm Mountain Press, Laramie, WY.

Holmgren, N. 1998. Illustrated Companion to Gleason and Cronquist's Manual - Illustrations of the Vascular Plants of Northeastern United States and Adjacent Canada. New York Botanical Garden, Bronx NY.

Hitchcock, C.L., A. Cronquist, and M. Owenbey. 1969. Pt. 1. Vascular Cryptograms, Gymnosperms, and Monocotyledons, IN: Hitchcock, C.L., A. Cronquist, M. Owenbey, and J.W. Thompson (eds). Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(1): 1-914.

Porsild, A.E. and W.J. Cody. 1980. Vascular Plants of Continental Northwest Territories, Canada. National Museums of Canada, Ottawa.

Dorn, R.D. 1977. Manual of the Vascular Plants of Wyoming. 2 volumes. Garland Publ., INC., New York, NY.

Porter, C.L. 1963. A Flora of Wyoming, Part II. Bulletin 404:1-16. Agricultural Experiment Station University of Wyoming.

Author:
Walter Fertig

Updated:
00-11-24

STEPHANOMERIA FLUMINEA

TETON WIRE-LETTUCE
ASTERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G2?State: S2?
WYNDD Plant List:

Description:
Teton wire-lettuce is a milky-juiced perennial forb with multiple stems 15-40 cm tall from a creeping rhizome. Stems and leaves are short-tomentose throughout. Basal leaves are oblong or oblanceolate with entire to toothed margins and form a rosette. Stem leaves are 35-45 mm long and 3-5 mm wide with oblong-oblanceolate blades and entire margins. Flower heads have 5 main involucre bracts 8-10 mm long subtended by shorter, irregular bracts 2-4 mm long and are borne in an open, terminal panicle. Heads contain 5-6 pink, lavender, or white ligulate flowers (disk flowers are lacking). Fruits are tan, ribbed achenes 4-4.4 mm long and topped by a white pappus of plumose bristles (Gottlieb 1999).

Synonyms:

Similar Species:
Stephanomeria tenuifolia has slender stem leaves less than 3 mm wide. S. runcinata has runcinate-pinnatifid leaves (segments of the leaf point backward or towards the base) and roughened achenes. Lygodesmia spp. have smooth pappus bristles.

Flowering/Fruiting Period:
Late July-August.

Distribution:
State endemic of the Absaroka and Gros Ventre ranges and Jackson Hole in Park, Sublette, and Teton counties.

Habitat:
Sand, gravel, and cobblestone bars along large streams and rivers at 6500-7800 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from 6 extant occurrences (most recently observed in 1998) and 2 historical records in Wyoming.

Abundance:
Population size not known.

Range:
State endemic restricted to the Gros Ventre, Snake, and South Fork Shoshone river drainages in Park, Sublette, and Teton counties.

Trends:
Not known.

Protection status:
5 occurrences are protected in Grand Teton National Park and the Teton and Washakie wilderness areas.

Threats:
Some populations could be negatively impacted by gravel quarrying in river bottoms.

Managed Areas:
Occurs in Grand Teton National Park and Bridger-Teton and Shoshone National Forests.

References:
Gottlieb, L.D. 1999. A new species of STEPHANOMERIA (Asteraceae) from northwestern Wyoming. Madrono 46(1):58-60.

Fertig, W. 2000. Rare vascular plant species in the Wyoming portion of the Utah-Wyoming Rocky Mountains Ecoregion. Prepared for the Wyoming Nature Conservancy by the Wyoming Natural Diversity Database, Laramie, WY.

Fertig, W. 2000. Stephanomeria fluminea, a new species endemic to Wyoming. Castilleja 19(1):7.

Welp, L., W.F. Fertig, G.P. Jones, G.P. Beauvais, and S.M. Ogle. 2000. Fine filter analysis of the Bighorn, Medicine Bow, and Shoshone National Forests in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.

Author:
Walter Fertig

Updated:
00-12-02

TOWNSENDIA FLORIFER

SHOWY EASTER-DAISY
ASTERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5State: SH
WYNDD Plant List: PERIPHERAL

Associated Rare Species:

Occurrences in Wyoming:
Known from a single historical record in Wyoming, last observed in 1892. A more recent report from Uinta county is now known to be based on a mis-identification.

Abundance:
Not known.

Range:
Peripheral; Known only from the "Snake River" in Teton County.

Trends:
Unknown.

Protection status:
The historical record may be from Grand Teton National Park, although this needs to be confirmed.

Threats:
Not known.

References:

Lesica, P. & J. S. Shelly. 1991. Sensitive, Threatened and Endangered Vascular Plants of Montana. Montana Natural Heritage Program, Occ. Publ. No. 1. Helena, MT.

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Cronquist, A. 1955. Pt. 5. Compositae. In: Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson (eds). Vascular Plants of the Pacific Northwest. Univ. Washington Publ. Biol. 17(5): 1-343.

Author:
Walter Fertig

Updated:
99-01-09

TOWNSENDIA LEPTOTES

COMMON EASTER-DAISY
ASTERACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G4State: S1
WYNDD Plant List: PERIPHERAL

Occurrences in Wyoming:
Known from 3 occurrences in Wyoming, only one of which has been documented since 1960. Reported from 8-10 locations by Scott (1997).

Abundance:
Not known.

Range:
Peripheral; Known from the Gros Ventre, Wind River, and Absaroka mountains and Yellowstone Plateau in Sublette, Park, and Teton counties. Also reported from Carbon and Fremont counties by Scott (1997).

Trends:
Not known.

Protection status:
All 3 known occurrences are found within special management areas (either designated wilderness or national parks).

Threats:
Presumably low due to the ruggedness of the plant's habitat. The population on White Rock Mountain in the Wind River Range is probably secure due to the low use of the area.

Managed Areas:
Populations are found on lands managed by Bridger-Teton NF (Pinedale and Jackson RDs, Bridger and Gros Ventre Wilderness areas) and Yellowstone NP.

References:
Hartman, R.L. 1995. General floristic/sensitive plant species survey of the Gros Ventre Range, Wyoming. Unpublished report prepared for Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Hartman, R.L. 1996. General floristic/sensitive plant species survey of the Gros Ventre area and the Mount Leidy Highlands, Wyoming. Unpublished report prepared for Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming. 18 pp + appendices.

Scott, R.W. 1997. The Alpine Flora of the Rocky Mountains. Volume 1 The Middle Rockies. University of Utah Press, Salt Lake City, UT. 901 pp.

Author:
Walter Fertig

Updated:
99-08-19

TRAUTVETTERIA CAROLINIENSIS

CAROLINA TASSEL-RUE
RANUNCULACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G5State: S1
WYNDD Plant List: DISJUNCT

Associated Rare Species:

Occurrences in Wyoming:
Known from a single extant occurrence in Wyoming, last observed in 1985. Also known from an historical record from the same general vicinity (last seen in 1884).

Abundance:
Not known, but presumed to be small.

Range:
Disjunct; in Wyoming, known only from the Yellowstone Plateau in Teton County.

Trends:
Not known.

Protection status:
The single extant Wyoming occurrence is protected within Yellowstone National Park.

Threats:
Could be potentially impacted by heavy recreational use (populations are near a popular campground).

Managed Areas:
Found in Yellowstone National Park.

References:
Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.
Parfit, B.D. 1997. TRAUTVETTERIA. In: Flora of North America Editorial Committee. Flora of North America North of Mexico. Volume 3 Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, NY.

Author:
Walter Fertig

Updated:
99-02-28

TRITELEIA GRANDIFLORA

LARGE-FLOWER TRITELEIA
LILIACEAE

Status:
US Fish & Wildlife Service:
Agency Status:

Heritage Rank:
Global: G4State: S1
WYNDD Plant List: PERIPHERAL

Occurrences in Wyoming:
Known from 7-8 extant populations (last observed in 1998) and 1 historical record in Wyoming.

Abundance:
Individual populations are often very small (6-50 plants) according to Jennifer Whipple. One of the largest populations in Grand Teton NP consists of several hundred plants.

Range:
Peripheral; in Wyoming known from the Star Valley, Jackson Hole, Yellowstone Plateau, and Teton Range in Lincoln and Teton counties.

Trends:
Not known.

Protection status:
3-4 populations occur in Grand Teton and Yellowstone National Parks. Other populations are on public lands managed for multiple use.

Threats:
Could be threatened by heavy recreational use of its habitat and over-collection for showy flowers. Impacts from grazing are not understood.

Managed Areas:
Occurs in Grand Teton and Yellowstone National Parks, and Bridger-Teton, Caribou, and Targhee National Forests.

References:
Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. Volume 6, The Monocotyledons. Intermountain Flora: Vascular Plants of the Intermountain West, USA. Columbia University Press, New York.

Hoover, R.F. 1941. A systematic study of TRITELEIA. American Midland Naturalist 25:73-100.

Porter, C.L. 1965. A Flora of Wyoming: Part IV. Bulletin 434:1-88. Agricultural Experiment Station, University of Wyoming.

Author:
Walter Fertig

Updated:
00-11-25

UTRICULARIA INTERMEDIA

FLATLEAF BALDDERWORT
LENTIBULARIACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1
WYNDD Plant List:

Description:
Flat-leaf bladderpod is an aquatic or semi-terrestrial herb with green, leafy, bladderless aquatic stolons 10-50 cm long and colorless, leafless, bladder-bearing, rooting stolons. Leaves are 5-30 mm long and divided into threes, with each division further divided into 6-20 flat, blunt-tipped segments with 2-10 short bristles along the margin. Bladders are 1.5-4.5 mm long, ovoid, and restricted to side branches (not intermixed among the vegetative leaf segments). The inflorescence consists of 3-5 bright yellow 2-lipped flowers borne on an emergent stalk 5-20 cm tall with 1-2 bract-like scales. The calyx consists of 2 subequal lobes 3-4 mm long, with the upper lobe acute and the lower lobe blunt. The corolla is 1-1.8 cm long, with the ovate upper lip about 6.5 mm long and the broadly rounded lower lip about 12 mm long and 15 mm wide and bearing a prominent, rounded swelling. The spur of the flower is straight, cylindrical, more than 1/2 the length of the lower corolla lip and borne closely parallel to it (rather than at a right angle). Fruits are globose capsules about 3 mm in diameter (Ceska and Bell 1973; Taylor 1989; Fertig 1998).

Synonyms:

Similar Species:
UTRICULARIA MACRORHIZA [U. VULGARIS] differs in having deeply pinnately-divided leaves with more than 20 rounded segments and numerous bladders intermixed among the vegetative leaf segments (not on separate branches). U. MINOR has slender, flattened leaf blades divided into 3 main, bladder-bearing segments and flowers with spurs much less than 1/2 the length of the lower lip. U. OCHROLEUCA has shorter spurs borne at a right angle to the lower corolla lip and sharp-tipped leaf segments with less than 4 long bristles or teeth along the margin (Ceska and Bell 1973; Dorn 1992; Fertig 1998).

Flowering/Fruiting Period:
July-August.

Distribution:
Circumboreal; in North America occurs from Alaska to eastern Canada and south to California, northwestern Wyoming, North Dakota, Illinois, and Pennsylvania. In Wyoming, this species is restricted to Jackson Hole (Teton County).

Habitat:
Occurs in oligotrophic and dystrophic lakes and marshes and on sublittoral mud flats (Ceska and Bell 1973). In Wyoming, populations occur in aquatic or semi-terrestrial habitats with slow-moving or slack water currents. Most populations are found on shallowly flooded streambanks and marshy meadows in less than 1/2 inch of water over marl beds or deep organic muck. Such sites are typically dominated by communities of CAREX AQUATILIS, C. SIMULATA, CALAMAGROSTIS STRICTA, TRIGLOCHIN MARITIMUM, and DESCHAMPSIA CESPITOSA. May form large clones.

Associated Rare Species:

Occurrences in Wyoming:
Known from a single occurrence in Wyoming, first observed in 1994.

Abundance:

Locally abundant at the one known site in Wyoming, but restricted to an area of less than 100 acres.

Range:
Disjunct; in Wyoming known only from the Flat Creek Fen in Jackson Hole (Teton County).

Trends:
Not known.

Protection status:
Protected on the National Elk Refuge.

Threats:
Threats low.

Managed Areas:
Originally determined as U. OCHROLEUCA, a closely related species that differs in subtle flower and leaf margin characteristics.

References:

Fertig, W. 1998. Plant species of special concern and vascular plant flora of the National Elk Refuge. Unpublished report prepared for the US Fish and Wildlife Service by the Wyoming Natural Diversity Database, Laramie, WY.

Taylor, P. 1989. The genus UTRICULARIA - a taxonomic monograph. Kew Bulletin Addtl. Series XIV. Royal Botanic Gardens, Kew. 724 pp.

Ceska, A. and M.A.M. Bell. 1973. UTRICULARIA (Lentibulariaceae) in the Pacific Northwest. Madrono 22:74-84.

Fertig, W. 1997. Additions to the flora of Wyoming. Castilleja 16(3):5.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. 1984. Intermountain Flora. Vascular Plants of the Intermountain West, USA. Vol 4. Subclass Asteridae. New York Botanical Garden, Bronx, NY.

Hitchcock, C.L., A. Cronquist, and M. Ownbey. 1959. Pt. 4. Ericaceae through Campanulaceae. In: C.L. Hitchcock, A. Cronquist, M. Ownbey, and J.W. Thompson. Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(4):1-510.

Rossbach, G.B. 1939. Aquatic UTRICULARIAs. Rhodora 41 (484):113-128.
Washington Natural Heritage Program. 2000. Field Guide to Washington's Rare Plants. Washington Dept. of Natural Resources and Spokane District, USDI Bureau of Land Management.

Author:
Walter Fertig

Updated:
00-08-09

UTRICULARIA MINOR

LESSER BLADDERWORT
LENTIBULARIACEAE

Status:
US Fish & Wildlife Service:
Agency Status:None.

Heritage Rank:
Global: G5State: S1S2
WYNDD Plant List:

Description:
Lesser bladderwort is a perennial aquatic herb with submersed, weak stems and leaves. The leaves are 0.3-1 cm long and finely dissected, with each 3-parted leaflet further divided into 1-3 flat, toothed segments. Small bladders (1-2 mm wide) are scattered along the main leaf blade among the leaflets. The inflorescence is a raceme of 2-9 yellow flowers on an emergent stalk 4-15 cm long. The short-spurred, snapdragon-like flowers are bilobed, with the lower lip 4-8 mm long and about twice as long as the upper lip (Cronquist et al. 1984).

Synonyms:

Similar Species:
UTRICULARIA VULGARIS has leaves 10-50 mm long, forked leaf segments, and flowers 12-18 mm long. U. INTERMEDIA has bladders 2.5-4.0 mm long, borne on separate, leafless branches.

Flowering/Fruiting Period:
July - Sept.

Distribution:
Circumboreal, extending south in North America to California, Colorado, Indiana and New Jersey. In Wyoming, known from the Yellowstone Plateau, Jackson Hole, Laramie Valley, and Bighorn, Absaroka, and Laramie ranges.

Habitat:
Submerged in shallow ponds, lakes, and slow-moving streams at 6600-8600 feet.

Associated Rare Species:

Occurrences in Wyoming:
Known from at least 6 records in Wyoming (one of which is historical, dating from 1900). Two records have been relocated since 1996.

Abundance:
Known populations are all very small and restricted to specialized microsites. This species may be more widespread and abundant than currently known, especially in Yellowstone National Park (Jennifer Whipple, personal communication). The plant can be extremely difficult to locate and identify when it is not in flower.

Range:
Sparse; in Wyoming known from scattered locations in the Big Horn, Laramie, and Absaroka ranges, Yellowstone Plateau, and the Laramie and Jackson Hole basins (Albany, Teton, Park, and Washakie counties).

Trends:
Not known.

Protection status:
One occurrence is protected within the Swamp Lake Special Botanical Area (Shoshone NF) and at least 2 others are found within Grand Teton and Yellowstone National Parks. All other known populations are on unprotected private lands or public lands managed for multiple use.

Threats:
May be threatened by loss or deterioration of wetland habitat.

Managed Areas:
Found on lands managed by Bighorn, Shoshone and Medicine Bow National Forests and Grand Teton and Yellowstone National Parks.

References:

Dorn, R.D. 1992. Vascular Plants of Wyoming, second edition. Mountain West Publishing, Cheyenne, WY.

Fertig, W. 1997. Plant species of special concern on Shoshone National Forest: 1996 survey results. Unpublished report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

Rossbach, G.B. 1939. Aquatic UTRICULARIAs. Rhodora 41 (484):113-128.
Ceska, A. and M.A.M. Bell. 1973. UTRICULARIA (Lentibulariaceae) in the Pacific Northwest. Madrono 22:74-84.

Taylor, P. 1989. The genus UTRICULARIA - a taxonomic monograph. Kew Bulletin Addtl. Series XIV. Royal Botanic Gardens, Kew. 724 pp.

Fertig, W. 1998. The status of rare plants on Shoshone National Forest: 1995-97 survey results. Report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. 1984. Intermountain Flora. Vascular Plants of the Intermountain West, USA. Vol 4. Subclass Asteridae. New York Botanical Garden, Bronx, NY.

Hitchcock, C.L., A. Cronquist, and M. Ownbey. 1959. Pt. 4. Ericaceae through Campanulaceae. In: C.L. Hitchcock, A. Cronquist, M. Ownbey, and J.W. Thompson. Vascular Plants of the Pacific Northwest. University of Washington Publications in Biology 17(4):1-510.

Fertig, W. 1999. The status of rare plants in the Bighorn Landscape. Report prepared for The Nature Conservancy Wyoming Field Office by the Wyoming Natural Diversity Database, Laramie, Wyoming.

Beauvais, G.P., W. Fertig, and G.P. Jones. 2000. Rare species and the vegetation of Washakie County, Wyoming. Report prepared for the Washakie County planner by the Wyoming Natural Diversity Database, Laramie, WY.

Author:
Walter Fertig

Updated:
00-04-18

Biologically Important Sites

Sites are biologically-important areas, based on Wyoming Natural Diversity Database (WYNDD) data for rare plant and animal species and communities, and the opinion of expert scientists. Site boundaries were designed to incorporate significant habitat and landforms, as well as important species locations. Sites are arranged alphabetically.

These sites were created by WYNDD for the sole use of the Snake River Resources Review. They should not be used as a measure of conservation priority at any other scale, or for any other purpose.

Site Basic Record
AFTON FRONT

Sitecode: S.USWYFO * 11
Sitename: AFTON FRONT

Directions:
The Afton Front site is equivalent to the RNA and is located ca 2.5 air miles northeast of Afton, WY. From the west, the site is accessible from two roads on private property (LANDOWNER PERMISSION REQUIRED) that extend to the bases of Blaney Canyon and Lily Hollow. Blaney Canyon directions: From the Grey's River Ranger District (GRRD) office in Afton, travel 2.75 miles north on U.S. Highway 89. Turn east and travel approximately 0.5 miles to the end of the road. Cross the creek at the ranch and head southeast, following Blaney Canyon uphill, just over 1 mile to the western boundary. Lily Hollow directions: Travel 1.5 miles north of the GRRD office on U.S. Highway 89. Turn right and follow the road 0.5 miles east to the ranch. Follow the drainage approximately 0.4 miles north to the mouth of Anderson Canyon and then proceed east through the canyon about 1 mile to the western boundary. The site can be reached from the south and the east by foot. From the south: Drive or walk east of the GRRD office approximately 1 mile to the Bridger-Teton National Forest boundary (park here). Follow the path north to the Landmark Star. Continue northeast on the trail along the crest of the north-south trending ridge for about 1 mile. When the trail ends, continue to follow the ridgeline for another 0.25-0.50 miles until you reach the southern boundary which is just south of the south fork of Anderson Canyon. From the east: Again, travel east from the GRRD office to the Bridger-Teton National Forest boundary. Continue walking for 3 miles, passing the campground and gaging station. Stop where a tributary drainage of Swift Creek crosses the road and proceed upslope about 1 mile to the northwest. This is steep and requires a climb of about 1800 feet but is the shortest route to the eastern portion of the site.

Site Description:
The site lies on the western edge of the Salt River Range, one of a series of north-south trending mountain ranges of the Overthrust Belt. It contains the crest of the ridge separating Star Valley on the west from Swift Creek Canyon to the east, as well as the upper reaches of Anderson and Blaney Canyons, both steep, V-shaped canyons dropping west into the Star Valley. The canyon walls exhibit the influence of slope aspect on vegetation: south-facing valley walls are vegetated with a mix of bluebunch wheatgrass grassland and big sagebrush shrub stands, while north-facing valley walls support a mix of Douglas-fir woodland and subalpine fir forest.

Boundary Justification:
The boundary of the site is based on Tuhy's preferred alternative in his Environmental Analysis report (1987); however, a smaller area which does not include the lower portions of Anderson and Blaney Canyons was recommended by the District Ranger of the Grey's River Ranger District. These are the current boundaries of the site which follow topographic features whenever possible.

Biodiversity Significance:
B3

Biodiversity Comments:
The site provides known and/or potential habitat for four U.S. Forest Service Sensitive Species and U.S. Fish and Wildlife Service (USFWS) candidate species. These are: boreal draba, Payson's bladderpod, North American Lynx, and the three-toed woodpecker (U.S. Department of Agriculture Forest Service 1991 and USFWS 1993; Joslin 1994). The Afton Front RNA was selected to help fill gaps in the RNA system for the Agropyron spicatum-Balsamorhiza sagittata-Purshia tridentata community on south-facing slopes and the Pseudotsuga menziesii/Physocarpus malvaceus forest habitat type on north-facing slopes (Tuhy 1987).

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
PDBRA1N190*027*WY	LESQUERELLA PAYSONII	PAYSON'S BLADDERPOD	G3	S3

Literature Cited:
Baxter, G. T., and M. D. Stone. 1980. Amphibians and rep- tiles of Wyoming. Wyoming Game and Fish Department.

Clark, Tim W. Mark R. Stromberg. 1987. Mammals in Wyoming. University Press of Kansas. Lawrence, Kansas.

Fertig, W. and H. Marriott. 1993. Field survey for Astragalus paysonii (Payson's milkvetch) and Draba borealis (Boreal draba), Bridger-Teton National Forest, Final Report. Unpublished report prepared for the Bridger-Teton National Forest by the Wyoming Natural Diversity Database, Laramie, Wyoming.

Fertig, W. and Jones, G.P. 1994. Establishment record for Afton Front Research Natural Area within Bridger-Teton National Forest, Lincoln County, Wyoming. Unpublished report prepared by the Wyoming Natural Diversity Database for the Bridger-Teton National Forest, September 2, 1994.

GREGORY, S. 1983. SUBALPINE FORB COMMMUNITY TYPES OF THE BRIDGER-TETON NATIONAL FOREST, WY COMPLETION REPORT FOR USFS COOPERATIVE EDUCATION AGREE.

Hartman, R. L. and B. E. Nelson. 1994. Status report on the general floristic inventory of the Southern Powder River Basin and Eastern Plains, Wyoming. Unpublished report prepared for the BLM Casper District by the Rocky Mountain Herbarium.

Hartman, R.L. and B.E. Nelson. 1993. General floristic/sensitive plant species survey of the Wyoming and Salt River ranges, northern portions, Wyoming. Unpublished report prepared for Bridger-Teton National Forest by the Rocky Mountain Herbarium, University of Wyoming.

Mueggler, Walter F. 1988. Aspen community types of the Inte rmountain region. USDA Forest Service General Technical Rep ort INT-250. Intermountain Research Station, Ogden, UT.

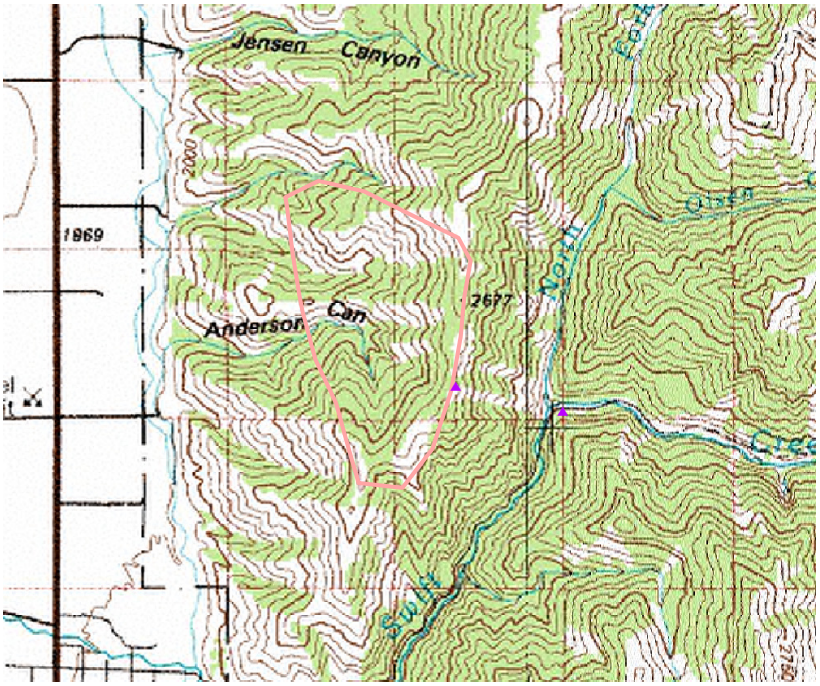
Steele, Robert, Stephen V. Cooper, David M. Ondov, David W. Roberts, & Robert D. Pfister. 1983. Forest habitat types of eastern Idaho-western Wyoming. USDA Forest Service, Inter mountain Forest and Range Experiment Station, General Technical Report INT-144

Tuhy, Joel S. 1987. Environmental analysis for Afton Front Research Natural Area, Greys River Ranger District, Bridger-Teton National Forest. Unpublished report prepared by The Nature Conservancy for the Bridger-Teton National Forest, December 25, 2987.

U.S. Forest Service. 1989. Final environmental impact statement. Bridger-Teton National Forest, Jackson, WY.

U.S. Forest Service. 1989. Land and resource management plan. Bridger-Teton National Forest, Jackson, WY.

Afton Front



Riparian vegetation occurrences
Plant element occurrences
Animal element occurrences
Animal point observations
Biologically important sites

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200000 0 200000 400000 Miles

Site Basic Record
BRECCIA RIDGE

Sitecode: S.USWYHP * 1385
Sitename: BRECCIA RIDGE

Directions:
The site is in the southern Absaroka Mountains on a ridge along the Continental Divide, ca 1.3-2 miles northwest of Brooks Lake and 0.4 miles west of Upper Jade Lake, ca 2-2.5 miles northeast of Togwotee Pass.

Site Description:
This site includes the alpine ridges and upper subalpine slopes along the Continental Divide between Breccia Peak and Sublette Peak. The vegetation (Merrill et al. 1996) is sparsely vegetated alpine rock & soil, graminoid- dominated alpine and subalpine meadows, and forb-dominated alpine tundra. East-facing cliffs of volcanic breccia contain shady alcoves and scree slopes with ledges of light-colored, fine, sparsely-vegetated soils derived from a layer in the Wiggins Formation. These soils have thin humus and some cryptobiotic crusts.

Boundary Justification:
The boundary was selected to include most of the known and potential habitat of Descurainia torulosa (G1/S1), a locally endemic plant listed as Sensitive by the US Forest Service. Descurainia torulosa is found sporadically along Breccia Ridge and adjacent volcanic ridges in small rocky alcoves or talus slopes. The site also contains habitat for several wide-ranging vertebrate species, although the site is probably not large enough to contain viable populations.

Biodiversity Significance:
B1

Biodiversity Comments:
This site contains four moderate to high-ranked occurrences of Descurainia torulosa (G1/S1).

Element Occurrence Information:

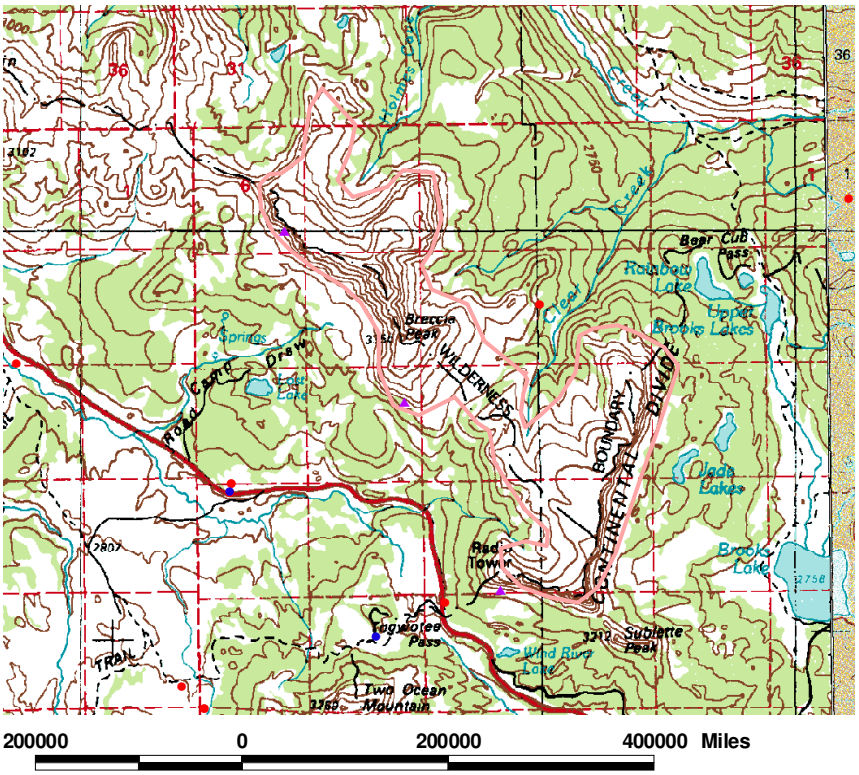
ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
PDBRA0X070*001*WY	DESCURAINIA TORULOSA	WYOMING TANSYMUSTARD	G1	S1
PDBRA0X070*005*WY	DESCURAINIA TORULOSA	WYOMING TANSYMUSTARD	G1	S1
PDBRA0X070*006*WY	DESCURAINIA TORULOSA	WYOMING TANSYMUSTARD	G1	S1
PDBRA0X070*007*WY	DESCURAINIA TORULOSA	WYOMING TANSYMUSTARD	G1	S1

Literature Cited:
Fertig, W. 1997. Plant species of special concern on Shoshone National Forest: 1996 survey results. Unpublished report prepared by the Wyoming Natural Diversity Database, Laramie, WY.

Marriott, H.J. 1991. Status report for DESCURAINIA TORULOSA (Wyoming tansymustard). Prepared for Bridger-Teton and Shoshone National Forests by the Wyoming Natural Diversity Database.

Merrill, E.H., T.W. Kohley, and M.E. Herdendorf. 1996. Wyoming Gap Analysis terrestrial vertebrate species map atlas. Wyoming Cooperative Fish and Wildlife Unit, University of Wyoming, Laramie WY. 982 pp. in 2 volumes.

Breccia Ridge



- Riparian vegetation occurrences
- Plant element occurrences
- Animal element occurrences
- Animal point observations
- Biologically important sites

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Site Basic Record
CLIFF CREEK

Identifiers:
ID: COUNTER:
Sitecode: S.USWYHP * 1423
Sitename: CLIFF CREEK

Directions:
This site is in the Snake River Watershed, in the southern foothills of the Gros Ventre Range, approximately 20 air miles southeast of Jackson, Wyoming. From Jackson, proceed south on U.S. Highway 191 ca. 25 miles. The site is on Highway 191.

Site Description:
The Cliff Creek site includes the main stem of Cliff Creek (a tributary of the Hoback River), as well as smaller tributaries (Kerr Creek and Little Cliff Creek). The north end of the site is characterized by steep slopes that rise 1000 feet in elevation from the Hoback River to the top of Game Hill. The rest of the site is fairly flat, or gently sloping northward to the Hoback River. Soils are largely gravelly, with areas of sandy loam and sandstone. Forests cover approximately 66% of the site. Over most of the site, these forests have been mapped as a mix of spruce-fir (Picea engelmannii- Abies lasiocarpa) forest and lodgepole pine (Pinus contorta) forest. In the northern part of the site, the spruce-fir forest is mixed with subalpine meadow.

Boundary Justification:
The boundary is drawn to include the portion of the Cliff Creek drainage that contains the known occurrences of several endemic plant species.

Biodiversity Significance:
B3

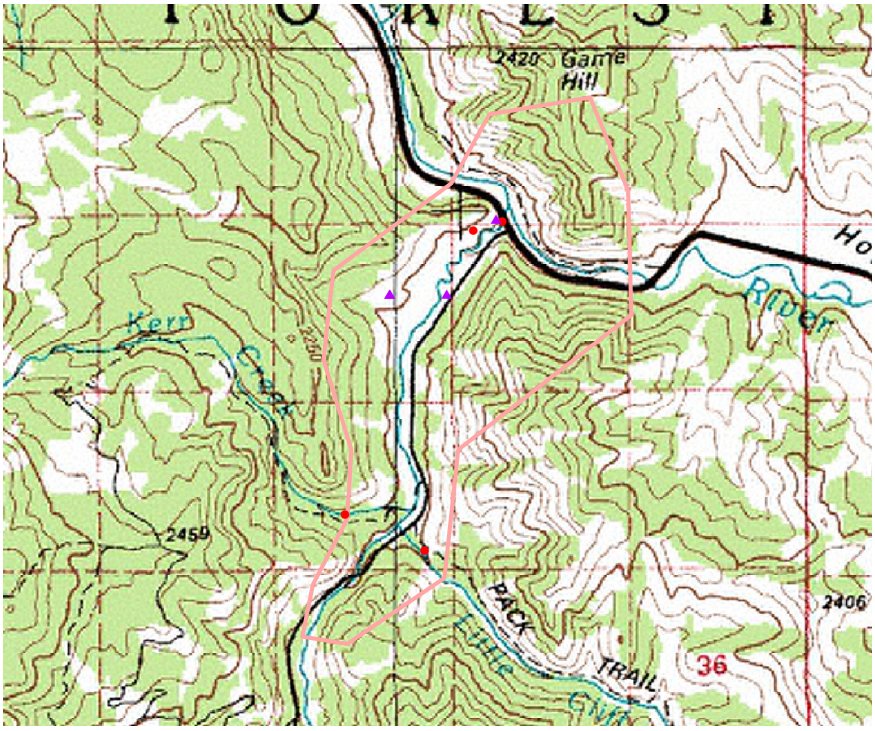
Biodiversity Comments:
The Cliff Creek site contains a cluster of regionally endemic plant species, including two ranked G3. Of these, Aster mollis (G3/S3) is known only from an historical report in the site and could not be relocated in 1998. The vegetation types represented in the area (Spruce-fir forest, Lodgepole pine forest, and Subalpine meadow) are all common cover-types in Hoback and Snake River drainages. These cover types may provide habitat for wide-ranging mammals, including lynx, wolf, wolverine, grizzly bear, and bison. Some habitat may also be available for Snake River cutthroat trout.

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
PDAST0T3P0*003*WY	ASTER MOLLIS	SOFT ASTER	G3	S3
PDBRA1N190*022*WY	LESQUERELLA PAYSONII	PAYSON'S BLADDERPOD	G3	S3
PDCAR0U1H1*001*WY	SILENE REPENS VAR AUSTRAL	CREEPING CAMPION	G5T?	S1
PDORO04041*002*WY	OROBANCHE CORYMBOSA VAR C	FLAT-TOP BROOMRAPE	G4T4	S1

Literature Cited:
None

Cliff Creek



Riparian vegetation occurrences
Plant element occurrences
Animal element occurrences
Animal point observations
Biologically important sites

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Site Basic Record
COTTONWOOD CREEK - FISH CREEK

Sitecode: S.USWYHP * 1446
Sitename: COTTONWOOD CREEK - FISH CREEK

Directions:
Northern Wind River Range, Cottonwood Creek and Fish Creek drainages (tributaries of the Gros Ventre River) approximately 30 air miles east-northeast of Jackson, WY and 30 air miles west-northwest of Dubois, WY, on Cottonwood Creek.

Site Description:
This site includes the valley bottoms along the lower parts of Cottonwood Creek and Fish Creek, both tributaries to the Gros Ventre River, and the river valley between the mouths of those creeks. The main topographic features are the meandering stream channels and the associated floodplains and stream terraces. The vegetation in the site, as mapped by the Wyoming Gap Analysis Project (Merrill et al. 1996), consists primarily of riparian shrublands mixed with subalpine meadows along the streams, and a mixture of mountain big sagebrush shrubland and subalpine meadows on the higher terraces.

Boundary Justification:
The boundary was drawn to include the valley bottoms along Cottonwood and Fish Creeks, two large tributaries of the Gros Ventre River, and of the river valley between the mouths of those creeks. Those valley bottoms provide habitat for several rare riparian plant species associated with gravel and clay stream terraces. The uplands in the area are excluded from the site.

Biodiversity Significance:
B3

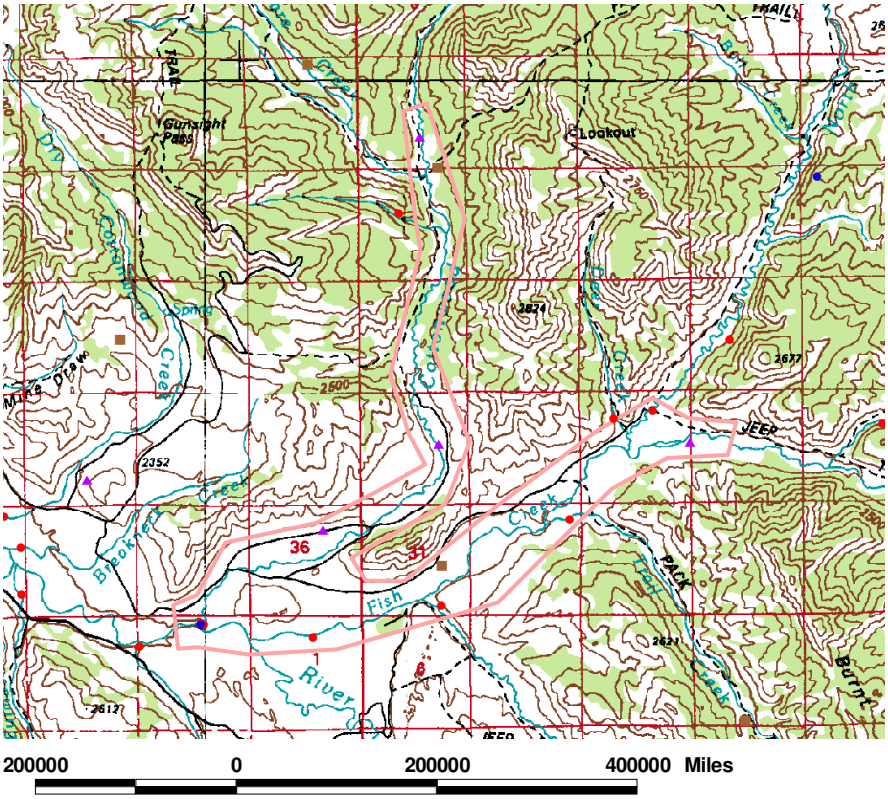
Biodiversity Comments:
This site contains two good-quality occurrences of Haplopappus macronema var. linearis, a regional endemic ranked T3, and two populations of the recently described Wyoming endemic Stephanomeria fluminea (provisionally ranked G2?). The site may also contain habitat for montane amphibians and some habitat for wide-ranging species such as wolf, wolverine, and grizzly bear, if combined with a larger, contiguous block of montane forest habitat. The fine-spotted variety of Yellostone cutthroat trout (Oncorhynchus clarki) is also reported in this drainage and is presumed extant.

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
AFCHA0208C*007*WY	ONCORHYNCHUS CLARKI SSP 2	FINE-SPOTTED SNAKE RIVER	G4T1T2	S1
PDAST3L0N2*017*WY	HAPLOPAPPUS MACRONEMA VAR	NARROWLEAF GOLDENWEED	G4G5T3	S2
PDAST8U0L0*007*WY	STEPHANOMERIA FLUMINEA	TETON WIRE-LETTUCE	G2?	S2?

Literature Cited:
Merrill, E.H., T.W. Kohley, and M.E. Herdendorf. 1996. Wyoming Gap Analysis terrestrial vertebrate species map atlas. Wyoming Cooperative Fish and Wildlife Unit, University of Wyoming, Laramie WY. 982 pp. in 2 volumes.

Cottonwood Creek - Fish Creek



- Riparian vegetation occurrences
- Plant element occurrences
- Animal element occurrences
- Animal point observations
- Biologically important sites

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Site Basic Record
DARBY CANYON

Sitecode: S.USWYHP * 1428
Sitename: DARBY CANYON

Directions:
The site is on the west slope of Teton Range, south of Driggs, Idaho.

Site Description:
This site includes the bottom and lower walls of a deep canyon cut into the limestone and dolomite bedrock on the western slope of the Teton Mountains. According to the Wyoming Gap Analysis Project (Merrill et al. 1996), the vegetation in the southern half of the site (mainly on north-facing slopes) is a mix of spruce-fir forest, Douglas-fir forest, and subalpine meadows. In the northern half of the site, the vegetation is a mix of aspen woodland, subalpine meadow, and Douglas-fir forest. Within this vegetation mosaic are stands of Cercocarpus ledifolius var intercedens shrub vegetation, a rare community type for Wyoming. The deep, shady canyon bottoms and alcoves contain habitat for several rare ferns. Wyoming's only grove of Larix occidentalis is located here, but was probably planted by the Forest Service in the 1930s. See report by Erwin Evert on this site (ca 1985).

Boundary Justification:
The boundary was drawn to include the canyon bottom and the lower canyon walls, which provide habitat for the rare ferns and the other plants of interest.

Biodiversity Significance:

Biodiversity Comments:
The site includes habitat for two rare, disjunct (but globally common) fern species: Asplenium trichomanes-ramosum and Cryptogramma stelleri. Several other uncommon plant species reach their eastern range limits in this general area (Cercocarpus ledifolius var. intercedens, Dicentra uniflora, Bromus vulgaris, Deschampsia elongata, Melica subulata).

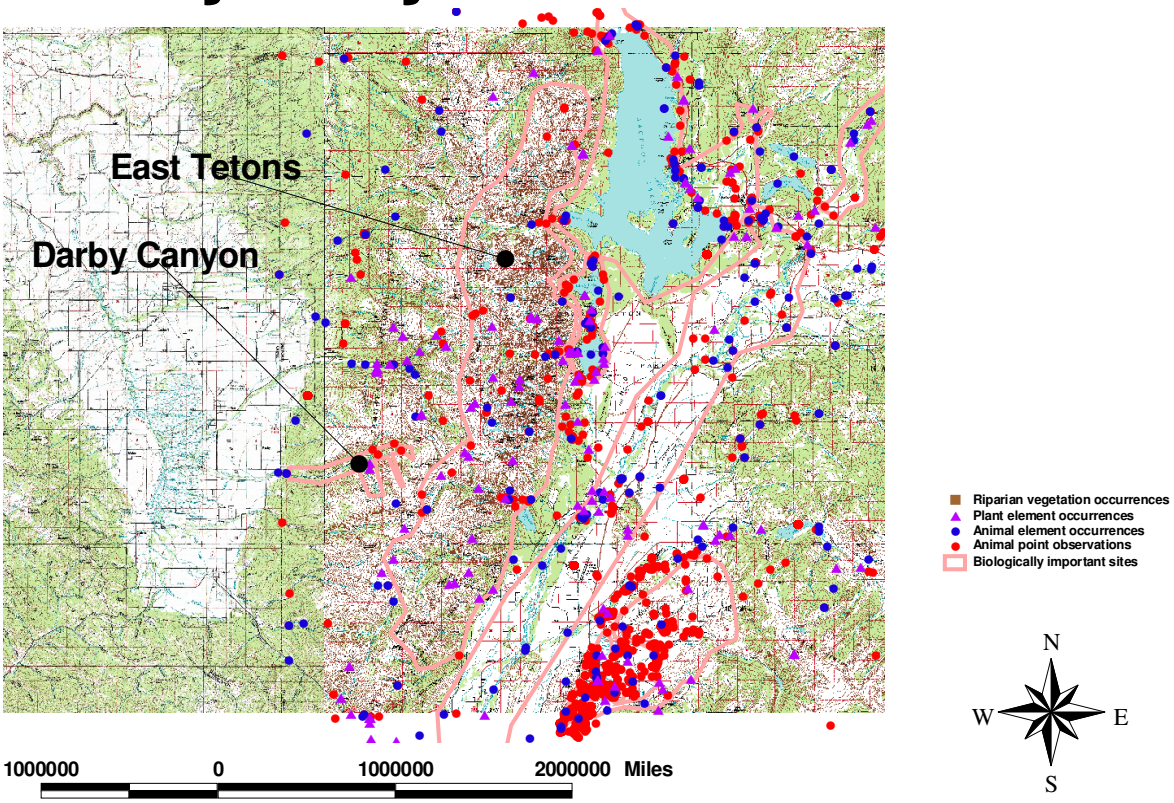
Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
PPADI0B020*004*WY	CRYPTOGRAMMA STELLERI	FRAGILE ROCKBRAKE	G5	S1
PPASP02250*007*WY	ASPLENIUM TRICHOMANES-RAM	GREEN SPLEENWORT	G4	S2

Literature Cited:
Evert, E.F. No Date. Rare Plants: Teton-Darby Canyon Area. Unpublished report.

Merrill, E.H., T.W. Kohley, and M.E. Herdendorf. 1996. Wyoming Gap Analysis terrestrial vertebrate species map atlas. Wyoming Cooperative Fish and Wildlife Unit, University of Wyoming, Laramie WY. 982 pp. in 2 volumes.

Darby Canyon and East Tetons



Site Basic Record
EAST TETONS

Sitecode: S.USWYHP * 1426
Sitename: EAST TETONS

Directions:
The site lies within Grand Teton National Park and encompasses much of the crest and the steep eastern side of the Teton Mountains north of Rendezvous Mountain.

Site Description:
This site encompasses the alpine peaks and ridges of the Teton Mountains, and extends down the steep eastern face of the range to the foothills. Geologic substrates are granitic igneous rocks in the northern part (north of Hurricane Pass), and dolomites and limestones in the southern part. According to the Wyoming Gap Analysis Project (Merrill et al. 1996), the land cover is primarily sparsely vegetated alpine rock and soil, subalpine meadows, and spruce-fir forest. Large streams flow eastward in the deep canyons, and small lakes dot the alpine zone.

Boundary Justification:
The boundary was drawn to encompass the alpine zone along the Teton crest (which provides habitat for several rare plants) and the deep canyons on the eastern side of the range (which also provide habitat for rare plants). Ponds and wetland areas of this site provide habitat for sensitive waterfowl species, such as the harlequin duck, and boreal amphibians, such as the boreal toad.

Biodiversity Significance:
B3

Biodiversity Comments:
Calcareous alpine ridges and meadows at the southern end of the site contain a large number of local and regional endemic plants, including Astragalus shultziorum, Lesquerella paysonii, and Draba globosa (all G3's). Some state rare plants (Kelloggia galioides, Hieracium scouleri, and Athyrium distentifolium) also occur on granitic outcrops and in alpine and subalpine meadows in the northern part of the site, but these are primarily peripheral in Wyoming and of low regional conservation significance. The deep, forested, mesic canyons in the eastern part of the site contain habitat for a suite of disjunct or state rare fern species, including Adiantum aleuticum and Gymnocarpium dryopteris. This site also contains habitat for wide-ranging animal species such as lynx, gray wolf, wolverine, and grizzly bear, for which it is mainly important to maintain larger area of contiguous montane forest. Wetland habitats in the lower canyons may provide important breeding habitat for the boreal toad and riparian corridors for sensitive waterfowl, such as the harlequin duck.

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
AAABB01031*064*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABB01031*093*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
ABNJB15010*002*WY	HISTRIONICUS HISTRIONICUS	HARLEQUIN DUCK	G4	S1B,SZ
ABNJB15010*013*WY	HISTRIONICUS HISTRIONICUS	HARLEQUIN DUCK	G4	S1B,SZ
ABNLC10030*003*WY	LAGOPUS LEUCURUS	WHITE-TAILED PTARMIGAN	G5	S1
ABPBG09050*002*WY	TROGLODYTES TROGLODYTES	WINTER WREN	G5	S1B,SZ
AMABA01130*003*WY	SOREX NANUS	DWARF SHREW	G4	S2S3
AMAJH03010*134*WY	LYNX CANADENSIS	NORTH AMERICAN LYNX	G5	S1
AMAJH03010*158*WY	LYNX CANADENSIS	NORTH AMERICAN LYNX	G5	S1
ARADA01010*009*WY	CHARINA BOTTAE	RUBBER BOA	G5	S2S3
ARADA01010*011*WY	CHARINA BOTTAE	RUBBER BOA	G5	S2S3
ARADA01010*013*WY	CHARINA BOTTAE	RUBBER BOA	G5	S2S3
PDAST4W1E0*004*WY	HIERACIUM SCOULERI	SCOULER HAWKWEED	G4G5	S1
PDBRA110S0*003*WY	DRABA CRASSA	THICK-LEAF WHITLOW-GRASS	G3	S2
PDBRA110S0*009*WY	DRABA CRASSA	THICK-LEAF WHITLOW-GRASS	G3	S2
PDBRA11350*002*WY	DRABA GLOBOSA	ROCKCRESS DRABA	G3	S2
PDBRA11350*009*WY	DRABA GLOBOSA	ROCKCRESS DRABA	G3	S2

PDBRA11350*014*WY	DRABA GLOBOSA	ROCKCRESS DRABA	G3	S2
PDBRA11350*017*WY	DRABA GLOBOSA	ROCKCRESS DRABA	G3	S2
PDBRA1N190*017*WY	LESQUERELLA PAYSONII	PAYSON'S BLADDERPOD	G3	S3
PDBRA1N190*019*WY	LESQUERELLA PAYSONII	PAYSON'S BLADDERPOD	G3	S3
PDBRA1N190*020*WY	LESQUERELLA PAYSONII	PAYSON'S BLADDERPOD	G3	S3
PDFAB0F9X0*002*WY	ASTRAGALUS SHULTZIORUM	SHULTZ'S MILK-VETCH	G3Q	S3
PDFAB0F9X0*009*WY	ASTRAGALUS SHULTZIORUM	SHULTZ'S MILK-VETCH	G3Q	S3
PDFAB0F9X0*010*WY	ASTRAGALUS SHULTZIORUM	SHULTZ'S MILK-VETCH	G3Q	S3
PDFAB0F9X0*012*WY	ASTRAGALUS SHULTZIORUM	SHULTZ'S MILK-VETCH	G3Q	S3
PDRUB12010*001*WY	KELLOGGIA GALIOIDES	MILK KELLOGGIA	G5	S1
PDRUB12010*005*WY	KELLOGGIA GALIOIDES	MILK KELLOGGIA	G5	S1
PMJUN020A2*001*WY	LUZULA GLABRATA VAR HITCH	SMOOTH WOOD-RUSH	G5T4	S1
PMORC1N050*005*WY	LISTERA CONVALLARIOIDES	BROAD-LEAVED TWAYBLADE	G5	S1
PPADI030Q0*001*WY	ADIANTUM ALEUTICUM	ALEUTIAN MAIDENHAIR-FERN	G5?	S1
PPDRY02010*001*WY	ATHYRIUM DISTENTIFOLIUM V	AMERICAN ALPINE LADY FERN	G4G5	S1
PPDRY02010*002*WY	ATHYRIUM DISTENTIFOLIUM V	AMERICAN ALPINE LADY FERN	G4G5	S1
PPDRY02010*003*WY	ATHYRIUM DISTENTIFOLIUM V	AMERICAN ALPINE LADY FERN	G4G5	S1
PPDRY02010*005*WY	ATHYRIUM DISTENTIFOLIUM V	AMERICAN ALPINE LADY FERN	G4G5	S1
PPDRY0D030*005*WY	GYMNOCARPIUM DRYOPTERIS	OAK FERN	G5	S1
PPLYC02070*001*WY	HUPERZIA SELAGO	FIR CLUBMOSS	G5	SH

Literature Cited:

Merrill, E.H., T.W. Kohley, and M.E. Herdendorf. 1996. Wyoming Gap Analysis terrestrial vertebrate species map atlas. Wyoming Cooperative Fish and Wildlife Unit, University of Wyoming, Laramie WY. 982 pp. in 2 volumes.

(See previous map).

Site Basic Record
ELK REFUGE GRASSLANDS

Sitecode: S.USWYHP * 1429
Sitename: ELK REFUGE GRASSLANDS

Directions:
Jackson Hole, grasslands at east and north end of the National Elk Refuge, approximately 7 miles northeast of Jackson, WY.

Site Description:
The boundaries of this site include northeast-southwest trending ridges of limestone in the northwest and southeast, and Long Hollow, the valley between the ridges. The calcareous ridges provide habitat for sparsely vegetated cushion plant-bunchgrass communities, and the ridges in the northwestern part of the site support aspen groves that are heavily browsed by elk. Parts of the valley floor is drained by ditches, and much of the native vegetation has been replaced by planted meadows of smooth brome.

Boundary Justification:
The boundary is drawn to include the ridges around and the upper parts of the valley in the Elk Refuge. The Miller Butte area, the southern arm of the site, is an extension of the habitat found on the ridge bordering the eastern edge of the site. The habitat found here is high quality for Lesquerella carinata and Artemisia tripartita communities.

Biodiversity Significance:
B3

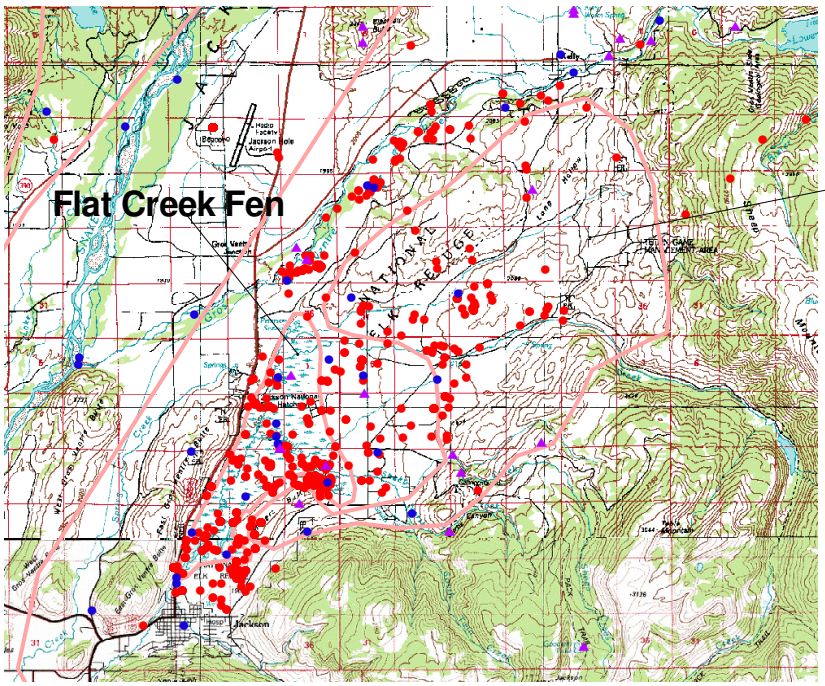
Biodiversity Comments:
The site contains the state's best habitat for Lesquerella carinata var. carinata, a regional endemic of eastern Idaho and northwest Wyoming, as well as habitat for the regionally endemic Astragalus terminalis. A medium-sized (but growing) herd of bison has become established in the area.

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
ABNKD06071*038*WY	FALCO PEREGRINUS ANATUM	PEREGRINE FALCON	G4T3	S1B,S2
ABNNF07070*044*WY	NUMENIUS AMERICANUS	LONG-BILLED CURLEW	G5	S3B,SZ
ABNSB10010*073*WY	ATHENE CUNICULARIA	BURROWING OWL	G4	S3B,SZ
PDBRA1N0B2*005*WY	LESQUERELLA CARINATA VAR	KEELED BLADDERPOD	G3G4T3	S1
PDBRA1N0B2*007*WY	LESQUERELLA CARINATA VAR	KEELED BLADDERPOD	G3G4T3	S1
PDFAB0F8U0*003*WY	ASTRAGALUS TERMINALIS	RAILHEAD MILKVETCH	G3	S1

Literature Cited:
Fertig, W. 1998. Plant species of special concern and vascular plant flora of the National Elk Refuge. Unpublished report prepared for the US Fish and Wildlife Service by the Wyoming Natural Diversity Database, Laramie, WY.

Flat Creek Fen and Elk Refuge Grasslands



Site Basic Record
FALLS RIVER BASIN

Sitecode: S.USWYHP * 1430
Sitename: FALLS RIVER BASIN

Directions:
Yellowstone Plateau, southwest corner of Yellowstone National Park, on Falls River. Includes the Bechler Meadows wetlands and parkland and wet meadows associated with the Squirrel Meadows/Indian Lake area.

Site Description:
This site includes the broad stream valleys and gently rolling uplands of the Falls River Basin and the Bechler Meadows. According to the Wyoming Gap Analysis Project (Merrill et al. 1996), the matrix vegetation is a mix of lodgepole pine forest and spruce-fir forest. The Falls River Basin and the Bechler Meadows contain large streams and extensive wetlands mixed with the matrix forest. In the southern part of the site, the Squirrel Meadows/Indian Lake area has a mix of mesic and dry meadows with coniferous forests, some of which have been burned in the past 10 to 15 years.

Boundary Justification:

Biodiversity Significance:
B3

Biodiversity Comments:
The Bechler Meadows and Indian Lake areas contain the only known habitat in Wyoming for 6 (all globally secure disjuncts or peripherals), including Scheuchzeria palustris, Sisyrinchium idahoense var. idahoense, Gentianopsis simplex, Dulichium arundinaceum, Scirpus subterminalis, and Cicuta bulbifera. Wetlands in the site also provide habitat for other rare plants (found sporadically elsewhere in the state), such as Carex livida and Drosera anglica. Several examples of quaking and floating mat vegetation occur in small ponds in the area. Drier meadows at the southern end of the site contain habitat for additional state rare plants (all peripherals) such as Paeonia brownii. This fairly remote corner of Yellowstone contains a high concentration of grizzly bears and is potentially habitat for wolves and wolverine. The numerous small lakes in the area are confirmed breeding grounds for several species of sensitive waterfowl that are globally secure (i.e., G4 or G5) but have limited Wyoming distributions (i.e., S2 or S1), including common loons, trumpeter swans, and bufflehead as well as columbian spotted frogs. Uplands include areas of open lodgepole pine with northern goshawk nests. Tributary streams enterying the basin support a population(s) of the fine-spotted variety of Yellowstone cuthroat trout.

Element Occurrence Information:

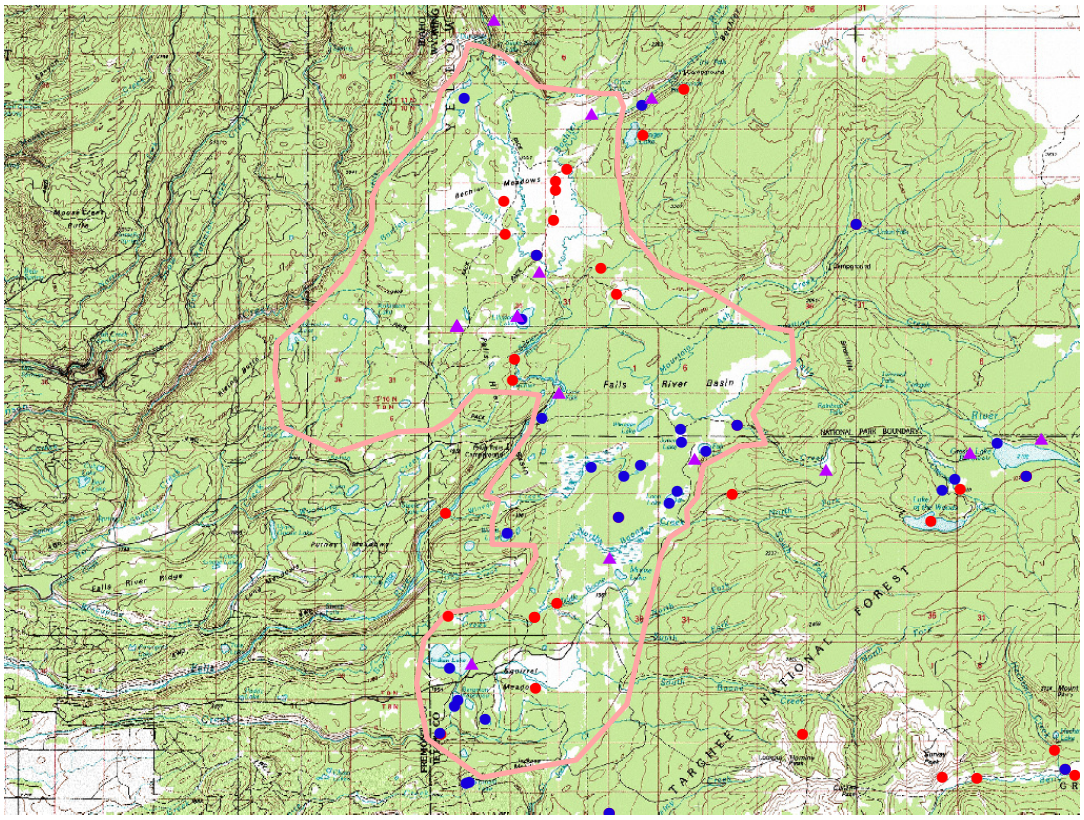
ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
AAABH01290*072*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
ABNBA01030*021*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*022*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*023*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*024*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*042*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*104*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*129*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*130*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNJB02030*029*WY	CYGNUS BUCCINATOR	TRUMPETER SWAN	G4	S1B,S2
ABNJB02030*045*WY	CYGNUS BUCCINATOR	TRUMPETER SWAN	G4	S1B,S2
ABNJB18030*001*WY	BUCEPHALA ALBEOLA	BUFFLEHEAD	G5	S1B,S4
ABNKC12060*114*WY	ACCIPITER GENTILIS	NORTHERN GOSHAWK	G5	S2S3B,
ABNKC12060*115*WY	ACCIPITER GENTILIS	NORTHERN GOSHAWK	G5	S2S3B,
AFCHA0208C*019*WY	ONCORHYNCHUS CLARKI SSP 2	FINE-SPOTTED SNAKE RIVER	G4T1T2	S1
AFCHA0208C*020*WY	ONCORHYNCHUS CLARKI SSP 2	FINE-SPOTTED SNAKE RIVER	G4T1T2	S1
ARADA01010*016*WY	CHARINA BOTTAE	RUBBER BOA	G5	S2S3
PDAPI0M020*001*WY	CICUTA BULBIFERA	BULB-BEARING WATER-HEMLOC	G5	S1
PDDRO02010*003*WY	DROSERA ANGLICA	ENGLISH SUNDEW	G5	S2
PDDRO02010*010*WY	DROSERA ANGLICA	ENGLISH SUNDEW	G5	S2
PDGEN080A0*001*WY	GENTIANOPSIS SIMPLEX	HIKER'S GENTIAN	G4	S1

PDPAE01010*004*WY	PAEONIA BROWNII	BROWN'S PEONY	G5	S1
PDPAE01010*005*WY	PAEONIA BROWNII	BROWN'S PEONY	G5	S1
PMCYP037L0*002*WY	CAREX LIVIDA	LIVID SEDGE	G5	S1
PMCYP08010*001*WY	DULICHIUM ARUNDINACEUM	THREE-WAY SEDGE	G5	S1
PMCYP0Q1G0*001*WY	SCIRPUS SUBTERMINALIS	WATER BULRUSH	G4G5	S1
PMIRI0D0T2*001*WY	SISYRINCHIUM IDAHOENSE VA	IDAHO BLUE-EYED GRASS	G5T4	S1
PMSCH02010*001*WY	SCHEUCHZERIA PALUSTRIS	POD-GRASS	G5	S1

Literature Cited:

Merrill, E.H., T.W. Kohley, M.E. Herdendorf, W.A. Reiners, K.L. Driese, R.W. Marrs, and S.H. Anderson. 1996. The Wyoming gap analysis project final report. University of Wyoming, Laramie, WY. 109 pp. + appendices.

Falls River Basin



500000 0 500000 1000000 Miles

- riparian vegetation occurrences.shp
- Plant element occurrences.shp
- Animal element occurrence.shp
- Animal point observations.shp
- Biologically important sites.shp

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Site Basic Record
FLAT CREEK FEN

Sitecode: S.USWYHP * 998
Sitename: FLAT CREEK FEN

Directions:
Jackson Hole, Flat Creek Fen, ca 1-5.5 miles north of Jackson on the east and west banks of Flat Creek east of US Highway 26, 89, 187, and north and west of Millers Butte on the National Elk Refuge.

Site Description:
Flat Creek Fen is an extensive calcareous wetland found along the banks of Flat Creek and its tributaries (including Nowlin, Sheep, and several unnamed creeks). The wetland is nearly flat but drains the surrounding calcareous foothills of the Gros Ventre Range. Much of the wetland consists of shallowly flooded marl deposits and swards of Carex simulata/Juncus balticus/Triglochin maritimum vegetation, with patches of slightly drier, hummocky terrain, and Carex utriculata [C. rostrata]/C. aquatilis communities along deeper creeks. Willows and other brushy species are a minor component of the vegetation, probably due to the high water table and heavy browsing by wintering elk herds. Several small natural and man-made ponds provide nesting cover for waterfowl. The area is part of the wintering range for one of the largest elk herds in the country.

Boundary Justification:
Boundary is based on hydrologic and topographic features and is intended to include the entire Flat Creek fen complex.

Biodiversity Significance:
B3

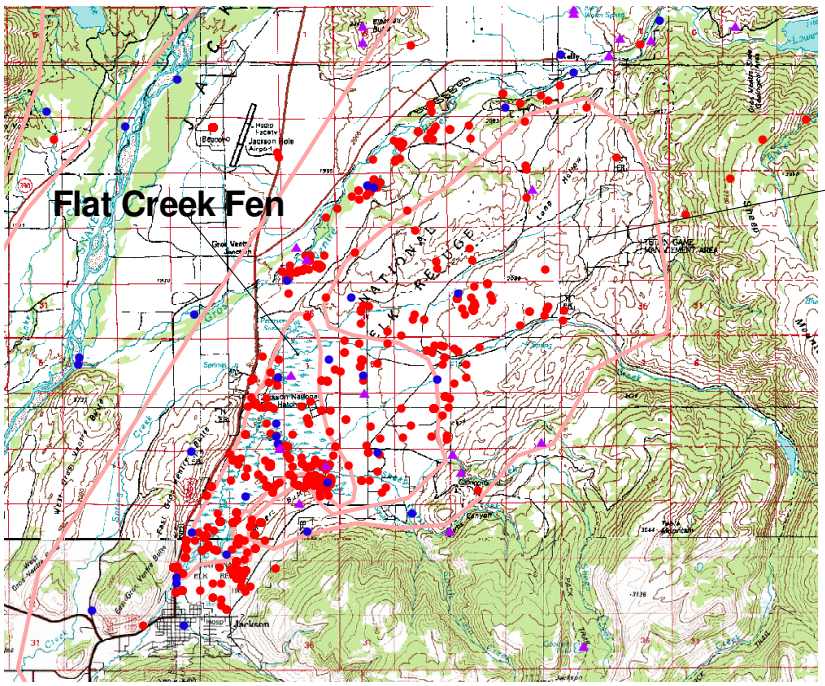
Biodiversity Comments:
The fen contains 10 plant species of special concern tracked by WYNDD, including the only known occurrence of Utricularia intermedia in the state, and the largest populations of Scirpus rollandii (G3Q) in Wyoming. With the exception of the Salix candida populations, all of these occurrences are at least A or B quality (see EORANK for more information**). This site is also significant habitat for several rare animal species, including trumpeter swan and boreal toad and the state's only breeding site for yellow rail.

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
AAABB01031*077*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
ABNBA01030*018*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNJB02030*070*WY	CYGNUS BUCCINATOR	TRUMPETER SWAN	G4	S1B,S2
ABNJB11040*010*WY	AYTHYA COLLARIS	RING-NECKED DUCK	G5	S3B,S3
ABNJB15010*011*WY	HISTRIONICUS HISTRIONICUS	HARLEQUIN DUCK	G4	S1B,SZ
ABNME01010*001*WY	COTURNICOPS NOVEBORACENSI	YELLOW RAIL	G4	SA?B,S
ABNNF20010*030*WY	PHALAROPUS TRICOLOR	WILSON'S PHALAROPE	G5	S3B,S3
AFCHA0208C*006*WY	ONCORHYNCHUS CLARKI SSP 2	FINE-SPOTTED SNAKE RIVER	G4T1T2	S1
PDLNT020A0*001*WY	UTRICULARIA INTERMEDIA	FLATLEAF BALDDERWORT	G5	S1
PDSAL020K0*010*WY	SALIX CANDIDA	HOARY WILLOW	G5	S2
PMCYP03C81*002*WY	CAREX SCIRPOIDEA VAR SCIR	CANADIAN SINGLE-SPIKE SED	G5T4Q	S1
PMCYP0A0E0*005*WY	ERIOPHORUM VIRIDICARINATU	GREEN KEELED COTTON-GRASS	G5	S1
PMCYP0Q1B0*003*WY	SCIRPUS ROLLANDII	ROLLAND BULRUSH	G3Q	S1
PMPOA480U0*006*WY	MUHLENBERGIA GLOMERATA	MARSH MUHLY	G5	S1

Literature Cited:
Fertig, W. 1998. Plant species of special concern and vascular plant flora of the National Elk Refuge. Unpublished report prepared for the US Fish and Wildlife Service by the Wyoming Natural Diversity Database, Laramie, WY.

Flat Creek Fen and Elk Refuge Grasslands



Site Basic Record
GRAYBACK RIDGE

Sitecode: S.USWYHP * 1431
Sitename: GRAYBACK RIDGE

Directions:
Wyoming Range, valley along west side of Grayback Ridge, containing the head of Bailey and Steer creeks and a segment of the Greys River and several large lakes, ca 20 air miles south of Jackson, WY.

Site Description:
This site lies at the western foot of Grayback Ridge. Its main topographic features are the valleys of Bailey Creek and the upper part of the Little Greys River drainage, including the lower parts of the valley walls. The vegetation in the valley bottoms is mapped by the Wyoming Gap Analysis Project (Merrill et al. 1996) as subalpine meadow mixed with mountain big sagebrush shrubland or with aspen woodland. The valley walls are a mix of lodgepole pine forest and spruce-fir forest. Some of the meadows around Waterdog Lake, which contain Astragalus paysonii, are derived from fires. There may be old clearcuts and logging roads at the southern end of the site.

Boundary Justification:
This boundary was drawn to capture several populations of Astragalus paysonii, a regionally endemic plant restricted to sandy meadows in recovering burns and clearcuts.

Biodiversity Significance:
B3

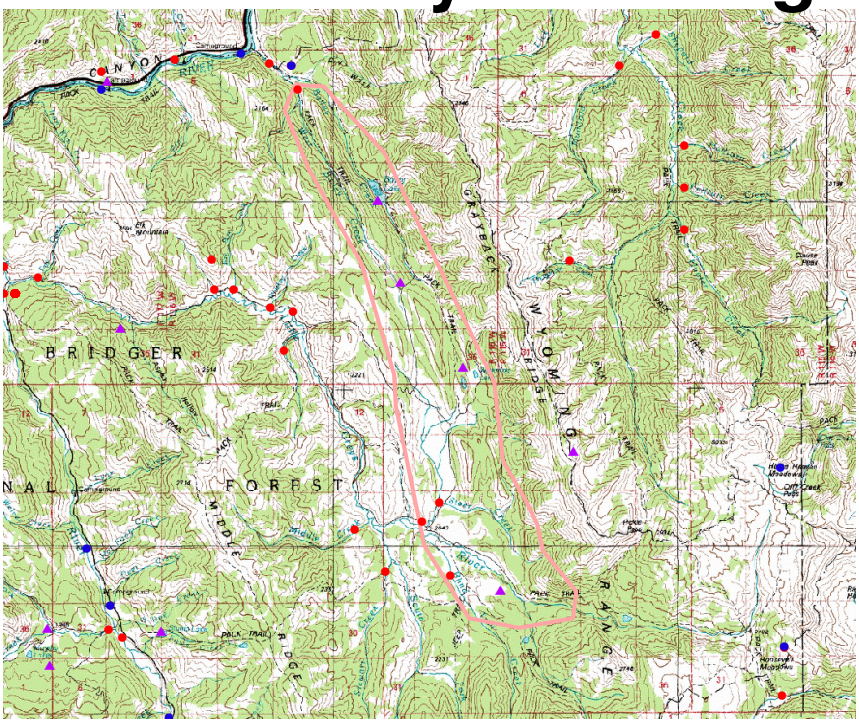
Biodiversity Comments:
The site contains one high quality and three low quality occurrences of Astragalus paysonii (G3). The site also falls within the potential range of lynx, gray wolf, great gray owl, wolverine, and grizzly bear.

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
PDFAB0F6P0*008*WY	ASTRAGALUS PAYSONII	PAYSON'S MILKVETCH	G3	S2
PDFAB0F6P0*010*WY	ASTRAGALUS PAYSONII	PAYSON'S MILKVETCH	G3	S2
PDFAB0F6P0*011*WY	ASTRAGALUS PAYSONII	PAYSON'S MILKVETCH	G3	S2
PDFAB0F6P0*025*WY	ASTRAGALUS PAYSONII	PAYSON'S MILKVETCH	G3	S2

Literature Cited:
Merrill, E.H., T.W. Kohley, and M.E. Herdendorf. 1996. Wyoming Gap Analysis terrestrial vertebrate species map atlas. Wyoming Cooperative Fish and Wildlife Unit, University of Wyoming, Laramie WY. 982 pp. in 2 volumes.

Grayback Ridge



500000 0 500000 1000000 Miles

- Riparian vegetation occurrences
- Plant element occurrences
- Animal element occurrences
- Animal point observations
- Biologically important sites

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Site Basic Record
GROS VENTRE ALPINE

Sitecode: S.USWYHP * 1433
Sitename: GROS VENTRE ALPINE

Directions:
This site lies along the summit of the Gros Ventre Range, from The Sawtooth on the southeast to Pyramid Peak on the northwest. It can be reached from all sides via a number of Forest Service trails.

Site Description:
This high-elevation site includes alpine and upper subalpine slopes and valleys on both sides of the Gros Ventre crest. The geologic substrate includes both granitic and calcareous sedimentary rocks. The vegetation, as mapped by the Wyoming Gap Analysis Project (Merrill et al. 1996), is primarily sparsely vegetated alpine rock & soil slopes, forb-dominated alpine tundra, and graminoid-dominated alpine and subalpine meadows. Stands of timberline spruce-fir forest grows on some of the lower slopes. Surveys in nearby areas (Fertig and Jones 1994) suggest that these stands consist primarily of whitebark pine and subalpine fir.

Boundary Justification:
The boundary was drawn to include the upper subalpine slopes and the alpine summits of the high peaks of the Gros Ventre Range in order to capture the habitat of a suite of alpine rock outcrop and tundra plants (many of which are disjuncts or regional endemics).

Biodiversity Significance:
B3

Biodiversity Comments:
Site contains an unusually high concentration of regionally endemic G3 alpine plants and G4-G5 disjuncts, including Saussurea weberi, Parrya nudicaulis, Braya glabella, Astragalus shultziorum, Draba crassa, Draba globosa, Lesquerella paysonii, and Antennaria aromatica. The site also provides potential summer habitat for gray wolf, grizzly bear, bighorn sheep, and wolverine. In addition, the site probably contains a variety of timberline and alpine vegetation types characteristic of the granitic and calcareous sedimentary substrates of the Gros Ventre Range.

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
AAABB01031*079*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
ABNKD06071*011*WY	FALCO PEREGRINUS ANATUM	PEREGRINE FALCON	G4T3	S1B,S2
PDAST0H0V0*024*WY	ANTENNARIA AROMATICA	AROMATIC PUSSYTOES	G4	S2S3
PDAST0H0V0*025*WY	ANTENNARIA AROMATICA	AROMATIC PUSSYTOES	G4	S2S3
PDAST3M1W0*009*WY	ERIGERON HUMILIS	LOW FLEABANE	G4	S2
PDAST8B060*008*WY	SAUSSUREA WEBERI	WEBER'S SAW-WORT	G3	S2
PDAST9C0F0*006*WY	TOWNSENDIA LEPTOTES	COMMON EASTER-DAISY	G4	S1
PDBRA0D020*001*WY	BRAYA GLABELLA		G5	S1
PDBRA0D020*002*WY	BRAYA GLABELLA		G5	S1
PDBRA110S0*013*WY	DRABA CRASSA	THICK-LEAF WHITLOW-GRASS	G3	S2
PDBRA11202*006*WY	DRABA PORSILDII VAR PORSI	PORSILD'S WHITLOW-GRASS	G3G4T3	S1
PDBRA11350*015*WY	DRABA GLOBOSA	ROCKCRESS DRABA	G3	S2
PDBRA11350*016*WY	DRABA GLOBOSA	ROCKCRESS DRABA	G3	S2
PDBRA1N190*031*WY	LESQUERELLA PAYSONII	PAYSON'S BLADDERPOD	G3	S3
PDBRA1N190*032*WY	LESQUERELLA PAYSONII	PAYSON'S BLADDERPOD	G3	S3
PDBRA1N190*036*WY	LESQUERELLA PAYSONII	PAYSON'S BLADDERPOD	G3	S3
PDBRA1Z020*006*WY	PARRYA NUDICAULIS	NAKED-STEMMED PARRYA	G5	S2
PDCAR0G0B0*002*WY	MINUARTIA FILIORUM	THREAD-BRANCH STITCHWORT	G3G4	S1
PDCAR0G0B0*003*WY	MINUARTIA FILIORUM	THREAD-BRANCH STITCHWORT	G3G4	S1
PDFAB0F9X0*020*WY	ASTRAGALUS SHULTZIORUM	SHULTZ'S MILK-VETCH	G3Q	S3
PDFAB0F9X0*023*WY	ASTRAGALUS SHULTZIORUM	SHULTZ'S MILK-VETCH	G3Q	S3
PDFAB0F9X0*024*WY	ASTRAGALUS SHULTZIORUM	SHULTZ'S MILK-VETCH	G3Q	S3
PDFAB0F9X0*025*WY	ASTRAGALUS SHULTZIORUM	SHULTZ'S MILK-VETCH	G3Q	S3
PMCYP037X2*009*WY	CAREX LUZULINA VAR ATROPU	BLACK AND PURPLE SEDGE	G5T3	S2
PMCYP037X2*010*WY	CAREX LUZULINA VAR ATROPU	BLACK AND PURPLE SEDGE	G5T3	S2
PPASP02250*010*WY	ASPLENIUM TRICHOMANES-RAM	GREEN SPLEENWORT	G4	S2
PPASP02250*011*WY	ASPLENIUM TRICHOMANES-RAM	GREEN SPLEENWORT	G4	S2

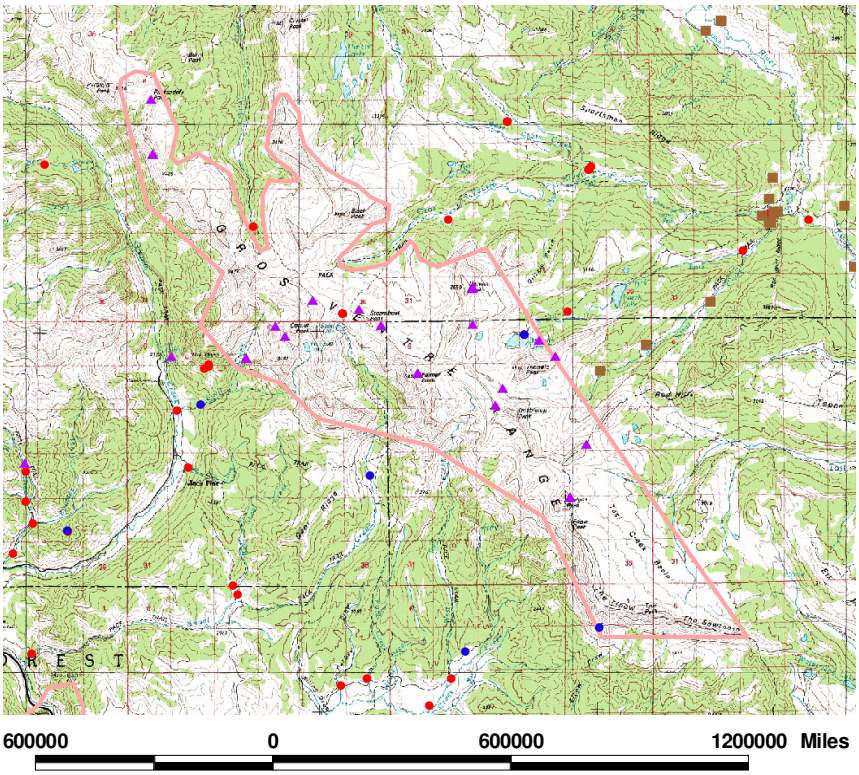
Literature Cited:

Fertig, W. 1999. Sensitive plant surveys and status of rare plant species on Bridger-Teton National Forest, 1997-1998. Report prepared by the Wyoming Natural Diversity Database, Laramie, Wyoming.

Fertig, W. and G. Jones. 1994. Establishment record for Horse Creek Research Natural Area within Bridger-Teton National Forest, Teton County, Wyoming. Unpublished report prepared for US Forest Service, Region 4, by the Wyoming Natural Diversity Database, 2 September 1994.

Merrill, E.H., T.W. Kohley, and M.E. Herdendorf. 1996. Wyoming Gap Analysis terrestrial vertebrate species map atlas. Wyoming Cooperative Fish and Wildlife Unit, University of Wyoming, Laramie WY. 982 pp. in 2 volumes.

Gros Ventre Alpine



Riparian vegetation occurrences
Plant element occurrences
Animal element occurrences
Animal point observations
Biologically important sites

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Site Basic Record
JACKSON LAKE

Sitecode: S.USWYHP * 1436
Sitename: JACKSON LAKE

Directions:
Jackson Hole, Jackson Lake, approximately 24 air miles north of Jackson, WY.

Site Description:
This site includes Jackson Lake, a narrow zone of upland around the lake, and the lower reaches of the valley of Pilgrim Creek, a large stream entering the lake from the east. The vegetation (Merrill et al. 1996) consists of a mix of lodgepole pine forest with subalpine meadows and foothills grasslands around the lake, and a mixture of riparian shrublands and mountain big sagebrush shrubland in the broad valley of Pacific Creek. Wetlands on the eastern shore of the lake, by Coulter Bay, contain many nutrient-rich ponds and lakes and a high density of G5/S1 wetland and aquatic plants. Gravelly stream terraces along Pilgrim Creek are important habitat for Stephanomeria fluminea.

Boundary Justification:
The boundary was drawn to capture all of Jackson Lake and the associated shoreline, wetland habitats that contain EO's of rare amphibian, bird, and plant species noted in the BIODIVCOM field.

Biodiversity Significance:
B4

Biodiversity Comments:
This site contains numerous low-ranked animal Element Occurrences (EO's) mainly of amphibians and water-associated birds. It has much wetland habitat suitable for rare, declining boreal amphibians, such as boreal toads (G4 T4 S2) and columbia spotted frogs (G4 S2-3) It is also suitable breeding and/or foraging habitat for numerous sensitive waterfowl and shore birds, including common loons (G5 S2), harlequin duck (G4 S1B), american white pelican (G3 S1B),and american bittern (G4 S2B). Bald eagles (TE, G2 S2B) have been known to breed near the lake and it is potentially good stop-over habitat for whooping cranes (G1 S1). Flat water wetland habitats proximate to cliff roosting sites may also serve as valuable bat foraging habitat. This site contains a high concentration of state rare (but globally abundant) vascular plant species that reach the southern or eastern extent of their range here. There is at least one occurrence of Stephanomeria fluminea (G2?), a local endemic.

Element Occurrence Information:

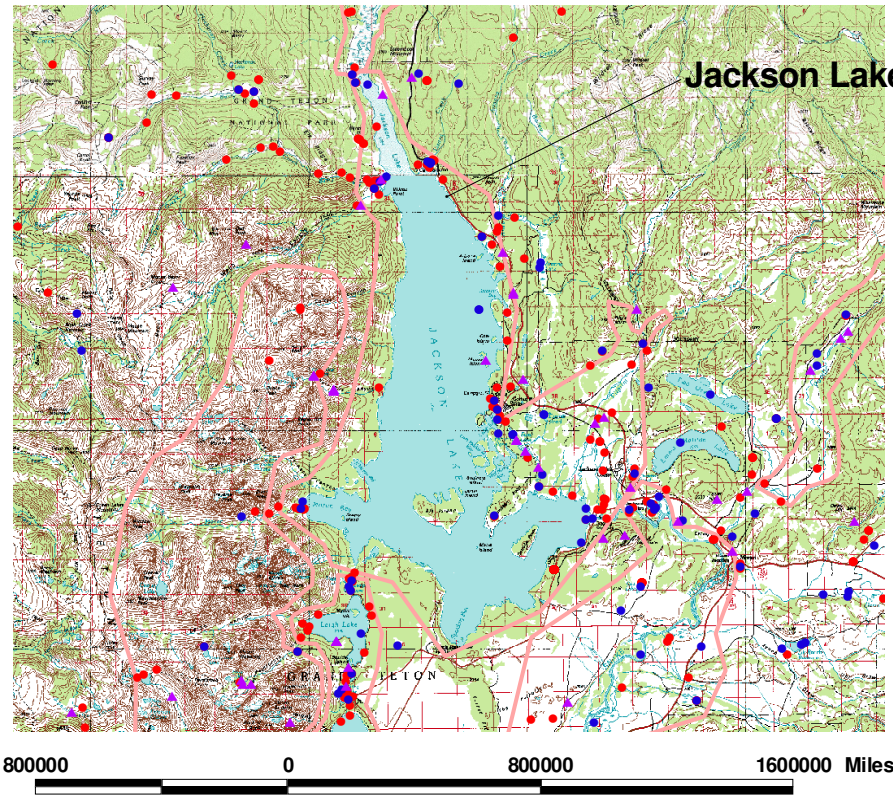
ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
AAABB01031*028*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABB01031*030*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABB01031*041*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABB01031*044*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABB01031*049*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABB01031*053*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABB01031*056*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABB01031*094*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABH01290*033*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
AAABH01290*044*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
AAABH01290*080*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
AAABH01290*100*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
ABNBA01030*017*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*020*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*101*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*102*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*116*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNFC01010*014*WY	PELECANUS ERYTHRORHYNCHOS	AMERICAN WHITE PELICAN	G3	S1B,SZ
ABNGA01020*005*WY	BOTAURUS LENTIGINOSUS	AMERICAN BITTERN	G4	S2B,SZ
ABNJB15010*003*WY	HISTRIONICUS HISTRIONICUS	HARLEQUIN DUCK	G4	S1B,SZ
ABNJB15010*012*WY	HISTRIONICUS HISTRIONICUS	HARLEQUIN DUCK	G4	S1B,SZ
ABNKC10010*013*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNKC10010*136*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNMK01030*002*WY	GRUS AMERICANA	WHOOPING CRANE	G1	S1N

ABNSB12040*007*WY	STRIX NEBULOSA	GREAT GRAY OWL	G5	S2
ABNSB12040*010*WY	STRIX NEBULOSA	GREAT GRAY OWL	G5	S2
AFCHA0208C*015*WY	ONCORHYNCHUS CLARKI SSP 2	FINE-SPOTTED SNAKE RIVER	G4T1T2	S1
PDAST4W1E0*002*WY	HIERACIUM SCOULERI	SCOULER HAWKWEED	G4G5	S1
PDAST8H400*001*WY	SENECIO HYDROPHILOIDES	SWEET MARSH BUTTERWEED	G5	S1
PDAST8U0L0*005*WY	STEPHANOMERIA FLUMINEA	TETON WIRE-LETTUCE	G2?	S2?
PDBRA110H0*006*WY	DRABA BOREALIS	BOREAL DRABA	G4	S2
PDPRI030A0*001*WY	DODECATHEON JEFFREYI	JEFFREY'S SHOOTING STAR	G5	S1
PDRAN0L0W0*002*WY	RANUNCULUS FLABELLARIS	YELLOW WATER-CROWFOOT	G5	SH
PDVIO041E0*003*WY	VIOLA ORBICULATA	WESTERN ROUGH-LEAVED VIOL	G4	S1
PMCYP033R0*001*WY	CAREX DIANDRA	LESSER PANICLED SEDGE	G5	S2
PMCYP037E0*001*WY	CAREX LEPTALEA	BRISTLY-STALK SEDGE	G5	S2
PMCYP09080*001*WY	ELEOCHARIS BELLA	DELICATE SPIKERUSH	G5	S1
PMCYP0A0E0*003*WY	ERIOPHORUM VIRIDICARINATU	GREEN KEELED COTTON-GRASS	G5	S1
PMJUN01150*006*WY	JUNCUS FILIFORMIS	THREAD RUSH	G5	S1
PMPOT03160*001*WY	POTAMOGETON ZOSTERIFORMIS	FLATSTEM PONDWEED	G5	S1
PPADI07030*003*WY	ASPIDOTIS DENSA	POD-FERN	G5	S1
PPMAR010B0*001*WY	MARSILEA VESTITA VAR OLIG	PEPPERWORT	G5	S1
PPMAR010B0*002*WY	MARSILEA VESTITA VAR OLIG	PEPPERWORT	G5	S1

Literature Cited:

Merrill, E.H., T.W. Kohley, and M.E. Herdendorf. 1996. Wyoming Gap Analysis terrestrial vertebrate species map atlas. Wyoming Cooperative Fish and Wildlife Unit, University of Wyoming, Laramie WY. 982 pp. in 2 volumes.

Jackson Lake



Site Basic Record
JENNY/LEIGH LAKES

Sitecode: S.USWYHP * 1437
Sitename: JENNY/LEIGH LAKES

Directions:
The site is in Jackson Hole, approximately 20 miles north of Jackson, at the foot of the Teton Range around Jenny and Leigh Lakes.

Site Description:
The site contains the two large montane lakes and the slopes around them. The vegetation (Merrill et al. 1996) is a mixture of lodgepole pine forest, spruce-fir forest, subalpine meadows, and mountain big sagebrush shrublands. Around Leigh Lake, the wet forests have rich undergrowths of rare ferns. The shrub Menziesia ferruginea may be important in undergrowth and represent a rare community type. Several organic wetlands provide habitat for Drosera anglica, Eriophorum gracile, Juncus filiformis, and other state rare species. Subalpine meadows are habitat for some G5/S1 peripheral plants.

Boundary Justification:
The site boundary was drawn to encompass the wetlands around Jenny and Leigh Lakes, to include the suitable habitat for the rare plants.

Biodiversity Significance:
B3

Biodiversity Comments:
The site contains an unusually high concentration of state rare plant species, most of which are common globally and reach the eastern or southern limit of their ranges here. As with other montane lakes and riparian areas in the area, this provides potential breeding habitat for globally secure but locally rare waterfowl, regionally declining amphibians, and cutthroat trout. It is one of the few places where boreal toads, columbia spotted frogs and leopard frogs have been identified in the same body of water, although the current status of these species is uncertain at this location.

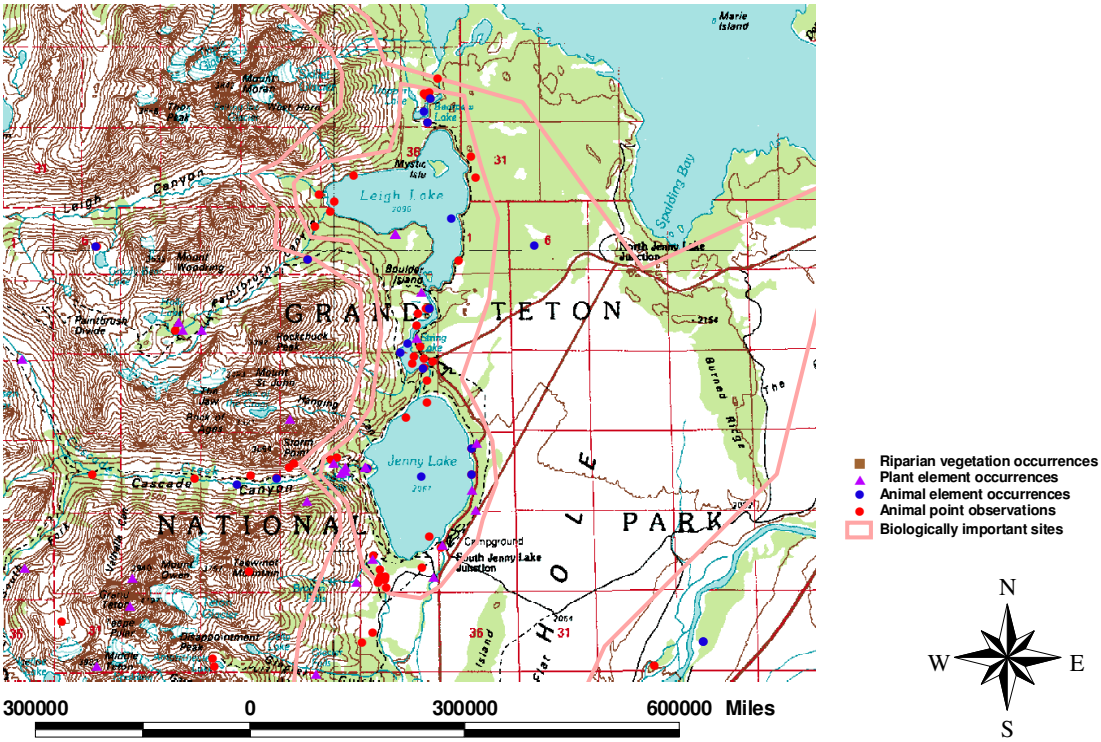
Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
AAABB01031*058*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABH01170*004*WY	RANA PIPIENS	NORTHERN LEOPARD FROG	G5	S3
AAABH01290*011*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
ABNBA01030*016*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*098*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*112*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*177*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
AFCHA0208C*013*WY	ONCORHYNCHUS CLARKI SSP 2	FINE-SPOTTED SNAKE RIVER	G4T1T2	S1
ARADA01010*012*WY	CHARINA BOTTAE	RUBBER BOA	G5	S2S3
PDCAR0X0B0*002*WY	STELLARIA CRISPA	CRIMPED STITCHWORT	G5	S1
PDDRO02010*002*WY	DROSERA ANGLICA	ENGLISH SUNDEW	G5	S2
PDLNT020D0*004*WY	UTRICULARIA MINOR	LESSER BLADDERWORT	G5	S1S2
PDORO04041*003*WY	OROBANCHE CORYMBOSA VAR C	FLAT-TOP BROOMRAPE	G4T4	S1
PDPAE01010*001*WY	PAEONIA BROWNII	BROWN'S PEONY	G5	S1
PDPAE01010*002*WY	PAEONIA BROWNII	BROWN'S PEONY	G5	S1
PDVIO041E0*002*WY	VIOLA ORBICULATA	WESTERN ROUGH-LEAVED VIOL	G4	S1
PMCYP036Y0*001*WY	CAREX LAEVICULMIS	SMOOTH-STEMMED SEDGE	G5	S1
PMCYP037E0*002*WY	CAREX LEPTALEA	BRISTLY-STALK SEDGE	G5	S2
PMCYP037E0*005*WY	CAREX LEPTALEA	BRISTLY-STALK SEDGE	G5	S2
PMCYP0A080*001*WY	ERIOPHORUM GRACILE	SLENDER COTTON-GRASS	G5	S1
PMJUN01150*002*WY	JUNCUS FILIFORMIS	THREAD RUSH	G5	S1
PMJUN01150*008*WY	JUNCUS FILIFORMIS	THREAD RUSH	G5	S1
PMLEM02010*001*WY	SPIRODELA POLYRRHIZA	COMMON WATER-FLAXSEED	G5	S1
PMORC1N050*004*WY	LISTERA CONVALLARIOIDES	BROAD-LEAVED TWAYBLADE	G5	S1
PPDRY0A0A0*002*WY	DRYOPTERIS EXPANSA	SPREADING WOODFERN	G5	S1
PPDRY0D030*001*WY	GYMNOCARPIUM DRYOPTERIS	OAK FERN	G5	S1

Literature Cited:

Merrill, E.H., T.W. Kohley, and M.E. Herdendorf. 1996. Wyoming Gap Analysis terrestrial vertebrate species map atlas. Wyoming Cooperative Fish and Wildlife Unit, University of Wyoming, Laramie WY. 982 pp. in 2 volumes.

Jenny/Leigh Lakes



Site Basic Record
PACIFIC CREEK

Sitecode: S.USWYHP * 1441
Sitename: PACIFIC CREEK

Directions:
Jackson Hole, Pacific Creek watershed, approximately 10 miles east of Jackson, WY.

Site Description:
This site includes Pacific Creek from Two Ocean Pass downstream nearly to its confluence with the Snake River. Landforms within the site are the alluvial valley bottom with gravelly stream floodplain and terraces, and the lower parts of the valley walls. The vegetation (Merrill et al. 1996) is a mix of subalpine meadows with lodgepole pine forest and mountain big sagebrush stands north of the stream, and subalpine meadows with spruce-fir forest south of the stream. Riparian shrub stands along Pacific Creek include an unusually diverse assemblage of willows, including the state rare Salix eriocephala var mackenzieana (S. prolixa).

Boundary Justification:
Boundary contains most of the Pacific Creek watershed.

Biodiversity Significance:
B3

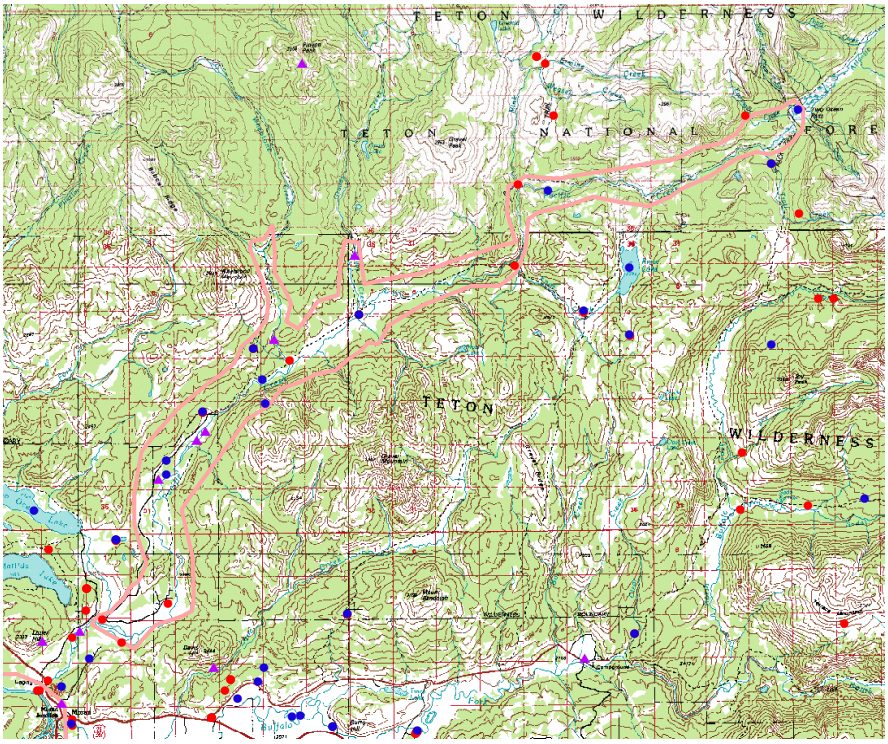
Biodiversity Comments:
Gravelly banks of the creek provide habitat for the locally endemic Stephanomeria fluminea (G2?) and for the regional endemic Heterotheca depressa (G3). Willow thickets along the bank include stands of Salix eriocephala var. mackenzieana, which is probably a state rare community type.

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
AAABB01031*072*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABB01031*100*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABH01290*016*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
AAABH01290*042*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
AAABH01290*105*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
ABNBA01030*037*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNKC01010*011*WY	PANDION HALIAETUS	OSPREY	G5	S3B,SZ
ABNYF07080*011*WY	PICOIDES TRIDACTYLUS	THREE-TOED WOODPECKER	G5	S3
AFCHA02087*001*WY	ONCORHYNCHUS CLARKI BOUVI	YELLOWSTONE CUTTHROAT TRO	G4T2	S2
AFCHA02087*063*WY	ONCORHYNCHUS CLARKI BOUVI	YELLOWSTONE CUTTHROAT TRO	G4T2	S2
AFCHA0208C*016*WY	ONCORHYNCHUS CLARKI SSP 2	FINE-SPOTTED SNAKE RIVER	G4T1T2	S1
PDAST4V0N1*001*WY	HETEROTHECA DEPRESSA	TETON GOLDEN-ASTER	G3	S2
PDAST4V0N1*005*WY	HETEROTHECA DEPRESSA	TETON GOLDEN-ASTER	G3	S2
PDAST8U0L0*003*WY	STEPHANOMERIA FLUMINEA	TETON WIRE-LETTUCE	G2?	S2?
PDAST8U0L0*004*WY	STEPHANOMERIA FLUMINEA	TETON WIRE-LETTUCE	G2?	S2?
PDSAL020Z1*003*WY	SALIX ERIOCEPHALA VAR MAC	MACKENZIE'S WILLOW	G5T4	S1

Literature Cited:
Merrill, E.H., T.W. Kohley, M.E. Herdendorf, W.A. Reiners, K.L. Driese, R.W. Marrs, and S.H. Anderson. 1996. The Wyoming gap analysis project final report. University of Wyoming, Laramie, WY. 109 pp. + appendices.

Pacific Creek



600000 0 600000 1200000 Miles

- Riparian vegetation occurrences
- Plant element occurrences
- Animal element occurrences
- Animal point observations
- Biologically important sites

N
W E
S

Site Basic Record
SHOSHONE LAKE

Sitecode: S.USWYHP * 1442
Sitename: SHOSHONE LAKE

Directions:
Yellowstone Plateau, Shoshone Lake, located 2-2.5 miles south of the road to Old Faithful, 4.5 miles west of West Thumb, and 2.5 miles northwest of Lewis Lake. Accessible via the DeLacy Creek Trail (from the Old Faithful Road) and the Grants Pass and Lewis Lake trails.

Site Description:
This site includes Shoshone Lake, a fringe of land around the lake, and several miles of two major streams that flow into the lake: DeLacy Creek north of the lake and Moose Creek to the south. The Shoshone Geyser Basin at the western end of Shoshone Lake also is within the site. The vegetation in the site includes a mix of herbaceous wetlands and forested wetlands at the western end of the lake and along the two major streams, and a band of lodgepole pine mixed with spruce-fir forest around the lake (Merrill et al. 1996).

Boundary Justification:
The boundary of this site encompasses the hydrologic basin of Shoshone Lake and includes segments of Shoshone and DeLacy creeks feeding into the lake and its outlet at the Lewis River. This boundary was selected to capture wetland habitats associated with the lakeshore that serve as foraging, breeding, and hibernating habitat for rare boreal amphibians and a series of thermal features in the Shoshone Geyser Basin that provide habitat for a suite of thermophilic plants.

Biodiversity Significance:
B3

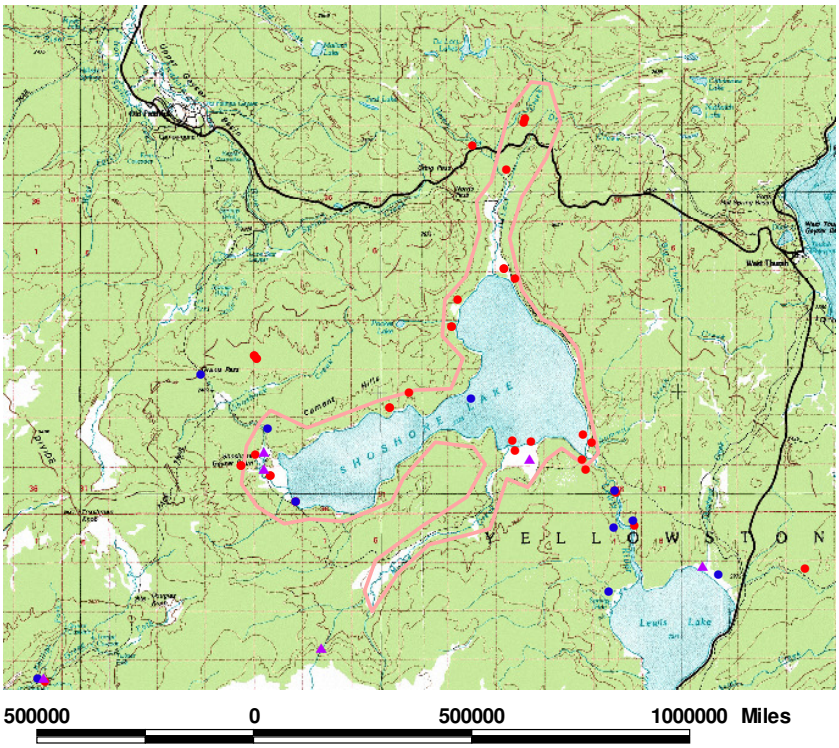
Biodiversity Comments:
This site contains habitat for a suite of thermal area-dependent plants (including the regionally endemic Juncus tweedyi, G3/S2), and wetland habitat for rare amphibians (Boreal toad and Spotted frog). The area also contains habitat for a number of wide-ranging vertebrates including lynx, gray wolf, wolverine, grizzly bear, and bison, but is probably too small to provide critical habitat for these species.

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
AAABB01031*051*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABH01290*047*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
AAABH01290*055*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
PMCYP090S2*006*WY	ELEOCHARIS FLAVESCENS VAR	WARM SPRINGS SPIKERUSH	G5T2T3	S2
PMJUN01310*003*WY	JUNCUS TWEEDYI	TWEEDY'S RUSH	G3Q	S2
PPOPH020B0*001*WY	OPHIOGLOSSUM VULGATUM	ADDER'S-TONGUE	G5	S1

Literature Cited:
Merrill, E.H., T.W. Kohley, M.E. Herdendorf, W.A. Reiners, K.L. Driese, R.W. Marrs, and S.H. Anderson. 1996. The Wyoming gap analysis project final report. University of Wyoming, Laramie, WY. 109 pp. + appendices.

Shoshone Lake



Site Basic Record
SNAKE RIVER FLOODPLAIN CORRIDOR

Sitecode: S.USWYFO * 366
Sitename: SNAKE RIVER FLOODPLAIN CORRIDOR

Directions:
Follow U.S. Highway 26-89-187-191 from Moran Junction south to Jackson, Wyoming. The site is the floodplain that is west of this highway. The northern-most point is where the Snake River flows out of Jackson Lake. The southern-most point is two miles north of the point where Porcupine Creek flows into the Snake River.

Site Description:
The site extends through Jackson Hole from Jackson Lake on the north, downstream along the Snake River to South Park, where the valley narrows. It includes the meandering and braided river channel and several terraces. The floodplain along the Snake River is dominated by narrowleaf cottonwood (Populus angustifolia), with some black cottonwood (P. trichocarpa) and hybrid cottonwood (P. x acuminata). Blue spruce (Picea pungens) is another common overstory tree that tends to increase in the absence of flooding due to the levees along the river. In most of the cottonwood woodland, the undergrowth is herbaceous meadow with patches of shrubs. Common shrubs are red osier dogwood (Cornus sericea), snowberry (Symphoricarpos sp.), hawthorn (Crataegus sp.), alder (Alnus sp.), buffaloberry (Shepherdia canadensis), chokecherry (Prunus virginiana), and common juniper (Juniperus communis). The common herbaceous species are redtop (Agrostis stolonifera), meadow timothy (Phleum pratense), and clovers (Trifolium sp.). Terraces above the river are dominated by mountain big sagebrush and grassland unless they have been converted to hayfields. The wide, braided nature of the Snake River lends itself to providing much habitat for waterfowl, songbirds, and birds of prey. The Snake River is an important corridor for the movement of the large elk herds that summer in the Yellowstone and Grand Teton National Parks and winter in Jackson Hole. Grizzly bears occasionally wander through this area and black bears are common. Moose, deer, ruffed and blue grouse, beaver, marten, mink, muskrat, badger, weasels, coyotes, porcupine, and bobcat have been routinely sighted in the area. The Snake River corridor has the highest density of wintering bald eagles in the state of Wyoming, as well as providing nesting habitat in the summer. Golden eagles are commonly seen year around. Peregrine falcons nest in the canyon south of this site, but use the site for foraging habitat. White pelicans and trumpeter swans nest nearby and possibly in the site.

Boundary Justification:
This site is designed to protect the riparian communities and the dependent wildlife species found in the riparian communities that exist along the floodplain corridor. The site was designed to include the floodplain portion of the Snake River which has a meandering, braided character and extends from Jackson Lake south to where the river narrows and enters Hoback Canyon.

Biodiversity Significance:
B3

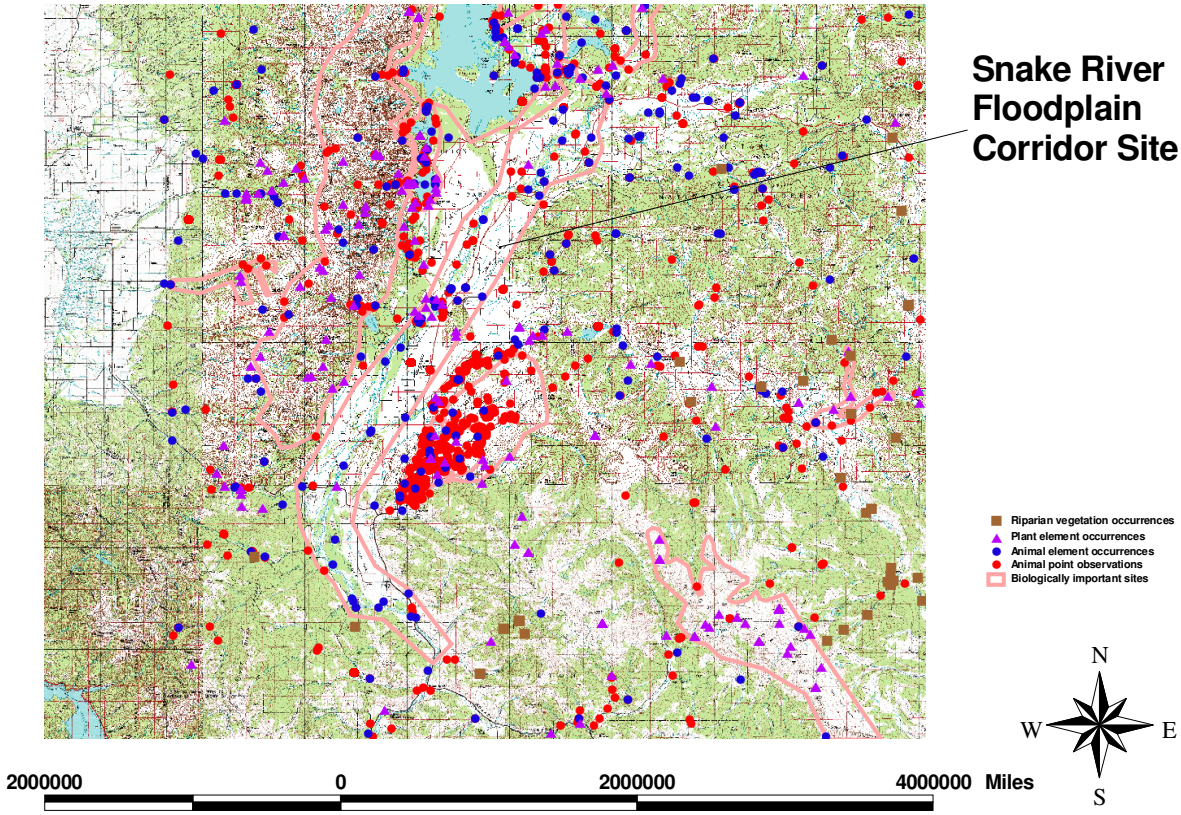
Biodiversity Comments:
The Snake River cooridor provides foraging habitat for senstive rapters such as peregrine falcon and bald eagle. While the falcons nest in nearby cliffs, bald eagles also nest along the river and winter here in high concentrations. The braided channels and flood plains provide potential breeding habitat for numerous globally secure but locally rare waterfowl, shore-birds, and riparian-obligate song birds as well as regionally declining amphibians. The fine spotted vareity of Yellowstone cuthroat trout can be found in the main river channel. The site includes habitat for several state rare plants, including three local or regional endemics adapted to gravelly floodplain terraces (Stephanomeria fluminea, Astragalus terminalis, and Heterotheca depressa). Numerous state rare peripheral plants also are found on adjacent upland meadows or ponds. Lesquerella carinata var carinata (G3G4T3) is found on calcareous slopes and mesas in the adjacent uplands. The future of the cottonwood woodland in much of the valley is doubtful because levees prevent floods from creating habitat for new cottonwood stands. On the landward sides of the levees, from which floodwaters are now excluded, the cottonwood woodland probably will be replaced by meadows or, in some areas, by shrub stands as the trees die. Spruces may become dense enough to form a woodland in some areas. Cottonwood groves will continue to grow between the levees on bars, but given the highly dynamic channel, most of these groves will be composed of saplings or small trees at best.

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
AAABB01031*060*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABB01031*132*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABH01170*005*WY	RANA PIPIENS	NORTHERN LEOPARD FROG	G5	S3
AAABH01290*003*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
AAABH01290*088*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
AAABH01290*095*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
ABNBA01030*019*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*100*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNJB02030*009*WY	CYGNUS BUCCINATOR	TRUMPETER SWAN	G4	S1B,S2
ABNJB02030*012*WY	CYGNUS BUCCINATOR	TRUMPETER SWAN	G4	S1B,S2
ABNJB02030*013*WY	CYGNUS BUCCINATOR	TRUMPETER SWAN	G4	S1B,S2
ABNJB15010*014*WY	HISTRIONICUS HISTRIONICUS	HARLEQUIN DUCK	G4	S1B,SZ
ABNKC01010*012*WY	PANDION HALIAETUS	OSPREY	G5	S3B,SZ
ABNKC10010*001*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNKC10010*007*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNKC10010*008*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNKC10010*012*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNKC10010*087*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNKC10010*096*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNKC10010*112*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNKC10010*129*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNKC10010*130*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNKC10010*132*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNKC10010*133*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNKC10010*134*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNNF07070*002*WY	NUMENIUS AMERICANUS	LONG-BILLED CURLEW	G5	S3B,SZ
ABNNF07070*003*WY	NUMENIUS AMERICANUS	LONG-BILLED CURLEW	G5	S3B,SZ
ABNNF07070*005*WY	NUMENIUS AMERICANUS	LONG-BILLED CURLEW	G5	S3B,SZ
ABNNF07070*043*WY	NUMENIUS AMERICANUS	LONG-BILLED CURLEW	G5	S3B,SZ
ABNSB01020*003*WY	OTUS FLAMMEOLUS	FLAMMULATED OWL	G4	SA?B
ABNSB12040*006*WY	STRIX NEBULOSA	GREAT GRAY OWL	G5	S2
ABNSB12040*008*WY	STRIX NEBULOSA	GREAT GRAY OWL	G5	S2
ABNSB12040*017*WY	STRIX NEBULOSA	GREAT GRAY OWL	G5	S2
AFCHA0208C*003*WY	ONCORHYNCHUS CLARKI SSP 2	FINE-SPOTTED SNAKE RIVER	G4T1T2	S1
AFCHA0208C*011*WY	ONCORHYNCHUS CLARKI SSP 2	FINE-SPOTTED SNAKE RIVER	G4T1T2	S1
AFCJC02070*004*WY	CATOSTOMUS DISCOBOLUS	BLUEHEAD SUCKER	G4	S2S3
AFCJC02070*015*WY	CATOSTOMUS DISCOBOLUS	BLUEHEAD SUCKER	G4	S2S3
AMACC05030*001*WY	LASIURUS CINEREUS	HOARY BAT	G5	S2B,SZ
AMACC05030*005*WY	LASIURUS CINEREUS	HOARY BAT	G5	S2B,SZ
AMAJF08010*002*WY	LUTRA CANADENSIS	RIVER OTTER	G5	S3
AMAJF08010*007*WY	LUTRA CANADENSIS	RIVER OTTER	G5	S3
AMAJF08010*009*WY	LUTRA CANADENSIS	RIVER OTTER	G5	S3
AMAJF08010*010*WY	LUTRA CANADENSIS	RIVER OTTER	G5	S3
AMAJH03010*165*WY	LYNX CANADENSIS	NORTH AMERICAN LYNX	G5	S1
ARADA01010*015*WY	CHARINA BOTTAE	RUBBER BOA	G5	S2S3
PDAST4V0N1*002*WY	HETEROTHECA DEPRESSA	TETON GOLDEN-ASTER	G3	S2
PDAST8U0L0*008*WY	STEPHANOMERIA FLUMINEA	TETON WIRE-LETTUCE	G2?	S2?
PDBRA1N0B2*004*WY	LESQUERELLA CARINATA VAR	KEELED BLADDERPOD	G3G4T3	S1
PDCRA0A1H0*002*WY	SEDUM STENOPETALUM	NARROW-PETAL STONECROP	G4G5	S1
PDFAB0F8U0*001*WY	ASTRAGALUS TERMINALIS	RAILHEAD MILKVETCH	G3	S1
PDFAB0F8U0*004*WY	ASTRAGALUS TERMINALIS	RAILHEAD MILKVETCH	G3	S1
PDFAB0F8U0*005*WY	ASTRAGALUS TERMINALIS	RAILHEAD MILKVETCH	G3	S1
PMCYP033E0*002*WY	CAREX CUSICKII	CUSICK'S SEDGE	G5	S1
PMPOA61031*001*WY	TORREYOCHLOA PALLIDA VAR	FERNALD ALKALI-GRASS	G5?T4Q	S1
PMPOT030C0*004*WY	POTAMOGETON FRIESII	FRIES PONDWEED	G4	S1

Literature Cited:
None

Snake River Floodplain Corridor



Site Basic Record
SWIFT CREEK

Sitecode: S.USWYFO * 29
Sitename: SWIFT CREEK

Directions:
The site is located ca 5 air miles east of Afton, WY. From the west, the site is accessible from the Swift Creek Road (USFS Road 10211). From U.S. Highway 89 in Afton, proceed east ca 6 miles on Swift Creek Road, following the signs to the Periodic Spring picnic area. Follow the trail approximately 0.75 miles to the eastern boundary of the RNA, which begins just beyond the point where a large tributary stream enters Swift Creek from the south (upstream from the flow from the Periodic Spring). From the southwest, the site is accessible from the trailhead at Dry Creek Lake. From Afton, proceed ca 3.5 miles south on US Highway 89 to Dry Creek Road (USFS Road 10079). Proceed 8.5 miles east on the Dry Creek Road to Dry Creek Lake. At the road's end, park and then follow the hiking trail north 1 mile over the ridge to Swift Creek Lake which is just inside the southwest boundary of the RNA.

Site Description:
The site is based on the RNA boundaries but actually extends farther up Swift Creek than the RNA. The site is located on the west slope of the Salt River Range and includes the drainage of Swift Creek from the Periodic Spring at ca. 7,100 feet elevation upstream to the high peaks (Mt. Fitzpatrick, 10,907 ft.) along the crest of the range. The upper (southern) part of the Swift Creek Valley is relatively broad and U-shaped, and the downstream (northern and western) part is narrowly V-shaped with steep valley walls. The vegetation at lower elevations is a mix of Douglas-fir woodlands and subalpine meadows on south-facing slopes, and lodgepole pine forest with spruce-fir forest on north-facing slopes. At higher elevations, the valley walls are vegetated with a mix of spruce-fir woodlands and meadows. Aspen forest grows in the central part of the site, and Engelmann spruce woodland forms a narrow band of riparian vegetation along Swift Creek.

Boundary Justification:
The boundary of the site primarily follows topographic features to include the upper drainage of Swift Creek. The boundary of the RNA does not include the upper reaches of Swift Creek.

Biodiversity Significance:
B3

Biodiversity Comments:
Swift Creek site provides known or potential habitat for six USFS Region 4 and Bridger-Teton NF Sensitive species and USFWS candidate species: boreal draba, Payson's bladderpod, North American lynx, northern goshawk, boreal owl, and the three-toed woodpecker. Most of these species are dependent on shady, coniferous forests or sparsely vegetated calcareous ridges with minimal disturbance. In addition, eleven state rare plant species occur in the site. Potential habitat may occur for seven state rare animal species. The Swift Creek RNA was selected to help fill gaps in the RNA system for Picea engelmannii/Galium triflorum, Abies lasiocarpa/Acer glabrum and A. lasiocarpa/Ribes montigenum coniferous forest habitat types. The RNA also protects several underrepresented forbland and riparian community types, including Salix boothii/Smilacina stellata, Mertensia ciliata, Arnica longifolia, and Heracleum lanatum-Rudbeckia occidentalis community types.

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
ABPBG09050*001*WY	TROGLODYTES TROGLODYTES	WINTER WREN	G5	S1B,SZ
PDAST0H0V0*021*WY	ANTENNARIA AROMATICA	AROMATIC PUSSYTOES	G4	S2S3
PDBRA1N190*024*WY	LESQUERELLA PAYSONII	PAYSON'S BLADDERPOD	G3	S3
PDFAB0F9X0*006*WY	ASTRAGALUS SHULTZIORUM	SHULTZ'S MILK-VETCH	G3Q	S3
PMCYP033Q2*003*WY	CAREX DEWEYANA VAR BOLAND	BOLANDER'S SEDGE	G5T5	S1

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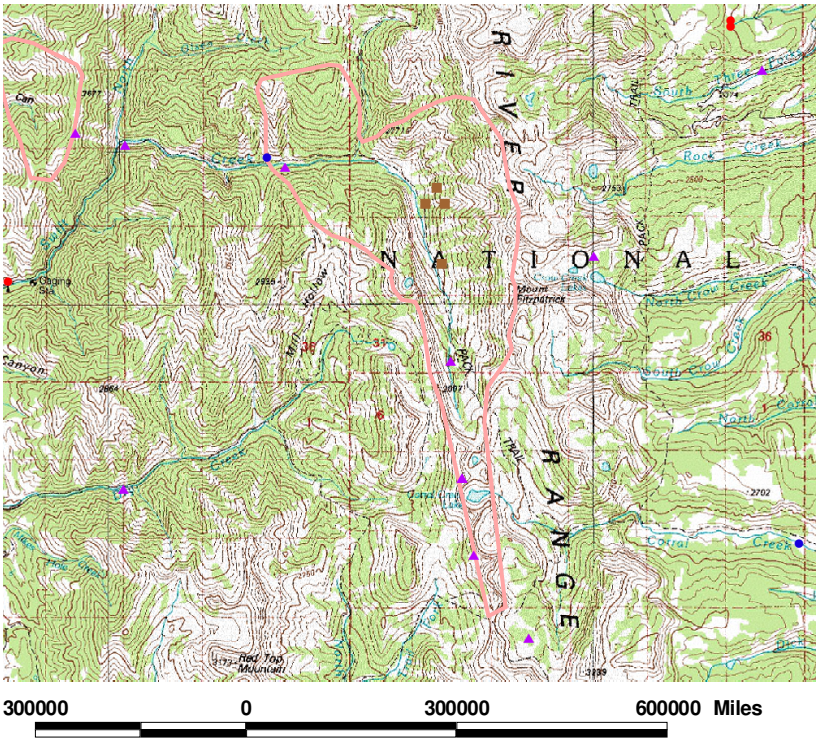
Swift Creek



- Riparian vegetation occurrences
- Plant element occurrences
- Animal element occurrences
- Animal point observations
- Biologically important sites

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S

Site Basic Record
UPPER SNAKE RIVER

Sitecode: S.USWYHP * 1443
Sitename: UPPER SNAKE RIVER

Directions:
Yellowstone Plateau, approximately 40 air miles north of Jackson, WY, Snake River, north of Jackson Lake.

Site Description:
This site includes the Snake River from the mouth of Red Creek downstream to Jackson Lake, the lower ca. 7 miles of Glade Creek, and the upland area between the two streams. The topographic features are the floodplains and stream terraces along the Snake River, Glade Creek, and other tributaries; the lower portions of the valley walls along these streams; and rolling volcanic uplands between the stream valleys. The Wyoming Gap Analysis Project (Merrill et al. 1996) has mapped the vegetation as a mixture of riparian shrublands and lodgepole pine forest in the larger stream valleys, with lodgepole pine forest and spruce-fir forest on the uplands between the Snake River and Glade Creek. Small areas of subalpine meadows grow mixed with lodgepole pine forest and with spruce-fir forest. Three areas of hot springs occur within the site, one in the eastern part and two in the east-central part.

Boundary Justification:
The boundary was drawn to incorporate the Upper Snake River, the lower reaches of its tributary streams, and associated wetlands that support amphibian and waterfowl populations.

Biodiversity Significance:
B3

Biodiversity Comments:
This site contains some thermal and riparian habitat for several state rare (but globally secure) plants at the eastern periphery of their range. This site contains recently confirmed breeding habitat for boreal toads and columbian spotted frogs, both sensitive montane amphibians which are found in wetland areas not necessarily associated with the river channel. As with many other riparian/wetland sites in the Snake River wathershed, this site contains potential breeding habitat for sensitive waterfowl (e.g., loons, trumpeter swans and harlequin ducks) and raptors (e.g., bald eagle). There are some old reports of river otter and potentially suitable habitat may still exist.

Element Occurrence Information:

ELCODE:	SNAME:	SCOMNAME:	GRANK:	SRANK:
AAABB01031*026*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABB01031*027*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABB01031*106*WY	BUFO BOREAS (NORTHERN ROC	WESTERN BOREAL TOAD	G4T4	S2
AAABH01290*078*WY	RANA LUTEIVENTRIS	COLUMBIA SPOTTED FROG	G4	S2S3
ABNBA01030*003*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNBA01030*106*WY	GAVIA IMMER	COMMON LOON	G5	S2B,SZ
ABNJB02030*021*WY	CYGNUS BUCCINATOR	TRUMPETER SWAN	G4	S1B,S2
ABNJB15010*009*WY	HISTRIONICUS HISTRIONICUS	HARLEQUIN DUCK	G4	S1B,SZ
ABNKC10010*125*WY	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4	S2B,S3
ABNSB15010*026*WY	AEGOLIUS FUNEREUS	BOREAL OWL	G5	S2
AMAJF08010*008*WY	LUTRA CANADENSIS	RIVER OTTER	G5	S3
AMAJF08010*013*WY	LUTRA CANADENSIS	RIVER OTTER	G5	S3
PDCRA0A1H0*003*WY	SEDUM STENOPETALUM	NARROW-PETAL STONECROP	G4G5	S1
PMCYP033E0*004*WY	CAREX CUSICKII	CUSICK'S SEDGE	G5	S1
PMCYP033E0*008*WY	CAREX CUSICKII	CUSICK'S SEDGE	G5	S1
PMCYP090S2*007*WY	ELEOCHARIS FLAVESCENS VAR	WARM SPRINGS SPIKERUSH	G5T2T3	S2
PMPOT030R0*002*WY	POTAMOGETON OBTUSIFOLIUS	BLUNT-LEAF PONDWEED	G5	S1

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Upper Snake River