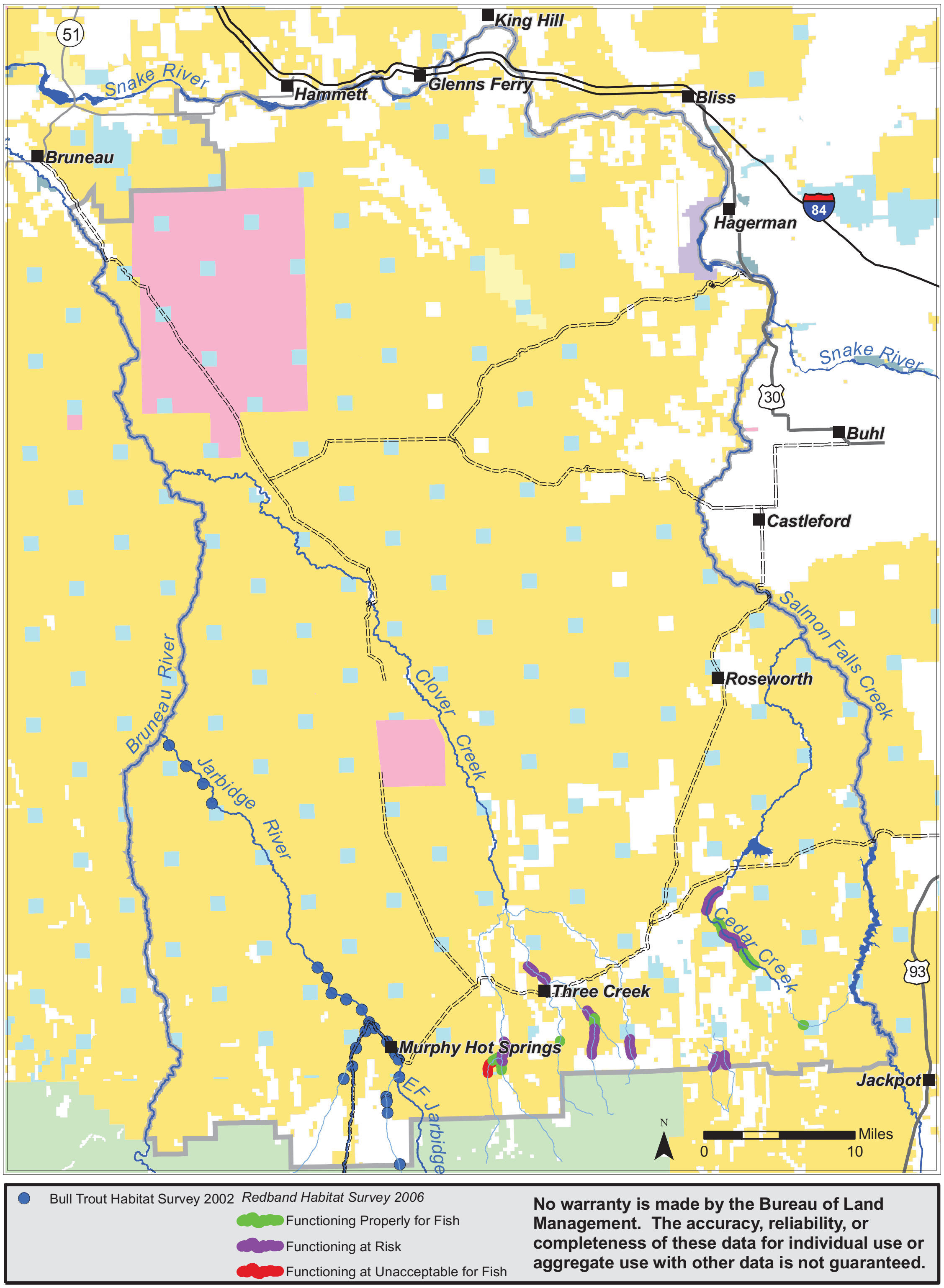
Figure 10. Condition of Redband Trout Habitat



JARBIDGE FIELD OFFICE

The stream habitat surveys assessed the number of pools per mile for each reach. Pool frequencies in 43 stream reaches were rated as functioning appropriately for redband trout, two were rated as functioning at risk, and four were considered not functioning properly for redband trout. The highest pool frequencies were found in the headwater reaches of Cedar Creek (Reaches 5 - 7; 122 to127 pools/mile) and the lowest pool frequencies were found in Flat Creek (Reaches 1- 3; 34 to 41 pools/mile). In general, pool frequencies were higher in the headwater reaches that had boulders and large woody debris to form pools and lower in reaches with low stream gradient and limited boulders and instream woody debris. The standard for large pools, such as those that are 3 ft deep or more, was met in 25 of the stream reaches. Twenty-three of the stream reaches were function at risk or not functioning properly for redband trout due to their limited occurrence of large pools. Some of these reaches may have limited potential to form large pools due to low stream gradient.

Redband trout can be found in extreme temperature regimes from near freezing to 77˚F and can occur in alkali environments. Spawning temperatures occur between the temperatures of 39˚F to 57˚F usually during the months of May and June. There is evidence that large redband trout are affected more by thermal regimes than small redband trout, and that higher densities occur at higher elevations where thermal conditions are cooler (Rodnick et al., 2004; Zoellick et al., 2005). The temperatures in these redband streams are typical of this area, ranging from 59˚F to 73˚F (Johnson et al., 1985; Kunkel, 1976; Zoellick et al., 1996).

Water temperature recorded at the time of the habitat surveys indicate water temperature on 20 of the stream reaches was above the 65^{o}F considered to be functioning properly for redband trout. Water temperature on sixteen of the reaches was less than 65^{o}F. Water temperature was not recorded for twelve of the reaches due to low streamflow or an absence of fish. Water temperatures are naturally elevated during the hot summer months when air temperatures are high. Management actions that promote dense streambank vegetation and instream flows can reduce water temperature at some times of the year.

Thirty-two stream reaches contain natural or human-caused migration barriers that prevent redband trout from moving throughout a stream. The remaining sixteen stream reaches did not have migration barriers to that would inhibit or prevent fish movement.

White Sturgeon

The present distribution of white sturgeon in the Snake River is fragmented into nine discrete subpopulations. Of these subpopulations, only the Hells Canyon-Lower Granite and the Bliss Dam to C.J. Strike reaches currently support self-sustaining populations (Cochnauer et al., 1985). Snake River reaches above the Bliss Dam Reservoir, such as the Upper Salmon Falls Dam and Lower Salmon Falls Dam, have small populations with little or no detectable natural recruitment (Lepla et al., 2002). These dams block upstream migrations, decreasing the amount of suitable spawning areas and creating poor incubation environments for white sturgeon (Lukens, 1981).

The current population of white sturgeon between Upper Salmon Falls Dam and Lower

Salmon Falls Dam consists of potentially remnant native fish stocks and hatchery-reared fish. This population of fish is not self supporting and relies on the reproduction of hatchery-stocked white sturgeon (Jager et al., 2002). Nineteen white sturgeon were captured when this reach was last surveyed in 2004 (Lepla et al., 2004).

The Snake River reach from Bliss Dam to Lower Salmon Falls Dam was surveyed from March through August 2004. Thirty-eight sturgeon (5 wild and 33 hatchery) were captured below the reservoir between 1992 and 1994. A total of 45 sturgeon (9 wild and 35 hatchery) were captured were captured between 1992 and 2004 (Lepla et al., 2004). A low number of small fish captured during the last three stock assessments 1980 to1981 (Lukens, 1981), 1992 to 1993 (Lepla & Chandler, 1995), and 2004 (Lepla et al., 2004) suggests natural recruitment remains low and infrequent. Sturgeon growth rates in reaches between Bliss and Shoshone Falls remain higher when compared to lower reaches on the Snake River with viable populations (Lepla et al., 2004).

The limited availability of suitable spawning habitat is a factor in the status of white sturgeon in the planning area. White sturgeon typically require 10 to 15 years to reach sexual maturity and have a low natural recruitment of off-spring. IDFG regulations only allow for the catch and release of white sturgeon.

<u>Shoshone Sculpin</u>
Shoshone sculpin are found in 52 locations within 26 springs and streams in the Hagerman Valley (FWS, 1995). They also are found in Upper Salmon Falls Reservoir, below Upper Salmon Falls Reservoir, in Lower Salmon Falls Reservoir, and in Bliss Reservoir. These sculpin are not found in the Snake River above Shoshone Falls. The number of Shoshone sculpin captured during fisheries surveys by Idaho Power from 1986 to 1990 varied by reach in Upper Salmon Falls Reservoir (116), below Upper Salmon Falls Reservoir (7), Lower Salmon Reservoir (95), below Lower Salmon Falls Reservoir (20), and Bliss Reservoir (6) (Lepla & Chandler, 1995).

Shoshone sculpin require clear, cool streams with moderate streamflow. They live on the stream bed and spend daylight hours under cobbles and boulders, coming out to feed at night. Preferred summer temperatures vary from 55ºF to 65ºF (Sigler & Sigler, 1987). Spawning seasons occur from late winter to mid summer under rocks or ledges. Shoshone sculpin females deposit 20 to 120 eggs in nests created by the male. A male fans the eggs with his pectoral fins to keep the eggs supplied with oxygen, and protects the nest from predators.

Shoshone sculpin are only found in association with groundwater outflows or upwelling from stream bottoms. The occurrence of this fish decreases when there is less influence of spring water on water quality (Wallace & Griffith, 1982). Juvenile sculpin prefer vegetated areas with both adults and juveniles preferring low water velocities (<20 cm/sec) with temperatures near 59ºF (Wallace & Griffith, 1982).

<u>Aquatic Snails/Mollusks</u>
The Bliss Rapids snail, Utah valvata snail, Idaho springsnail, and the Snake River physa

are present in the Snake River, and the Bruneau Hot springsnail is present in the lower Bruneau River. Since the 1987 RMP, several changes in the designated status for aquatic snails/mollusks have occurred within the planning area (Table 16).

Table 16. Current Status of Special Status Aquatic Snails/Mollusks Designated in the 1987 Jarbidge RMP

Common Name	Scientific Name	1985[A]	2007[B]	Rank[C]
Idaho springsnail	*Pyrgulopsis idahoensis*	Not listed	Type 1[D]	G1/S1
Utah valvata	*Valvata utahensis*	Candidate	Type 1	G1/S1
Snake River physa	*Physa natricina*	Candidate	Type 1	G1/S1
Bliss Rapids snail	*Taylorconcha serpenticola*	Candidate	Type 1	G1/S1
Bruneau Hot springsnail	*Pyrgulopsis bruneauensis*	Not listed	Type 1	G1/S1
Short-face lanx	*Fisherola nuttalli*	Not designated	Type 2	G2?/S1
California floater	*Anodonta californiensis*	Not designated	Type 3	G4/S?
Columbia pebblesnail	*Fluminicola columbianus*	Candidate	Type 3	GU/S1

[A] (BLM, 1985)
[B] 1–Federally listed, proposed for listing, or designated Candidate species, 2–range wide imperiled, 3–regional/state imperiled, 4–at periphery of range, 5–Watch species.
[C] G = Global ranking: 5–secure, 4–apparently secure, 3–vulnerable, 2–imperiled, 1–critically imperiled
S = State ranking: 5–secure, 4–apparently secure, 3–vulnerable, 2–imperiled, 1–critically imperiled, ? = Uncertainty exists about stated rank
[D] Presently considered for delisting due to change in taxonomy.

The habitat requirements for Snake River snails include cold, clean, well-oxygenated, flowing water of low turbidity. With the exception of the Utah valvata snail and possibly Idaho springsnail, these snails prefer gravel to boulder-sized substrates. Despite this similarity, each of these species has slightly different habitat preferences. The Idaho springsnail and Snake River physa are found only in the free-flowing reaches of the Snake River. The Bliss Rapids snail and Utah valvata occur in both cold-water springs and Snake River habitats. The development of hydroelectric power for the Snake River system has changed the Snake River from a primarily free-flowing, cold-water system to a slower-moving, warmer water system. As of 2006, the Federally listed species occur mainly in the remaining free-flowing reaches or spring habitats of the Snake River.

Idaho Springsnail

The Idaho springsnail was listed by the FWS as Endangered on December 14, 1992. These snails are currently under a status review by the FWS for possible delisting because a recent clarification in taxonomy indicates the snail is more common that originally believed. This snail is small (0.24 to 0.3 inches), has a narrowly elongated shell, and is only found in the flowing waters of the Snake River in Idaho. This snail is not found in any of the Snake River tributaries or river margin cold-water springs (Taylor, 1982b). The Idaho springsnail is 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, and the snail is often found attached to vegetation in riffles (Taylor, 1982b).

Historically, the Idaho springsnail was found from Homedale, Idaho upstream to Bancroft Springs, Idaho; however, it has been extirpated from the headwaters of C.J. Strike reservoir downstream to Homedale (57 FR 58244). The current distribution is in fragmented, small populations from Bancroft Springs to the head of C.J. Strike Reservoir; a reduction of 80% of its historic range. BLM inventory and monitoring data is not available for this species, but inventories have been completed by Idaho Power.

Utah Valvata Snail

The Utah valvata snail was listed by the FWS as an Endangered species under the ESA on December 14, 1992. This snail is small (<0.2 inches) and lives in deep pools near rapids and habitats associated with large perennial spring complexes (57 FR 58244). They are found in mud, silt, and fine sand substrates in shallow shore-line water and in pools adjacent to rapids or perennial-flowing waters associated with large spring complexes and submerged vegetation. This species avoids areas with strong currents or rapids. These snails primarily feed on dead plant material, but are known to graze on zooplankton and algae on rocks and aquatic plants. Utah valvata snails require cold, clean, well-oxygenated water with low turbidity.

Historically, these snails were found from American Falls downstream to the Grandview area as well as Utah Lake, Utah (FWS, 1995). The current distribution includes a few sites in Hagerman Valley and scattered locations from American Falls Reservoir to King Hill Creek, Idaho.

Snake River Physa

The Snake River physa was listed by the FWS as Endangered on December 14, 1992. This snail is small (0.3 inch) and only found in the Snake River. It requires cold, clean, well-oxygenated, flowing water with low turbidity (57 FR 58244). The Snake River physa snails are found on the underside of gravel- to boulder-sized rock in swift current at the margins of rapids. Other life history information (reproduction, food habits) are largely unknown for this species. The Snake River physa snail is a relic survivor from the Pleistocene that once occurred in lakes and streams in northern Utah and southeastern Idaho (Taylor, 1982c).

Historically, Snake River physa snails occurred from near Grandview upstream to the Hagerman area (Taylor, 1988) and possibly up to Minico Dam. Presently, they are found in a few scattered sites between King Hill and Hagerman with a potential isolated population near Minidoka Dam (57 FR 58244). It is believed that fewer than 50 have been collected in the Snake River (Frest & Bowler, 1992). The BLM lacks inventory or site-specific data for Snake River physa.

Bliss Rapids Snail

The Bliss Rapids snail was listed by the FWS as a Threatened species on December 14, 1992. This snail is small (<0.1 inch) and found primarily on cobbles and boulders in swift current in rapids or boulder bars below rapids (Taylor, 1982a). It also can be found in spring-influenced areas or along the edges of rapids that border the shoreline and is known to avoid surfaces with attached plants (57 FR 58244). It is present in the Snake River between the Upper Salmon Falls Dam and the Snake River at King Hill and in a few spring habitats in the Hagerman Valley.

Reproduction occurs October through February, and adults experience a seasonal die-off after reproducing (57 FR 58244). The Bliss Rapids snail appears to require cold, clean, well-oxygenated, flowing water with low turbidity (57 FR 58244). This species can be quite abundant, especially on smooth rock surfaces covered with red algae. These snails avoids daylight and prefers the darker undersides of rocks during the daylight (Bowler, 1990).

Historically, the Bliss Rapids snail was present in the Snake River from the Indian Cove Bridge upstream to an area east of American Falls. Currently, they are found in a few discontinuous areas in the Bliss Dam tailwaters to Lower Salmon Falls Dam tailwaters, a few unpolluted springs (Thousand Springs, Banbury Springs, Box Canyon Springs, and Niagara Springs), and one spring near American Falls (FWS, 1995).

Bruneau Hot Springsnail

The Bruneau Hot springsnail was listed by the FWS as an Endangered species on June 17, 1998. This snail is small (<0.25 inch) and is only found in warm water springs and seeps along a 5.5 mile reach of the lower Bruneau River near Hot Creek. It reproduces best in water between 75ºF to 95ºF and appears to be an opportunistic grazer, eating a variety of algae (Mladenka, 1992). This species of springsnail is found on rock, sand, silt, and algae substrates, and eggs are laid individually on rock at any time of the year (Mladenka, 1992).

Short-Face Lanx

The short-face lanx is an oval-outlined, flat cone-like, freshwater mollusk about 0.5 inches in diameter (FWS, 1995). The short-face lanx lives in steady to strong currents on the under surfaces of large rocks (Taylor, 1985). It is found in large rivers or in large springs in rapids and boulder bars below rapids (Taylor, 1985). The short-face lanx deposits seven to eight eggs in a jelly-like mass on the lower surfaces of rocks (FWS, 1995). This mollusk has neither lungs nor gills, but absorbs oxygen from a vascularized mantle bordering the foot. This species requires water with high amounts of oxygen (FWS, 1995).

The historic distribution of this species is in the Snake River from the Rupert area downstream to near King Hill, as well as major rivers in Washington and Oregon. The southern Idaho population is disconnected from the populations in Hells Canyon, the Salmon River, and the Columbia Rivers (Neitzel & Frest, 1990). The numerous dams on the Snake River have further fragmented the habitats used by Short-faced lanx. The BLM lacks any specific data for this mollusk.

California Floater

The California floater is a clam-like mollusk most commonly found in rivers, cold-water springs, or reservoirs in relatively stable, oxygenated mud to fine gravel beds (FWS, 1995). This species can be found in the Snake River immediately upstream or downstream of rapids in mud-sand substrates with good water quality and can reach a fairly large size of 6 to 9 inches in length. This mollusk is relatively sessile (attached to substrate) and exposes about one-third to one-half of the shell from the substrate with the opening of the shell facing upstream (FWS, 1995). California floaters have a larval and adult life form. The larval form appears to be an external parasite on fish for about three to six weeks. This species is long-lived, reaching 20 years of age (FWS, 1995).

Although there is some information on the distribution of this species in Idaho, little is known about the habitat requirements of this species. Frest and Bowler discovered this species can still be found in scattered locations between Bliss and Alkali Creek in the middle reaches of the Snake River; however, their distribution in this reach is very patchy (Frest & Bowler, 1992).

Columbia pebblesnail

The Columbia pebblesnail is a small freshwater snail with a turbinate (spiral) shell approximately 0.4 inches high. The pebblesnail lives in flowing waters and uses gravel- to boulder-sized substrate at the edges or downstream of rapids and whitewater areas (FWS, 1995). The habitat use, food habits, and other basic biological information for this species is largely unknown.

Prior to 1988, the Columbia pebblesnail was known only from the lower Snake, Columbia, Spokane, Little Spokane, and Payette Rivers. Recently, a single population of this species was discovered in the Snake River in the Wiley Reach upstream of the Bliss Dam (Neitzel & Frest, 1993).

Trends

Bull Trout

The primary factors affecting bull trout populations within the planning area are related to livestock grazing and road construction, maintenance, and use by removing riparian vegetation and altering streambanks by increasing fine sediments in the stream channel. These sediments further affect stream channels if they are not flushed through the stream system, and can cause a widening of the stream channel which can increase solar exposure and elevate water temperatures.

There is limited historic data on bull trout in the Jarbidge River Watershed that can be used to assess the trend for bull trout. The current understating of bull trout is increasing with the current ESA listing and ongoing bull trout recovery planning efforts. The additional collection of water temperature data, migration data, habitat surveys, spawning ground surveys, road maintenance improvements, and adjustments in livestock management will serve to provide the data necessary for a bull trout recovery planning effort. This data will provide a comprehensive understanding of how bull trout are using the Jarbidge River Watershed and identify where restoration and recovery efforts should be focused. It is expected bull trout populations should demonstrate an upward trend in the near future through this recovery framework.

Redband Trout

Populations of redband trout have declined across much of their geographic range because of impacts from agriculture, grazing, logging, dams, hybridization, and competition with nonnative fishes (Behnke, 1992; Williams et al., 1989; Zoellick et al., 2005). Although hybridization with other species is not identified as a concern within the planning area, other redband trout populations within the historic range have hybridized with non-natives (Allendorf et al., 1980; Knudsen et al., 2002; Williams et al., 1997).

Threats to redband trout within the planning area include livestock grazing, historic mining, dewatering streams for private land agriculture, recreation and OHV use in riparian areas, and energy development. These land uses can alter streambanks leading to an increase of fine sediments in redband spawning and rearing habitats, which can alter water temperature regimes. Mining outflows may affect water quality and lower the groundwater table. Recreational use of OHVs at stream crossings or the creation of new roads can impact stream hydrology and increase sediment inputs, reducing pool quality and quantity. The damming or diversion of streams for agriculture and hydroelectric power purposes can further isolate existing redband populations restricting their distribution within a watershed and preventing genetic exchange with other redband populations.

White Sturgeon

Current trends show remnant native populations between Lower Salmon Falls Dam and Bliss Reservoir (est. 400-700 sub-adults and adults) have limited spawning areas and documented natural spawning is rare. Stocking of white sturgeon by IDFG has resulted in hatchery-reared sturgeon captured within the section between Upper Salmon Falls Dam and Lower Salmon Falls Dam. Few natives were documented in recent surveys by Idaho Power.

The primary threat to white sturgeon is the development of the Snake River for hydroelectric power. These dams alter the natural flow of the Snake River and decrease water flows to levels that do not consistently provide adequate water velocities for successful spawning and egg survival. The changes in flow regimes reduce the natural recruitment of the species. The hydroelectric dams also create a migration barrier that prevents the passage of adult sturgeon between their historic spawning areas in the lower Snake River, Columbia River, and Pacific Ocean.

Shoshone Sculpin

A recent survey conducted by an American Fisheries Society, Idaho Chapter workshop found Shoshone sculpin populations within the Hagerman Valley were stable in 1995 compared with previous distribution data gathered in the early 1980s. Shoshone sculpin were found within Upper Salmon Falls Reservoir, Lower Salmon Falls Reservoir, and Bliss Reservoir between 1986 and 1990, indicating they may be found in locations within the Snake River other than spring seeps.

Threats to Shoshone sculpin populations include activities that increase water temperatures and nutrient levels in water and the diversion of water or development of springs. The development of the Snake River for hydroelectric power and private land developments for fish farming have dewatered or degraded springs and served as sources for non-native invertebrates, fishes, diseases, and parasites within occupied Shoshone sculpin habitats along the Snake River. This species will continue to be susceptible to these influences as development continues within the Snake River Canyon.

Aquatic Snails/Mollusks

Snake River snails, such as the Bliss Rapids snails, Utah valvata snails, Idaho springsnail, and Snake River physa, experienced declines as a result of the construction and operation of the Snake River dams (57 FR 59242). All experienced a reduction in their distribution and fragmentation of their habitat. The primary threats include dam construction, rapid changes in streamflows, agricultural related water withdrawals, and degraded water quality from irrigated agriculture runoff from feedlots and dairies, fish hatchery effluent, municipal sewage effluent, and non-point discharges (57 FR 59242).

The Bruneau Hot springsnail experienced declines in recent times. Mladenka noted increased sediment loading into Bruneau Hot springsnails’ egg-laying habitat reduced the availability of this essential habitat considerably in recent years (Mladenka, 1992). Varriccione and Minshall found declines can also be attributed to agricultural-related groundwater withdrawals in the lower Bruneau River (Varriccione & Minshall, 1994). The number of springs and seeps where this species was found has declined from 131 in 1991 to 89 in 1998.

Sensitive snails and mollusks in the Snake River, such as the Columbia pebblesnail, California floater, and short-face lanx experienced population declines due to the conversion of the Snake River to a slow-moving, warm-water, shallow lake system. Threats common to these species include degraded water quality due to changes in water temperature, nutrient loading, siltation, agricultural chemicals, loss of suitable habitat, fragmentation of habitat, and reductions in water quantity due to the development of deep wells into the Snake River plain aquifer (FWS, 1995).

Forecast

Bull Trout and Redband Trout

Under the current management plan, populations of bull trout and redband trout could be maintained at their current levels or decline due to a lack of specific guidelines for improving the condition of the habitats these fish depend upon. BLM policy requires management plans provide for the conservation of Federally listed and BLM Sensitive species, including conservation strategies with specific habitat and population objectives and management actions to achieve those objectives (BLM Manual 6840.06).

White Sturgeon

This species is expected to remain static or decline under the current management direction. Lands administered by BLM and BLM authorized actions likely have an insignificant effect on the listing status of this species. White sturgeon populations will continue to be limited by the existing migration barriers in the Snake River reaches within the planning area.

Shoshone Sculpin
This species could experience further declines under the current management direction. Additional development along the Snake River altering streamflow and reducing water quality could further limit the distribution of Shoshone sculpin.

Aquatic Snails/Mollusks
These species could experience further declines under the current management direction. Without changes in management, further declines for these aquatic species are likely to occur. Lands administered by BLM or BLM-authorized actions likely have an insignificant effect on the listing status of this species.

Key Features

Bull Trout and Redband Trout
The southern region of the planning area along the Nevada border is an area of critical importance for native salmonids within the planning area. This area includes the headwaters for the watersheds of Salmon Falls Creek, Clover Creek, and the Jarbidge River and contains important cold water habitats for redband and bull trout. Upland riparian habitats containing mature aspen and aspen regeneration should be maintained for deposition of large woody debris into stream beds. Willow, dogwood, and herbaceous grasses, such as sedge, along the greenline should also be monitored within these sections. Streambank stability, channel width, pool frequency, pool depths, fine sediment, and thermal regimes for these areas should be closely monitored in relation to ongoing management activities within the planning area. Thermal refugia in the form of shade, deep pools, groundwater inputs for adults-juveniles, and spawning habitat limits these populations.

White Sturgeon
White sturgeon are only found within the Snake River Canyon along the north end of the planning area. Hydroelectric dams greatly limit the river reaches where these fish can successfully spawn in the Snake River Canyon from Shoshone Falls to C.J. Strike Reservoir. Key features to the distribution of white sturgeon include fast flowing water with cool water temperatures and high water quality. River reaches with high deposition of fine sediments can degrade sturgeon spawning habitats by filling interstitial spaces in which eggs and hatchlings develop, hide from predators, and take refuge during periods of high flows. The areas below rapids and pool tail-outs for white sturgeon spawning and deep pools for overwintering cover are essential to maintaining sturgeon populations in the Snake River.

Shoshone Sculpin
Shoshone sculpin are found in cold water springs and alcove habitats along the Snake River. Changes in streamflow regimes and reductions in water quality limit the amount of suitable habitat for this species. Shoshone sculpin are only found in association with groundwater outflows or upwelling from stream bottoms. The protection of this key

feature along the Snake River is essential to the long-term existence of the species.

Aquatic Snails/Mollusks

Key habitat features for Federally listed Snake River snails include cold, clean, well-oxygenated, flowing water of low turbidity. With the exception of the Utah valvata snail and possibly Idaho springsnail, these snails prefer gravel- to boulder-sized substrates. Each of these species has slightly different habitat preferences. The Idaho springsnail and Snake River physa are found only in the free-flowing reaches of the Snake River. The Bliss Rapids snail and Utah valvata occur in both cold-water springs and mainstem habitats. The Bruneau Hot springsnail requires well-oxygenated, flowing water of low turbidity warmed by geothermal influences. Management guidelines specific to the individual needs for each of these species will be important to maintaining their populations over time.

The Columbia pebblesnail and freshwater mollusks, such as the short-face lanx and the California floater, live in the Snake River but have slightly different habitat requirements. Management considerations should be given to each of these habitat types for managing these Sensitive aquatic snails and mollusks.

Current Management

The 1987 Jarbidge RMP directed the protection of aquatic habitat of Sensitive and Candidate species in the Snake River below Lower Salmon Falls Dam. The Bliss Rapids snail, Idaho Springsnail, Snake River physa, Utah valvata, White sturgeon, and Shoshone sculpin are present in the Snake River. Fences in the Saylor Creek/North Three Island, Three Island, and River Bridge Allotment restrict livestock access to the Snake River. The fences were constructed in 2001 and 2002 and protect about 1.8 miles of Federally listed snail habitat. About 4 miles of the Sand Point Riparian Fence in the Lower Saylor Creek allotment created a riparian pasture in 1999, limiting livestock grazing on 3.5 miles of Snake River. Completed ESA consultation resulted in a determination of Likely to Adversely Affect for several BLM livestock grazing allotments where cattle had access to the river. A biological opinion closed that portion of the Hagerman Allotment in MUA 4 to livestock grazing, protecting about 8 miles of the Snake River.

Management Opportunities

The revised RMP could include the following management actions specific to particular special status species. These actions are also expected to benefit game fish and native non-game fish species.

Bull Trout and Redband Trout

The revised RMP, including an aquatic species conservation strategy, is anticipated to place special emphasis on improving populations, protecting and improving existing occupied habitats, and implementing projects that promote the expansion of bull trout and redband trout into other suitable habitat where access is currently limited or habitat improvements are needed. Management objectives for the habitats of these fish will promote the maintenance of quality pool habitat with limited deposition of instream fine sediments, connectivity into adjoining tributaries with suitable habitat, and maintenance of natural water temperature regimes. Maintaining or improving these parameters will support management goals for these fish through the next planning period.

White Sturgeon

It is likely that interagency recovery planning efforts will be required to provide river flow regimes that meet white sturgeon requirements and population monitoring and supplementation to ensure these fish persist over time. The BLM could partner in this effort through the application of land management guidelines reducing sediment contributions from upland erosion, protecting streamside vegetation, and minimizing recreational impacts in areas adjacent to the Snake River.

Shoshone Sculpin

Future management guidelines for Shoshone sculpin are likely to emphasize maintaining or improving the Snake River spring sources where they currently exist, protect coldwater spring sources, and natural temperature regimes.

Aquatic Snails/Mollusks

Restoring a more natural flow regime in the Snake River and lower Bruneau River, reducing the introduction of fine sediments into these rivers, and protecting water quality and restoring water temperature regimes would all promote the long-term recovery of snails and mollusks in the Snake and Bruneau Rivers.

1.B.12. Riparian Vegetation

Profile

Riparian zones are vegetated areas along rivers and streams. They are important from an ecological standpoint because they provide a transition zone between aquatic and upland areas and provide cover and food for wildlife and fish. They provide water quality benefits by filtering out nutrients from runoff, maintaining stream temperature by providing shade, and controlling erosion.

Within the planning area, riparian areas and wetlands are generally associated with stream and river bottoms and springs/seeps. There are approximately 158 miles of intermittent streams and 570 miles of perennial streams within the planning area. Rivers and streams often have narrow riparian zones varying from 25 to 200 feet in width and confined by steep side slopes. Wetlands in the planning area include approximately 885 acres of playas or ponds, 208 seeps or springs, and an unknown acreage of wet meadows associated with these water features.

Data for riparian areas was collected during the summer of 2006; however, as of the date of this document, that data is still being analyzed.

1.B.13 Soil Resources

Profile

Indicators

Watershed health is the degree to which the soil, vegetation, water, and air, as well as the ecological and hydrological processes of the ecosystem, are balanced and sustained (The Task Group on Unity in Concepts and Terminology, 1995). Improving and maintaining healthy, properly functioning watersheds benefits grazing, wildlife, fisheries, water quality, and recreation programs. Soils are the basic building blocks for good watershed health. They provide the medium for most plant life forms and serve to capture, store, and supply water to support plant growth. The ability of the soil to function in rangeland ecosystems is a factor of the soil's physical, biological, and chemical properties. Natural events and various land management actions can affect these soil properties and alter the ability of the soil to support a healthy rangeland ecosystem.

If soil resources are in good condition, Standards 1 (Watersheds), 2 (Riparian Areas and Wetlands), and 3 (Stream Channel/Floodplain) of the S&Gs should be met as documented by S&G assessments conducted by an ID team (BLM, 1997). See Appendix 2 for more information on S&G assessments.

S&G assessments were conducted by BLM from 1998 through 2003 in 44 allotments on a total of 840,000 acres within the planning area. The standard for watersheds (Standard 1) was met on the majority of acreage assessed. Standards for riparian areas and wetlands (Standard 2) and stream channel/floodplain (Standard 3) did not apply to nearly half of the areas assessed; the majority of the acres where Standards 2 and 3 did apply did not meet those standards (Table 17).

Table 17. S&G Determinations for Standards 1, 2, and 3, 1998-2003

	Determination*				
			Standard is Not Being Met		
	Standard is Being Met	Progress is Being Made Towards Meeting Standard	Cattle Not a Significant Factor	Cattle a Significant Factor	Standard Does Not Apply
1 – Watersheds	66%	0%	12%	22%	0%
2 – Riparian Areas and Wetlands	3%	4%	8%	44%	41%
3 – Stream Channel/ Floodplain	3%	3%	8%	46%	42%
Percentages were rounded to the nearest whole number and Standards may not total 100%. *Determination displayed as percent of 840,000 acres assessed.					

The amount and distribution of bare ground is one of the most important contributors to site stability relative to site potential and is a direct indication of site susceptibility to accelerated wind and water erosion (Pellant et al., 2005). In general, a site with a lot of bare ground will be less stable compared to a site with a lot of ground cover.

A compaction layer is a near-surface layer of dense soil caused by repeated impacts upon the soil surface. Compaction is an important soil health indicator as it may directly affect and limit plant growth, water infiltration, or nutrient cycling processes (Pellant et al., 2005). Soil compaction may cause a breakdown of the soil structure and the development of a soil crust that physically restricts moisture infiltration and increases runoff probability.

Microbiotic soil crusts are also important indicators of rangeland health (Belnap et al., 2001; Butler et al., 2003; Johansen et al., 1984). These crusts may serve as an early indicator to ecological site decline as they appear to be more sensitive to disturbance from wildfire, livestock grazing, and OHV activity than vascular plants. Microbiotic soil crusts are also affected by soil compaction. Microbiotic soil crusts are discussed in more detail under the Vegetative Communities section.

Current Condition

Soil information and classification for the planning area is obtained from the Natural Resource Conservation Service (NRCS) by means of four third-order soil surveys for southern Idaho and northern Nevada. These surveys consist of the following publications by the NRCS:

- Soil Survey of Elmore County Area, Idaho (1991)
- Soil Survey of Owyhee County Area, Part 1 (2003)
- Soil Survey of Jerome County and Part of Twin Falls County (2003)
- Soil Survey of Elko County, Northeast Part (1999)

The soils of the planning area are highly diverse, variable, and complex (Appendix 7). As with all soils, their makeup and composition are dependent on parent material, climate, location, topography, aspect, elevation, and time and age in place. The soils of the planning area range from very sandy and deep in the northern portion of the planning area to heavy with silts and clays and very shallow and rocky in the southern foothills region. Some soils contain a lot of organic material and are well developed, highly structured, and protected from erosion with plant and litter cover.

S&G assessments were conducted by BLM from 1998 through 2003 in 44 allotments on a total of 840,000 acres within the planning area. The standard for watersheds (Standard 1) was met on the majority of acreage assessed. Standards for riparian areas and wetlands (Standard 2) and stream channel/floodplain (Standard 3) did not apply to nearly half of the acres assessed; the majority of the acres where Standards 2 and 3 did apply did not meet the standards.

Protecting soils from water and wind erosion hazards and keeping them stabilized with proper vegetation and litter cover is of utmost importance. Approximately 20% of the planning area contains soils rated with greater than moderate wind erosion hazards. Another 30% of the area contains soils rated with greater than moderate water erosion hazards.

Plant pedestals and road rutting observed during S&G assessments indicate some wind and water soil erosion has occurred. This erosion is likely a result of blowing soil immediately following several wildfires, starting with the Centennial Fire in 1976, and water channeling down two-track roads. Some accelerated erosion events resulting from the quick melt and release of snow cover have been observed in several areas within the FO. Rill and gully erosion are estimated to be low over most of the planning area except on the sandy-alluvial soils of the Snake River Sediments and the clayey-rhyolitic soils of the Jarbidge Foothills. Many of these soils occur on steep, open, and poorly vegetated slopes.

Most areas with S&G assessments exhibited slight to moderate levels of bare ground, but there were also localized areas where bare ground was more evident and vulnerable to erosion. The amount of bare ground can vary seasonally, depending on the amounts of vegetation and litter, and annually, relative to weather conditions. The S&G data were collected during periods when conditions were either drier or wetter than normal, which may have had some effect on the amount of bare ground detected.

Most areas with S&G assessments exhibited none to slight soil compaction ratings. Areas with higher soil compaction ratings were localized, including portions of the Diamond A Desert, the north end of Browns Bench, and the 71 Desert. Winter grazing occurs in these areas, and soils are more likely to be wet from fall to spring. Moist soils are more easily compacted than dry or saturated soils (Hillel, 1998).

Trends

There is no trend data for soil resources in the Jarbidge FO; however, some conclusions can be drawn from field observations. Field observations suggest most soil erosion problems generally occur on the soils derived from sedimentary parent material. Much of this erosion is the result of wildfire, historic grazing practices, agricultural development, and recent OHV activities. Warmer local climate conditions and proximity to population areas have led to increased OHV use near Glenns Ferry and Hagerman for the past several years, areas that contain highly erosive soils.

Wildfires have negatively affected soils throughout the planning area as the removal of vegetation has increased soil exposure to wind and water. Soil loss has been observed by BLM staff immediately after wildfires. In certain areas, soil loss of as much as two inches resulted from wind exposure, leading to plant root exposure and death, complete loss of the A soil horizon, and partial loss of B soil horizons. Wildfires can cause hydrophobic soils, although not all fires produce a water-repellent layer in soil. Hydrophobicity reduces the amount of water infiltration resulting in increased runoff, which can cause soil loss, sedimentation, damaging flows in stream channels, and degraded water quality (NRCS, 2000).

Much of the northern and central portions of the planning area have been converted from native shrublands to annual or perennial grasslands, negatively affecting soil resources of the area. This vegetation conversion has been caused by fire consuming several hundred thousand acres, the spread of cheatgrass and other annuals, past seedings with grass-only mixtures, and the relatively poor success of shrub seedings. Studies have found that following conversion of sagebrush to grasslands, water infiltration into the soil decreased and run-off increased, resulting in increased erosion (Blackburn et al., 1986; Gifford, 1972; Sturges, 1994).

Livestock and OHV use can lead to soil compaction, especially when soils are saturated, but compaction can also be caused by fire vehicles, brush removal, seeding operations, or any other activities that repeatedly cause a physical impact to the soil. Layers of soil can be damaged by livestock where they trail or congregate (e.g., watering sites, gates, pasture corners). Trailing compaction can lead to serious gully formation depending on slopes and soil types encountered and may develop into escalating headcuts. Studies on grazing intensity consider heavy trampling by livestock to be more harmful to the watershed than excessive grazing of the plants (Rauzi & Hanson, 1966; Warren, 2001).

Forecast

As the population of the surrounding area continues to increase, public demand and use of the public lands will increase, adding to impacts on the soil resources of the planning area. In particular, soils could be negatively impacted by increasing OHV use and, on a lesser scale, mining operations. Concentrated livestock use will continue to impact the soils of the area, especially around water troughs, in and around gates, in pasture corners, and in trailing areas.

Soil condition in the planning area is likely to worsen if cheatgrass invasion and wildfires continue. Soils will contain less native vegetation and more annual vegetation, significantly reducing functionality and natural capability. If wildfires become larger and more frequent, more soil surface will be exposed to wind and water erosion until vegetation recovers naturally or rehabilitation seedings establish.

Key Features

Currently, most OHV use occurs on the highly erosive Snake River Sediment soils in the northern portion of the planning area. This use created several areas of severe and accelerated erosion problems, leading to on-site rill and gully formation and off-site sediment deposition. OHV use also leads to reduced moisture infiltration into the soil profile as compaction and bulk density increase at the soil surface.

Many of the soils in the Snake River Sediment region and the lower reaches of the Basalt Plains and Plateaus are associated with early seral or disturbed vegetation communities resulting from large and repeated wildfire events. In these areas, native vegetation is depleted and replaced with increaser shrubs, annual grasses, and non-native forbs. Because intact native plant communities help protect the soil from erosion, areas with native vegetation are important to consider with respect to soil conditions.

Current Management

The 1987 Jarbidge RMP did not address goals, objectives, or management actions for soil resources. Soils are managed to maintain productivity and to minimize erosion. Soil erosion can be minimized by maintaining perennial vegetation cover on all sites.

The BLM is required to comply with FLPMA, the Clean Water Act, Idaho S&Gs, and other related Federal and State laws, regulations, and policies regarding watershed health, soil stability, and water quality. Management guidelines for soil resources include:

- Adapted perennial grasses, forbs, and shrubs are seeded when needed to stabilize the soil, prevent weed invasion, restore wildlife habitat, and reduce the likelihood of future fires;
- Grazing management actions provide for adequate amounts of vegetative ground cover and litter (determined on an ecological site basis) to support infiltration and soil stability, protect resources, and maintain site productivity; and
- BMPs and/or standard operating procedures specific to minimizing soil erosion and sedimentation are applied to all surface-disturbing activities (NRCS, 2007).

Management Opportunities

Current soil management practices, which mainly include rehabilitating burned areas, mitigating range improvement projects, and managing proper grazing use, have had success at maintaining and protecting soils in the majority of the planning area. However, there are localized areas of concern for both soil loss and compaction, including areas affected by intensive OHV use, concentrated livestock use, wildfire, and annual vegetation. BLM should continue to consider the guidelines from FWS and the BMPs endorsed by DEQ for improved water quality and NRCS for better erosion control (DEQ, 1993; FWS, 2007; NRCS, 2007). Activities such as moving troughs or OHV play areas from erosive to non-erosive soils could be undertaken to improve the quality of the soils in the planning area.