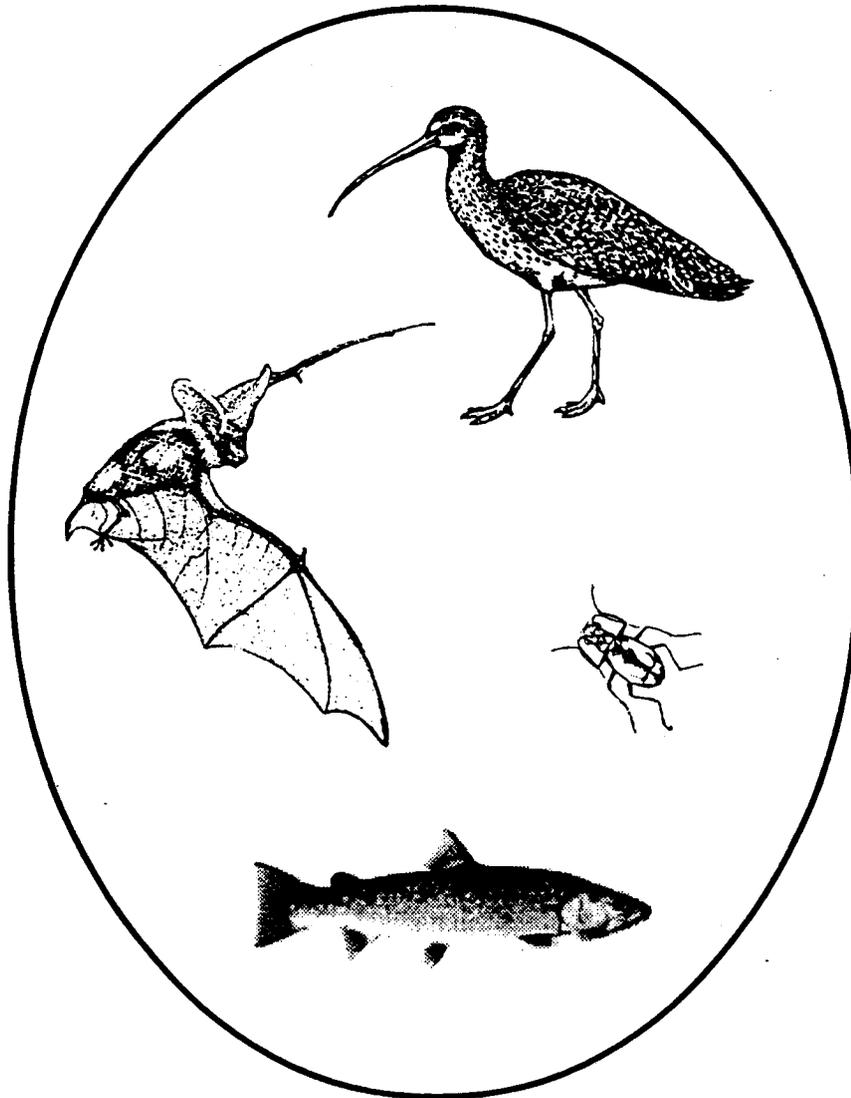


# Sensitive Animals of the Jarbidge Resource Area, Idaho

by  
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**SENSITIVE ANIMALS OF THE  
JARBIDGE RESOURCE AREA, IDAHO**

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## Introduction

The Bureau of Land Management under the policy established in BLM Manual (Section 6840) manages special status species. Section 6840 of the BLM Manual sets policy for managing threatened and endangered species as required by the Endangered Species Act. The 6480 section of the BLM Manual also authorizes the BLM State Offices to carry out management of the conservation of state listed plants and animals. State laws protecting species applies to all BLM programs and actions to the extent that they are consistent with the Federal Land Policy and Management Act (FLPMA).

In Idaho, the Idaho Chapter of the Wildlife Society, Idaho Herpetological Society, and Idaho Chapter of the American Fisheries Society make recommendations to the State of Idaho, Forest Service, Bureau of Land Management, Fish and Wildlife Service and other agencies regarding the local rarity, endangerment, and/or extirpation of fish, reptile, amphibian, bird and mammal species. In general the State Director adopts the recommendations of the these groups for the BLM's Sensitive Animal List.

Statewide, there are currently over 90 animal species on the various animal lists (Conservation Data Center 1994). In several instances the species have been listed by the Fish and Wildlife Service as threatened or endangered. Included in these species are the bald eagle, peregrin falcon, gray wolf, Bliss Rapids Snail, and others. A number of others are believed to have declining populations and may become locally extirpated (bull trout, wolverine, etc.) and others have either had severe habitat reduction (pygmy rabbit, California floater) or there is little information regarding the species presence, distribution or abundance in Idaho (kit fox, dark kangaroo mouse, and most bat species). The animal list is reviewed by the by the various scientific societies biannually and updated based on new information. In the Jarbidge Resource Area there are presently 40 animal species that are either present or are likely to be present.

The following are brief accounts of the sensitive animals in the Jarbidge Resource Area including technical references. I thank Jim Clark and Charlene Vullo for reviewing a draft of this document. Marilyn Hemker of the Boise Field Office of the Fish & Wildlife Service is thanked for assisting in the gathering of information in many of the Federal Registers.

## INVERTEBRATES

### Bliss Rapids Snail

Bliss Rapids snail (*Taylorconcha serpenticola*) was first collected live and recognized as a new species in 1959 (Fish & Wildlife Service 1992), but not formally described as a species until 1994 (Hershler et al. 1994). The Bliss Rapids snail is small (less than 0.1 inch; 2.5 mm) and is found primarily on cobbles and boulders in swift current in rapids or boulder bars below rapids (Taylor 1982d) or alcove springs and avoids surfaces with attached plants (Fish & Wildlife Service 1992). This snail consumes algae on rock surfaces primarily at night and is found on the along side or underneath of rocks during the day (Taylor 1985; Bowler 1990). Reproduction occurs in October through February with egg laying occurring within two months of breeding and the eggs hatch a month later (Fish & Wildlife Service 1992). Adult snails show a seasonal die-off after reproduction (Fish & Wildlife Service 1992). Bliss Rapids snail is the only member of this genus and is found only in the Snake River, Idaho. The Bliss Rapids snail appears to require cold, clean, well-oxygenated flowing water with low turbidity (Fish & Wildlife Service 1992). The historic distribution of Bliss Rapids snails was from near Indian Cove Bridge upstream to an area east of American Falls. Currently, Bliss Rapids snails are found in a few discontinuous areas in the Hagerman reach (Bliss Dam tailwaters to and Lower Salmon Dam tailwaters), a few unpolluted springs (Thousand Springs, Banbury Springs, Box Canyon Springs, and Niagara Springs), and one spring location on the Fort Hall Shoshone/Bannock Reservation near American Falls (Fish & Wildlife Service 1995a).

Bliss Rapids snails were first designated a candidate species in 1984 (Fish & Wildlife Service 1984). They were subsequently listed as "Threatened" in December 1992 (Fish & Wildlife Service 1992). Threats to Bliss Rapids snails were identified as proposed dam construction, peak loading, dewatering, and degraded water quality from irrigated agriculture (waste water containing fertilizers, herbicides and/or pesticides), run-off from feedlots and dairies, fish hatchery effluent, municipal sewage effluent and non-point discharges (Fish & Wildlife Service 1992). Bliss Rapids snails maybe impacted by cattle grazing and recreation at spring habitat, however, the Fish & Wildlife Service (1992) believed that trampling would likely produce minimal affects to spring habitat on the Fort Hall Reservation. BLM presently has no site specific inventory or monitoring data for this threatened species.

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### Bruneau Hot Springsnail

Bruneau hot springsnail (*Pyrgulopsis bruneauensis*) is a small (less than 0.25 inch; 5.5 mm) dark snail endemic to warm springs and seeps along a 5.5 mile reach of the Bruneau River in Idaho. The Bruneau hot springsnail reproduces best in water that is between 24 and 35oC (Mladenka 1992). Bruneau hot springsnails appear to be opportunistic grazers eating a variety of algae (Mladenka 1992). This species of springsnails were found on a variety of substrates including rock, sand, silt, and algae, however, eggs laid individually at any time of

the year are primarily on rock (Mladenka 1992). Bruneau hot springsnails are known to reside in several of the thermal springs and seeps along a short reach of the Bruneau River (Mladenka 1992).

Mladenka (1992) commented that cattle were a direct cause of mortality to the Bruneau hot springsnail because of trampling mature and juvenile snails. Mladenka (1992) was not able to show any impacts on the springsnail due to changes in water chemistry (increases in phosphorus and nitrate) that are typically by-products of livestock grazing in riparian areas. However, he noted that increased sedimentation may adversely impact Bruneau hot springsnail egg-laying habitat. The snail's habitat has diminished considerably in recent years because of agricultural-related groundwater mining in the area (Varricchione and Minshall 1994).

Bruneau Hot springsnails were first designated as a C2 species by the Fish & Wildlife Service in 1984. Bruneau hot springsnail was then listed as "Endangered" by the Fish and Wildlife Service (1993). Subsequent litigation resulted in the listing being revoked (Varricchione and Minshall 1994), however, an appellate court reinstated the "Endangered" status of this species. In the Jarbidge Resource Area a number of springs on the east side of the Bruneau River have been shown to have Bruneau hot springsnails. The distribution of habitat is somewhat greater on the west side of the Bruneau River in the Bruneau Resource Area. Some population data on this species exists and has been made possible by cooperative efforts between Idaho State University and the Boise District, BLM.

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## **Idaho Springsnail**

Idaho springsnail (*Pyrgulopsis idahoensis*) is a small (0.24 - 0.3 inches; 5 to 7 mm) fresh water snail that is found only in the flowing waters of the mainstem Snake River in Idaho. Taylor (1982a) commented that the Idaho springsnail was one of a few surviving snail species from the Pliocene Lake Idaho that covered parts of southwest Idaho and adjacent Oregon. Habitat for the Idaho springsnail includes mud or sand associated with gravel and boulders (Taylor 1982a) and is often attached to vegetation in riffles (Fish & Wildlife Service 1992). Idaho springsnails appear to require cold, clean, well-oxygenated flowing water with low turbidity (Fish & Wildlife Service 1992). Little is known about the life history of the Idaho springsnail but reproduction is by eggs laid in single capsules (Taylor 1982a).

Historically, the Idaho springsnail was found from Homedale upstream to Bancroft Springs, however, it has been extirpated from the headwaters of C.J. Strike Reservoir downstream to Homedale (Fish & Wildlife Service 1992). The current distribution is between Bancroft Springs and the headwater of C.J. Strike Reservoir in fragmented small populations a reduction of 80% of its historic range (Fish & Wildlife Service 1995a).

Idaho springsnail was first designated a candidate species in 1988 (Fish & Wildlife Serv. 1988). The Fish and Wildlife Service (1992) formally listed the Idaho springsnail as "Endangered" in the winter of 1992. Threats to this species were identified as proposed dam

construction, peak loading, dewatering, and degraded water quality from irrigated agriculture (waste water containing fertilizers, herbicides and/or pesticides), run-off from feedlots and dairies, fish hatchery effluent, municipal sewage effluent and non-point discharges.

No inventory or monitoring data for this endangered species has been or is currently being collected by the Bureau of Land Management. Some inventory has been conducted by Idaho Power Company in specific reaches of the Snake River at either existing dam sites or at proposed dam sites.

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### **Snake River Physa Snail**

Snake River physa snail (*Physa natricina*) is another small (0.3 inch; 5 to 7 mm) snail endemic to the Snake River in southern Idaho. The Snake River physa snail was first described as a species by Taylor (1988). It is the only large stream physa snail to be found in Idaho, most members of this genus are found in standing or slow moving water (Taylor 1982c). This species of snail requires cold, clean, well-oxygenated flowing water with low turbidity (Fish & Wildlife Service 1992). Snake River physa snails are found on the underside of gravel to boulder size rock in swift current at the margins of rapids (Fish & Wildlife Service 1992). Other life history information (reproduction, food habits, etc.) are largely unknown for this species (Fish & Wildlife Service 1992). The Snake River physa snail is a relict survivor from the Pleistocene that once occurred in lakes and streams in northern Utah and southeastern Idaho (Taylor 1982c).

In historical times the Snake River physa snail occurred from near Grandview upstream to the Hagerman area (Taylor 1988) and possibly up to near Minico Dam (Fish & Wildlife Service 1992). Presently, the Snake River physa snail is found in few scattered sites between King Hill and Hagerman with a potentially disjunct population near the Minidoka Dam (Fish & Wildlife Service 1992). Where this species is found it is uncommon (Fish & Wildlife Service 1995a)

Snake River physa snails were designated a candidate 2 species in 1984 (Fish & Wildlife Service 1984). This snail species was formally listed as "Endangered" in December 1992 (Fish & Wildlife Service 1992). Threats to this species were identified as proposed dam construction, peak loading, dewatering, and degraded water quality from irrigated agriculture (waste water containing fertilizers, herbicides and/or pesticides), run-off from feedlots and dairies, fish hatchery effluent, municipal sewage effluent and non-point discharges (Fish & Wildlife Service 1992). BLM lacks any inventory or site specific monitoring data for the endangered Snake River physa.

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### **Utah Valvata Snail**

Utah valvata snail (*Valvata utahensis*) is a small (less than 0.2 inches; 4.5 mm) snail that lives in deep pools near rapids and associated with large perennial spring complexes (Fish & Wildlife Service 1992). Utah valvata snails are found in mud, silts and fine sand substrates in slow current or with no perceptible current and submergent vegetation (Taylor 1985). Utah valvata snails feed primarily on detritus, but are known to graze on diatoms and algae on rocks and macrophytes (Fish & Wildlife Service 1992). Utah valvata snails also require cold, clean, well-oxygenated flowing water with low turbidity (Fish & Wildlife Service 1992). Little is known about the life history of the Idaho springsnail (Taylor 1982b). Fossil evidence suggests that the Utah valvata snail is a relict species that was once much wide spread during the Pleistocene (Taylor 1982b).

Historically, it was found from American Falls downstream to the Grandview area as well as Utah Lake, Utah (Fish & Wildlife Service 1995a). The current distribution now includes a few sites in the Hagerman Valley and scattered locations near Eagle Rock and Burley with the Utah population believed to be extirpated (Fish & Wildlife Service 1995a). The aquatic plant Chara is a common associate of the Utah valvata snail (Fish & Wildlife Service 1995a).

This species was first designated a candidate species in 1984 (Fish & Wildlife Service 1984). Utah valvata snails were formally listed as "Endangered" in December 1992 (Fish & Wildlife Service 1992). Threats to this species were identified as proposed dam construction, peak loading, dewatering, and degraded water quality from irrigated agriculture (waste water containing fertilizers, herbicides and/or pesticides), run-off from feedlots and dairies, fish hatchery effluent, municipal sewage effluent and non-point discharges (Fish & Wildlife Service 1992). Because Utah valvata snails occupy habitat with emergent vegetation and low flows, they could potentially be impacted by livestock grazing or watering from springs and at the waters edge. BLM lacks any inventory or site specific monitoring data for the endangered Snake River physa.

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## California Floater

California floater (*Anodonta californiensis*) is a freshwater mussel (Fish & Wildlife Service 1991) mature adults can reach a fairly large size 6 to 9 inches (150 to 225 mm) in length. The California floater is a clam like mollusk in a genus with 10 other species (Pennak 1989). California floaters are broadcast spawners that have a larval form and an adult form. Larval forms appear to be ecto-parasites on fish for 3 - 6 weeks (Frest pers. comm.). Larva of other species in the genus Anodonta use salmon and stickleback as the host fish (Fish & Wildlife Service 1995a). The host fish for the California floater has not been identified (Fish & Wildlife Service 1995a). The larvae then undergo metamorphosis and become small mussels, less than 0.1 inch (1.5 mm) in length (Frest pers. comm.). Growth is fairly rapid for this thin-shelled mussel (Fish & Wildlife Service 1995a) and the hinge lacks any teeth (Pennak 1989). This species is long lived, reaching 20 years of age (Fish & Wildlife Service 1995). Following metamorphosis, the mussel then becomes an obligate filter feed (Frest pers.

comm.). California floaters are usually found in sand and fine gravels, but have been observed in cobble/boulder as well as silt substrates (Frest pers. comm.). It is a relatively sessile mussel and exposes 1/3 to 1/2 of the shell from the substrate and typically has the anterior margin oriented upstream (Fish & Wildlife Service 1995a). This mussel can survive several months without feeding, however, it can not survive anaerobic conditions (Frest pers. comm.).

California floater has a number of disjunct populations in the western United States and is found in large streams and rivers (Frest 1994). Populations in parts of Utah and Nevada have been extirpated, while a few isolated populations remain in Arizona, California, Oregon and Washington (Frest pers. comm.). Frest (1994) stated that the California floater can survive in the slack water of reservoirs if the water is clean and cold. Threats to the California floater have been identified as water quality, loss of habitat, habitat fragmentation, grazing, agricultural chemicals, and energy development.

Although there is some known about the distribution of this species in Idaho, little is known about the habitat requirements of this species. Frest and Bowler (1992) found that this species can still be found at scattered locations between Bliss and Alkali Creek in the middle Snake River. Frest (pers. comm.) has found that the distribution in this reach is very patchy. As recently as 1994 California floaters had been categorized as C2 species by the Fish & Wildlife Service (1994a). Idaho BLM does not have any site specific information regarding the presence or abundance of this species.

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### **Columbia Pebblesnail**

Columbia pebblesnail (*Fluminicola columbianus*) is small (0.4 inch; 8 mm) freshwater snail that is restricted to large rivers (Taylor 1982e). Eggs are laid in single capsules that may remain as horny rims on the shell of the adult (Taylor 1982e). Habitat use, food habits and other basic biological information for this species are unknown. Its historic distribution included the Columbia, Snake, and lower Payette Rivers. Taylor (1982e) reported that the Columbia pebblesnail is a relict of old Lake Idaho from the late Miocene when it was more wide spread in southwest Idaho and southeast Oregon. Taylor (1982e) believed that Idaho populations had been extirpated, however, Neitzel and Frest (1990) documented Columbia pebblesnail in 15 locations including the Snake River in Idaho and in the middle Snake River (Frest and Bowler 1992). Life history and specific habitat requirements for the Columbia pebblesnail are not well defined. It is known that the Columbia pebblesnail is an obligate grazer on diatoms and other small attached algae.

Information regarding the distribution of the Columbia pebblesnail in the Snake River in Idaho is lacking. Frest and Bowler (1992) stated that the only remaining Columbia pebblesnail in the middle Snake River was in the reach between Lower Salmon Dam and the tail waters of Bliss Dam. A landslide in the lower portion of this reach may have affected this population.

Columbia pebblesnails were designated as a candidate species in the 1980's and remained a C2 as recently as 1994 (Fish & Wildlife Service 1994a). The Bureau of Land Management has not inventoried the Snake River for this species or any of the candidate mollusk species. Presently, the Jarbidge Resource Area has limited data on the distribution and no information on the abundance of any of these candidate species. Threats to candidate mollusc species likely include water quality (temperature, nutrients, siltation, and agricultural chemicals), water quantity from the continued development of deep wells into the Snake River Plains aquifer, and habitat fragmentation.

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### **Short-face Lanx**

Short-face lanx (*Fisherola nuttalli*) is an oval outlined, limpet-shaped, freshwater, mollusk about 0.5 inches (13 mm) in diameter (Taylor 1982f). Shortface lanx lives in steady or strong current where it is found on the lower surfaces of large rocks (Taylor 1985). It is found in rapids and boulder bars below rapids (Taylor 1982f) in large rivers or in large springs (Taylor 1985). Shortface lanx deposit 7-8 eggs in a jelly-like mass on the lower surfaces of rocks (Taylor 1982f). Taylor (1982f) speculated that food is organic film on rocks, but algae or silt-coated surfaces would be unsuitable because of the grip on the rock would be impossible. Shortface lanx have neither a lung nor gill but absorb oxygen from a vascularized mantle bordering the foot, therefore water with high amounts of dissolved oxygen are required (Taylor 1982f).

The historic distribution of this species is from the Rupert Area down stream to near King Hill in Idaho as well as major rivers in Washington and Oregon. The southern Idaho population is disjunct (Taylor 1982f) from the populations in the Hells Canyon, Salmon River and Columbia Rivers (Neitzel and Frest 1990). The numerous dams on the Snake and Columbia Rivers has further fragmented habitat. The Fish & Wildlife Service (1991) had classified this species as a 3c candidate species, but because of new information dropped it from the candidate species list by 1994. Like the other Snake River mollusks, the BLM lacks any specific inventory or monitoring data.

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### **Idaho Dunes Tiger Beetle**

Idaho dunes tiger beetle (*Cicindela arenicola*) is a predatory insect that occupies some habitats with sand dunes and sandy soils. Idaho dunes tiger beetles are about 0.75 inches long and the wing coverings have both tan and dark brown markings. Two color phases (metallic green or metallic copper) are present based on the coloration of the head and thorax (Shook and Clark 1988). The Idaho dunes tiger beetle has a wide distribution from the St. Anthony dunes in eastern Idaho (Bauer 1991), to several locations along the Snake River plains (Makela 1994; Logan 1995) to the Bruneau Dunes State Park. Shook (1984) noted that this species of tiger beetle is endemic to Idaho. Shook and Clark (1988) found that adult tiger beetles are

active in both the spring (April - May) and fall (September and October). Bauer (1991) reported that it may take 3.5 to 4 years for the Idaho dunes tiger beetle to develop from egg to adult. Mating and egg-laying occur during the spring (April and May). Larvae habitat is usually the sparsely vegetated flat areas with coarser material between dunes (Baker et al. 1994). Eggs may hatch in the fall or overwinter and then hatch in the spring (Baker pers. comm.). Bauer (1991) found that the larvae form tubes in the sand from which the larval tiger beetles capture other insects walking adjacent to their burrow. The diameter of the burrows indicate the size of Idaho tiger beetle larvae (Baker et al. 1994). Bauer (1991) also found that as the diameter increased, the burrow deepened to about 20 inches (0.5 m) and may be an adaption for survival allowing the larvae to retreat into more moist layers during the summer. Adult Idaho dunes tiger beetles forage on other insects. Adults burrow into sand dunes during the evening, to escape the heat of the day and to avoid windy, cloudy, or rainy weather (Bauer 1991). Based on laboratory experiments Baker (pers. comm.) found adult Idaho dunes tiger beetles lived over the winter and he believes some may be able to overwinter in nature.

Shook and Clark (1988) reported that populations of Idaho dunes tiger beetle at several historical locations appear to have been extirpated. Shook and Clark (1988) reported that off-road vehicles may be a threat to larval habitat, whereas, Bauer (1991) found that livestock trampling of larval burrows caused mortality. Shook and Clark (1988) also reported that commercial collecting may be a threat to the Bruneau population. There has been some discussion regarding whether or not the population of dunes tiger beetle in the Bruneau Dunes area is a separate species from those found in the St. Anthony area (Shook and Clark 1988).

The Fish and Wildlife Service has rated the Idaho dunes tiger beetle as a C2 species since 1984 (Fish & Wildlife Service 1984). As recently as 1994, the Fish & Wildlife Service (1994a) had retained the Idaho Dunes tiger beetle as a C2 species. In the Jarbidge Resource Area the Idaho Dunes tiger beetle is known to occur in two general locations. One location is adjacent to Bruneau Dunes State Park, the second location is several miles south of Indian Cove. A cooperative project with Boise State University has collected some inventory and monitoring data of Idaho dunes tiger beetles in these areas.



## FISH

### Bull Trout

Bull trout (*Salvelinus confluentus*) is a species of char (Cavender 1978) that was once believed to be the same species as the Dolly Varden (*Salvelinus malma*). Bull trout reach maturity from 4 to 7 years (Simpson and Wallace 1982; Fraley and Shepard 1989). Spawning occurs in September and October in cold headwater streams with clean gravel or rubble bottoms (Simpson and Wallace 1982). The young remain in headwater streams until they are two years old or more. At this point the fish either remain as resident fish or become migratory moving into larger rivers or lakes (Reiman and McIntyre 1993).

Bull trout are still widely scattered over portions of their historic range. However, several of the populations have become fragmented due to dams. Within specific watersheds impacts from, logging, roads and grazing have all had an adverse effect on bull trout habitat. Populations of bull trout appear to be best in areas that have not received much development. Historically, bull trout were found in much of Idaho including the Jarbidge River and Salmon Falls Creek, however, none have been reported since the 1960's (Warren and Partridge 1995).

In the Jarbidge Resource Area, bull trout are known to occur only in the Jarbidge River Basin. This population of bull trout is physically barred from any other populations by numerous dams on the Snake River. They have been documented in several of the tributaries and all of the spawning habitat is likely on lands administered by the Humboldt National Forest (Johnson 1990, Johnson and Weller 1994). Specific drainages where bull trout have been documented include Jack Creek, Dave Creek, Slide Creek, Fall Creek and the Jarbidge River (Nevada) (Johnson and Weller 1994). Bull trout have not been documented downstream the confluence of the East Fork Jarbidge and Jarbidge Rivers (Warren and Partridge 1993; Zoellick et al. 1995), however, this river habitat may be used during the late fall through spring before temperatures rise above the tolerance of bull trout.

Currently, the bull trout is classified as a Candidate species by the Fish & Wildlife Service (1996). Threats to bull trout in the Jarbidge River system include sediment from roads and possible impacts of increased sedimentation from summer long grazing in some riparian areas. Impacts from old mines in the Jarbidge drainage to bull trout or its habitat are not known. Another potential effect to bull trout has been the introduction of brook trout to some areas. Brook trout may compete for spawning areas or hybridize with bull trout. Whirling disease is suspected of being present in the Jarbidge River (Warren pers. comm.). The impact of whirling disease on bull trout is not known, but may be similar to its impact on other native trout. Whirling disease has severely reduced trout populations a few rivers in Montana and Wyoming.

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## **Interior Redband Trout**

Interior redband trout (*Oncorhynchus mykiss gibbsi*) are believed to be a subspecies of rainbow trout, however, there is some question to the validity of this classification (Fish & Wildlife Service 1995b). The Fish & Wildlife Service lists the scientific name of interior redband trout as (*O. m. gibbsi*) in 1994, but as (*O. m. gairdneri*) in 1995 (Fish & Wildlife Service 1994a and 1995b). Interior redband trout are reported to tolerate high water temperatures and low dissolved oxygen levels (Behnke 1992; Vinson and Levesque 1994) in the desert environment that would be fatal to other rainbow trout. In many drainages costal rainbow (*O. m. irideus*) have been stocked into rivers containing redband trout. Costal rainbow are the most common trout raised in hatcheries. Redband trout have larger and sparser more-elliptical blotches (parr marks) on their sides, with narrower and brighter coloration (orange/red) along lateral line (stripe along the side of the fish) and hatchery trout lack parr marks and have a broader more pink lateral stripe on their more silvery side (Allen et al. 1995) and frequently have had one or more fins clipped. The fins of redband trout are light colored on the tips of the dorsal, anal, and pelvic fins (Fish & Wildlife Service 1995a). Simpson and Wallace (1982) report that rainbow trout reach sexual maturity in 2-3 years. Wild trout spawn in the spring (March to June) and use gravel riffles of small tributaries (Simpson and Wallace 1982). The eggs hatch in 4 - 7 weeks and the young then move to pool areas (Wallace and Simpson 1982). Young trout feed primarily on insects, larvae, or other invertebrates, adult trout consume other fish as well as insects.

Redband trout are the most widely distributed gamefish in the desert areas of southern Idaho and eastern Oregon. Vinson and Levesque (1994) documented redband trout tolerating water temperatures of 18.5oC and dissolved oxygen readings as low as 1.6 mg/L. Warren and Partridge (1993) stated that redband trout were observed to be stressed and a few were dying when water temperatures reached 25oC; data on dissolved oxygen were not collected. Warren and Partridge (1992) also recorded a maximum water temperature of 26oC in the Jarbidge River in August 1992, a drought year. In the Jarbidge Resource Area what are believed to be redband trout are known to be present in several drainages including Bruneau River, East Fork of the Jarbidge River, Jarbidge River, Dave Creek (Zoellick et al. 1995), Three Creek, Big Flat Creek, Deadwood Creek, Deer Creek, Cedar Creek, Bear Creek, Shack Creek, and North Fork Salmon Falls Creek (Bur. Land Manage. unpubl. data). Native trout were found in Salmon Falls Creek below Salmon Falls Creek Dam (Warren and Partridge 1995); these may have been redband trout.

Interior redband trout had been categorized as a C2 in 1994 by the Fish & Wildlife Service (1994a). Threats to redband trout in the Jarbidge Resource Area are dewatering of streams on private lands, increased water temperature due to the lack of shade and increased siltation of gravel from agricultural return water and heavy grazing in riparian zones. Warren and Partridge (1995) observed what may be whirling disease in redband trout in Salmon Falls Creek. Impacts of this disease on redband trout have not been documented, but could be devastating to the trout population in this drainage.

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## **Leatherside Chub**

Leatherside chub (*Gila copei*) is a small (1.5-5 inch; 38 to 110 mm) member of the cyprinid family (carp/minnow) (Simpson and Wallace 1982; Johnson et al. 1995). The leatherside chub has a short rounded head, large eyes with the back dark bluish or greenish gray, and silvery below (Simpson and Wallace 1982). Males have an orange hue on the lower sides, lower lobe of the caudal fin and the base of the anal fin (Simpson and Wallace 1982). Johnson et al. (1995) reported that leatherside chubs grow rapidly for their first two years then as they become reproductively mature growth slows. Most leatherside chubs appear to reach maturity in two years and are approximately 2.25 inches (58 mm) in size. Leatherside chubs are believed to spawn in the summer (Simpson and Wallace 1982), but their life history is poorly documented. Johnson et al. (1995) reported that the peak of spawning for leatherside chubs occurs in May in central Utah. Johnson et al. (1995) commented that temperature may influence the onset of spawning resulting in leatherside chubs spawning a different times in other geographic areas. In the wild leatherside chubs may reach 8 years in age (Johnson et al. 1995). Simpson and Wallace (1982) reported that leatherside chubs are found in cool clear streams and prefers pools to riffles.

Leatherside chub was rumored to be in Salmon Falls Creek, however, it was not detected in surveys conducted by the Idaho Department of Fish & Game (Warren and Partridge 1995). Simpson and Wallace (1982) report that leatherside chub occur in Trapper Creek upstream of Shoshone Falls. Warren and Partridge (1995) commented that historically leatherside chub may not have occurred in Salmon Falls Creek.

The Fish & Wildlife Service (1994a) had rated the leatherside chub as a C2 species in 1994. Threats to the leatherside chub are not documented by may include impacts from heavy grazing in riparian areas, dewatering creeks, and the introduction of non-native fish. If leatherside chub is in Salmon Falls Creek, it is unknown if whirling disease would impact this species.

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## **Shoshone Sculpin**

Shoshone sculpin (*Cottus greenei*) is a small member of the family Cottidae (sculpins) that is endemic to the springs in the Hagerman Valley/Thousand Springs area and a few immediate tributaries of the Snake River in Idaho (Wallace et al. 1984). Shoshone sculpin are about 3.5 to 4.0 inches (9 to 10 cm) in length and are known to live up to 3 years (Griffith and Daley 1984). They become reproductively mature at one year of age (Fish & Wildlife Service 1995a). Eggs are laid on rocky substrates with spawning occurring in May through July (Fish & Wildlife Service 1995a). There is some evidence that female sculpin may spawn more than once a year (Fish & Wildlife Service 1995a). In the Shoshone sculpin like other sculpins, the fins have true spines (although not stiff and sharp) and soft rays, fan shaped pectoral fins, a large somewhat flattened head with the eyes located on top (Simpson and Wallace 1982). The diet of Shoshone sculpin consists of aquatic insects and plankton (Griffith and Daley

1984) and their habitat is nearly restricted to cool (16°C), clear, well oxygenated water with low velocity and abundant gravel, rock, and aquatic vegetation. The much more common and widely distributed mottled sculpin (*C. bairdi*) is sympatric (occurs in the same habitat) with Shoshone sculpin in several locations and is known to eat Shoshone sculpin (Griffith and Daley 1984).

In the Jarbidge Resource Area, Shoshone sculpin has been documented only in one area. The location is in a spring on private land upstream of Bliss Bridge (Griffith and Daley 1984). The majority of the Shoshone sculpin locations are on the north bank of the Snake River, primarily on private property. However, a population of Shoshone sculpin in Box Canyon is on lands administered by the Shoshone Field Office of the Bureau of Land Management. Threats to Shoshone sculpin are increases in water temperature, increases in nutrients, and diversion of water or the development of springs.

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## White Sturgeon

White Sturgeon (*Acipenser transmontanus*) is a large anadromous fish that inhabits large river systems (McCabe et al. 1993). Sturgeon are distinguished from all other fish in that they have a cartilaginous skeleton with a persistent notochord (Fish & Wildlife Service 1994b). The toothless tube-like mouth is positioned on the underside of the elongated head and there are four sensory barbels (whiskers) on the underside of the snout (Simpson and Wallace 1982). The white sturgeon is the largest freshwater or anadromous fish in North America (Fish & Wildlife Service 1995a). As a result of dam building on the Columbia and Snake Rivers several populations have become landlocked (McCabe et al. 1993). Landlocked populations of white sturgeon tend to be smaller (Fish & Wildlife Service 1994b). White sturgeon are long lived and may reach 30 to 70 or more years in age (Fish & Wildlife Service 1994b and 1995a). Sexual maturity occurs sometime between 10-15 years of age and breeding usually takes place in May and June (Simpson and Wallace 1982). Only a portion of the mature individuals spawn and for females the interval between spawning ranges from 2 to 11 years (Fish & Wildlife Service 1995a). Eggs are laid over rocky substrates in swift current typically near rapids where the sticky eggs adhere to the bottom (Simpson and Wallace 1982). Young sturgeon feed on a variety of benthic (bottom dwelling) invertebrates (McCabe et al. 1993), the diets of adults is a little more varied and includes fish, vegetation, and detritus (Simpson and Wallace 1982).

The Kootenai River population has been designated as an endangered species (Fish & Wildlife Service 1994b), but the Bureau of Land Management regards this species as Sensitive throughout Idaho due to habitat fragmentation. Other rivers in Idaho where white sturgeon are found include the Salmon River and Snake River. Dams along the Snake River have blocked migration routes for white sturgeon. In the Jarbidge Resource Area white sturgeon are found between C.J. Strike Reservoir and Bliss Dam. This population seems to be reproducing itself and may be the most viable population above Brownlee Dam (Fish & Wildlife Service 1995a). There are white sturgeon between Bliss Dam and Lower

Salmon Dam and between Lower Salmon Dam and Upper Salmon Dam, however, these populations are not believed to be reproductively viable (Fish & Wildlife Service 1995a).

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## AMPHIBIANS

### Northern Leopard Frog

The northern leopard frog (*Rana pipiens*) are medium sized 3 to 4 inches (80 to 100 mm snout to vent length) frogs with numerous dark blotches surrounded by a light border on a green to brown background color with a light belly (Groves 1989). The blotches are on the back, down the sides and the dorsal surface of the legs (Groves 1989). A circular ear is located behind the eye and somewhat smaller than the eye (Nussbaum et al. 1983). Leopard frogs breed soon after ice and snow disappear, March - April, or when the water reaches 10oC (Nussbaum et al. 1983). The females lay masses of eggs in flattened spheres attached to underwater vegetation in shallow water. Egg and tadpole development vary with water temperature, but tadpoles are believed to metamorphose in over two months (Nussbaum et al. 1983) with maturity reached in 2 to 3 years. Northern leopard frogs prefer marshes, ponds and other quiet water with considerable aquatic vegetation, whereas, larval habitat usually has cattail or sedge marshes, weedy ponds or wetlands (Nussbaum et al. 1983).

Nussbaum et al. (1983) shows the distribution of northern leopard frogs were found in major river valleys in southern Idaho. Munger et al. (1996) did not detect any leopard frogs in the Owyhee Mountains of southwest Idaho. Northern leopard frogs were found historically in Salmon Falls Creek and the Bruneau River near Hot Creek (McDonald and Marsh 1995). Scouring floods in spring of 1984 may be responsible for the loss of leopard frogs from Salmon Falls Creek, but does not account for the decline in other areas. Northern leopard frogs are categorized as sensitive by the Bureau of Land Management and a species of special concern by the Idaho Department of Fish and Game (Conservation Data Center 1994).

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### Spotted Frog

Spotted Frog (*Rana pretiosa*) is a medium sized, highly aquatic frog 3 to 4 inches in length (68 to 100 mm snout to vent length) (Nussbaum et al. 1983). Females are larger than males (Nussbaum et al. 1983). Spotted frogs have large-light centered dark dorsal spots with indistinct edges on an light brown to brown background skin (Groves 1989), full webbing between the hind toes, and yellowish to orange color on the lower belly and underside of the hind legs near the belly (Nussbaum et al. 1983). Little is known about the biology of spotted frogs in southern Idaho. However, in Washington and British Columbia male spotted frogs arrive at breedings sites in February (Nussbaum et al. 1983). Nussbaum et al. (1983) females lay eggs in free floating rounded masses in March - June and several females may lay egg masses in communal clusters. The development of eggs and tadpoles is dependent upon water temperature, Nussbaum et al. (1983) speculates that the metamorphosis from tadpole to adult

form probably occurs the following spring. Mature frogs eat a variety of insects, mollusks, crustaceans, and other invertebrates (Turner 1959). Nussbaum et al. (1983) reported that spotted frog habitat includes marshy edges of ponds, lakes, and slow moving streams. In southwest Idaho Munger et al. (1994) observed that adult spotted frogs used creeks with slow water, oxbows, and ponds and generally were found at sites with sandy bottoms and submerged vegetation. Munger et al. (1996) found that larval habitat has mud bottoms, warmer water temperature, and some hiding cover.

Spotted frogs are currently designated as a candidate species (information indicates that listing as threatened or endangered would be appropriate) south of the Snake River with a downward trend (Fish & Wildlife Service 1996). Spotted frogs had been classified as a C2 species north of the Snake River with an upward trend (Fish & Wildlife Service 1994a). The distribution south of the Snake River is poorly documented, however, recent inventories have shown that spotted frogs are present in several drainages in southwest Idaho (Munger et al. 1996). In the Jarbidge Resource Area spotted frogs have not been documented. However, the bulk of the riparian zones have not been surveyed. There are reports of spotted frogs occurring in Salmon Falls Creek in Nevada (McDonald and Marsh 1995) and in the adjacent Humbolt National Forest (McNeill pers. comm.).

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### **Western Toad**

Western toad (*Bufo boreas*) color varies from greenish to brown with a cream colored strip down the middle of the back with numerous swollen glands (warts) on the back and sides (Groves 1989). Adult western toads are largely terrestrial and may hibernate in terrestrial situations (Nussbaum et al. 1983). Western toad are diets composed invertebrates mainly flying insects. Breeding occurs from February at low elevations to July at high elevation (Groves 1989). Toads mate in water and use spring pools, ponds, lake shallows and slow moving portions of streams (Nussbaum et al. 1983) and may prefer mud bottoms in the breeding habitat. Females lay eggs in two gelatinous strands that may become entangled with each other and vegetation. Nussbaum et al. (1983) reported that tadpoles appear to seek out warmer water which may speed up development. Adults reach maturity in 2 to 3 years and may live several more years.

Munger et al. (1996) documented 2 adult western toads in the Owyhee Mountains and McDonald and Marsh (1995) found western toads in the Tuana Gulch and Yahoo Creek drainages. No eggs or tadpoles for western toads were reported in either inventory effort. Like the leopard frog, western toads are designated as sensitive by the Bureau of Land Management and a species of special concern by the Idaho Department of Fish and Game (Conservation Data Center 1994).

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Some populations of amphibians are believed to be declining worldwide (Wyman 1990). Declines have been documented in the tropics as well as more temperate areas. Hypothesized causes of the amphibian declines include: increased ultra-violet radiation due to decreases in the ozone layer; climatic change; pollution (pesticides, acid rain, etc.); loss of habitat and habitat fragmentation; and the introduction of exotic species including fish and other amphibians (Munger et al. 1996). In the Idaho declines in several formerly common amphibian species have resulted in them being designated as species of special concern by the Idaho Department of Fish & Game including the western toad, spotted frog, and northern leopard frog (Conservation Data Center 1994). The spotted frog and tailed frog have been petitioned for listing under the Endangered Species Act, and were classified as Candidate species by the Fish and Wildlife Service (1994a). The Idaho Herpetological Society rates amphibians and reptiles based on recent surveys for species in areas where they were historically found. Idaho State University maintains a data base for all Idaho amphibians and reptiles.

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## REPTILES

### Mojave Black-collared Lizard

Mojave black-collared lizard (*Crotaphytus bicinctores*) is a brightly colored, large headed lizard, with distinctive neck markings (alternating black, white, black bands) (Groves 1989). The base color of black-collared lizards is chocolate brown with light flecks (Groves 1989). Their diet is quite varied and includes: flowers, leaves, and any animal smaller than themselves including other lizards (Nussbaum et al. 1983). Andre and MacMahon (1980) reported that Mojave black-collared lizards breed in (April) May and June. Females lay eggs (3-8) in either sandy soil, rodent burrows, or under large rocks in June-July (Nussbaum et al. 1983). Black-collared lizards occupy arid, rocky canyons that are sparsely vegetated (Groves 1989), however, Diller and Johnson (1982) found that most black-collared lizards were near canyon rims. Typically, males are found in dispersed groups during the breeding season. Vegetation along the rims included sagebrush, winterfat, and shadscale communities (Diller and Johnson 1982). Nussbaum et al. (1983) wrote that black-collared lizards was found only in areas with boulders or piles of rocks and frequented talus slopes at the base of cliffs, but black-collared lizards did not climb well.

Nussbaum et al. (1983) and Groves (1989) depict the distribution of black-collared lizards primarily along the Snake River Canyon from the Oregon stateline to near Hammett. The current information suggests that black-collared lizards maybe limited to lower elevations as well as sparsely vegetated rocky habitat in Idaho. Southern Idaho is the northern extension of the range of the Mojave black-collared lizard (Nussbaum et al. 1983). This species has been on the sensitive species list for a number of years (Conservation Data Center 1990, 1992, and 1994). Black-collared lizards have only been documented in the Bruneau River Canyon southeast of Hot Creek in the Jarbidge Resource Area.

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### Longnose Snake

Longnose snake (*Rhinocheilus lecontei*) is a slender medium-sized snake (20 - 41 inches) with dark (brown to black) blotches interspersed with bands of red, orange or yellow (Groves 1989). The head has a long pointed snout and the lower jaw is shorter than the upper jaw which is possibly an adpation for burrowing (Nussbaum et al. 1983). Nothing is known about reproduction of longnose snakes in Idaho, however, in other areas females lay 5-8 eggs in July which hatch in late August (Nussbaum et al. 1983). Long-nose snakes prey primarily on lizards and small mammals. Longnose snakes are active at twilight and throughout the night, usually entering burrows during the day (Nussbaum et al 1983). Diller and Wallace (1981) and Diller and Johnson (1982) reported that longnose snakes are found in most habitats, but seem to be more common south of the Snake River. Beck and Peterson (1995) found that sandy to sandy loam soils, burrows and shrub cover were common factors in microhabitats used by longnose snakes. Beck and Peterson (1995) did not find longnose snakes in annual

grasslands.

The distribution of the longnose snake is primarily in the Snake River Canyon between Glens Ferry and Oregon (Groves 1989). Southern Idaho is at the northern edge of the longnose snake's geographic range. In the Jarbidge Resource Area this species has been documented in Bruneau Arm and Bruneau Dunes State Park areas. The current status of the longnose snake is a species of special concern for the Idaho Department of Fish and Game and sensitive to the Bureau of Land Management (Conservation Data Center 1994). Longnose snakes have been a sensitive species for a number of years (Conservation Data Center 1990 and 1994).

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### **Western Ground Snake**

Western ground snake (*Sonora semiannulata*) a small (8 to 19 inch) nocturnal snake that has two color phases in Idaho (Groves 1989). Nussbaum et al. (1983) indicates that the orange and black banded phase occurs at about the same rate as the unbanded phase. Groves (1989) comments that unbanded western ground snakes may be a uniform olive, gray, tan or reddish or have a broad pink to red stripe down the back. Nussbaum et al. (1983) writes that ground snakes have shallow grooves on the outsides of their rear teeth and speculates that they may be mildly venomous. Diller and Johnson (1982) report that ground snakes are moderately fossorial (dwell underground). In addition to being fossorial, western ground snakes are more active in the night than the day. Essentially, nothing is known about their reproductive habits in Idaho. Nussbaum et al. (1983) and Groves (1989) write that ground snakes occur in desert areas with sandy soil, however, Diller and Wallace 1981) reported ground snakes were only found in or adjacent to talus slopes in the Snake River Canyon. Western ground snakes eat a variety of burrowing or burrow dwelling arthropods (centipedes, millipedes, spiders, and insects).

The distribution of western ground snakes is in the Snake River Canyon from near Hammett downstream and the lower part of the Bruneau River Canyon (Diller and Wallace 1981, Nussbaum 1983). The majority of the observations have been between C.J. Strike Reservoir and Swan Falls Dam. The geographic range of this species extends into southern Idaho (Nussbaum et al. 1983). Presently, the western ground snake is rated as a species of special concern by the Idaho Department of Fish and Game and sensitive by the Bureau of Land Management (Conservation Data Center 1990, 1992, and 1994). In the Jarbidge Resource Area western ground snakes have been confirmed in the Bruneau Sand Dunes area.

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## Birds

### Bald Eagle

Bald eagle (*Haliaeetus leucocephalus*) is a large raptor (31-37 inches, 75 to 94 cm), with the mature adults having the distinctive yellow bill, white head and tail with a dark brown to black body. The bald eagle is the only North American member of the fish or sea eagles (Fish & Wildlife Service 1995c). Juveniles and young to about 2 years of age are generally dark (Harmata 1989). Between the 2nd and 4th year, more white appears in the tail feathers (starting near the body), head, and belly (Johnsgard 1990). On the immatures any white plumage is usually duller and the feathers have dark tips (Johnsgard 1990). Courtship varies with location and has been observed in the fall, late winter and spring (Harmata 1989) which coincides with nesting building and repair. Two eggs are laid in the stick nests from late February (March) to April (Harmata 1989). Bald eagles incubate the eggs for about 5 weeks and the young fledge at 11-14 weeks (Johnsgard 1990). Bald eagle prey selection is determined largely by availability (Peterson 1986). Bald eagles in the winter forage on fish, waterfowl (Lingle and Krapu 1986; Isaacs and Anthony 1987, Keister et al. 1987), small mammals (Johnsgard 1990) and carrion (Peterson 1986). During the fall and winter bald eagles may congregate in foraging areas when food is abundant (Keister et al. 1987; Crenshaw and McClelland 1989) or at communal roosts (Keister et al. 1987; Crenshaw and McClelland 1989). Bald eagles also forage or roost alone during the winter.

Bald eagles are known to winter in the C.J. Strike area along the Snake River. There are no known nest sites for this species within at least 15 miles of the Bruneau area. The nearest known occupied nesting habitat occurs along the South Fork of the Boise River. Fish and waterfowl are much more abundant along the Snake River than inland in the Jarbidge Resource Area. Because of the lack of native range, particularly sagebrush, jackrabbit numbers are low. Ground squirrels and other rodents are present during the summer, but are usually hibernating during the winter. Big game, mule deer and antelope numbers in the area are also low. There are no known communal roosts for wintering bald eagles in the Jarbidge Resource Area. The majority of the wintering eagles observed along the Snake River in the Jarbidge Resource Area are single or pairs of adults.

Originally, the Bald Eagle Protection Act was passed in 1940 to protect bald eagles. Subsequent legislation first listed bald eagles as endangered under the Endangered Species Preservation Act in 1966 and protection continued as the bald eagle was listed as endangered under the Endangered Species Act in 1973 (Fish & Wildlife Service. 1995c). Idaho is in the Pacific region recovery area. The Pacific Region reported 1,192 occupied territories in 1994 (Fish & Wildlife Service 1995c). In July 1995, the Fish and Wildlife Service lowered the classification of the bald eagle from endangered to threatened based upon an increase of bald eagle pairs in the lower 48 states from 417 in 1963 to 4,452 in 1994 (Fish and Wildlife Service 1995c).

Currently, the only threat to bald eagles in the Jarbidge Resource Area is shooting.

Ingestion of lead shot by eagles eating wounded waterfowl may be a potential problem. Power lines particularly in the Snake River Canyon area have been modified to prevent electrocution. Historic threats, such as the use of poison bait and DDT, have been eliminated.

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## **Peregrine Falcon**

Peregrine falcon (*Falco peregrinus*) adults are a deep gray on the back with a nearly black helmet, nape, and moustache stripe or wedge to below the eye (Langelier 1989). Juveniles have dark brown plumage rather than the gray of the adults (Craig 1986). The breast and belly are cream to buff marked with horizontal bars (Craig 1986). Males have fewer markings on the upper part of the breast than do the females (Langelier 1989). Maturity is reached by the second year (Johnsgard 1990). Males establish and begin defending territories in March (Langelier 1989) with courtship starting soon to several weeks later (Craig 1986). Nests are small depressions on shelf, ledge, or pothole located on a tall cliff with an overhang that protects the nest (Johnsgard 1990). Nest locations usually provide protection from solar radiation and driving rain and may be situated in areas where there is ready access to water (Grebence and White 1989). The clutch size averages 3-5 eggs which usually hatch in May (Craig 1986) and the young fledge in about 7 weeks, but the adults may continue to feed them for several more weeks (Craig 1986). The young begin making their own kills two to four weeks after fledging and are likely to be self-supporting after six weeks (Craig 1986). Peregrine falcons feed primarily on other birds including shorebirds, pigeons, doves, robins, jays, swallows, flickers, and less frequently waterfowl (Craig 1986). Peregrines are migratory in the northern portion of their range including Idaho (Saab and Groves 1992).

Only one peregrine falcon sighting has been substantiated in the Jarbidge Resource Area in the past 5 years. An individual reported a pair nesting in Salmon Falls Creek Canyon upstream of the reservoir in 1992. A field check revealed a pair of peregrines in courtship flights, however, no nest was ever confirmed. Nests of prairie falcons, golden eagles, American kestrels, red-tailed hawks, and great horned owls were documented in this portion of Salmon Falls Creek Canyon. Field checks in the same area since 1992 have not resulted in any peregrine falcon sightings. There have been two reports from kayakers and rafters of peregrine falcons in the Jarbidge and Bruneau River Canyons. However the limited access into the canyons, the lack of specific geographic locations, and delays in the BLM receiving the reports has kept any these sightings from being verified.

Peregrine falcons were first listed as endangered under the Endangered Species Conservation Act in 1969 and were subsequently listed as endangered under the Endangered Species Act in 1973. Idaho is in the Rocky Mountain/Southwest population recovery area and its goal was to have 17 breeding pairs (Fish & Wildlife Service 1995d). Through the recovery of natural populations and the release of captive bred young the populations have recovered to some extent. The Rocky Mountain/Southwest area has exceeded its population target of 376 pairs and the population consists of 559 pairs of peregrine falcon (Fish & Wildlife Service 1995d). According to the Fish & Wildlife Service (1995d) Idaho has not yet achieved its

target of 17 nesting pairs. The ban on DDT and restrictions on the use of organophosphate pesticides has further enhanced the recovery of peregrine falcons. The Fish and Wildlife Service (1995d) has recommended that the peregrine falcon's status be downgraded from endangered to threatened. No current threats to this species species have been identified.

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## **Ferruginous Hawk**

Ferruginous hawk (*Buteo regalis*) are known the largest Buteo hawk in United States (Johnsgard 1990). Like other *Buteo* hawks, this species has color phases or morphologies. Light phase ferruginous hawks are generally light in appearance when viewed from below, except for some dark patches in the wrist area of the wing, dark tips of the wing primaries, and a reddish "V" formed by the legs. The dark phase has a whitish tail, dark body, and under wing coverts. The primaries and secondary feathers are white, but the tips of the primary feathers are dark.

Ferruginous hawks exhibit fairly strong fidelity to nest sites between years (Johnsgard 1990). Ferruginous hawks are migratory in Idaho (Saab and Groves 1992) and arrive in March and depart by mid-October. There are some sightings of ferruginous hawks in the winter, suggesting that a few may be year round residents. In Idaho and Utah ferruginous hawks nest in trees, on the ground and on artificial structures (Woffinden and Murphy 1983). Ferruginous hawks lay 3 to 6 eggs and have been known to fledge up to 5 young (White and Thurow 1985). Ferruginous hawks seem to be sensitive to disturbance mid-March to early May and may abandon the nest (Howard and Wolfe 1976). Howard and Wolfe were referring to heavy equipment use (i.e. chaining junipers) as disturbance. White and Thurow (1985) found that vehicles and the approach of humans were adequate disturbance to cause nest abandonment. White and Thurow (1985) also observed that cattle rubbing on nest trees did not appear to result in any nests being abandoned.

Ferruginous hawks has been designated as a C2 species for a over 10 years, most recently in 1994 (Fish & Wildlife Service 1992b, 1994a). In 1992 the Fish & Wildlife Service (1992b) evaluated a petition to list the ferruginous hawk as endangered and determined that the petitioner did not present substantial information to warrant listing. In the Jarbidge Resource Area ferruginous hawks appear to be widely scattered, with most of the nests located in isolated junipers. Data in the Jarbidge Resource Area shows that not all of the active nests are used each year and the ferruginous hawks may use alternative nests within the same general nesting territory.

Threats to ferruginous hawks include shooting, large scale wildfire which reduces sagebrush habitat which seems to support higher prey densities and destroys nest trees. Because human disturbance, particularly from March to mid-May may result in nest abandonment, care should be taken when monitoring nests for activity and nest success. By scheduling project work for other times of the year (after mid-June) or rerouting proposed projects more than 0.25 miles from nest sites, these human impacts can be minimized.

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## Northern Goshawk

Northern goshawk (*Accipiter gentilis*) is the largest accipiter hawk in North America. Adults are dark to slate gray on the back with a light breast and belly which has gray vermiculations and bars (Johnsgard 1990). A light stripe is present above the eye. Saab and Groves (1992) note that goshawks are migratory in Idaho. Goshawks return from wintering areas to the old nesting territory in March to repair or build a new nest and for courtship (Johnsgard 1990; Detrich and Woodbridge 1994; Reynolds et al. 1994). Males appear to have more fidelity to the nest site than females and about 70% of goshawks that mated the previous year were likely to retain the same mate (Detrich and Woodbridge 1994). Goshawks nest in a variety of habitat including deciduous, coniferous and mixed forests, however, nesting areas are usually older taller forests (Reynolds 1989) and are somewhat associated with openings and near water (Reynolds et al. 1982). The nest itself is frequently in a fork of a deciduous tree (Speiser and Bosakowki 1987) or next to the trunk of a large conifer with horizontal branches (Shuster 1980; Reynolds et al. 1982).

Three to five eggs are laid by the female in May-June which hatch in about 5 weeks, the young fledge in another 5 to 6 weeks (Ehrlich et al. 1988). The juveniles remain dependent on the adults for up to 6 weeks after fledging (Johnsgard 1990). Although some goshawks breed after one year, the majority breed after the third year (Johnsgard 1990). Goshawks prey nearly equally on birds and small mammals and take flickers, robins, jays, tree squirrels, snowshoe hares, and ground squirrels (Reynolds 1989; Reynolds et al. 1994). Younk and Bechard (1994) reported that ground squirrels, robins, and common flickers were important prey species for goshawks nesting in aspen stands. Northern goshawks are able to hunt in the tree canopy, shrub canopy, and ground (Reynolds and Meslow 1984).

Northern goshawks have been observed in aspens stand in a few instances in the southern portion of the Jarbidge Resource Area. Reynolds et al. (1982) documented northern goshawks nesting in aspen, but this was less frequent than in either conifer or mixed forest types. Several reports indicate that goshawks favor large stands of trees. However, Younk and Bechard (1994) found that northern goshawks nested in small isolated aspen stands in high elevation shrub steppe habitats in northern Nevada. Aspen stands in Younk and Bechard's study area ranged in size from near 5 acres to over 60 acres. DeStefano et al. (1994) recommended that in areas where timber sales were proposed that inventories for nesting goshawks be conducted for multiple years, at least 2, preferably 3, because: not all nests are active each year, alternate nest sites maybe used, a nest may not be used because of environmental factors, or early nest failures may result in active nests not being found.

Northern goshawks have been designated as a C2 species for several years and as recently as 1994 (Fish & Wildlife Service 1989, 1994a). Goshawks have been observed during nesting season in the southern portion of the Jarbidge Resource Area in aspen stands near the headwaters of Cedar Creek and Bear Creek. To date no nest sites have been documented for

the northern goshawk in the Jarbidge Resource Area. The lack of large size stands of aspen or conifers limit potential nesting habitat for this species in the Jarbidge Resource Area. In other areas the logging of nest sites and areas around nest sites and habitat fragmentation have been documented as adverse impacts to the northern goshawk (DeStefano et al. 1994).

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### **Western Burrowing Owl**

Western burrowing owl (*Speotyto cunicularia hypugea*) are one of two migratory owl species that winter in the tropics (Saab and Groves 1992). The burrowing owl is the only robin sized owl with long-legs and a stubby tail in sagebrush and grassland habitats. The short-eared owl is bigger and has relatively short legs. Burrowing owls have a light "v" above the eyes, a light patch under the chin, followed by a darker band and a light "v" on upper breast. The overall appearance of the western burrowing owl is a light mottled brown due to light speckling on the back and wings. Rich (1986) reported that burrowing owls arrive in Idaho during April. Burrowing owls nest in burrows in the ground and may use old coyote dens, badger den, or natural small cavities in ledges. Eggs are usually laid in late April and May with the average clutch size being 7 to 9 eggs (Zarn 1974). Ehrlich et al. (1988) stated that burrowing owls maintain family units into September. Western burrowing owls usually migrate from the area during September (Rich 1986). Burrowing owls eat a variety of prey including invertebrates, rodents, and birds (Gleason and Craig 1979). Rich (1986) found that nest burrows were usually within cheatgrass habitats with substantial portions of bare ground. Burrows themselves were more successful if they were in rock outcrops which may protect nesting owls from some mammalian predators such as badgers, dogs, and coyotes (Rich 1986). Burrowing owls may be one of only a few avian species to benefit from substantially disturbed habitat (Rich 1986).

The designation of the Western burrowing owl has shifted between C2 and 3c. The Fish & Wildlife Service (1994a) had designated the western burrowing owl as a C2 species. In the Jarbidge Resource Area burrowing owl nests are very sparse. Fidelity to nest burrows from the previous year has not been observed in the Jarbidge Resource Area, however, a couple of owls have returned to the same general area. Rich (1986) commented that feral or pet dogs and cats could pose a problem for this species. Other threats may include pesticide spraying particularly insecticides which may result in either the depletion of prey or secondary poisoning.

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### **Columbian Sharp-tailed Grouse**

Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) is a subspecies of sharp-tailed grouse found in the Western United State (Aldrich 1963). Columbian sharp-tailed grouse are adapted to shrub-steppe habitats, whereas, the other subspecies are

more adapted to more grassland habitat. Columbian sharp-tailed grouse are brown mottled with tan, dark brown and nearly black markings. The sexes are similar in appearance, but there are some differences in the feather pattern of the crown and tail feathers (Henderson et al. 1967). During breeding season males inflate yellow air sacs in the combs above their eyes and lavender air sacs on the sides of their throats when displaying. The males display at a dancing grounds (lek) in from April into June with the majority of the breeding taking place in late April to early May (Johnsgard 1983; Meints 1991). The peak of female attendance is usually in early May. Males also attend leks in the fall from September into November. Sharp-tailed grouse frequently nest under shrubs (Oedekoven 1985), but also use herbaceous cover (Meints 1991). A clutch of 10 to 14 eggs are fairly typical (Ehrlich et al. 1988). The young hatch in late May to early June, but because Columbian sharp-tailed grouse reneest if their first attempt fails downy young can be seen into early July. Chicks are able to walk shortly after hatching (precocial), develop rapidly and are able to fly short distances within 3 weeks. The young are highly insectivorous (Johnsgard 1983), but switch to a diet of leaves, flowers, and seeds as they mature. Adults consume a variety of foods including grain, seeds, leaves, fruits, flowers, and the buds from shrubs as well as insects (Marshall and Jensen 1937; Schneider 1994). Schneider (1994) describes variation in winter diets as being strongly influenced by snow depth. When the snow is shallow grouse tend to seek green vegetation or seeds, however, in deeper snow situations, the diet shifts to the buds and fruits of shrubs and trees including chokecherry, serviceberry, willow, and aspen. These shrub species occur in mountain shrub communities and/or in riparian zones.

Nesting habitat apparently requires fairly tall herbaceous cover, primarily bunchgrass (Meints 1991). Summer and brood habitat usually contains some amount of shrub cover (Klott and Lindzey 1990; Meints 1991; Saab and Marks 1992), but have been found in agricultural fields adjacent to native shrub-steppe habitats (Marshall and Jensen 1937; Parker 1970; Oedekoven 1985; Meints 1991; Apa unpublished data). Klott and Linzey (1990) found that areas used by sharp-tailed grouse had more plant species than random areas, but shrub height and cover varied with habitat type. Winter habitat is more defined and contains mountain shrub communities or shrub riparian zones as critical components (Marks and Marks 1988; Ulliman 1995). Ulliman (1995) documented that sharp-tails use CRP (conservation reserve program) fields during light winters, but move to mountain shrub communities in years with deep snow.

The sharp-tailed grouse was classified as a C2 species by the Fish & Wildlife Service (1994a). A recent survey of the western states indicated that Idaho had the only significant population of Columbian sharp-tailed grouse that was stable. In the Jarbidge Resource Area Columbian sharp-tailed grouse were extirpated over 50 years ago. In a number of locations the habitat appears to be suitable for reintroducing Columbian sharp-tailed grouse. These areas contain patches of mountain shrub and aspen needed for winter habitat as well as native shrub grassland for nesting and brood habitat. At present there are no plans by the Bureau of Land Management or the Idaho Department of Fish & Game to reintroduce Columbian sharp-tailed grouse back into suitable habitat in the Jarbidge Resource Area in the near future.

Threats to Columbian sharp-tailed grouse include loss of winter habitat, nesting and brood

habitat fragmentation, isolated populations, and loss of CRP habitat in some areas. The use of insecticides during late May to early June may cause a depletion of insects needed by young grouse or lead to secondary poisoning. Because this species displays in the morning during the fall, the impacts of hunting on fragmented populations and the timing of hunting during the day needs to be examined.

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## Mountain Quail

Mountain quail (*Oreortyx picata*) is the largest of the North American quail. Both sexes of the mountain quail appear similar having long straight black head plume, gray head with a chestnut colored throat patch outlined with black and white feathers, a brownish back, and chestnut sides marked with black and white barring (Johnsgard 1973). The nest is a scrape (small shallow depression on the ground) lined with leaves, grasses, and a few feathers concealed by brush, rocks, fallen logs or at the base of a tree in which 9-10 eggs are usually laid (Ehrlich et al. 1988). The nest is typically within a few hundred yards of water, because chicks require water soon after hatching (Johnsgard 1973). In Idaho Heekin (pers. comm.) noted that some females laid two clutches of eggs, one of which was incubated by the male. Delehanty (1995) also reported males incubating eggs and successfully raising a brood in Nevada. Eggs are incubated for around 24 days and the young are able to walk soon after hatching like other quail. Mountain quail eat a variety of foods including leaves, flowers and other green vegetation, bulbs, fruits, and insects.

Mountain quail habitat is varied depending upon the location. Mountain quail are known to use grown over clearings in coniferous forests (Brennan et al. 1987), dense brush patches at the edge of coniferous forests or around mountain meadows (Johnsgard 1973), or riparian zones with dense brush and trees (Heekin pers. comm.). In Nevada mountain quail are reliant on riparian zones in good condition that are surrounded by sagebrush uplands. Mountain quail migrate elevationally by foot from summer habitat down to winter habitat in the valleys the back up slope for nesting and raising their young (Johnsgard 1973). Winter habitat is also dense brush and trees usually associated with riparian zones. During the winter mountain quail remain in family groups of 10 to 14 birds, or may join with other groups forming larger coveys (Johnsgard 1973; Ehrlich et al. 1988).

In the Jarbidge Resource Area surveys for mountain quail were conducted in several drainages in 1992 and 1993. Mountain quail were heard calling in the Black Rock Pocket area of the Bruneau River in both years (Smith 1994). No visual observations were made in either year. Smith (1994) noted that mountain quail had been reported in Cougar Creek, however, he did not believe that the habitat in the area of the sighting was suitable. A number of drainages (Big Flat Creek, Deer Creek, Cherry Creek, and the East Fork of the Jarbidge River) appear to have the dense shrub cover preferred by mountain quail, however, tree cover maybe somewhat lacking.

Mountain quail was classified as a C2 species for a number of years (Fish & Wildlife

Service 1989, but changed to a 3c level (Fish & Wildlife Service 1994a). This species will likely remain designated a Sensitive species by the BLM in Idaho due to low numbers and isolated populations. Heavy grazing of riparian areas and habitat fragmentation are possible threats to mountain quail. Idaho Department of Fish and Game currently prohibits the hunting of mountain quail in Idaho.

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### **Long-billed Curlew**

Long-billed curlew (*Numenius americanus*) (BLM sensitive) are a members of a group of birds commonly referred to as shorebirds. Although it is a categorized as a shorebird it nests in the uplands well away from riparian zones. The long-billed curlew, the largest shorebird in North America, has a long decurved (down-turned) bill and is a mottled-brown in color (Redmond 1989). Long-billed curlews nest on the ground in grasslands and prairies (Ehrlich et al. 1988). Redmond and Jenni (1986) noted that long-billed curlew arrive in western Idaho in late March and form nesting pairs. Redmond (1989) writes that males arrive first and are followed by females, although some females return with their mate which greatly shortens the courtship between experienced mates. Jenni et al. (1982) reported that long-billed curlew selected areas for nesting that been recently grazed and were characterized by short, low profile vegetation.

Long-billed curlew lay four eggs in a ground nest during April and into early May (Jenni et al. 1982). The cup nest is commonly lined with fine grasses, feathers, and other fine material. Incubation lasts about 4 weeks and the young fledge in about 7 weeks (Redmond 1989). Adults engage in mobbing behavior from late in the incubation until the chicks are about a month old to drive off predators (Redmond 1989). It is common for adjacent curlews to assist with mobbing. Jenni et al. (1982) never observed breeding long-billed curlew in areas of rangeland that had not been grazed sometime during the previous year. Long-billed curlew migrate from the Idaho to the coast by mid-August (Jenni et al. 1982).

In the Jarbidge Resource Area long-billed curlew seem to be strongly associated with annual grasslands and grazed crested wheatgrass seedings. They have been seen scattered from the uplands south of the Snake River from the Bruneau River to Salmon Falls Creek, south several miles. There are concentrations of long-billed curlew in the Bruneau Arm area as well as the Grindstone Farms area. Populations of long-billed curlew appear to be stable based on monitoring data in the Cheatgrass Study Area south of Glens Ferry. Jenni et al. (1982) never observed breeding long-billed curlew in areas of rangeland that had not been grazed sometime during the previous year. Long-billed curlew were classified as C2 species for a while, but subsequent information has lead to the Fish & Wildlife Service (1994a) to delete this bird as a candidate species. They remain designated as sensitive by the BLM in Idaho (Conservation Data Center 1994).

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## **White-face Ibis**

White-faced ibis (*Plegadis chihi*) is a shorebird slightly smaller than a raven with a long dark down-turned bill. White-faced ibis is a bronze brown in color, but iridescence of the feathers can give the adults a silver, purple or black appearance (Trost 1989). The bare face behind the bill is red, but outlined with white feathers from the upper bill around behind the eye to the lower bill. Like most shorebirds white-faced ibis are migratory in Idaho (Saab and Groves 1992). White-faced ibis arrive in breeding areas in late March to early April and nest in colonies in marshes (Trost 1989). Nests are cupped platforms made of coarse emergent vegetation in bulrush, reed, or cattails or stick nests in willows and lined with finer material (Ehrlich et al. 1988). Trost and Gerstell (1994) note that nests are placed near ground level. The clutch size ranges from 2 - 7 eggs of which usually two young reach fledging age (Trost 1989). Eggs hatch in May to early June and the surviving young fledge about a month later. White-faced ibis reach breeding maturity their second year. White-faced ibis begin to migrate to their winter range in western Mexico early in September (Trost 1989), however some birds remain until October (Taylor et al. 1989). White-face ibis diets include a wide variety of prey including insect larvae, worms, mollusks, crustaceans, fish and frogs (Bray and Klebenow 1988; Taylor et al 1989). Ibis forage by probing wet soil with their long bill. Bray and Klebenow (1988) and Taylor et al. (1989) reported white-faced ibis feeding in irrigated fields and mudflats.

White-faced ibis have been observed in the Cedar Mesa Reservoir, Heil Reservoir, and Camas Slough Reservoir in the spring. The lack of suitable nesting habitat at Cedar Mesa and Heil Reservoir and lack of late season water in most years at Camas Slough may preclude this species from becoming established during the summer.

No threats to white-faced ibis have been identified in the Jarbidge Resource Area. In other locations wetland alteration and chemical residues in wetlands are likely threats. White-faced ibis were categorized as a C2 species (Fish & Wildlife Service 1994a).

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## **Trumpeter Swan**

Trumpeter swan (*Cygnus buccinator*) is the largest of the waterfowl in North America (Bellrose 1980). Adults are white with a black bill, legs and feet, however, the neck is frequently stained rust from iron rich water and sediments (Gale 1989). The young (cygnets) are a dull mouse gray with adult plumage being attained during the molt of the second year (Bellrose 1980). Gale (1989) wrote that trumpeter swan breed when they are 4+ years old, although they form pair bonds their second or third year. Nest building begins in April to early May (Gale 1989). The nest is a mound of marsh vegetation (cattails, bulrush, sedges, or rush) lined with feathers in 1 to 3 feet of water or on a muskrat house and the same nest maybe used for several years (Bellrose 1980). Clutch size varies from 2 to 7 eggs which hatch in June (Gale 1989). Gale (1989) describes winter habitat as ice free and containing extensives beds of aquatic vegetation and macroinvertebrates. Nesting habitat is shallow, still waters, in

quiet areas with dense emergent vegetation (Bellrose 1980). Squires and Anderson (1995) commented that shallow water feeding sites were about 30 inches (.74 m) deep. Trumpeter swans feed on a variety of aquatic plants including pondweed, white water-buttercups, ditchweed, water milfoil, duckweed, pond lily, and sedges (Bellrose 1980; Squires and Anderson 1995). Trumpeter swans show a season shift in diets, but aquatic macrophytes are important year round (Squires and Anderson 1995).

Trumpeter swans in the Yellowstone Area winter in the Henry's Fork country in eastern Idaho. In the early 1990's the Idaho Department of Fish and Game in cooperation with the Fish & Wildlife Service moved some trumpeter swans wintering at the Henry's Fork to the C.J. Strike Wildlife Management Area. The majority of the swan's winter habitat in the Henry's Lake area had frozen over, and the swans were moved to prevent a die-off and hopefully establish a new wintering area. Some trumpeter swans have been observed in subsequent years wintering along the Snake River from Glens Ferry down stream to Loveridge Bridge and near the Hagerman Wildlife Management Area. No trumpeter swans have been documented to nest in either area.

Trumpeter swans were classified as a C2 (Fish Wildlife Service 1994a) for several years. Known threats to trumpeter swans include illegal harvest, human disturbance during nesting, and restricted winter habitat.

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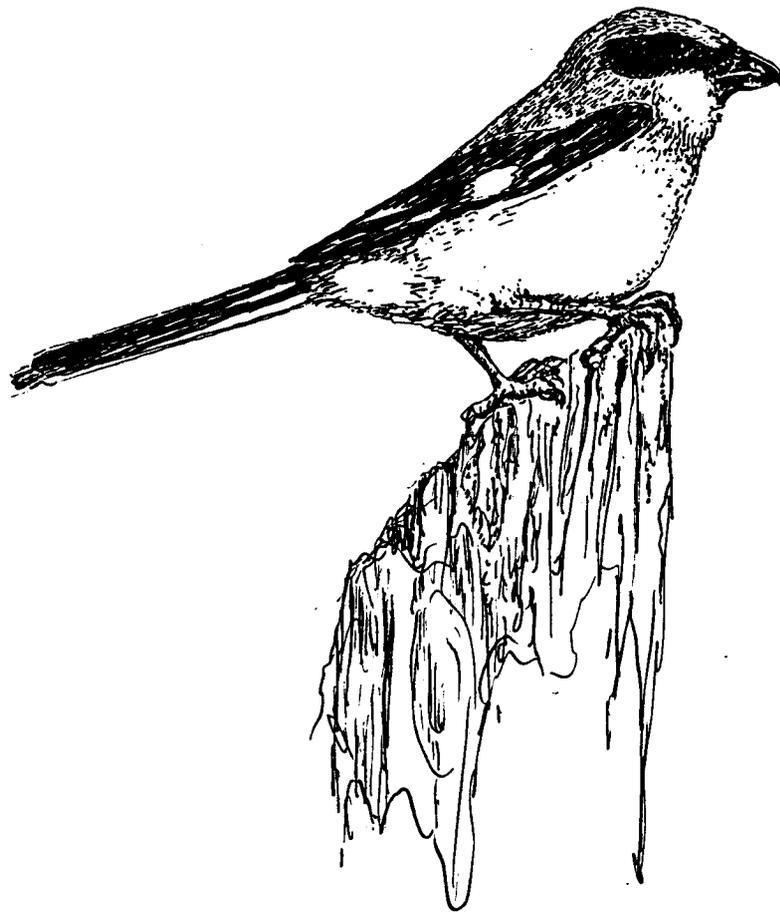
### **Loggerhead Shrike**

Loggerhead shrike (*Lanus ludovicianus*) are migratory species in Idaho (Saab and Groves 1992) and winter in central Mexico (Ehrlich 1988). Loggerhead shrikes are a little smaller than a robin generally gray on the back, white underneath with a black eye mask and black and white wing and tail feathers. The bill is black and the upper portion is hooked over at the tip similar to a hawk but not as sturdy. Loggerhead shrikes have been observed in establishing territories Idaho as early as April in the Brown's Bench area of the Jarbidge Resource Area. Fraser and Luukkonen (1986) note loggerhead shrikes begin egg laying in April and May before other passerine birds. Nests are placed in shrubs and trees. Locally, shrike nests have been found in taller sagebrush, western juniper, and black greasewood. Fraser and Luukkonen (1986) report a minimum nest height of 3 feet. Loggerhead shrikes lay 4-7 eggs which hatch in about 17 days and the young fledge in 3 weeks (Ehrlich 1988). Fraser and Luukkonen (1986) comment that loggerhead shrikes feed their young upto a month after fledging and that in some locations loggerhead shrikes may have two or three broods in a year. Shrikes consume a variety of food types primarily large insects, but also lizards, rodents, and small birds (Ehrlich et al. 1988). Loggerhead shrikes are known to cache prey on barbed wire fences or plants with thorns or spines. This behavior has resulted in loggerhead shrikes being called "butcher birds". Habitat requirements of loggerhead shrikes in the Intermountain West have not been researched.

In the Jarbidge Resource Area, loggerhead shrikes are found in upland areas where there

are tall sagebrush or junipers and open foraging areas, but not in the aspen or mountain shrub communities in the southern end of the resource area. Although this species is not locally abundant, there have been observations of loggerhead shrikes in a number of areas within the Jarbidge Resource Area. Nests of loggerhead shrikes have been documented in 3 areas.

For a period of time loggerhead shrikes were designated as C2 species (Conservation Data Center 1992) by the Fish & Wildlife Service. In 1994 the Fish & Wildlife Service (1994a) did not include Idaho as one of the states where loggerhead shrikes were designated a C2 species. Threats to loggerhead shrikes include loss of nesting habitat (tall shrubs or trees) due to fire and the conversion of large areas to either annual grassland or crested wheatgrass with no re-establishment of nesting habitat.



## MAMMALS

### Fringed Myotis

Fringed myotis (*Myotis thysanodes*) is a small bat very similar to the long-eared myotis in size and appearance (Larrison and Johnson 1981). The fur on the back is light brown and lighter on the belly (Genter 1989c). The ears of this species are shorter than the long-eared myotis, when folded forward the ears extend 5mm or less from the tip of the nose to the tip of the ear (Larrison and Johnson 1981). The fringed myotis also has a fringe of short stiff hairs at the free edge of the tail membrane (also called the uropatagium or interfemoral membrane) (Larrison and Johnson 1981, Keller 1985).

Fringed myotis mate in the fall and winter, fertilization is delayed until April or May and a single young is born in the late June to July (O'Farrell and Studier 1973; O'Farrell and Studier 1980; Genter 1989c). Pregnant females are highly social and are often found in large maternity roosts. Males and possibly non-pregnant females often form separate colonial roosts (O'Farrell and Studier 1980; Genter 1989c). The young bats mature rapidly and are able to fly in 17 days and are similar in size to the adults in 3 weeks (O'Farrell and Studier 1973). Fringed myotis roost in caves, mines, rock crevices, and buildings (Genter 1989c). The general distribution of the fringed myotis is generally west of the Rocky Mountains from Mexico north to Wyoming, west through central Idaho and then northwest to Washington. Little is known about winter habitat, winter range, or migration if any. Genter (1989c) notes that fringed myotis is found in desert scrub, juniper, and coniferous forests. Williams (1968) located fringed bat in sagebrush grass communities, but O'Farrell and Studier (1980) commented that in all desert or scrub locations this species was always within 1 hour of flight of riparian areas.

The diet of fringed myotis is more varied than some bat species and includes beetles, moths, crickets, and harvestmen (Black 1974; O'Farrell and Studier 1980; Genter 1989c). Genter (1989c) states that fringed myotis are able to catch prey by aerial capture as well as glean insects from vegetation. O'Farrell and Studier (1980) suggest that fringed myotis is most active within the first two hours of sunset based on mist netting.

In 1994 the Fish & Wildlife Service (1994a) first designated the fringed bat as a candidate species. No fringed myotis have been documented in the Jarbidge Resource Area, however, there has been very limited inventory for bats.

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### Long-eared Myotis

Long-eared myotis (*Myotis evotis*) is a small sized bat with long black ears, wing and tail membranes, and a medium brown body (Larrison and Johnson 1981). Keller (1985) notes that the under parts are buffy, and the ears are 9-10 mm wide with the tragus more than half the

length of the ear. Humphrey (1982) reported that the typical litter size for Myotis is 1 with very rare occurrences of twins and that young are born in late spring to early summer. The diet is like many other bat species in Idaho and composed primarily of nocturnal insects.

Larrison and Johnson (1981) comment that long-eared myotis are not as gregarious as other bat species. Long-eared bats have been collected in conifers and old buildings in southern Idaho. Long-eared bats have been captured during late dusk and well into the night indicating that foraging may occur later in the evening (Larrison and Johnson 1981). Genter (1986) considered long-eared bat migratory in Idaho, but noted that little is known about the winter habitat of this species.

Long-eared bats are believed to be present in the Salmon Falls Creek Canyon and other river canyons within the Jarbidge Resource Area, however, none were trapped by SAIC (1995) in Salmon Falls Creek. In 1994 the Fish & Wildlife Service (1994a) first classified the long-eared bat as a candidate species (C2).

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### **Long-legged Myotis**

Long-legged myotis (*Myotis volans*) is a small cinnamon to brownish bat with buffy to light brown on the belly. Ears and membranes are dark brown to black (Larrison and Johnson 1981). There is fur on the underside of the wing membrane about half way down the femur to the elbow (Larrison and Johnson 1981). Keller (1985) notes that the ears are short round and dark, and emphasizes that the underside of the wing membrane being furred as the most distinctive characteristic of long-legged myotis. Warner and Czaplewski (1984) wrote that the long-legged bat has a keeled calcar, the rounded ears do not reach the nostrils when folded forward, and the under wing hair is long dense, and extensive. Breeding occurs as early as August and into the winter (Warner and Czaplewski 1984). Like other species of Myotis, fertilization is delayed until the spring and a single young is born anywhere from May through August (Warner and Czaplewski 1984).

The long-legged bat has a wide distribution essentially from Wyoming west to the Pacific Coast and from southern Alaska into Mexico (Warner and Czaplewski 1984). There are 3 subspecies of the long-legged myotis. The subspecies found over most of Idaho is M. v. interior, although M. v. longicrus may occur in the Idaho panhandle (Warner and Czaplewski 1984). Larrison and Johnson (1981) commented that this bat species seems to prefer arid regions, but is also found in open forests. Larrison and Johnson (1981) comment that not much is known about long-legged bats, although they seem not to be as gregarious as other Myotis, avoid caves, and forages relatively late at night. This conflicts with Schowalter (1980) and Warner and Czaplewski (1984) who reported that long-legged myotis used caves and mines as hibernacula and foraged throughout most of the night. Long-legged myotis are typically found in montane habitats and rarely occur in arid lowlands. This species is found in coniferous forest and riparian areas in deserts (Warner and Czaplewski 1984).

No information is present for the Jarbidge Resource Area regarding this bat species. Long-legged myotis have not been confirmed in the Jarbidge Resource Area. The Fish & Wildlife Service (1994a) categorized this candidate species as C2 in 1994.

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## **Spotted Bat**

Spotted bat (*Euderma maculatum*) is a medium sized bat with a distinctive visual appearance black with a white spot on the rump at the base of the tail and on each shoulder, very large pink to red ears that have some white hair at their base (Larrison and Johnson 1981). The spotted bat is the only member of its genus. In size the spotted bat is slightly larger than the Townsend's big-eared bat. Watkins (1977) presented little information on reproduction, growth or longevity of spotted bats. However, Watkins (1977) suggested that adults breed in November and possibly into the winter. Findley and Jones (1965) and Watkins (1977) believe that mothers give birth to a single young and that birth takes place in early summer. Lactating females have been captured in August in Utah (Esterla 1965). Snow (1974) wrote that spotted bats were late flyers, however, Woodsworth et al. (1981) and Leonard and Fenton (1983) found spotted bats are active from sunset to sunrise with the peak of foraging was from mid-night to 3:00 in the morning. Habitats used by spotted bats include ponderosa pine, desert scrub, pinyon-juniper, and rough arid terrain (Genter 1989a; Storz 1995).

Spotted bats may be territorial in foraging sites (Leonard and Fenton 1983; Storz 1995). Roost areas are usually crevices in cliffs (Leonard and Fenton 1983; Wai-Ping and Fenton 1989). In the northern part of its range spotted bats may migrate south in the winter, but migratory movements and winter habitat requirements are unknown (Genter 1989a). Spotted bats appear to be more solitary than other species and may roost alone (Leonard and Fenton 1983; Wai-Ping and Fenton 1987). Spotted bats forage on insects, primarily moths (Esterla and Whittaker 1972). Unlike many other bats, the calls of spotted bats are audible and that foraging sounds are different from calls used when another bat intrudes into its foraging area (Leonard and Fenton 1983).

Remains of spotted bats have been recovered from nest boxes used by sawwhet owls in the C.J. Strike Reservoir area. A number of cliffs occur in the Jarbidge Resource Area particularly along the Jarbidge River, Bruneau River, Salmon Falls Creek, and many side drainages may support populations of spotted bats. No inventory for this species has been initiated for this species. The spotted bat has been categorized as a C2 species for a number of years and currently retains that designation (Fish & Wildlife Service 1994a).

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## **Townsend's Big-eared Bat**

Townsend's big-eared bat (*Corynorhinus townsendii*) is a medium sized bat with very

large ears (Genter 1986). Other large eared bats in Idaho include the pallid bat, spotted bat, and long-eared myotis (Larrison and Johnson 1981). The face of the Townsend big-eared bat has glandular lumps between the nostrils and eyes, buffy brown to grayish brown fur on the back, and sooty colored wings, limbs, and tail membrane (Larrison and Johnson 1981). Mating occurs in the fall and or winter in the hibernaculum (Genter 1989b). Young are born in May to July and are able to fly within 3 weeks (Kunz and Martin 1982; Genter 1989b), and weaned by 6 weeks (Kunz and Martin 1982). Longevity for Townsend's big-eared bat is estimated to exceed 10 years based on banding studies (Kunz and Martin 1982). Males and non-pregnant are solitary or form small groups, whereas, pregnant females or females with young form larger maternity colonies (Genter 1989b). A number of different roost types have been identified for this bat species including night roosts, summer roosts, maternity roosts and transient roosts in addition to winter roosts or hibernacula (Idaho State Conservation Effort 1995). Townsend big-eared bats winter in colonial roosts (hibernacula) usually in local caves, mines or lava tubes (Genter 1989b; Dobkin et al. 1995). Winter hibernacula usually are relatively cold portions of caves or mines that are thermally stable (Kunz and Martin 1982).

Habitats used by Townsend big-eared bats include sagebrush, deciduous forest and conifer forest including pinyon-juniper (Idaho State Conservation Effort 1995) and is regarded as a habitat generalist (Dobkin et al. 1995). Genter (1989b) commented that Townsend big-eared bats are active later at night than other species and forage primarily on moths (Whitaker et al. 1981). Foods of Townsend's big-eared bats are largely insects including nocturnal moths.

Townsend's big-eared bat was documented in the Salmon Falls Creek Canyon by Science Applications International Company in 1995. Little is known about the presence or distribution of this species in the Jarbidge Resource Area, however, the general lack of deep caves or lava tubes may limit the maternity roosting or hibernating habitat for this bat species. Like the spotted bat, the Townsend's big-eared bat has been designated as a C2 species for a number of years (Fish & Wildlife Service 1994).

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## Yuma Myotis

Yuma myotis (*Myotis yumanensis*) is a small bat with a buffy or light brownish back and whitish belly with the fore and aft portions of the wing membranes being whitish (Larrison and Johnson 1981). Keller (1985) states that the Yuma myotis has dull fur, with a relatively large foot, (9-10 mm) and an unkeeled calcar compared to other members of the genus *Myotis*. This species of *Myotis* roost alone or in clusters in rock crevices, caves, or old buildings (Larrison and Johnson 1981). Habitat for the Yuma bat was described by Larrison and Johnson (1981) as open areas with scattered trees. SAIC (1995) commented that bats skimming over the surface of a reservoir was behavior consistent with Yuma myotis.

The genus *Myotis* tend to breed in the fall, winter, and possibly the early spring (Humphrey 1982), and this likely includes the Yuma myotis. Fertilization is delayed until

spring, with a single young usually born, although Humphrey (1982) wrote that twins may be a very rare occurrence. Yuma myotis were captured by SAIC in Salmon Falls Creek canyon in the summer of 1995. The Fish and Wildlife Service (1994a) designated Yuma bats as candidate species with a C2 status.

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There are a number of threats common to all bats. Those species that hibernate or roost in caves have been known to be impacted by caver's or other recreationists in some instances. Vandals have been known to shoot bats in various roosts in the Shoshone District. Research on wintering bats have caused declines in some areas (Speakman et al. 1991). Other threats that have been identified include improperly gating (Pierson et al. 1991) or entirely sealing off mine adits which provide roosting, maturity, and wintering habitat for many bat species. The use of broad spectrum insecticides may result the depletion of the prey base or secondary poisoning of bats (Henney et al. 1982).

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### **Pygmy Rabbit**

Pygmy rabbit (*Brachylagus idahoensis*) is the smallest rabbit in Idaho, smaller than Nuttall's (mountain) cottontails, and can be separated from cottontails by the buff-colored tail rather than white tail (Larrison and Johnson 1981; Chapman et al. 1982). Pygmy rabbits are unique in that they are the only burrowing rabbit in North America (Larrison and Johnson 1981). Pygmy rabbits believed to produce young up to three times per year (Green and Flinder 1980a). Breeding is initiated as early as late February with the first young being born in April (Green and Flinders 1980a). Pygmy rabbits do not breed their first year, but mate the following year (Green and Flinders 1980a). Pygmy rabbits are strongly associated with tall dense sagebrush stands usually in areas with deeper soils, but have been reported in areas supporting some greasewood (Green and Flinders 1980a). Pygmy rabbits are active during twilight (Larrison and Johnson 1981), peak activity occurs at mid-morning (Bradfield 1975), but pygmy rabbits can be seen above ground any time of day.

Pygmy rabbits are only associated with sagebrush (Chapman et al. 1982) which provides food and cover (Larrison and Johnson 1981; White et al. 1982). Pygmy rabbit diets are dominated by sagebrush (99%) during the winter and sagebrush remains an important food year long (Green and Flinders 1980b). However, grasses and forbs as well as sagebrush are eaten in mid-late summer (Green and Flinders 1980b). During the winter pygmy rabbits make tunnels below the snow to sagebrush plants. White et al. (1982) found that pygmy rabbits did not seem to have any foraging preferences between sagebrush species or subspecies.

The only pygmy rabbits observed in the Jarbidge Resource Area were northwest of Signal Butte. Because of the amount of the Jarbidge Resource Area that has been converted to crested wheatgrass or annual grassland because of wildfire, much of the suitable habitat (dense

sagebrush growing on deep soils) for this species has been severely altered by past wildfires and the subsequent invasion of annual grasses and weeds or seeding to crested wheatgrass.

Pygmy rabbits were classified as a C2 species by the Fish & Wildlife Service (1994a). The fragmentation and loss of habitat due to wild fires, seedings, and agricultural expansion continue to be the primary threats to pygmy rabbits.

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## **Kit Fox**

Kit fox (*Vulpes macrotis*) is the smallest canid in North America (Egoscue 1962; O'Farrell 1987). Snow (1973) comments that the species distinction between kit fox and swift fox (*V. velox*) may not be warranted. McGrew (1979) stated that the tails were longer, with the ears closer together and longer in kit fox compared to swift fox. Larrison and Johnson (1981) describe kit fox as nearly buff in color, grayer on the back with a black tipped tail and white chin, throat, and belly. The subspecies in Idaho, Nevada, Oregon, and Utah is the Nevada kit fox (*V. m. nevadensis*) (Snow 1973). Kit fox breed in late December to early January and the litter of pups are born in late February to early March (Egoscue 1962; McGrew 1979). The litter size is variable but usually has 4 to 5 pups (McGrew 1979). Kit fox reach maturity around the age of 10 months or later (O'Farrell 1987). In the wild there are records of kit fox living to 7 years of age (McGrew 1979). Kit foxes use dens year round (Samuel and Nelson 1982). Dens of kit fox have a unique key-hole shaped opening and dens usually have two or more entrances with dirt berms from the construction of new tunnels (McGrew 1979; O'Farrell 1987).

The kit fox is ecologically adapted to the desert shrub biome. McGrew (1979) commented that kit foxes apparently obtain adequate moisture from their prey, because the often den many kilometers for water. Kit fox are basically nocturnal hunters that begin to forage around sunset (Samuel and Nelson 1982). Foods of the kit fox include cottontails, black-tailed jackrabbits, and assorted mice (Egoscue 1962; Samuel and Nelson 1982), although Larrison and Johnson (1981) noted that they may be strongly associated with kangaroo rat colonies. McGrew (1979) suggests that kit fox are opportunistic hunters that consume ground nesting birds, reptiles, and insects.

Larrison and Johnson (1981) wrote that historically kit fox probably occurred throughout southern Idaho south of the Snake River, but that documented occurrences were from western Owyhee County and Oneida County. A kit fox was observed in the Snake River Canyon near Bliss Dam in 1993 by Idaho Power Company. In Idaho the kit fox has been classified as a species of special concern by the Idaho Department of Fish and Game and as a sensitive species by the Bureau of Land Management (Conservation Data Center 1994).

In some parts of the United States the kit fox has been listed as endangered (O'Farrell 1987), but was designated as a C2 species in Idaho (Fish & Wildlife Service 1994a). In Idaho no threats to kit fox have been identified, since the use of poison bait (1080) to control predators was prohibited. The use of M-44's to control coyotes could potentially be a threat to

kit fox in some locations. The impact of wildfire and the annual grassland expansion or crested wheatgrass



seedings on kit fox is likely detrimental to the habitat of their prey. In other areas coyotes and feral or domestic dogs have been documented to be significant predators on kit fox.

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## **California Bighorn Sheep**

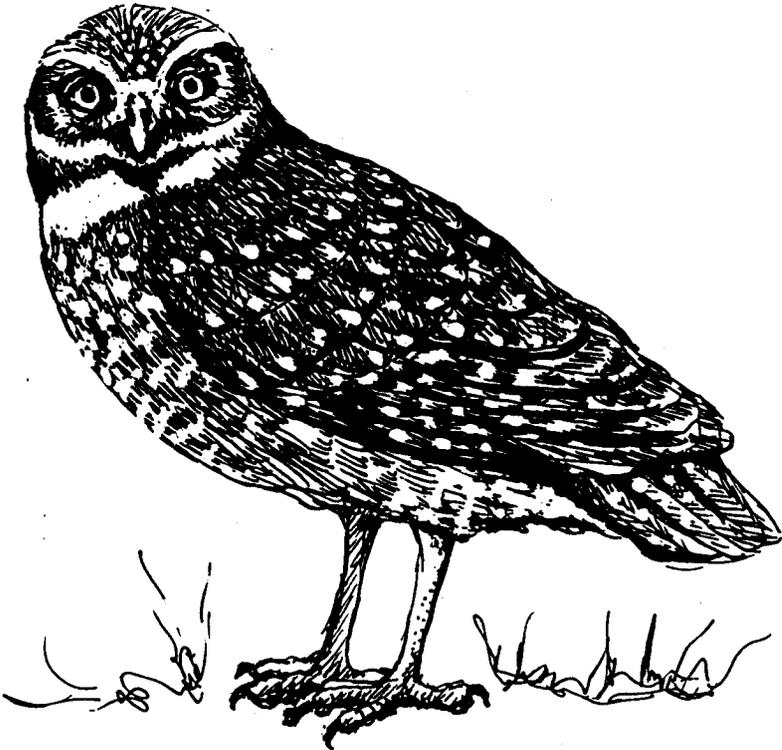
California bighorn sheep (*Ovis canadensis californiana*) are one of four recognized subspecies of bighorn sheep (Lawson and Johnson 1982). They are generally light brown with a light gray to almost white nose, rump patch and undersides. Both sexes have horns, but the female's horns remain small, whereas, the male's horns are much thicker and grow into a curl. Breeding occurs in the fall (October to December) (Hanna 1990) and the young are born the following spring (April through June) according to Lawson and Johnson (1982). California bighorns usually give birth to a single lamb (Hanna 1990), however, twins are occasionally born. California bighorn sheep are diurnal, but they exhibit some limited nocturnal behavior. Lambing habitat has been described as precipitous terrain that provides escape cover (Lawson and Johnson 1982). California bighorn sheep are generally non-migratory and closely associated with steep river canyons in Idaho (Hanna 1990). Females, lambs and young rams usually form bands separate from the bands of mature males. Bighorn sheep are grazers primarily, but do eat some browse (Hobbs et al. 1983). Typical habitat for California bighorn would include bluebunch wheatgrass, Idaho fescue, and bluegrass, with a mixture of shrubs including sagebrush in a fairly steep canyon with a series of benches, cliffs, and water sources.

Bighorn sheep were extirpated from the Bruneau and Jarbidge River Canyons by the 1930's. A number of bighorn sheep have been transplanted into the Bruneau and Jarbidge River Canyons by the Idaho Department of Fish & Game since 1978 (Hanna 1990). The last transplant of 19 bighorn sheep occurred in December 1993. The current population of California bighorn is estimated to be 150 to 175. The vast majority of the bighorn sheep in the Jarbidge Resource Area are located above the confluence of the Jarbidge and Bruneau Rivers. A California bighorn sheep was observed on one occasion near the confluence of Clover Creek (East Fork of the Bruneau River) and the Bruneau River. There are no known established populations for this species in this area of the Bruneau River (Idaho Dept. Fish & Game, unpublished data).

The Fish & Wildlife Service (1994a) had designated California bighorn sheep as a C2 species in Idaho. In the Jarbidge Resource Area the primary threat to bighorn sheep is the degradation of quality habitat due to the invasion of annual grasses and weeds following wildfires. Because of the topography, drill seeding burned areas is not possible, and air space restrictions by the military make aerial seeding difficult. In some regions it has been speculated that domestic sheep transmitted disease to bighorn sheep. However, bighorn sheep also appear to suffer population crashes from disease in the absence of domestic sheep grazing. In the Jarbidge Resource Area areas grazed by domestic sheep does not overlap areas used by California bighorn sheep. Maintaining lower populations of California bighorn sheep may be necessary to maintain a healthy population. A proposed expansion of the Saylor Creek Training Range may affect bighorn sheep by possibly causing shifts in habitat use,, increases

in wild fires, or more stress from low flying jet aircraft. Impacts may be just short term if the bighorn sheep become habituated to the jets.

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## Literature Cited

- Aldrich, J. W. 1963. Geographic orientation of American Tetraonidae. *J. Wildl. Manage.* 27:529-5545.
- Allen, D. B., B. J. Flatter, and K. Fite. 1995. Redband trout (*Oncorhynchus mykiss gairdneri*) population and habitat surveys in Jump, Reynolds, and Sheep Creeks, and sections of the Owyhee County, Idaho. U.S. Dept. Interior, Bur. Land Manage., Idaho Tech. Bull. No. 95-6., Boise, ID. 35 p.
- Andre, J. B. and J. A. MacMahon. 1980. Reproduction in three sympatric lizard species from west-central Utah. *Great Basin Nat.* 40:68-72.
- Baker, C. W., J. C. Munger, L. McCauley, M. Olson, and G. Stevens. 1994. Bruneau Dunes tiger beetle inventory. U. S. Dept. Interior, Bur. Land Manage. Idaho Tech. Bull. No. 94-1. Boise, ID. 45p.
- Bauer, K. L. 1991. Observations on the developmental biology of *Cicindela arenicola* Rumpff (Coleoptera: Cicindelidae). *Great Basin Nat.* 51:226-235.
- Beck, J. M. and C. R. Peterson. 1995. Movements and habitat selection of the longnose snake (*Rhinocheilus lecontei*) in southwestern Idaho. U. S. Dept. Interior, Bur. Land Manage. Idaho Tech. Bull. No. 95-18, Boise, ID. 30 p.
- Behnke R. J. 1992. Native trout of western North America. American Fisheries Society Monograph 6. Bethesda, MD.
- Bellrose, F. C. 1980. Ducks, geese, and swans of North America, 3rd ed., Stackpole Books, Wildlife Management Institute, Harrisburg, PA. 540 p.
- Black, H. L. 1974. A north temperate bat community: structure and prey populations. *J. Mammal.* 55:138-157.
- Bowler, P. A. 1990. The rapid spread of the freshwater Hydrobiid snail *Potamopyrgus antipodarum* (Gray) in the middle Snake River, Idaho. *Proc. Desert Fishes Council* 21:173-182.
- Bradfield, T. D. 1974. On the behavior and ecology of the pygmy rabbit *Sylvilagus idahoensis*. M.S. Thesis, Idaho State University, Pocatello, ID. 43 p.
- Bray, M. P. and D. A. Klebenow. 1988. Feeding ecology of white-faced ibis in a Great Basin Valley, USA. *Colonial Waterbirds* 11:24-31.

- Brennan, L. A., W. M. Block, and R. J. Gutierrez. 1987. Habitat use by mountain quail in northern California. *Condor* 89:66-74.
- Cavender, T. M. 1978. Taxonomy and distribution of the bull trout, *Salvelinus confluentus* (Suckley) from the American Northwest. *Calif. Fish and Game* 3:139-174.
- Chapman, J. A., J. G. Hockman, and W. R. Edwards. 1982. Cottontails (*Sylvilagus floridanus* and allies). pp. 83-123. In J. A. Chapman and G.A. Feldhamer (eds.) *Wild Mammals of North America*. John Hopkins University Press, Baltimore, MD. 1147 p.
- Conservation Data Center. 1990. Rare, threatened, and endangered plants and animals of Idaho. Idaho Dept. Fish and Game, Boise, ID. 33 p.
- Conservation Data Center. 1992. Rare, threatened, and endangered plants and animals of Idaho (2nd ed.). Idaho Dept. Fish and Game, Boise, ID. 38 p.
- Conservation Data Center. 1994. Rare, threatened, and endangered plants and animals of Idaho (3rd ed.). Idaho Dept. Fish and Game, Boise, ID. 39 p.
- Craig, G. 1986. Peregrine Falcon. pp. 806-824. In R. L. DiSilvestro (ed.) *Audubon Wildlife Report 1986*. R. R. Donnelly, and Sons, Co., National Audubon Society, New York, NY. 1094 p.
- Crenshaw, J. G. and B. R. McClelland. 1989. Bald eagle use of a communal roost. *Wilson Bull.* 101:626-933.
- Delehanty, D. J. 1995. Incubation and brood rearing by a wild male mountain quail. *Western Birds* 26:46-48.
- DeStefano, S., S. K. Daw, S. M. Desimone, and E. C. Meslow. 1994. Density and productivity of northern goshawks: implications for monitoring and management. *Studies in Avian Biology* 16:88-91.
- Detrich, P. J. and B. Woodbridge. 1994. Territory fidelity, mate fidelity, and movements of color-marked northern goshawks in the southern Cascades of California. *Studies in Avian Biology*. 16:130-132.
- Diller, L. V. and R. L. Wallace. 1981. Additional distribution records and abundance of three species of snakes in southwestern Idaho. *Great Basin Nat.* 41:154-157.
- Diller, L. V. and D. R. Johnson. 1982. Ecology of reptiles in the Snake River Birds of Prey Area. U. S. Dept. Interior, Bur. Land Manage, Boise, ID. 107 pp.
- Dobkin, D. S. R. D. Gettinger, and M. G. Gerdes. 1995. Springtime movements, roost use,

- and foraging activity of Townsend's big-eared bat (*Plecotus townsendii*) in central Oregon. *Great Basin Nat.* 55:315-321.
- Easterla, D. A. 1965. The spotted bat in Utah. *J. Mammal.* 46:665-668.
- Easterla, D. A. and J. O. Whitaker, Jr. 1972. Food habits of some bats from Big Bend National Park, Texas. *J. Mammal.* 53:887-890.
- Egoscue, H. J. 1962. Ecology and life history of the kit fox in Tooele County, Utah. *Ecology* 43:481-497.
- Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. *The Birder's Handbook: a field guide to the natural history of North American birds.* Simon & Schuster Inc., New York, NY. 785 p.
- Findley, J. S. and C. Jones. 1965. Comments on spotted bats. *J. Mammal.* 46:679-680.
- Fish & Wildlife Service. 1984. Endangered and threatened wildlife and plants; review of invertebrate wildlife as endangered or threatened species. *Federal Register* May 22, 1984, Vol. 49:21664-21675.
- Fish & Wildlife Service. 1989. Endangered and threatened wildlife and plants; animals notice of review. *Federal Register* December 29, 1989, Vol. 54:554-579.
- Fish & Wildlife Service. 1991. Endangered and threatened wildlife and plants; animal candidate review for listing as endangered or threatened species, proposed rule. *Federal Register* November 21, 1991, Vol. 56:58804-58836.
- Fish & Wildlife Service. 1992a. Endangered and threatened wildlife and plants; determination of Endangered or Threatened Status for five aquatic snails in south central Idaho. *Federal Register* December 14, 1992, Vol. 57:59244-59257.
- Fish & Wildlife Service. 1992b. Endangered and threatened wildlife and plants; Notice of finding on petition to list the ferruginous hawk. *Federal Register* August 19, 1992, Vol 57:37507-37513.
- Fish & Wildlife Service. 1993. Endangered and threatened wildlife and plants; determination of Endangered Status for the Bruneau Hot Springsnail in southwestern Idaho. *Federal Register* January 25, 1993, Vol. 58:5938-5946.
- Fish & Wildlife Service. 1994a. Endangered and threatened wildlife and plants; animal candidate review of listing as endangered or threatened species. *Federal Register* November 15, 1994 Vol. 59:58982-59028.
- Fish & Wildlife Service. 1994b. Endangered and threatened wildlife and plants; determination of endangered status for the Kootenai River population of the white sturgeon.

Federal Register September 6, 1994 Vol. 59:45989-46001.

Fish & Wildlife Service. 1995a. Snake River Aquatic Species Recovery Plan. Snake River Basin Office, Ecological Services, Boise, ID. 92 p.

Fish & Wildlife Service. 1995b. Endangered and threatened wildlife and plants; 90-day finding for a petition to list desert redband trout in the Snake River drainage above Brownlee Dam and below Shoshone Falls as threatened or endangered. Federal Register September 27, 1995 Vol. 60:49819-49821.

Fish & Wildlife Service. 1995c. Endangered and threatened species; bald eagle reclassification; final rule. Federal Register July 12, 1995 Vol. 60:36000-36010.

Fish & Wildlife Service. 1995d. Endangered and threatened species; American peregrine falcon; proposed rule. Federal Register June 30, 1995 Vol. 60:34406-34409.

Fish & Wildlife Service. 1996. Endangered and threatened wildlife and plants; review of plant and animal taxa that are candidates for listing as endangered or threatened species. Federal Register February 28, 1996 Vol. 61:7596-7605.

Fraley, J. J. and B. B. Shepard. 1989. Life history, ecology, and population status of migratory bull trout (*Salvelinus confluentus*) in the Flathead Lake and River system, Montana. Northwest Sci. 63(4):133-143.

Fraser, J. D. and D. R. Luukkonen. 1986. The loggerhead shrike. pp. 932-941. In R.L. DiSilvestro (ed.) Audubon Wildlife Report. R.R. Donnelly and Sons, Co., National Audubon Society, New York, NY. 1094 p.

Frest, T. J. and P. A. Bowler. 1992. A preliminary checklist of the aquatic and terrestrial mollusks of the middle Snake River sub-basin. Proc. Desert Fishes Council. 24:53-58.

Frest, T. J. 1994. Current status of the *Anodonta californiensis*, California floater. U. S. Dept. Interior. Fish & Wildl. Serv. Status Rep. Portland, OR. 2 p.

Gale, R. S. 1989. Trumpeter swan. pp. 59-60, In T.W. Clark, A. H. Harvey, R. D. Dorn, D. L. Genter, and C. Groves. (eds.) Rare, sensitive, and threatened species of the Greater Yellowstone Ecosystem. Northern Rockies Conservation Cooperative, Montana Natural Heritage Program, The Nature Conservancy, and Mountain West Environmental Service. 153p.

Genter, D. L. 1986. Wintering bats of the upper Snake River Plain: occurrence in lava tube caves. Great Basin Nat. 46:241-244.

- Genter, D. L. 1989a. Spotted bat. pp. 102. In T.W. Clark, A. H. Harvey, R. D. Dorn, D. L. Genter, and C. Groves. (eds.) Rare, sensitive, and threatened species of the Greater Yellowstone Ecosystem. Northern Rockies Conservation Cooperative, Montana Natural Heritage Program, The Nature Conservancy, and Mountain West Environmental Service. 153 p.
- Genter, D. L. 1989b. Townsend big-eared bat. pp. 103. In T.W. Clark, A. H. Harvey, R. D. Dorn, D. L. Genter, and C. Groves. (eds.) Rare, sensitive, and threatened species of the Greater Yellowstone Ecosystem. Northern Rockies Conservation Cooperative, Montana Natural Heritage Program, The Nature Conservancy, and Mountain West Environmental Service. 153 p.
- Genter, D. L. 1989c. Fringed myotis. pp. 100. In T.W. Clark, A. H. Harvey, R. D. Dorn, D. L. Genter, and C. Groves. (eds.) Rare, sensitive, and threatened species of the Greater Yellowstone Ecosystem. Northern Rockies Conservation Cooperative, Montana Natural Heritage Program, The Nature Conservancy, and Mountain West Environmental Service. 153 p.
- Gleason, R. L. and T. H. Craig. 1979. Food habits of burrowing owls in southeastern Idaho. *Great Basin Nat.* 39:274-276.
- Grebence, B. L. and C. M. White. 1989. Physiographic characteristics of peregrine falcon nesting habitat along the Colorado River system in Utah. *Great Basin Nat.* 49:408-417.
- Green, J. S. and J. T. Flinders. 1980a. *Brachylagus idahoensis*. Mammalian Species No. 125:1-4.
- Green, J. S. and J. T. Flinders. 1980b. Habitat and dietary relationships of the pygmy rabbit. *J. Range Manage.* 33:136-142.
- Griffith, J. and D.M Daley. 1984. Re-establishment of Shoshone sculpin (*Cottus greenei*) in the Hagerman Valley, Idaho. Final Report, Nongame Program, Idaho Dept. Fish & Game, Boise, ID. 12p.
- Groves, C. 1989. Idaho's amphibians and reptiles: description, habitat & ecology. Idaho Dept. Fish Game, Nongame Wildlife Leaflet #7, Boise, ID. 12p.
- Groves, C. R. and K. Steehof. 1988. Responses of small mammals and vegetation to wildfire in shadscale communities of southwestern Idaho. *Northwest Sci.* 62:205-210.
- Hanna, P. 1990. Bighorn sheep: species management plan. Idaho Dept. Fish & Game, Boise, ID. 39 p.

- Harmata, A. R. 1989. Bald Eagle. pp. 65-67. *In* T.W. Clark, A. H. Harvey, R. D. Dorn, D. L. Genter, and C. Groves. (eds.) Rare, sensitive, and threatened species of the Greater Yellowstone Ecosystem. Northern Rockies Conservation Cooperative, Montana Natural Heritage Program, The Nature Conservancy, and Mountain West Environmental Service. 153 p.
- Henderson, F. R., F. W. Brooks, R. E. Wood and R. B. Dahlgren. 1967. Sexing of prairie grouse by crown feather patterns. *J. Wildl. Manage.* 37:764-769.
- Henney, C. J., C. Maser, J. O. Whitaker, Jr., and T. E. Kaiser. 1982. Organochlorine residues in bats after a forest spraying with DDT. *Northwest Sci.* 56:329-337.
- Hershler, R., T.J. Frest, E. J. Johannes, P. A. Bowler, and F. G. Thompson. 1994. Two new genera of Hydrobiid snails (Prosobranchia: Rissosoidea) from the Northwestern United States. *The Veliger* 37(3):221-243.
- Hobbs, N. T., D. L. Baker, and R. B. Gill. 1983. Comparative nutritional ecology of montane ungulates in winter. *J. Wildl. Manage.* 47:1-16.
- Howard, R. P. and M.L. Wolfe. 1976. Range improvement practices and ferruginous hawks. *J. Range Manage.* 29:33-37.
- Humphrey, S. R. 1982. Bats. pp. 52-70. *In* J. A. Chapman and G.A. Feldhamer (eds.) *Wild Mammals of North America*. John Hopkins University Press, Baltimore, MD. 1147 p.
- Idaho State Conservation Effort. 1995. Habitat conservation assessment and conservation strategy for the Townsend's big-eared bat. Draft Unpubl. Rep. No. 1, Boise, ID. 78 p.
- Isaacs, F. B. and R. G. Anthony. 1987. Abundance, foraging, and roosting of bald eagles wintering in the Harney Basin, Oregon. *Northwest Sci.* 61:114-121.
- Jenni, D. A., R. L. Redmond, and T. K. Bicak. 1982. Behavioral ecology and habitat relationships of long-billed curlews in western Idaho. U.S. Dept. Interior, Bur. Land Manage., Boise, ID. 234p.
- Johnsgard, P. A. 1973. *Grouse and Quails of North America*. University of Nebraska Press, Lincoln, NE. 553 p.
- Johnsgard, P. A. 1990. *Hawks, eagles, and falcons of North America: biology and natural history*. Smithsonian Institution Press, Washington, DC. 403 p.
- Johnson, G. L. 1990. Bull trout species management plan. Nevada Division of Wildlife, Elko, NV. 17 p.

- Johnson, G. L. and D. E. Weller. 1994. The status of the bull trout in Nevada. Nevada Division of Wildlife, Reno, NV. 14 p.
- Johnson, J. B., M. C. Belk, and D. K. Shiozawa. 1995. Age, growth, and reproduction of leatherside chub (*Gila copei*). *Great Basin Nat.* 55:183-187.
- Keister, G. P., Jr., R. G. Anthony, and E. J. O'Neill. 1987. Use of communal roosts and foraging areas by bald eagles wintering in the Klamath Basin. *J. Wildl. Manage.* 51:415-420.
- Keller, B. L. 1985. A simplified key for Idaho bats. *Tebiwa* 22:57-63.
- Klott, J. H. and F. G. Lindzey. 1990. Brood habitats of sympatric sage grouse and Columbian sharp-tailed grouse in Wyoming. *J. Wildl. Manage.* 54:84-88.
- Kunz, T. H. and R. A. Martin. 1982. *Plecotus townsendii*. *Mammalian Species* 175:1-6.
- Langelier, L. 1989. Peregrine falcon. pp. 68-69. *In* T.W. Clark, A. H. Harvey, R. D. Dorn, D. L. Genter, and C. Groves. (eds.) Rare, sensitive, and threatened species of the Greater Yellowstone Ecosystem. Northern Rockies Conservation Cooperative, Montana Natural Heritage Program, The Nature Conservancy, and Mountain West Environmental Service. 153 p.
- Larrison, E. J. and D. R. Johnson. 1981. Mammals of Idaho. Northwest Naturalist Books, University Press of Idaho, Moscow, ID. 166 p.
- Lawson, B. and R. Johnson. 1982. Mountain sheep. pp. 1036-1055. *In* J.A. Chapman and G.A. Feldhamer (eds.), *Wild Mammals of North America: biology, management, economics*. The Johns Hopkins University Press, Baltimore, MD 1147 p.
- Leonard, M. L. and M. B. Fenton. 1983. Habitat use by spotted bats (*Euderma maculatum*, Chiroptera: Vespertilionidae): roosting and foraging behavior. *Canadian J. Zool.* 61:1487-1491.
- Lingle, G. R. and G. L. Krapu. 1986. Wintering ecology of bald eagles in southcentral Nebraska. *Prairie Nat.* 18:65-78.
- Logan, D. R. 1995. Idaho dune tiger beetle survey 1995, *Cicindela arenicola* Rumpff. U.S. Dept. Interior, Bur. Land Manage. Idaho Tech. Bull. 95-17, Boise, ID. 50 p.
- Makela, P. D. 1994. Burley District tiger beetle inventory. U. D. Dept. Interior, Bur. Land Manage., Idaho Tech. Bull. 94-2, Boise, ID. 21 p.
- Marks, J. S. and V. S. Marks. 1988. Winter habitat use by Columbian sharp-tailed grouse in western Idaho. *J. Wildl. Manage.* 52:743-746.

- Marshall, W. H. and M. S. Jensen. 1937. Winter and spring studies of the sharp-tailed grouse in Utah. *J. Wildl. Manage.* 1:87-99.
- McCabe, G. T., Jr., R. L. Emmett, and S. A. Hinton. 1993. Feeding ecology of juvenile white sturgeon (*Acipenser transmontanus*) in the lower Columbian River. *Northwest Sci.* 67:170-180.
- McDonald, M. and R. E. Marsh. 1995. Amphibian inventory of the Jarbidge Resource Area, Boise District. U.S. Dept. Interior, Bur. Land Manage. Idaho Tech. Bull. No. 95-4, Boise, ID. 31p.
- McGrew, J. C. 1979. *Vulpes macrotis*. *Mammalian Species* No. 123:1-6.
- Meints, D. R. 1991. Seasonal movements, habitat use, and productivity of Columbian sharp-tailed grouse in southeastern Idaho. M.S. Thesis, University of Idaho, Moscow. 74p.
- Munger, J. C., L. Heberger, D. Logan, W. Peterson, L. Mealy, and M. Cauglin. 1994. A survey of the herpetofauna of Bruneau Resource Area, Boise District with focus on the spotted frog, *Rana pretiosa*. U.S. Dept. Interior, Bur. Land Manage. Idaho Tech. Bull. No. 94-7, Boise, ID. 63p.
- Munger, J. C., M. Gerber, M. Carroll, K. Madrid, and C. Peterson. 1996. Status and habitat associations of the spotted frog *Rana pretiosa* in southwestern Idaho. U.S. Dept. Interior, Bur. Land Manage. Idaho Tech. Bull. No 96-1, Boise, ID. 112p.
- Neitzel, D. A. and T. J. Frest. 1990. Survey of Columbia River Basin streams for Columbia pebblesnail and shortface lanx. *Fisheries* 15:2-3.
- Nussbaum, R. A., E. D. Brodie, Jr., and R. M. Storm. 1983. Amphibians & reptiles of the Pacific Northwest. University of Idaho Press, Moscow, ID. 332 p.
- Oedekoven, O. O. 1985. Columbian sharp-tailed grouse population, distribution and habitat use in south-central Wyoming. M.S. Thesis, University of Wyoming, Laramie. 58p.
- O'Farrell, M. J. and E. H. Studier. 1973. Reproduction, growth, and development in *Myotis thysanodes* and *M. lucifugus* (Chiroptera: Vespertilionidae). *Ecology* 54:18-30.
- O'Farrell, M. J. and E. H. Studier. 1980. *Myotis thysanodes*. *Mammalian Species* No. 137:1-5.
- O'Farrell, T. P. 1987. Kit fox. pp. 423-431. In M. Novack, J.A. Baker, M.E. Obbard, and B. Malloch, (eds.). *Wild Furbearer Management and Conservation in North America*. Ontario Trappers, Assoc., North Bay, Ontario, Canada.
- Parker, T. L. 1970. On the ecology of the sharp-tailed grouse in southeastern Idaho. M.S.

Thesis, Idaho State University, Pocatello. 140p.

- Pennak, R. W. 1989. Fresh-water invertebrates of the United States. Ronald Press Co., New York., NY.
- Peterson, A. 1986. Habitat suitability index models: Bald eagle (breeding season). U.S. Dept. Interior, Fish & Wildlife Serv., Biological Report 82(10.126), Washington, DC. 25 p.
- Pierson, E. D., W. E. Rainey, and D. M. Koontz. 1991. Bats and mines: experimental mitigation for Townsend's big-eared bat at the McLaughlin Mine in California. pp. 31-42. In Proceedings Issues and Technology in the Management of Impacted Wildlife, Thorne Ecological Institute, Snowmass, CO.
- Redmond, R. L. 1989. Long-billed curlew. pp. 75-76. In T.W. Clark, A. H. Harvey, R. D. Dorn, D. L. Genter, and C. Groves. (eds.) Rare, sensitive, and threatened species of the Greater Yellowstone Ecosystem. Northern Rockies Conservation Cooperative, Montana Natural Heritage Program, The Nature Conservancy, and Mountain West Environmental Service. 153p.
- Redmond, R. L. and D. A. Jenni. 1986. Population ecology of the long-billed curlew (*Numenius americanus*) in Western Idaho. *Auk* 103:755-767.
- Reiman, B. E. and J. D. McIntyre. 1993. Demographic and habitat requirements of bull trout. U. S. Dept. Agric. Forest. Serv., Intermountain Research Station, Gen. Tech. Rep. INT-302, Boise, ID.
- Reynolds, R. T. 1989. Accipiters. pp. 92-101. In Proceedings of Western Raptor Management, National Wildlife Federation, Scientific and Technical Series. No. 12, Washington, DC.
- Reynolds, R. T. and E. C. Meslow. 1984. Partitioning of food and niche characteristics of coexisting *Accipiter* during breeding. *Auk* 101:761-779.
- Reynolds, R. T., E. C. Meslow, and H. M. Wight. 1982. Nesting habitat of coexisting *Accipiter* in Oregon. *J. Wildl. Manage.* 46:124-138.
- Reynolds, R. T., S. M. Joy, and D. G. Leslie. 1994. Nest productivity, fidelity, and spacing of northern goshawks in Arizona. *Studies in Avian Biology* 16:106-113.
- Reynolds, T. D. 1980. Effects of some different land management practices on small mammal populations. *J. Mammal.* 61:558-561.
- Reynolds, T. D. and C. H. Trost. 1980. The response of native vertebrate populations to crested wheatgrass planting and grazing by sheep. *J. Range Manage.* 33:122-125.

- Rich, T. 1986. Habitat and nest-site selection by burrowing owls in the sagebrush steppe of Idaho. *J. Wildl. Manage.* 50:548-555.
- Saab, V. A. and J. S. Marks. 1992. Summer habitat use by Columbian sharp-tailed grouse in western Idaho. *Great Basin Nat.* 52:166-173.
- Saab, V. and C. Groves. 1992. Idaho's migratory landbirds. Nongame Wildlife Leaflet #10, Idaho Dept. Fish & Game, Boise, ID. 16 p.
- Samuel, D. E. and B. B. Nelson. 1982. Foxes (*Vulpes vulpes* and Allies). pp. 475-490. In J. A. Chapman and G.A. Feldhamer (eds.) *Wild Mammals of North America*. John Hopkins University Press, Baltimore, MD. 1147 p.
- Schneider, J. W. 1994. Winter feeding and nutritional ecology of Columbian sharp-tailed grouse in southeastern Idaho. M.S. Thesis, University of Idaho, Moscow. 118p.
- Schowalter, D. B. 1980. Swarming, reproduction, and early hibernation of *Myotis lucifugus* and *M. volans* in Alberta, Canada. *J. Mammal.* 61:350-354.
- Science Applications International Corporation. 1995. Clearance surveys for proposed BLM land disposal near Salmon Falls Creek, Twin Falls County, Idaho. Report No. 0091625. Boise, ID. 33 p.
- Shook, G. A. 1984. Checklist of tiger beetles from Idaho (Coleoptera: Cicindelidae). *Great Basin Nat.* 44:159-160.
- Shook, G. A. and W. H. Clark. 1988. Status of the Idaho dunes tiger beetle, *Cincindela arenicola* Rumpff, (Coleoptera: Cicindelidae). *J. Idaho Acad. Sciences.* 24:38-42.
- Shuster, W. C. 1980. Northern goshawk nest site requirements in the Colorado Rockies. *Western Birds* 11:89-96.
- Simpson, J. C. and R. L. Wallace. 1982. *Fishes of Idaho*, (2nd ed.). University of Idaho Press, Moscow, ID. 238 p.
- Smith, R. 1994. Survey of mountain quail in the Jarbidge Resource Area. Idaho Dept. Fish & Game, Jerome, ID. 9 p.
- Snow, C. 1973. San Joaquin kit fox, *Vulpes macrotis mutica* related subspecies and the swift fox *Vulpes velox*. U. S. Dept. Interior, Bur. Land Manage., Tech. Note No. 6, Denver, CO. 24 p.
- Snow, C. 1974. Spotted bat *Euderma maculatum*. U.S. Dept. Interior, Bur. Land Manage. Tech. Note Report No. 4, Denver, CO. 13 p.

- Speakman, J. R., P. I. Webb, and P. A. Racey. 1991. Effects of disturbance on the energy expenditure of hibernating bats. *J. Appl. Ecol.* 28:1087-1104.
- Speiser, R. and T. Bosakowski. 1987. Nest site selection by northern goshawks in northern New Jersey and southeastern New York. *Condor* 89:387-394.
- Squires, J. R. and S. H. Anderson. 1995. Trumpeter swan (*Cygnus buccinator*) food habits in the Greater Yellowstone Ecosystem. *Am. Midl. Nat.* 133:274-282.
- Storz, J. F. 1995. Local distribution and foraging behavior of the spotted bat (*Euderma maculatum*) in northwestern Colorado and adjacent Utah. *Great Basin Nat.* 55:78-83.
- Taylor, D. M., C. H. Trost, and B. Jamison. 1989. The biology of the white-faced ibis in Idaho. *Western Birds* 20:125-133.
- Taylor, D. W. 1982a. Status report on Homedale Creek spring snail. Tomales Bay Marine Laboratory, Marshall, California, U.S. Dept. Interior, Fish & Wildlife Serv., Portland, OR. 10 p.
- Taylor, D. W. 1982b. Status report on the Utah Valvata snail in southwestern Idaho. Tomales Bay Marine Laboratory, Marshall, California, U.S. Dept. Interior, Fish & Wildlife Serv., Portland, OR. 10 p.
- Taylor, D. W. 1982c. Status report on Snake River Physa snail. Tomales Bay Marine Laboratory, Marshall, California, U.S. Dept. Interior, Fish & Wildlife Serv., Portland, OR. 8 p.
- Taylor, D. W. 1982d. Status report on Bliss Rapids snail. Tomales Bay Marine Laboratory, Marshall, California, U.S. Dept. Interior, Fish & Wildlife Serv., Portland, OR. 8 p.
- Taylor, D. W. 1982e. Status report on the Great Columbia River spire snail. Tomales Bay Marine Laboratory, Marshall, California, U.S. Dept. Interior, Fish & Wildlife Serv., Portland, OR. 8 p.
- Taylor, D. W. 1982f. Status report on giant Columbia River limpet in southwestern Idaho. Tomales Bay Marine Laboratory, Marshall, California, U.S. Dept. Interior, Fish & Wildlife Serv., Portland, OR. 9 p.
- Taylor, D. W. 1985. Candidate threatened or endangered molluscs in Box Canyon ACEC, Gooding County, Idaho. Report ID-050-PH5-0093, U.S. Dept. Interior, Bur. Land Manage. Shoshone, ID. 19 p.
- Taylor, D. W. 1988. New species of Physa (Gastropoda: Hygrophila) from the western United States. *Malacological Review* 21:43-79.

- Trost, C. H. 1989. White-faced ibis. pp. 57-58. In T.W. Clark, A. H. Harvey, R. D. Dorn, D. L. Genter, and C. Groves. (eds.) Rare, sensitive, and threatened species of the Greater Yellowstone Ecosystem. Northern Rockies Conservation Cooperative, Montana Natural Heritage Program, The Nature Conservancy, and Mountain West Environmental Service. 153 p.
- Trost, C. H. and A. Gerstell. 1994. Status and distribution of colonial nesting waterbirds in southern Idaho, 1993. U.S. Dept. Interior, Bur. Land Manage., Idaho Tech. Bull. No. 94-6, Boise, ID. 104 p.
- Turner, F. B. 1959. An analysis of the feeding habits of *Rana pretiosa* in Yellowstone Park, Wyoming. Amer. Midl. Nat. 61:403-413.
- Ulliman, M. J. 1995. Winter habitat ecology of Columbian sharp-tailed grouse in southeastern Idaho. M.S. Thesis, University of Idaho, Moscow. 119p.
- Varricchione, J. T. and G. W. Minshall. 1994. Annual Monitoring Report: Bruneau Hot-spring springsnail (*Pyrgulopsis bruneauensis*). Stream Ecology Center, Idaho State Univ., Pocatello, ID. 20 p.
- Vinson, M. and S. Levesque. 1994. Redband trout response to hypoxia in a natural environment. Great Basin Nat. 54:150-155.
- Wai-Ping, V. and M. B. Fenton. 1989. Ecology of spotted bat (*Euderma maculatum*) roosting and foraging behavior. J. Mammal. 70:617-622.
- Wallace, R. L., J. S. Griffith, D. M. Daley, P. J. Connolly, and G. B. Beckman. 1984. Distribution of the Shoshone Sculpin (*Cottus greeniei*: Cottidae) in the Hagerman Valley of southcentral Idaho. Great Basin Nat. 44:324-326.
- Warner, R. M. and N. J. Czaplewski. 1984. *Myotis volans*. Mammalian Species 224:1-4.
- Warren, C. D. and F. E. Partridge. 1993. Evaluation of the status of bull trout in the Jarbidge River drainage, Idaho. Idaho Dept. Fish & Game, for U.S. Dept. Interior, Bur. Land Manage., Idaho Tech. Bull. No. 93-1, Boise, ID. 20 p.
- Warren, C. D. and F. E. Partridge. 1995. Salmon Falls Creek fish inventory. Idaho Dept. Fish & Game, for U.S. Dept. Interior, Bur. Land Manage., Idaho Tech. Bull. No. 95-2., Boise, ID. 26p.
- Watkins, L. C. 1977. *Euderma maculatum*. Mammalian Species 77:1-4.
- Whitaker, J.O., Jr., C. Maser, and S. P. Cross. 1981. Food habits of eastern Oregon bats, based on stomach and scat analyses. Northwest Sci. 55:281-292.

- White, C. M. and T. L. Thurow. 1985. Reproduction of ferruginous hawks exposed to controlled disturbance. *Condor* 87:14-22.
- White, S. M., J. T. Flinders, and B. L. Welch. 1982. Preference of pygmy rabbits (*Brachylagus idahoensis*) for various populations of big sagebrush. (*Artemisia tridentata*). *J. Range Manage.* 41:114-117.
- Williams, D. F. 1968. A new record of *Myotis thysanodes* from Washington. *Murrelet* 49:26-27.
- Woffinden, N. D. and J. R. Murphy. 1983. Ferruginous hawk nest site selection. *J. Wildl. Manage.* 47:216-219.
- Woodsworth, G. C., G. P. Bell, and M. B. Fenton. 1981. Observations of the echolocation, feeding behavior and habitat use of *Euderma maculatum* (Chiroptera: Vespertilionidae) in southcentral British Columbia. *Canadian J. Zool.* 59:1099-1102.
- Wyman, R. 1990. What's happening to the amphibian? *Conserv. Biol.* 4:350-352.
- Younk, J. V. and M. J. Bechard. 1994. Breeding ecology of the northern goshawk in high-elevation aspen forest of northern Nevada. *Studies in Avian Biology* 16:119-121.
- Zarn, M. 1974. Burrowing owl (*Speotyto cunicularia hypugaea*). Report No. 11, Tech. Note T-N-250, U.S. Dept. Interior, Bur. Land Manage. Denver, CO. 25 p.
- Zoellick, B. W., R. Armstrong, and J. Klott. 1995. Status of the migratory bull trout population in the Jarbidge River drainage. U.S. Dept. Interior, Bur. Land Manage. and Fish Wildlife Serv. Project Completion Report, Boise, ID. 8 p.