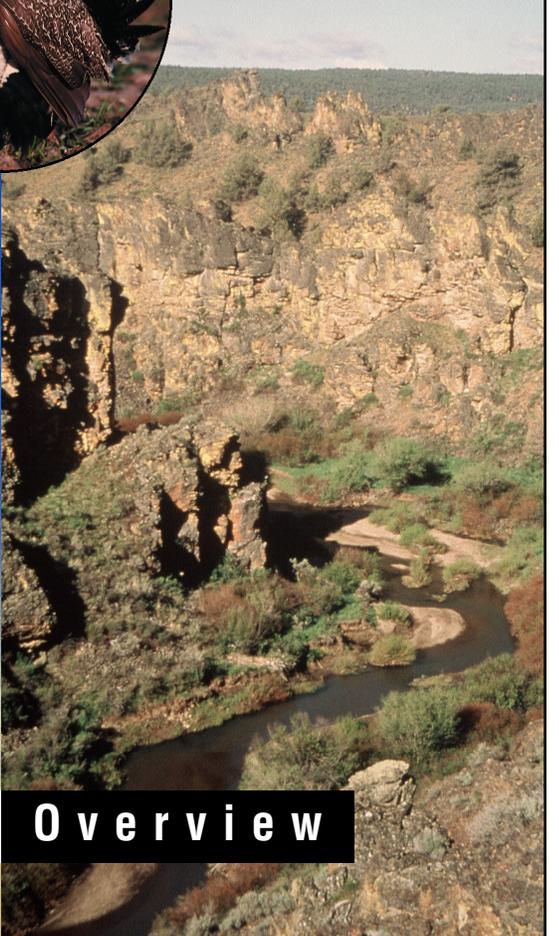
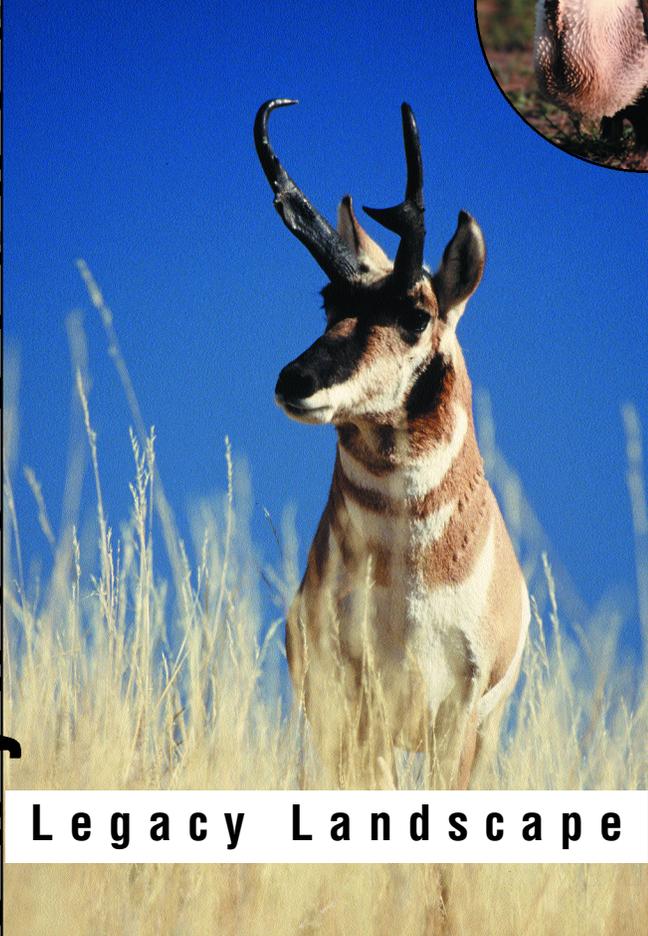


Owyhee-Bruner Canyonlands



Legacy Landscape

Overview



Where the remote corners of Idaho, Oregon and Nevada come together lies one of the most unique and spectacular high desert areas remaining in the continental United States. This region, known as the Owyhee - Bruneau Canyonlands, represents one of the last best examples of the wide-open country which once characterized the American West. Consisting of high sagebrush and grassland plateaus incised by deep, sheer-walled river canyons and mountains dominated by juniper woodlands, the Owyhee-Bruneau Canyonlands stretch across an area twice the size of Yellowstone National Park. Home to some of the nation's rarest fish, wildlife, and plant species, scientific assessments have rated the region one of the most biologically rich and diverse high deserts in the country. Humans have been part of the Owyhee country for over 15,000 years—resulting in the richest concentration of archaeological sites in Idaho. It is also one of the greatest contiguous landscapes of historical and cultural significance in the West.

The unique geologic, biologic, and historic resources of the Owyhee-Bruneau Canyonlands lend the region to protection as a national monument under the Antiquities Act. This document was prepared to compile the wide range of scientific information identifying the nationally significant values of this land and to put forth the argument for monument designation. Focusing on the geology, paleontology, landscape ecology, biology, archaeology, history, and culture of the Owyhee-Bruneau Canyonlands, this document also presents a picture of the threats posed to these values and the landscape as a whole. If not addressed, these threats will erode away the resources of these canyonlands and an irreplaceable part of our national heritage will be lost.

Credits

This report was produced by the The Wilderness Society, American Lands, The Committee for Idaho's High Desert, and the Sierra Club.

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Table of Contents

<i>Preface</i>	<i>i</i>
<i>Credits</i>	<i>ii</i>
<i>Table of Contents</i>	<i>iii</i>
<i>Introduction</i>	<i>1</i>
Cataclysmic Origins	<i>1</i>
Flourishing Sage Steppe and Canyons	<i>1</i>
A Dynamic Cultural Landscape	<i>2</i>
Threats and Protection	<i>3</i>
Significant Values—15 Key Points	<i>4</i>
<i>Geography</i>	<i>5</i>
Desert Defined by Rivers	<i>5</i>
Landscape Level Management	<i>6</i>
<i>Geology and Paleontology</i>	<i>9</i>
Geology	<i>9</i>
Labyrinthine Rhyolite Canyonlands	<i>9</i>
Paleontology	<i>13</i>
<i>Landscape Ecology</i>	<i>17</i>
What Sagebrush Steppe Habitat Can, Could, and Should Look Like	<i>17</i>
<i>Biology</i>	<i>23</i>
Flora	<i>23</i>
Fauna	<i>29</i>
<i>Archaeology</i>	<i>39</i>
The Richest Complex of Sites in Idaho	<i>39</i>
Only a Fraction of the Resources Present	<i>40</i>
The Camas and Pole Creek Archaeological District	<i>41</i>
The Bruneau-Jarbidge	<i>42</i>
<i>Shoshone and Paiute Tribes of the Duck Valley Reservation</i>	<i>45</i>
<i>History</i>	<i>47</i>
Stories in Stone	<i>47</i>
Camas, Salmon, and Horses	<i>49</i>
Trappers, Trails, and War	<i>50</i>
<i>Solitude and Space</i>	<i>55</i>
The Sagebrush Ocean	<i>55</i>
Space as a Value	<i>56</i>
<i>Conclusions</i>	<i>57</i>

Stretching over 2.7 million acres of BLM managed land in Southwest Idaho, the Owyhee-Bruneau Canyonlands encompass one of the largest intact and unprotected desert ecosystems in the West, a vast landscape of rhyolite canyons that cut through oceans of sagebrush and rugged breaks buzzing with diverse biotic communities (see “The Owyhee-Bruneau Canyonlands: Southwest Idaho Location” map). Just a few hours drive from the rapidly growing urban center of Boise, this vast and biologically lush desert, filled with remnants of the people who have lived here for thousands of years according to natural cycles, still retains an undisturbed sense of peace. The ecosystems of the Owyhee-Bruneau Canyonlands are fragile, however, and without the type of comprehensive landscape level protection provided by national monument status the incredible geological, paleontological, biological, and cultural values of this last enclave of the sagebrush ocean – with its expansive steppes and mazes of canyons – will be fractured, degraded, and destroyed.

Cataclysmic Origins



Violent geological forces first molded this place around 14 million years ago. The shifting Yellowstone hot spot first erupted in the area where Idaho, Oregon and Nevada meet, spewing gigantic clouds of volcanic ash into the air. When these superheated billows of ash reached the ground, they cooled into masses of welded rhyolitic tuffs characteristic of the Owyhee region.

Shifting slowly northeast, the rhyolite caldera blew again, about 11 million years ago, in the Bruneau region, belching more molten rhyolite and leaving basalt shield volcanoes in its wake. After this turbulence, massive Lake Idaho began to form, flooding the volcanic crescent of the Snake River Plain. As time passed, the climate grew moist and cool; plants and animals, some long-extinct like the saber-toothed salmon and the scimitar-toothed cat, flourished in and around this series of ancient lakes just north of the eruptions. The fossils of these creatures are still visible in a series of extraordinary exposed strata found only in the Owyhee-Bruneau Canyonlands.

Nearly a million years ago in a prolonged flood, Lake Idaho drained out Hells Canyon, and, as the water level dropped, the mouths of the Owyhee, Bruneau, and Jarbidge Rivers and their tributaries began to erode headwards, carving a fantastic labyrinth of canyons in the thick layers of igneous deposits. These gargantuan natural forces left a network of exposed rhyolitic formations found nowhere else in the world, and molded the fantastic topography of the Owyhee-Bruneau Canyonlands. Just 3,000 years ago, the climate began to grow warmer and drier, and the surrounding flora and fauna in turn changed and adapted, until the present-day high desert ecosystem developed in the remnants of massive volcanic and climatic cataclysm.

Flourishing Sage Steppe and Canyons

Today, in this desert defined by rivers, expansive reaches of sage steppe, lush riparian pockets, ancient juniper woodlands, and intermittent drainages support rare, endemic, and diverse pop-

ulations of flora and fauna including sage grouse, California bighorn sheep, spotted bats, Columbia spotted frogs, red band trout, rattlesnake stickseed, Davis's peppergrass, and the unique papposa sagebrush. Often sagebrush country has been maligned as useless land, but even a short walk through the Owyhee-Bruneau Canyonlands reveals instead a network of vibrant biotic communities. Pronghorn antelope, gray fly-catchers, mule deer, loggerhead shrikes, ferruginous hawks, pygmy rabbits, and scores of other birds, mammals, reptiles, and invertebrates utilize the forage and cover of the sagebrush sea.

This wealth of biological life is linked to the health of the Owyhee as a dynamic ecological system, in which all these diverse species rely on the communities of sage and riparian oases that provide necessary habitat and food. Identified by the Interior Columbia Basin Ecosystem Management Project (ICBEMP) as one of only three regions in the entire basin with high range integrity, the Owyhee is the largest and one of the last remaining examples of the flourishing sage steppe that once covered the Columbia Plateau. It provides the expansive habitat that these species and natural processes need to survive in one of the most rapidly growing and changing sectors of the West.

A Dynamic Cultural Landscape

Beyond its biological richness, however, the Owyhee-Bruneau Canyonlands is also a dynamic cultural landscape where people have long joined in a close-linked relationship between land and life. The canyons run through some of the richest archaeological and cultural sites in the country, a place inhabited for thousands of years by the ancestors of the Shoshone and Paiute Tribes, and still an essential and sacred landscape to this nation within our nation.

The explorer Peter Skene Ogden named the river Owyhee in memory of three Hawaiian trappers lost in its deep canyons, and the high reaches of the Bruneau River and the Owyhee Uplands gained notoriety with early settlers as inaccessible, wild country where the whims of nature still ruled the land.



In this high, lonely desert cowboys and Basque sheepherders scratched out a living or went bust, Native Americans clashed with the westward push of Euro-American settlement on the Oregon Trail, and nefarious outlaws evaded the law. The contours of the land are dotted with vestiges of this rough history – the skeleton frame of a homestead, crumbling stone walls, petroglyphs depicting bighorn sheep etched into the rimrock. The story of people in the Owyhee-Bruneau Canyonlands has been shaped by the land itself, from the ancient tribes whose hunting technology changed as the climate grew warmer to the horse thieves who took advantage of the broken topography of Juniper Mountain to hide. In deep canyons, ancestors of the Shoshone and Paiute tribes gathered camas and caught salmon according to the change of seasons. Their modern relatives consider the whole landscape sacred – the canyon walls, the flights of migrating birds, the water melting down from the mountains – a symbiotic relationship in which their lives and spirituality intertwine with their traditional homeland. Since the history of people here has been composed according to the landscape itself, protection of this place must include an understanding of the indigenous conception of the land as well as preservation of the thousands of cultural sites that tell the stories and hint at the mysteries of its human inhabitants.

Threats and Protection



In 1936, Bob Marshall identified the Owyhee as the second largest roadless desert area in the nation, an enclave of solitude and sublime natural beauty, but this expansive complex of rivers and sage steppe has not yet been nationally recognized or protected for its unique values as a system of priceless biological, geological, and cultural value. The vast and varied wonders of the Owyhee have even ranked it as one of the three best places in Idaho for a National Park, but still, it remains a blank spot on the map. As this lonely corner of Idaho continues to be ignored and fragmented, large tracts of land in the Owyhee are being lost

faster than they are being protected. The dangers of degrading this ecosystem pose a serious threat to the economic livelihood of Idaho as well, since the region lures hunters from around the world who want a chance to see a California bighorn sheep, and the loss of sagebrush habitat has the sage grouse, a popular upland game bird, flirting with listing as an endangered species.

The integrity of the Owyhee-Bruneau Canyonlands as a vast and dynamic system is severely threatened by the spinning tires of reckless ORVs, the invasion of cheat grass and other exotic species into its native plant communities, looters and vandals rummaging through sacred native sites, poor grazing practices that threaten the very soils and water that hold the biological communities together, and, most of all, by a perception of the Owyhee as a series of separate environments instead of as the intact and interconnected landscape that it is.

The Owyhee-Bruneau Canyonlands is not a mere chunk of land that can be sliced into parcels managed for specific uses, but a contiguous entity representative of a much larger biological and cultural community that must be envisioned as an entire landscape and protected through national monument status.

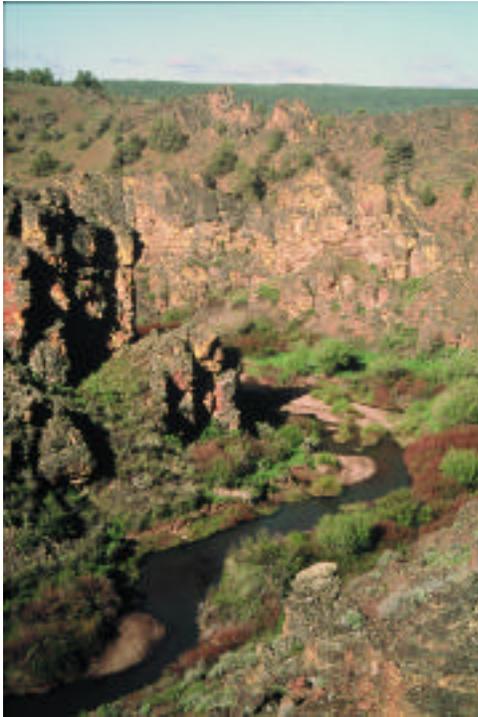
Significant Values—15 Key Points

Through the compilation of a wide range of up-to-date scientific data, this report identifies the nationally (if not internationally) significant values of the Owyhee-Bruneau Canyonlands and makes an argument for its designation as a national monument by the President under the Antiquities Act due to its:

- 1.** value as an entire and intact landscape of sage steppe, canyonlands, and woodlands; a center of biodiversity and endemism; a unique and dynamic system representing one of the last remaining areas of high range integrity in the Columbia River Basin;
- 2.** vital importance as unfragmented core habitat for numerous sagebrush obligate migratory songbirds, raptors, and other sagebrush obligate species including pronghorn antelope and pygmy rabbit,
- 3.** specific role in providing necessary large tracts of habitat for sage grouse;
- 4.** specific role as critical habitat for the largest population of California big horn sheep in the nation;
- 5.** populations of other fauna of special concern including redband trout, spotted bat, Columbia spotted frog, Bruneau hot springs snail, Mojave collared lizard, loggerhead shrike, and river otters among others;
- 6.** rare and endemic plant communities including those associated with intermittent streams and playas, ash endemics, and 36 diverse communities of sagebrush;
- 7.** prominence as one of the richest cultural landscapes in the West including National Register quality rock shelters, petroglyph panels, rock alignments, and historic cabins;
- 8.** unique geology featuring a massive complex of exposed rhyolite canyons found nowhere else in the world and providing evidence of the path of the Yellowstone hot spot as well as associated volcanism with ash-flow tuffs;
- 9.** unusual series of exposed paleontological strata in the remnants of vast inland lake stages;
- 10.** deep historical significance, reaching back over 12,000 years and encompassing the stories of indigenous people as well as Euro-American settlers;
- 11.** current importance as a sacred site in the culture of the Shoshone and Paiute Tribes of the Duck Valley Reservation;
- 12.** potential and current value in scientific research as a natural laboratory, an unfragmented ecosystem for use as a reference area and as an anchor for species restoration and long term population viability;
- 13.** incredible network of rivers and canyons offering clean water and world-class opportunities for recreation;
- 14.** value as an enclave of solitude and vast open space;
- 15.** vulnerability to invasive species, unchecked ORV use, vandalism, road building, overgrazing, range projects and other developments that threaten its integrity.

Through national monument designation and cohesive, landscape-level management by the BLM, these outstanding values could be preserved, protected, and enhanced, finally giving the Owyhee-Bruneau Canyonlands the national recognition that it deserves. This report will expand on the unique geology, paleontology, landscape ecology, biology, archaeology, history and culture of the Owyhee-Bruneau Canyonlands and identify the threats posed to these individual values and the landscape as a whole, providing comprehensive science-based data that justifies the need for national monument designation.

Desert Defined by Rivers



The loneliest and largest unprotected corner of the West, the proposed Owyhee-Bruneau Canyonlands National Monument stretches over 3.2 million acres in Owyhee County, Idaho, though the Owyhee Uplands ecoregion as a whole extends over 9 million acres in Idaho, Oregon, and Nevada (Vander Schaaf 1996).

The boundaries of the proposed monument encompass a landscape of open sagebrush and bunchgrass, towering cliffs, windswept table lands, hidden canyons, and lush meadows comprised of 2.7 million acres of BLM, 201,000 acres of State, and 252,000 acres of private land (see “The Owyhee-Bruneau Canyonlands: Land Ownership” map). With an annual precipitation ranging from seven to over 15 inches per year (Quigley and Arbelbide 1997) the region is considered a desert, but vast networks of rivers slicing through steep canyonlands and sage steppe communities define the sublime character of the place.

Draining the Bull Run, Tuscarora, and Independence Mountains in Nevada, the Owyhee River system cuts through the rhyolite formations of the Owyhee Uplands in Southwestern Idaho, emptying into the Owyhee Reservoir in Oregon before joining the Snake River near Ontario. The Bruneau River flows down from its headwaters in the Jarbidge and Copper Mountains in Nevada on the Great Basin Divide. Joined by the Jarbidge River, the Bruneau carves a canyon of steep and narrow cliffs that tower over it for nearly 100 miles until the river mingles with the Snake in C.J. Strike Reservoir.

The proposed Owyhee-Bruneau National Monument is geographically unique in that, unlike the mountainous Great Basin to the south, the topography of the region consists of varied sage plateaus averaging 4-6,000 feet in elevation, broken when it reaches the granitic formations of the Owyhee Mountains which rise up to over 8,500 feet (Quigley and Arbelbide 1997). The Owyhee and Bruneau systems carve mazes of canyons, dissecting the rolling sage and juniper plateaus known as the Owyhee Uplands (McNab and Avers 1994). These geographical features combine sagebrush steppe vegetation representative of the Northern Great Basin to the south, with a rare system of high desert rivers draining into the Pacific through the Snake and Columbia Rivers. While melding the characteristics of these larger physiographic provinces, the Owyhee-Bruneau Canyonlands differs from both the Great Basin and the Columbia Plateau, through its unique geomorphology and high degree of endemism, making a case for consideration of the Owyhee Uplands as a unique and distinctive ecoregion (Vander Schaaf 1996).

The Owyhee and Bruneau systems are a component of the larger Snake River drainage, which, in turn, comprises the southeast corner of the Columbia River Plateau, a massive river basin network stretching from northern Nevada, Idaho, and parts of Montana and Wyoming up to British Columbia. The Columbia drains Washington and Oregon east of the Cascade Crest

before it empties into the Pacific, defining the majority of the southern border between the two states. Nearly 100 years ago, the Columbia and its tributaries ran free, allowing runs of salmon and steelhead to travel upstream to spawning grounds high and deep in the desert waters of the Owyhee and Bruneau, but the river is now confined by dams that draw off the water for power and irrigation. The high reaches of the Owyhee and Bruneau are still largely unfettered, however. In Oregon, 126 miles of the Owyhee River system were designated Wild and Scenic by Congress 1984, while an additional 167 miles of the Owyhee and its tributaries in Idaho have been recommended as eligible for Wild and Scenic designations by the BLM (BLM, 1999b).

In 1979, the National Park Service recommended 66 miles of the East Fork and mainstem Owyhee River in Idaho for Wild and Scenic designation, but it remains unprotected (BLM 1999a). 121 miles of the Bruneau and Jarbidge have been under consideration for Wild and Scenic designation since 1976 (Bureau of Outdoor Recreation 1976). Considered together, these river systems define one of the most unique, vast and biologically diverse desert canyon complexes in the West, a landscape of seemingly endless open space broken by sudden chasms sheltering verdant life and running water.

Landscape Level Management

Studies support designating the Owyhee-Bruneau Canyonlands as a cohesively managed and nationally recognized unit. Wilderness advocates have identified the combined Idaho, Oregon, and Nevada complex of the Owyhee including the Bruneau and Jacks Creek as suitable for a Wilderness National Park of 8-10 million acres (Foreman and Wolke 1989). According to a report by the Idaho Forest, Wildlife and Range Policy Analysis Group, the Owyhee combines several of the National Park Service's geographical themes—plains, plateaus, and mesas; river systems and lakes; sculpture of the land; and the desert ecosystem—within its borders. The study concludes that the Owyhee Canyonlands, along with Hells Canyon and Sawtooth National Recreation Areas, “all appear to be nationally significant, and may be suitable and feasible for National Park status” (MacCracken and O’Laughlin 1992).

Besides lacking any national designation, the Owyhee differs from Sawtooth and Hells Canyon as well in that most of the vegetation types within the proposed national monument have not been adequately protected in the ecoregion (Wright, MacCracken, and Hall 1994). No National Parks currently represent the Columbia Plateau geophysical province, while national monuments within the massive region such as the Hagerman Fossil Beds and Craters of the Moon have been protected for specific paleontological or geological features, and not in an attempt to preserve a broad landscape of distinct native ecosystems and cultural sites.

The Owyhee is big country, a place to get lost, to wander by foot or horse or bone-rattling back roads, giving the nearly half a million residents of the rapidly growing Treasure Valley hope with its pure sense of space (Shallat 1995). In 1936, when Bob Marshall inventoried the last remaining roadless areas in the United States, he identified the Owyhee as the second largest roadless desert in the nation—behind the Colorado Plateau—with more than 4 million acres of uninterrupted roadless land spanning Idaho, Oregon, and Nevada. He also recorded the Bruneau River

Wild and Scenic River Eligibility

River	—Miles—		
	Wild	Scenic	Rec
South Fork Owyhee River	26.5		1.5
East Fork Owyhee River	66		
Deep Creek	29.5	2.5	
Nickel Creek	8		
Current Creek	7.5	1.5	
North Fork Owyhee River	19.5	5	
Bruneau River	71		
Jarbidge River	29		
Sheep Creek	21		
Subtotals	278	9	1.5
Overall total	—288.5—		

Statistics compiled from: Bureau of Land Management. 1999. Owyhee RMP; USDI Bureau of Recreation. 1976. Bruneau Wild and Scenic River Study Report.



desert as containing a further 650,000 roadless acres (Foreman and Wolke 1989).

Notwithstanding the Mud Flat Road National Scenic Byway that now bisects the Owyhee Uplands as well as an ever-increasing encroachment of ways and unregulated ORV use, the proposed monument still retains a wilderness character, reportedly the largest remaining wild land in the Lower 48 states (Vander Schaaf 1996) containing more than 700,000 acres of recognized BLM Wilderness Study Areas (BLM 1991). Ted Trueblood, an Idaho outdoorsman and local icon described the place as

“...more than a mile above the sea, and it stretches away endlessly into Nevada on the south and Oregon on the west, and for as far as you can see in all directions there is not one house or fence or any other sign of man save the road by which we got here” (Trueblood 1994). However, the continuity of this unbroken land has not been reflected in landscape level management.

Currently the public lands contained within the Owyhee-Bruneau Canyonlands are administered separately through the Owyhee, Bruneau, and Jarbidge Resource Areas of the Lower Snake River District of the BLM based in Boise, Idaho. None of the Owyhee-Bruneau Canyonlands is permanently protected as Wilderness or by any other national designation. Instead, the region has been sub-divided into a fragmented patchwork of Wilderness Study Areas, Areas of Critical Environmental Concern, Research Natural Areas, and Outstanding Natural Areas. The Owyhee and Jack’s Creek areas alone have been sectioned into 19 Wilderness Study Areas totaling 535,007 acres (BLM 1991). An additional 196,254 acres have been spread over four WSAs in the drainages of Bruneau-Jarbidge Canyonlands Unit (BLM 1991) (see “The Owyhee-Bruneau Canyonlands: Wildland Protection Status” map).

The BLM has designated two ACECs totaling 225,880 acres for California big horn sheep habitat (BLM 1999b) and many isolated ACECs, RNAs and ONAs identified for diverse biological and geological features (BLM 1999b)—yet these massive acreages are not considered as a contiguous unit or as an entire region of national significance in agency planning. Furthermore, over two million acres of uninventoried roadless areas that border or partition the WSAs have been left in isolated pockets throughout the proposed monument. It might seem as if this preponderance of special designation is protecting the unique values of the region; however the most important geographical significance of the Owyhee-Bruneau Canyonlands, its vitality as a dynamic and interconnected landscape, is lost in this piecemeal conception of over 40 WSAs, ACECs, RNAs, and ONAs (see “The Owyhee-Bruneau Canyonlands: Sensitive Areas” map).

Secretary of the Interior Bruce Babbitt has suggested a new conception of BLM-managed national monuments that would preserve whole dynamic landscapes (Babbitt 2000) which we believe would be appropriate for the Owyhee-Bruneau Canyonlands. As opposed to National Park status, national monument designation would allow for continued management by the BLM and permit traditional uses such as hunting and responsible grazing while still maintaining the wide open grandeur, ecological vitality, and cultural integrity of the Owyhee. The present fragmented administration of the Owyhee-Bruneau Canyonlands could thus be re-tooled and coalesced into a plan of comprehensive landscape level management bringing this heretofore ignored region national recognition, protection, and a vision for the future.

Geology



Labyrinthine Rhyolite Canyonlands

Envisioned as an entire geological landscape, the topography of the Owyhee-Bruneau Canyonlands conveys the record of the massive rhyolite eruptions of the Yellowstone hot spot and the ancient great Lake Idaho, two unique geologic features of the American West. Carving into the heart of the gently undulating uplift of the Owyhee Plateau, the Owyhee and Bruneau-Jarbidge River systems “provide the largest concentration of sheer-walled rhyolite/basalt canyons in the western United States” (BLM 1999). A similar extensive network of deep rhyolite canyons with such excellent exposure is found nowhere else in the world (S. Wood pers. com.).

Although it bears affinities to the Snake River Plains and Great Basin, the Owyhee Uplands represent an unusual geologic landscape unlike anything else in the Pacific Northwest. Its high plateau and deep river canyons are more similar to the Colorado Plateau than to the Great Basin of the Intermountain West (Vander Schaaf 1996). Due to its altitudinal relief, colorful rhyolite and sedimentary rock, and streams that have carved a myriad

of deep, narrow canyons, the Owyhee-Bruneau Canyonlands differs considerably from the Snake River Plains: a flat, broad lava plain of substrate derived from black basalt. Furthermore, when compared to the basin and range topography of the faulted and uplifted Great Basin, the high plateau and deeply incised canyons of the Owyhee Uplands emerge as much more of an erosional landscape (Vander Schaaf 1996).

In the Owyhee Front, the gentle run of the 4,000–6,000-foot Owyhee Plateau ends suddenly at the northern edge of the proposed monument, where the Owyhee Mountains rise up to over 8,000 feet and then slope down to meet the Snake River Plains. Although similar in appearance to the ranges of the Great Basin, the Owyhee Mountains differ from southern ranges through their granitic makeup and older intrusives in their core. The Owyhee Mountains may have been an “island in the lava sea” (Cronquist et al. 1986).

In Wilderness Study Area inventories, the BLM (1986, 1989, 1991, 1999) has documented more than 275 miles of scenic canyons with sheer cliffs 400 to more than 1,000 feet high along the Owyhee River and its tributaries. Dramatically expressed in places like Deep Creek—which runs through a narrow, 400-foot deep 13-mile slot with some of the largest rhyolite cliff formations in the Owyhee Canyonlands—these canyons offer the best rhyolite canyon scenic areas in the West. The stunning formations of the canyons vary from sheer cliffs to mosaics of red rhyolite platelet rubble fields with talus slope sagebrush-grassland communities (BLM 1999).

Throughout the canyonlands “hundreds and hundreds” of rock spires or pinnacles separated by erosion from the main cliff walls create myriad fantastic formations known as “hoodoos” and occasional arches. Sentinel Rapid below Coyote Hole gets its name from ominous sets of

hoodoos, standing side-by-side, overlooking the rapid (BLM 1999). Downcutting through the high sagebrush plateau, these river systems have formed a strange and varied landscape. The meanders of the East Fork Owyhee River are so prominent that at one point a mile of the ancient riverbed was cut off from the present river channel to isolate an oxbow called The Tules, a “rare geologic formation in the desert environments of the western United States” that shelters a lush riparian, almost swamp-like habitat (BLM 1999).

Wilderness Study Areas in the Jacks Creek complex include more than 90 miles of canyons up to 1,000 feet deep. (BLM 1989). “Little Jacks Creek is a high-quality example of the canyon-cutting characteristics of major watercourses of Owyhee County (Caicco et al. 1983b).” The Bruneau River and its major tributaries have carved over 85 miles of narrow, meandering chasms of vertical rock walls 200 to 1,000 feet deep in the rhyolite (BLM 1984, 1987, 1991), and the 1,000 foot sheer cliffs of the Jarbidge River Canyon offer an excellent look into the massive Sheep Creek rhyolite flow (Bonnichsen 1991)

The rock layers in all of these deep canyons expose the history of the awesome volcanic eruptions that occurred here when the rhyolite volcanoes of the Owyhee-Humboldt and the Bruneau-Jarbidge Eruptive Centers blew (Bonnichsen 1991, Hackett and Bonnichsen 1995). Far more than aesthetically spectacular wonders, the canyons of the proposed monument serve as a world-class natural laboratory, allowing geologists to study hot-spot rhyolite flows in their entirety because the rock is so well exposed (Caicco and Wellner 1983a, 1983b; S. Wood pers. com.) (see “The Owyhee-Bruneau Canyonlands: Geology” map).

The Yellowstone Hot Spot and Lake Idaho

Between 15 and 11 million years ago, the Owyhee-Humboldt Eruptive Center—a huge caldera 40-60 miles across located at the junction of Idaho, Nevada, and Oregon in the Owyhee Uplands—sent massive explosions of superheated rhyolite magma—molten rock filled with water vapor and silica, melted deep in the Earth’s crust—into the atmosphere. These explosions of gas-charged rhyolite ash spewed 5-10 miles up into the sky and could have easily expunged 100 to 1,000 times more ash than the 1980 eruption of Mount St. Helens (Hackett and Bonnichsen 1995).

The Owyhee-Humboldt Eruptive Center has been identified as the first expression of the Yellowstone hot spot—a deep upwelling current of hot magma from the Earth’s mantle—which has since shifted along with the movement of the North American continent across the Snake River Plains to its present location underneath Yellowstone National Park. Between 10 and 11 million years ago as the continent moved over the hot spot, the complex known as the Bruneau-Jarbidge Eruptive Center spewed out a sequence of more than 11 ash-flow tuff layers—known as the Cougar Point Tuff—and at least 12 gigantic rhyolite flows (Hackett and Bonnichsen 1995).

Around 10 million years ago, as the volcanism began to subside, streams began carving drainages and Lake Idaho—a series of large ancient lakes about the size of Lake Ontario—filled much of the western Snake River basin between Twin Falls, Idaho and Baker, Oregon (Bonnichsen 1991). But, nearly 1 million years ago, the Snake River tapped Lake Idaho, cutting the lake’s new outlet, Hells Canyon, deeper and deeper as it drained. While the lake waters dropped, and afterwards, the tributary streams to Lake Idaho, including the Owyhee and Bruneau-Jarbidge systems, began eroding headwards, carving deep gorges in the thick layers of rhyolite and overlying basalt left by the Yellowstone hot spot and forming the spectacular canyons of the Owyhee-Bruneau Canyonlands (Hackett and Bonnichsen 1995).

The Bruneau-Jarbidge Eruptive Center and the Cougar Point Tuff



“The Bruneau-Jarbidge Eruptive Center encloses several times more area than most calderas, and it may contain one or more buried calderas or a caldera complex” (Bonnichsen 1982). The first volcanic phase in the evolution of the Bruneau-Jarbidge Eruptive Center occurred during the middle and late Miocene with a sequence of nine or more cooling units, known as the Cougar Point Tuff. With each sequence, welded rhyolitic ash-flow tuff was formed as thick volcanic ash settled and cooled. “Each Cougar Point Tuff eruption blew tens to hundreds of cubic miles of red-hot ash high into the atmosphere, perhaps as high as 20 miles. And the ensuing hell-fired torrent was no less astounding (Bonnichsen 1991).” When these columns of fiery material collapsed and fell back to earth, they picked up incredible speed.

“The incandescent, hot-ash cloud flowed at tens- or even hundreds- of miles-per-hour across the earth’s surface for tens of miles in all directions. The ash was still so hot when it came to rest that the individual particles welded themselves together to form the solid rock we now see (Bonnichsen 1991).” Each Cougar Point Tuff unit formed from one or a succession of these pyroclastic eruptions. The 1- to 3-meters of bedded ash at the base of each

unit suggests that the eruptions began with large volumes of vesiculated magma being propelled to great heights, and the thin sedimentary layers that occur between the volcanic rock layers indicate that thousands of years passed between eruptions (Bonnichsen and Citron 1982).

The massive central zone constitutes most of a typical cooling unit of the tuff. These zones are completely welded lithoidal rhyolite, compacted to such an extent that virtually no pore space exists (Bonnichsen and Citron 1982). Following the ash-flows, eight to twelve enormous rhyolite lava flows rose up through the Earth’s crust at 1,000° C. The huge quantity of material evacuated in these eruptions caused the land surface to sink and elongate, creating a 60- by 35-mile basin identified today as the Bruneau-Jarbidge Eruptive Center (Bonnichsen 1982). Eight units of the Cougar Point Tuff, with an aggregate thickness of 400- to 475-meters, are exposed at Black Rock escarpment in the Bruneau River Canyon. “Because the area is dissected by several deep canyons and has undergone only minimal structural adjustment since volcanism, much unequivocal stratigraphic and descriptive information has been developed for the volcanic units” (Bonnichsen 1982).

In addition, a light reddish-purple tuff unit is exposed in a small area along Alder Creek in south-central Owyhee County representing the oldest unit of Eocene age rocks that pre-date the Cougar Point Tuff, referred to as the Bieroth volcanics. These Eocene rocks consist of three units: the Alder Creek tuff, Cedar Canyon tuff, and the volcanic neck of Browns Basin. Part of the Eocene province of calc-alkaline volcanism, the Bieroth volcanics exploded from a local source and they extend southward, generally becoming younger, from the Challis volcanic field in Central Idaho into Nevada (Bernt and Bonnichsen 1982).

Owyhee-Bruneau Rhyolites

Approximately 16–10-million years ago, the Owyhee-Bruneau rhyolites erupted from vents in and adjacent to the Owyhee Mountains and Owyhee Plateau. They are overlain by basalt lavas that are 8–10-million-years old. At least 1,000-meters deep and overlain by thick widespread rhyolite tuffs and lavas, these Oligocene and Eocene volcanic rocks and Cretaceous granitic rocks form the eroded basement surface upon which the widespread olivine basalts and dark gray latite and quartz latite lavas of Miocene age were deposited (Ekren et al. 1982).

Magnetic polarity measurements of nine established cooling units of the Cougar Point tuff and several younger rhyolite lava flows indicate that the eruptions that formed these rhyolites “occurred over a span of time involving at least seven reversals of the earth’s magnetic field during the late Miocene and possibly early Pliocene time...Most likely, additional magnetic intervals will be found, since no work has yet been done on the forty or more basalt units that constitute the overlying Banbury basalt” (Bonnichsen 1991).

Owyhee Plateau rhyolites include the 13.8-million-year-old tuff of Swisher Mountain, which erupted at a minimum temperature of 1090° C from the Juniper Mountain volcanic center, and the 10-million-year-old tuff of Little Jacks Creek which also erupted at a minimum temperature of 1090° C from the Owyhee Plateau. Both tuffs formed in water-deficient levels of the crust and were erupted at depths likely as great as 15-25 kilometers (Ekren et al. 1982).

Basaltic magma probably provided the source of heat for producing these rhyolite magmas, and heat transfer from basaltic magma is believed to be a mechanism for triggering the eruption of rhyolitic rocks. “Heat transfer from basalt likely was involved in the generation and eruption of the Owyhee rocks because we can imagine no other way to raise these rhyolitic magmas to the eruption temperatures typical of basalt. Why this process should have operated in such a unique way in the Owyhee region remains a puzzle” (Ekren et al. 1982).

In the Bruneau-Jarbidge Canyonlands, the Sheep Creek flow, which erupted about 9.9 million-years-ago, is the most voluminous rhyolite lava flow in the area, containing at least 48-cubic-miles of lava covering more than 300-square-miles extending from southeast to northwest between Bruneau Canyon and Big Jacks Creek (Bonnichsen 1982, 1994). The Sheep Creek flow is nearly 800-feet thick in the Bruneau River Canyon.

Extending 25-miles from Murphy Hot Springs down the Jarbidge River Canyon to its confluence with the Bruneau River Canyon, “the Dorsey Creek Rhyolite is huge,” (Bonnichsen 1991) containing at least 18-cubic-miles of lava more than 650-feet thick and about 8 million years old. This extremely viscous lava probably took several years to erupt and flow, and many more years to cool and solidify. The southern edge of the flow, consisting of hundred-foot high bulbous masses of jointed rhyolite, forms the cliffs on both sides of the canyon at Murphy Hot Springs (Bonnichsen 1991). These world-class rhyolite flows may be the largest on earth; their enormous size and unique exposure make the Owyhee-Bruneau area a perfect laboratory.

The Bruneau Regional Geothermal Aquifer

Sedimentary and volcanic rocks underlying the Bruneau-Jarbidge Canyonlands form a regional geothermal aquifer. 18,000 to 25,000 years old, this geothermal water is meteoric in origin and its recharge originates from precipitation on the mountains to the south. Discharged as spring flow or underflow, ground water runs northward through the volcanic-rock aquifer to the sedimentary rock aquifer (Berenbrock 1993).

From the late 1800's to 1991, nearly 1,400,000 acre-feet of ground water—primarily used to irrigate crops associated with raising cattle—had been mined from wells, modifying the direction of water movement in both the sedimentary and volcanic-rock aquifers and causing hydraulic heads in the volcanic-rock aquifer to decline more than 30 feet in much of the area and at least 70 feet in one well (Berenbrock 1993). About 1 mile from Indian Bathtub Spring, the water level in one well declined about 0.7 feet per year. In 1964, discharge from Indian Bathtub Spring totaled about 2,400 gallons per minute, but by the summer of 1989, discharge dropped to zero. These declines in spring flow may cause the extinction of rare and endemic fauna, like the Bruneau hot springsnail, that thrives in these geothermal springs (Berenbrock 1993; Bowler 1991a, 1991b).

Paleontology

Lake Idaho, the Chalk Hills, and the Glens Ferry Formation

Over the past 10 million years, the Owyhee-Bruneau Canyonlands has experienced the creation and subsequent drainage of a series of lakes as well as the accompanying changes in flora and fauna, now preserved within excellent and unusual exposed strata (Akersten pers.com.) especially along the Owyhee Front. Two areas in the Owyhee Uplands—the 4,300-acre Hagerman Fossil Beds National Monument, once part of lands managed by the BLM in the Jarbidge Resource Area, and the 814.5 acre Sand Point Paleontological Site ACEC, near the Snake River in the Jarbidge Resource Area—have already been recognized and managed for their abundance of Tertiary-aged vertebrate fossils. The 1,604 acre Coal Mine Basin proposed Resource Natural Area in the Owyhee Front includes Miocene fossils of both vertebrates and plants.

Between 10 million and 1 million years ago, the Pliocene-Pleistocene Lake Idaho—a Lake Ontario-sized series of lakes that stretched from present-day Twin Falls, Idaho to Baker, Oregon—filled with thick layers of white and tan ash, clay, silt, sand, limestone, and gravel. Lake water quenched and altered basaltic lava flows into the lake, thereby recording the locations of old shorelines. Fossilized plants, fish, and horse bones are common in these 1- to 7-million-year-old sedimentary rock deposits (Gillerman and Bonnicksen 1990).

The volcanic activity in the lake preceded several million years of elapsing episodes of lacustrine deposition. “Correlations of lacustrine sediments based on comparisons of fossil fish faunas, volcanic ash chemistries, and lithologies show that sediments of the late Miocene Chalk Hills and Pliocene Glens Ferry Formations in the western Snake River Plain were deposited by two successive, large lakes (Kimmel 1982).” At least one million years separate the Chalk Hills and Glens Ferry Formations at exposures along the south flank of the Snake River Plain. The sediments were deposited in two lakes, which are the site of evolution of the most diverse fish fauna in late Cenozoic western North America (Smith et al. 1982).

The sedimentary record of the Glens Ferry Formation, exposed for nearly eight miles along Birch Creek, represents a nearly uninterrupted stratigraphic sequence spanning a large portion of the Pliocene of southern Idaho (Hearst 1998). Approximately 2.4-million-years old and critical because its age coincides with the initiation of Northern Hemisphere glaciation, the Birch Creek fauna adds an additional rich mammalian record to the Glens Ferry Formation, both in terms of the taxonomic diversity and the numerical abundance of the fauna (Hearst 1998).

The size of the collection is large, with more than 3,000 identified mammalian specimens including two nearly complete specimens of *Equus* (horse), *Homotherium* (scimitar-toothed cat), *Canis* (coyote), *Trigonictis* (grison), *Procastoroides* (giant beaver), and *Cervus* (elk-like deer). The sample size of various taxa is large enough to allow study of within-group variation and between-group variation, a situation rarely encountered in mammalian paleontology (Hearst

1998). In addition, the Glens Ferry Formation contains an unusually rich and diverse Blancan fauna, including mammalian, fish, bird, amphibian, and rare published reptile remains (Meade et al. 1998).

Suckers and Saber-toothed Salmon

Thirty-nine kinds of fish are recognized in the Glens Ferry and Chalk Hills formations with members of six families common to the late Cenozoic of North America, including whitefish, trout, and salmon. With 24 species, the upper zone of the Glens Ferry Formation possesses the richest fish fauna known in ancient or Holocene western North America. The most abundant remains are suckers, with the genus *Chasmistes* being of zoogeographic importance. The most diverse family is the minnows, a group that gained access to North America from north-east Asia probably in the Oligocene, and which shows its earliest and most extreme western American diversification in these formations (Smith et al. 1982). Another diverse group is small benthic sculpins, represented by three genera including the arctic and subarctic relict *Myoxocephalus*, and the endemic *Kerocottus*, as well as abundant catfish and sunfish.

The genus *Smilodonichthys* (saber-toothed salmon) is represented, and based on a large salmonlike fish described from the Miocene of Oregon and California. On the Snake River Plain it is known only from the lowest levels of the Chalk Hills Formation, as exposed in Browns Creek. The presence of this fish and the distinct *Mylopharodon doliolus*, a minnow from the same level, indicates that the Browns Creek beds are older than other Chalk Hills sediments. The minnow *M. doliolus* may be one of the most primitive North American minnows (Smith et al. 1982, Cavender and Rush 1972).

Across low drainage divides, these fish maintained biogeographic connections to the Great Basin and the Pacific coast of California. After 6-million-years the western Snake River Plain developed a large, deep cold lake environment in which subsidence exceeded deposition. The fauna retained the previous kinds of fishes, but added at least six kinds of salmonids and a diversity of deepwater sculpins, parallel to the Baikal rift lake fauna (Smith and Stearley 1999). The salmonids suggest connections to the sea in the vicinity of the Klamath basin and northern California. Connection of the Snake River Plain to the Columbia drainage occurred after 2.7-million-years-ago (Smith and Stearley 1999).

Mammals

A wide range of important mammals have been collected in the Birch Creek local fauna, among them an important complete skeleton of *Equus* (horse). “Although remains of horses are common in the Glens Ferry Formation, complete skeletons are not. The recovery of cranial and dental material with associated postcranial remains has important implications for the reconstruction of equid phylogeny” (Hearst 1998). Likewise collected in the Birch Creek local fauna, “the remains of *Homotherium*, the scimitar-toothed cat, are remarkable because they are the most complete remains of this genus from the Pliocene of North America, and the presence of this genus, previously restricted to Africa and Eurasia, significantly extends the temporal and biogeographic range of this large carnivore” (Hearst 1998).

A skull, mandible, and tibia of a wolverine (*Gulo gulo*) were recovered from sediments at Grasshopper Trail Cave in Owyhee County in porphyritic rhyolite, a rock that seldom forms caves (Anderson 1998). Rare in Pleistocene faunas, *Gulo gulo* is probably descended from *Plesiogulo*, a large musteline that inhabited Eurasia, South Africa, and North America in the Miocene and early Pliocene. Since the earliest records of *Gulo* are apparently from North America, the genus may have originated here. *Gulo gulo* has inhabited Idaho since at least the late Pleistocene and continues to dwell in the forested parts of the state (Anderson 1998).

The Star Valley Fauna

The earliest record of the family *Falconidae* in North America was recovered from Star Valley and the characters described place the specimen in *Oregonomys* (Becker and McDonald 1998). If the assignment is correct, this is only the second known locality for *Oregonomys pebblespringensis*. The Star Valley fauna includes four of the taxa that characterize early Hemphillian faunas, anomalous because both *Epiacyon* and *Pliotaxidea* are present. Either *Epiacyon* survived later or *Pliotaxidea* appeared earlier than previously documented or both.

Given the presence of these two taxa in the fauna, the age of the fauna is constrained to between 6.5- and 6.8-million-years, placing the fauna in the late Early Hemphillian. The Star Valley fauna appears to be older than the type fauna for the Hemphillian/Coffee Ranch local fauna dated at approximately 5.3-million- years old. The Star Valley local fauna includes a mixture of species from different habitats, and the fossils have been recovered from sediments interbedded with volcanics, all of which have been deeply dissected by the tributaries of the Little Owyhee River. The intermediate location of this fauna between the well-documented Drewsey Formation local fauna in Oregon and the Thousand Creek local fauna in Nevada adds to the understanding of Hemphillian faunas in the northern Great Basin (Becker and McDonald 1998).

Oolites

The Mud Flat Oolite Area of Critical Environmental Concern contains scenic sculptured oolite cliffs. The base of the Glens Ferry Formation includes a thick bed of gray oolite, and is about 32-feet thick at the Mud Flat site. Deposited during the terminal evaporative state of Pliocene Lake Idaho, the Mud Flat oolite rests on a five-foot layer of fossiliferous sandstone, which in turn rests on an unconsolidated layer of vitric ash (Moseley 1986). Excellent exposures of the Shoofly Oolite crop out for nearly 25-miles along the southwestern margin of the Snake River Plain between Grand View and Murphy (Hearst 1998). In the upper reaches of the Birch Creek drainage, this oolitic grainstone is truncated against the Miocene Tuff of Little Jacks Creek, and the oolitic carbonate facies contains gastropods, small bivalves, and generally isolated, disarticulated and abraded remains of large fish. The oolitic grainstones are interpreted as nearshore deposits formed during an overall transgression of Glens Ferry Lake (Hearst 1998). Potential mining of the oolitic limestone threatens both these sites.

What Sagebrush Steppe Habitat Can, Could, and Should Look Like



One of the three largest remaining blocks of intact shrub-steppe habitat within the entire Columbia Plateau, the Owyhee-Bruneau Canyonlands “serve as a control site for what sagebrush steppe habitat can, could and should like” (TNC 2000) (see “The Owyhee-Bruneau Canyonlands: Native Plant Communities” map). The Interior Columbia Basin Ecosystem Management Project’s (ICBEMP) scientific assessments identified the Owyhee Plateau as having high rangeland integrity, a rating met by only 6% of the Interior Columbia Basin rangelands (Quigley et al. 1996).

Ecosystem integrity is the degree to which all ecosystem components and their interactions are represented, functioning and able to renew themselves. A terrestrial system that exhibits high integrity is a mosaic of plant and animal communities consisting of well-connected, high quality habitats that support a diverse assemblage of native species, with full expression of life history and taxonomic lineages, and the taxonomic and genetic diversity necessary for long-term persistence.

ICBEMP studied 90 shrub-steppe basins but only ranked seven as having high ecological integrity. Three of these subbasins—the South Fork Owyhee, East Little Owyhee, and Upper Owyhee—occur within the Owyhee-Bruneau Canyonlands (Quigley et al. 1996, TNC 2000). In a conservation assessment of the ecoregions of North America, the World Wildlife Federation rated the Snake/Columbia Shrub Steppe—which includes the Owyhee Uplands—as Bioregionally Outstanding and Endangered: a “bioregionally and nationally important ecoregion requiring protection of remaining habitat and extensive restoration.” Irresponsible livestock grazing, the invasion of exotic plants, irrigated agriculture, and off-road vehicles present major threats to ecological integrity (Ricketts et al. 1999). Although weed invasions are fragmenting the ecoregion, “large, intact areas, though degraded, remain in southwestern Idaho, southeastern Oregon, and northwestern Nevada” in the Owyhee Uplands (Ricketts et al. 1999) corresponding to the proposed monument.

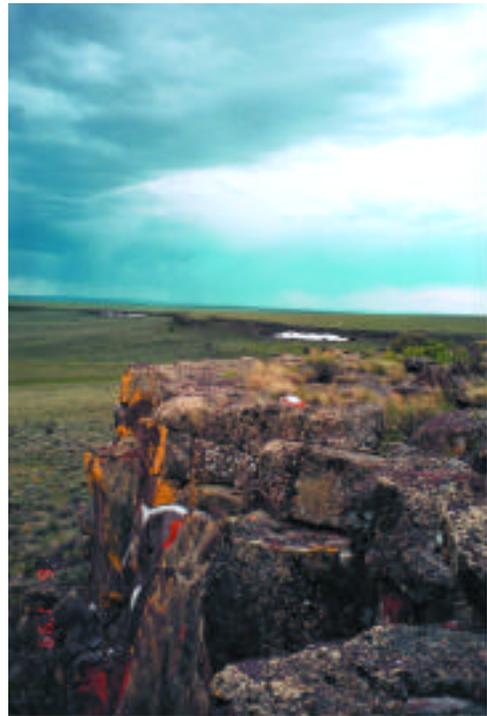
ICBEMP considers over 75% of the Owyhee-Bruneau Canyonlands subbasins “Range Cluster 5” with moderate to high integrity and minimally roaded, low disturbance, moderate and high composite integrity (Quigley et al. 1996). Primary risks to ecological integrity for these “Range Cluster 5” lands are identified as continued declines to herbland and shrubland habitats, and risks to local populations and local habitats for fish. Primary opportunities to address risks to integrity are identified as the restoration of riparian condition and aquatic areas, and conservation of fish strongholds and unique aquatic areas. A northern portion of the monument is “Range Cluster 6” of low composite integrity (Quigley et al. 1996) where continued declines in herbland and shrubland and dry shrubland highly sensitive to overgrazing and exotic plant invasion are identified as risks to ecological integrity.

ICBEMP identified containment of exotic plants, management of grazing, and riparian conservation as management opportunities in these regions.

A Center for Biodiversity, Endemism and Rarity

The Owyhee-Bruneau Canyonlands contains the largest continuous center of shrub-steppe biodiversity in the entire 145 million acre Interior Columbia Basin (Quigley et al. 1996). The Owyhee biodiversity center includes a broad area of both canyons and upland plateaus with a configuration that closely follows proposed monument boundaries, extending from the Oregon border on the west eastward to the East Fork of the Bruneau River. Identified centers of endemism and rarity are found in the Owyhee Front in a swath, extending up the Bruneau Canyon as well as onto the Owyhee Plateau, the East Fork Owyhee River Canyon, and an extensive plateau-canyon area extending from Pole Creek south to the Nevada border (“The Owyhee-Bruneau Canyonlands: Biodiversity, Endemism, and Rarity” map).

These identified centers of biodiversity—and of endemism and rarity—include significant acreages in the Owyhee-Bruneau Canyonlands. It must also be noted that the north-south area perpendicular to the East Fork Owyhee corresponds closely to lands previously extensively studied by the USAF as a Bombing Range location. Thus, it is possible that additional areas within the proposed monument (still largely unstudied) are also centers of biodiversity and/or endemism and rarity.



ICBEMP further identified hotspots of rarity and endemism within the Owyhee-Bruneau Canyonlands in the Horse Hill-Sugar Valley region (Quigley et al. 1996). In addition, populations of rare plants are concentrated in ash bed soils in portions of the Owyhee Front, playas peppering the Bruneau uplands, and other locations. Yet, most populations of rare plants within the proposed monument and the hotspots of rarity and endemism are located outside any protected areas. ICBEMP stresses the importance of realigning or enhancing natural areas to better coincide with hotspots of species rarity and endemism (Quigley et al. 1996).

A Unique Ecoregion

The Owyhee Uplands remains one of the great remote regions of the western United States, a large, wildland area pinched between the northern Great Basin and the Snake River Plain. Its distinctive geological and ecological features make it worthy of classification as a unique ecoregion. Globally, sage steppe ecosystems, like those represented in the Owyhee-Bruneau Canyonlands exist only in the Western United States and Central Asia (Vander Schaaf 1996). According to a report by the Bureau of Land Management and The Nature Conservancy “the overriding distinctiveness of the Owyhee Uplands makes for sound reasoning to consider the region as a unit when undertaking land management planning there that may have broad implications for the natural environment” (Vander Schaaf 1996).

Considered part of the Intermountain semi-desert province (McNab and Avers 1994), the Owyhee Uplands contain a major potential vegetation type of sagebrush-steppe with *Artemisia* and *Agropyron*. The Intermountain Flora Volume 1 (Cronquist et al. 1972) refers to the Owyhee Desert section of the Great Basin as 19,000 square miles of Idaho, Oregon and Nevada with the north boundary overlooking the low Snake River Plains and the southern boundary running roughly along the Great Basin drainage divide, abutting the Bull Run, Independence and Jarbidge Mountains. Ertter and Moseley (1992) recognize the Owyhee Division as being distinct from the Lower Snake River Plain and other areas, including an Owyhee Mountain Unit, Bruneau Plateau Unit, and Jarbidge Uplands Unit.

The evolution of the Owyhee flora is not well understood (Vander Schaaf 1966), but the present-day flora is closely associated with the Great Basin, and has many species in common with the western Snake River Plains. However, Owyhee salt desert shrublands are not associated with internally drained playas, as in the Great Basin. And, unlike the broad plains of the Snake River, the shrub-steppe of the Owyhee-Bruneau Canyonlands, downcut by river canyons, has exposed specialized habitats for plants. There is a high degree of endemism on harsh and unique ash beds, and a development and diversification of mountain mahogany. Externally drained river systems once had remarkable anadromous fish, now lost due to downstream dams.

The greater elevations of the Owyhees also give rise to more diversity in plant communities, particularly mountain mahogany and western juniper (Vander Schaaf 1996). The Owyhee-Bruneau Canyonlands possess a high rate of endemism or rarity—as much as 1% of flora is endemic—and many species are associated with ash beds. These endemic plants include *Astragalus camptopus*, *Astragalus solitarius*, *Astragalus sterilis*, *Erigeron latus*, *Eriogonum novonudum*, *Eriogonum salicornioides*, and *Mentzelia mollis*, while near-endemic taxa include *Artemisia papposa*, *Astragalus iodanthus* var. *viparius*, *Astragalus mulfordiae*, *Astragalus nudisilquus*, *Astragalus purshii* var. *ophiogenes*, and *Eriogonum ochrocephalum* var. *calcareum*.

Furthermore, the Owyhee Canyonlands is one of four areas in Idaho—along with Craters of the Moon, Hells Canyon, and the Sawtooth National Recreation Area—that have been proposed as national parks due to their suitability as representations of unique and outstanding landscapes. Under the Park Service's guidelines for suitability, McCracken and O'Laughlin (1992) determined that the Owyhee Canyonlands may be nationally significant, has unique resources and would represent several NPS suitability themes: plains, plateaus and mesas; river systems and lakes; sculpture of the land; and the desert ecosystem, plus a geologic history theme.

The Owyhee Canyonlands National Park proposal boundaries (based on BLM WSAs) contained 6 vegetation types, made important contributions to protection of three vegetation types—montane shrub fields, juniper/sagebrush/bitterbrush woodlands, and sagebrush mosaics—and contained montane shrub fields that were not adequately protected elsewhere (Wright et al. 1994). In contrast, the majority of the vegetation types contained in Hells Canyon, the SNRA and Craters were adequately protected elsewhere in their ecoregion. While Craters of the Moon, Hells Canyon, and the Sawtooths have been nationally recognized and received special management priorities, the Owyhee Canyonlands remains unrecognized and unprotected.

A System in Peril



In dire need of management priorities, the shrub-steppe habitats within the Interior Columbia Basin face serious degradation due to species declines, vulnerability to human activities, and habitat loss. Shrub-steppe habitats have experienced the greatest loss of all habitats within the Interior Columbia Basin, and are predicted to decline under all management themes (Quigley et al. 1996, Saab and Rich 1997). 43% of the species in rangeland habitats show low versatility in using other habitats, and consequently suffer high impacts from habitat loss. ICBEMP strategies for dealing with loss in shrub-steppe source habitat are

to “identify and conserve remaining core areas of shrub steppe and other source habitats where ecological integrity is still high” (Quigley et al. 1996). “Examples are the northern Great Basin and the Owyhee Uplands ERUs that contain large blocks of public land” (Wisdom et al. 1998). As one of the last vestiges of an essential and endangered ecosystem, the Owyhee-Bruneau Canyonlands must be preserved.

Cheatgrass has invaded sage-steppe and juniper woodlands and many native plants cannot survive the competition (Mac et al. 1998), rare plants are being displaced (Rosentreter 1994), and structure, composition and successional pathways are being altered (Vavra 1994, Quigley and Arbelbide 1997). Landscape-level dynamics have been altered (USDA/USDI 2000) and a dense cover of cheatgrass has increased fire frequency and altered fire cycles (Whisenant 1991, Billings 1994, Monsen 1994). The BLM’s traditional approach does not look beyond allotment and Resource Area boundaries for solutions to weed invasions, livestock grazing and fire recovery; thus, the current trend of degradation and fragmentation continues.

With each fire, dominance of non-indigenous annual grasses is enhanced at the expense of native perennials. Weeds are tied to disturbance processes (Sheley 1994). Livestock grazing enhances the establishment of cheatgrass and other weedy exotic plants (Fleischner 1994, Mac et al. 1998, Belsky 2000). The Owyhee Uplands is shown to have the highest susceptibility to invasion by cheatgrass of any of the 14 ERUs in the Interior Columbia Basin, and all of the area is shown as moderately susceptible to leafy spurge invasion, and some portions susceptible to knapweed (Quigley and Arbelbide 1997). According to Young and Sparks (1995), when sage-steppe ecosystems are faced with overgrazing and the invasion of exotic species, “these plant communities did not bend to adapt, they shattered.”

In a comment during a US Air Force study of the Owyhee, Gladwin and McKechnie (1993) worried that “the many threatened/endangered species found in the Owyhee canyon lands and surrounding areas are not being given proper consideration for habitat or population preservation.” Within the Interior Columbia Basin, habitat for terrestrial wildlife is declining rapidly as plant communities are invaded by exotics (Whisenant 1991, Billings 1994, Fleischner 1994, Sheley 1994, Quigley et al. 1996, Saab and Rich 1997, Quigley and Arbelbide 1997, Ricketts 1999, Belsky 2000).

Less than 1% of Snake-Columbia Shrub-steppe is protected under GAP Level 1, which encompasses permanent protection from conversion and includes a management plan to maintain a natural state, and only 3% at GAP level 2, which offers permanent protection from conversion, but may receive uses that degrade the quality of existing communities (Conservation Biology Institute 2000). The World Commission on Environment and Development recommended protection of 12% of ecological regions, and Noss (1992) recommended protection of 25% as strictly protected core areas, with core areas containing representations of major physical-biological habitat types, rare or endangered species, and high landscape connectivity.

As human populations continue to grow, wild lands will become increasingly insular, and habitat fragmentation will continue with concomitant species declines, habitat loss, and introduced species (Mac et al. 1998). Projected population increases in the Basin will result in more people in the high-density Counties like Ada and Canyon County in close proximity to BLM-administered lands in the Owyhee-Bruneau Canyonlands. These growing urban centers are anticipated to have a greater risk associated with their interface of wildlands. Furthermore, metro areas pose greater risks to areas of high integrity like the Owyhee-Bruneau Canyonlands than to areas of low integrity (Quigley et al. 1996). Current mixed ownership and potential ownership changes via trades or developments on state and private lands pose serious threats to the adjacent public lands.

The threat of losing this bastion of high ecological integrity increases each day, and a national monument could provide the type of protection and management priorities necessary to preserve this imperiled landscape.

Core Habitat, An Anchor for Restoration and Research

The Owyhee-Bruneau Canyonlands is of sufficient size to ensure long-term population viability for sage grouse and other sagebrush-dependent species. The Owyhee Uplands are the only place in the entire Interior Columbia Basin where ICBEMP predicts long-term persistence of sage grouse—100 years in the future—may be possible (Rich and Saab 2000). Biological conservation theory suggests that large contiguous conservation areas increase both the extent and probability of population survival, increase the protection of migratory pathways, and offer the most effective means of conserving aquatic and riparian communities. The large size of the monument provides the opportunity for long-term ecosystem management, research, and maintenance of viable populations of the declining native biota. In detailed recommendations for dozens of native wildlife species that occur in the Owyhee Uplands, ICBEMP scientific analysis (Wisdom et al. 1998) recommends protection of large core areas of habitat.

To achieve the stability and restoration of ecological systems and to provide reference sites for scientific research, protected areas need to be more than token small areas of high scenic value. Landscapes the immense size of the Owyhee-Bruneau Canyonlands must be preserved and managed as a contiguous entity. According to *Status and Trends of the Nation's Biological Resources* (Mac et al. 1998) “a range of reference sites and situations for biological diversity must be amassed...the array of sites must include not only those of unusual composition and aesthetic merit but also representatives of more common assemblages and ecosystems.”

Thus protection of the Owyhee-Canyonlands must include not just its spectacular canyons, but its vast expanses of a sagebrush ocean as well. “It is important that sufficiently large natural areas be protected as base lines or controls against which to compare the diversity composition and function in ecosystems altered by humans” (Sinclair 1983). The immense size of the Owyhee-Bruneau Canyonlands is a unique value in itself, offering the opportunity to connect a wide landscape both for the sake of biodiversity and for scientific research.

The 2.7 million-acres of BLM-managed land in the Owyhee-Bruneau Canyonlands ecosystem provides a unique opportunity in the Interior Columbia Basin to preserve arid land biodiversity. ICBEMP recommendations to maintain or restore biodiversity include protecting or restoring degraded communities, aligning natural areas to represent ecosystems and to provide for rare and endemic species; conserving centers of species rarity, endemism and richness; providing for an array of historic vegetation; providing for an array of key species ecological functions; providing for full species' ranges including disjunct populations, range margins, and endemic subspecies; maintaining soil structure and avoiding erosion; eradicating exotics and preventing further spread; and modifying livestock grazing strategies (Quigley et al. 1996). To achieve these conditions, high-quality environments need to be well distributed, well connected and persistent...as they are in the Owyhee-Bruneau Canyonlands.

“In the sagebrush lands of the West...the natural landscape is eloquent of the interplay of the forces that have created it. It is spread before us like the pages of an open book in which we can read why the land is what it is, and why we should reserve its integrity. But the pages lie unread.”

—Rachel Carson, *Silent Spring*

Flora



The flora of the Owyhee-Bruneau Canyonlands incorporates massive expanses of sagebrush communities, juniper forests, mountain mahogany woodlands, intermittent streams and playas, and lush riparian wetlands (see “Owyhee-Bruneau Canyonlands: Native Plant Communities” map). A center of biodiversity, the Owyhee Uplands exhibit a high rate of endemism including ash bed endemics in the Owyhee Front, globally rare plant communities in vernal pools, and salt desert shrub environments at the fringe of their range.

Priceless in their own right, these plant communities also support an eclectic assortment of wildlife and provide the type of large scale habitat necessary for the continued survival of sage grouse and other sagebrush obligate species. Yet, the integrity of this landscape is severely threatened by fragmentation due to the invasion of exotic species, unregulated ORV use, overgrazing, fire, human development and administrative practices. The significance of many species found in the Owyhee-Bruneau Canyonlands has only recently been recognized and no comprehensive management or monitoring plans exist to track their status. The greatest amount of scientific literature available on the Owyhee-Bruneau Canyonlands has focused on relatively small sites, studied in isolation because of proposals to develop the surrounding lands.

The Sagebrush Ocean

Settlers’ journals and diaries from years prior to the onset of grazing by domestic livestock in the late 19th century suggest that thick stands of shrubs once covered most of the vast Snake River Plains and Owyhee Uplands (Vale 1975, Trimble 1989, Paige and Ritter 1999, Yensen 1982). The present-day “sagebrush ocean” of the Owyhee-Bruneau Canyonlands extends in an almost unbroken expanse—typified by a complex of sagebrush communities—south from Grasmere to the Nevada border and from the Bruneau River-Sheep Creek westward to Oregon (USAF 1993 map based on Caicco 1989, Bruneau-Kuna Grazing EIS Vegetation Map 1983). This massive enclave preserves the continuity and dominance of shrubs that have disappeared from much of the high desert landscape in the Intermountain West.

The extent, diversity, and complexity of these sagebrush communities and their interspersions provides critical habitat for sage grouse, migratory songbirds, raptors, pronghorn antelope, pygmy rabbit and other important wildlife species. Sagebrush-obligate migratory birds are tuned in to the subtle differences in vegetation structure and composition between shrub habitats (Paige and Ritter 1999). The greatest asset of the Owyhee-Bruneau Canyonlands’ sagebrush ocean is its immense size which must remain unfragmented in order to retain its biological value.

The sagebrush habitats of the Owyhee-Bruneau Canyonlands can be complex and variable (Peterson 1995), as in lands north of the East Fork Owyhee River where: “a high diversity of plant communities ... form an intricate mosaic” (USAF 1993). Varied vegetation community types within sagebrush result from differences in soil, climate, topography, and other physical processes (Tisdale and Hironaka 1981). While a single species of sagebrush may be dominant in the overstory, communities differ widely in understory plants. Hironaka et al. (1983) refer to

both ecotypic and spatial variability of sagebrush communities, and the sagebrush communities of the Owyhee-Bruneau Canyonlands vary from expanses of single species to multispecies mosaics (USAF 1993, 1996).

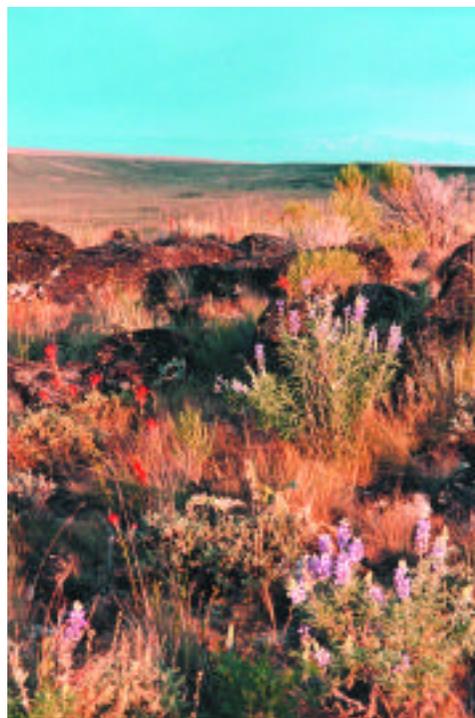
The major sagebrush-dominated vegetation zones of the Owyhee Uplands are comprised of Wyoming big sagebrush (43.1%), mountain big sagebrush shrubland (4.2%), and low sagebrush (24.3%), resulting in 71.6% of the vegetation being dominated by sagebrush (Rust and Moseley 1999). Salt desert shrubland comprises an additional 13.6% of the Owyhee Uplands (Rust and Moseley 1999). Thirty-six woody sagebrush community types have been identified within the Owyhee-Bruneau Canyonlands including *Artemisia arbuscula*, *Artemisia cana*, *Artemisia longiloba*, *Artemisia nova*, *Artemisia papposa*, *Artemisia tridentata tridentata*, *Artemisia tridentata vaseyana*, and *Artemisia tridentata wyomingensis* (Rust and Moseley 1999). Almost every possible combination of overstory shrub and understory bunchgrass is present in the Owyhee Uplands (Vander Schaaf 1996).

Continuous low sagebrush plant communities comprise nearly a quarter of the major vegetation zones of the Owyhee Uplands with low sagebrush dwarf shrub mosaic accounting for 15.3%, low sagebrush dwarf shrub mosaic-sparse 5.7%, and low sagebrush dwarf shrub mosaic-wet meadow 3.3% (Rust and Moseley 1999). Seventeen low sagebrush plant communities including *Artemisia arbuscula*, *Artemisia cana*, *Artemisia nova*, *Artemisia longiloba* and *Artemisia papposa* have been described for the Owyhee Uplands (Rust and Moseley 1999). These low sagebrush communities occur within the proposed monument on shallow soils, typically with a subsurface clay layer (Hironaka et al. 1983), and on shallow, rocky soils in the rolling Owyhee Plateau landscape (Vander Schaaf 1996). Big Springs Butte and Dickshooter Ridge represent one of the most extensive low sagebrush communities in Idaho (US Air Force 1993).

Juniper Woodlands

In 1987, the National Park Service recommended that 4,413 acres in the Owyhee Uplands be designated the North Fork Owyhee River National Natural Landmark, representing the best example of a “montane western juniper woodland subtheme” in the Columbia Plateau Natural Region. The Park Service selected the Owyhee Uplands site on the basis of “illustrative character, condition, diversity, rarity, and value for science and education” (Moseley 1996). Dominated by a canopy of old-growth and mature stands of western juniper with an upland understory of Idaho fescue mingled with low sagebrush, this recommended National Natural Landmark occupies the canyons and dissected uplands of Swisher Mountain tuff. The area supports a number of special status wildlife species including redband trout and several rare bats, neotropical migrant birds, elk, mule deer, mountain lions, river otters, beaver, raptors, reptiles and amphibians.

The North Fork Juniper Woodland was designated by the BLM as an Outstanding Natural Area (ONA) in the 1981 Owyhee MFP. There are two western juniper-dominated Outstanding Natural Areas within the Owyhee-Bruneau Canyonlands: the 10,741 acre Boulder Creek ONA with dominant western juniper-Idaho fescue, and the 9,741 North Fork Owyhee Juniper Woodland ONA. Dominant plant communities in these ONAs include western juniper/low sagebrush, in addition to a riparian shrub component (BLM 1999).





Over 95 wildlife species occur within western juniper. An Owyhee study (Golden Eagle Audubon 1997) found the greatest avian species diversity and abundance in more structurally diverse old growth and seral juniper communities, compared to prescribed burn and clearcut communities. Western juniper provide perching and nesting sites for at least 27 bird species, and juniper berries in the Owyhee Uplands supply an important food source for wintering migratory and resident birds such as Townsend's solitaire (*Myadestes townsendi*).

Samplings of western juniper habitats near the Mud Flat Road and the Oreana-Triangle-Jordan Valley road identified seven sensitive species of bats including the rare spotted bat (*Euderma maculatum*) (Perkins and Peterson 1997). A survey of butterfly communities in western juniper woodlands inventoried 18 species, with 3 new species documented for Owyhee County: *Gaeides editha*, *Strymon melinus* and *Aglais milberti*. Previously, 69 species had been documented in Owyhee County, based on Stanford and Opler's (1993) distribution maps (Stephens 1994).

A surprising population of elk (known to hunters for trophy characteristics) inhabits the Owyhee western juniper, mountain shrub, and juniper-sagebrush canyon breaks country. Black-throated gray warbler (*Dendroica nigrescens*), ash-throated flycatcher (*Myiarchus cinerescens*), and gray flycatcher (*Empidonax wrightii*) are found in Owyhee juniper country.

The oldest living western juniper is over 1,600 years old, but many old trees cannot be aged due to rotten trunks (Smith et al. 1999). In the Owyhee-Bruneau Canyonlands, large old growth groves of western juniper resembling the ancient trees in size, growth characteristics, and other attributes are found at upper Deep Creek tables, Pleasant Valley Table, North Fork Owyhee, Current Creek, and Juniper Mountain. Thus, Idaho's oldest forested communities may be those of the Owyhee Uplands.

Imminent threats to the juniper woodlands of the Owyhee Uplands include livestock grazing, exotic species invasions (Eddleman et al. 1994.; Belsky 1996, 1999), ORV activities and unauthorized removal for personal use. Since spur trails, entirely new roads, and established trails serve as avenues for exotic plant introductions within the pristine juniper woodlands of the Owyhee Uplands, leaving areas with an "open" OHMV designation would potentially cause degradation of scenic, biological, wilderness and cultural resources (BLM 1999a).

Mountain Mahogany

Expansive stands of mountain mahogany, *Cercocarpus ledifolius*, a large evergreen shrub, flourish in the Owyhee Mountains and on Owyhee Ridge in Oregon and Idaho. These stands are unmatched in terms of actual size or diversity of understories (Vander Schaaf 1996). Five distinct mountain mahogany plant associations have been described in the Owyhee Uplands (Rust and Moseley 1999). Mahogany Mountain and the Owyhee Mountains in particular typify the unique montane tall shrub communities that are present in the ecoregion (Vander Schaaf 1996). The center of mountain mahogany species distribution may be in the Owyhee ecoregion (Vander Schaaf 1996, citing Dealy 1979); mountain mahogany imbues the plateau lands with a savanna-like appearance.

Salt Desert Shrub Communities

Salt desert shrub communities in the Owyhee Uplands are near the northern extent of their range, and are more typical of Great Basin floras to the south. In the Owyhee Resource Area, they typically occur below 3500 ft in elevation (BLM 1999a). Salt desert shrub communities provide habitat for Great Basin reptiles also at the northern edge of their range in this hotspot of reptile distribution in Idaho. Three shadscale plant communities have been described within the monument (Rust and Moseley 1999), and other complex plant associations are detailed in Idaho Conservation Data Center (2000) macrosite descriptions for Star Valley, Deadman Gulch, and Horse Basin Gap, as well as BLM's 1997 description of the Horse Hill area, identified as a hotspot of biodiversity in the Interior Columbia Basin (Quigley and Arbelbide 1997). These salt desert communities—northern extensions of Great Basin elements—remain little-investigated components of the Owyhee ecosystem (T. Klahr pers. comm. 2000).

Salt desert shrub and sagebrush communities in lower elevations and on the Owyhee Front provide habitat for special status migratory songbirds including loggerhead shrike, sage sparrow and black-throated sparrow (BLM/Golden Eagle Audubon, BLM 1999c). Salt desert shrub communities are generally more open than sagebrush dominated communities, with greater distances between shrubs and bunchgrasses (Vander Schaaf 1996). Big sagebrush and salt desert shrub provide source habitats for black-throated sparrow and kit fox within the Owyhee-Bruneau Canyonlands where both species are at the northern periphery of their ranges. The black-throated sparrow is a species of high management concern (Saab and Rich 1997, Wisdom et al. 1998).

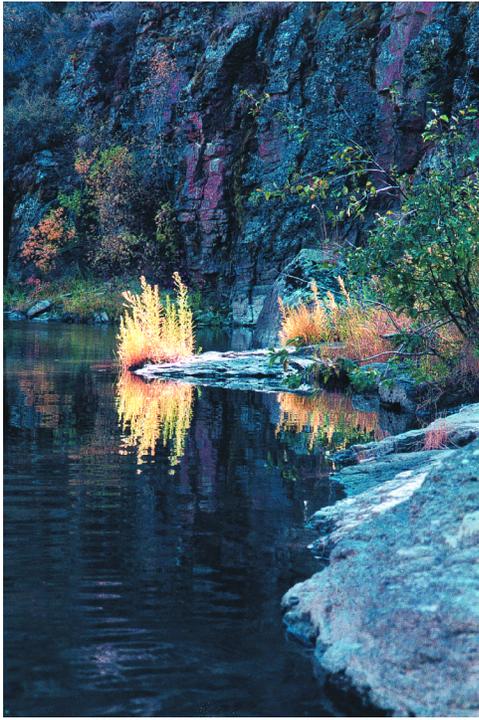
A strategy for addressing loss and degradation of these species' habitats is to “maintain remaining native shrublands, especially in the Upper Snake Ecological Reporting Unit, and in all watersheds in the Owyhee Uplands where strong negative trends have occurred” (Wisdom et al. 1998). In the Owyhee Front Special Recreation Management Area, which contains large acreages of salt desert shrub communities, the BLM identified threats due to the proliferation of ORV impacts, including unplanned roads and trails leading to decreased scenic quality; conflicts with sensitive plant populations; habitat fragmentation; erosion and water quality concerns (BLM 1999a). In addition these lower elevation communities are highly susceptible to cheatgrass truncating succession following fire or other disturbances (Billings 1994).

Ash Bed Endemics

Endemic plants uniquely adapted to harsh environments are found on volcanic ash beds centered around Leslie Gulch and Succor Creek, and stretching east into Idaho (Glad 1976, Grimes 1984, Packard 1992, Vander Schaaf 1996). This swath includes at least twelve (Mansfield et al. 1992) to thirteen (Vander Schaaf 1996) endemic species including Cusick's false yarrow (*Chaenactis cusickii*), barren milkvetch (*Astragalus sterilis*), succor creek parsley (*Lomatium packardiae*), soft blazingstar (*Mentzelia mollis*), Malheur yellow phacelia (*Phacelia lutea* var. *calva*), and Owyhee clover (*Trifolium Owyheense*). Four taxa are confined to Leslie Gulch, four to Succor Creek, and two to the Snake River Ash (Mansfield et al. 1992).

All taxa belong to evolutionarily active groups, and may have evolved to live in harsh ash bed environments less than 8000 years ago (Mansfield et al. 1992).





Succor Creek ash beds are intercalated with clay, silt and sandstone, and display a popcorn-like appearance due to shrink-swell properties of the clays to which the ash weathers. Rare endemic plants such as *Mentzelia mollis* exhibit edaphic endemism (Glad 1976, Grimes 1984), and are likely adapted to harsh physical features of exposed habitats. Soil properties of these unique communities pose a challenging set of environmental conditions for plant growth. In spring, wet clays generate anaerobic conditions for seedlings, quickly followed by shrink-swell conditions that can tear seedlings apart. Light-colored soils result in extreme heat during a compressed growing season. Endemics are typically annuals whose seeds persist in the soil (Vander Schaaf 1996).

Of the 31 special status plant species documented in the Owyhee Resource Area in 1998, 16 are “globally rare” throughout their range. Several occur only on soils derived from volcanic ash and are rare largely because of limited habitat. Barneby (1989) describes the stunning perennial ash endemic Owyhee clover (*Trifolium owyheense*) as “a rare and remarkable endemic clover.” A serious threat to these ash endemics is mining of industrial materials such as zeolite and bentonite from the ash substrates on which they grow

(BLM 1999). Development of livestock facilities (ponds, water projects), increased concentrations and shifting of livestock use are also threats (BLM 1999).

Riparian Systems, Springs, and Seeps

The Owyhee-Bruneau Canyonlands gains its geomorphological uniqueness from its large concentration of river systems, streams, and varied associated riparian habitats (Vander Schaaf 1996). The BLM inventoried over 1,218 miles of streams and rivers for potential wild and scenic river consideration in the Owyhee Resource Area alone (BLM 1999a), and a catalogue of biodiversity of a 70,000 acre area in the Owyhee Uplands near the South Fork Owyhee River watershed, identified a riparian flora of 275 species (Moseley 1999b). Populations of seven rare plant species were catalogued and 21 riparian and wetland plant communities were identified, with six communities considered rare throughout their range. Riparian plant community patterns thrive in the South Fork Owyhee River, Little Owyhee River, Canyon Spring Systems, and Intermittent Lakes and Creeks.

The concentration of high quality Basin big sagebrush/basin wild rye communities in the Owyhee-Bruneau Canyonlands is the greatest of any place inventoried in Idaho (TNC 2000, Moseley 1999b). Springs in the South Fork Owyhee River watershed provide habitat for the rare plants Nevada angelica (*Angelica kingii*), giant hellebore (*Epipactis gigantea*), and cut-leaved water parsnip as well as rare plant communities of threesquare bullrush (*Scirpus americanus*) G1/S1 and wandering spikerush (*Eleocharis rostellata*) G2/S2 (Moseley 1999a, TNC 2000). But, irresponsible gazing practices severely threaten these fragile systems. Studies noted evidence of heavy grazing on Nevada angelica outside an exclosure fence in vivid contrast to plants protected within the exclosure (Moseley 1999a).

Owyhee Upland spring systems provide year-round habitat for amphibians, reptiles, and a number of mammals. They also provide nesting substrate and foraging areas for neotropical migratory birds, and function as stop-over habitat for migrating waterbirds and other birds. In addition, they provide habitat for special status species such as the Columbia spotted frog (*Rana pretiosa*), white-faced ibis (*Plegadis chihi*), great egret (*Ardea alba*), and spotted bat (*Euderma maculatum*) (USAF

1993). Most pronghorn antelope recorded during spring surveys in the Owyhee Uplands were within 0.6 mi. of a water source (US Air Force 1996), and wet meadows—common in higher elevations—provide critical sage grouse brood rearing habitats (US Air Force 1993).

Although large areas of the Owyhee Uplands have limited upland springs and seeps—particularly lower elevation Wyoming big sagebrush habitats such as the YP Desert—many middle to upper elevation sagebrush areas have a wide variety of wetland types. USAF (1993) listed numerous wetlands north of the East Fork Owyhee River including stream beds, margins of reservoirs and wet meadows, intermittent springs, permanently or seasonally flooded wet meadows, and scattered springs. In contrast, wetlands found in lower elevation Wyoming big sagebrush communities are more typically vernal pools or playas (see discussion of *Lepidium davisii* below, and the description of YP Lakebed in Moseley 1998). Springs and seeps are some of the least-protected habitats in the Owyhee-Bruneau Canyonlands, often seriously degraded by livestock grazing practices despite their high values for wildlife species, and a high occurrence of cultural sites in and around them (BLM 1999c).

Intermittent Rivers, Playas, and Slickspots

As a desert ecosystem, the Owyhee-Bruneau Canyonlands contains a complex of intermittent rivers and streams, playas, slickspots, and ephemeral drainages that support endemic and diverse biotic communities. Five intermittent stream community types were surveyed in areas of the South Fork Owyhee watershed, including Owyhee sagebrush (*Artemisia papposa*) G1/S1 a distinctive and globally rare sagebrush community, western juniper/California oatgrass (*Juniperus occidentalis/Danthonia californicus*) G2/S2?, silver sagebrush/dry graminoid (*Artemisia cana/dry graminoid*) G3/S1, California oatgrass (*Danthonia californica*), and prairie sage (*Artemisia ludoviciana*) G3/S2 (Moseley 1999a). (See Appendix B—under separate cover—*Special Status Flora and Fauna*.)

Intermittent streams with perennial flow near springs, and ephemeral streams which have flow only during runoff, contain vegetation different from surrounding upland types. Unique hydrologic conditions in these ecosystems represent important biodiversity elements (U.S. Air Force 1996, Quigley and Arbelbide 1997). The intermittent Little Owyhee River is unique in Idaho and a high conservation priority. “Little is known about the succession, disturbance, and management of these communities and they are also ignored by most riparian inventories and classifications” (TNC 2000 citing Moseley 1999).

Two globally rare mustards of the genus *Lepidium* occur in the Owyhee Uplands. Davis’ peppergrass (*Lepidium davisii*) grows exclusively on the hard floors of clay-dominated bare playas (Moseley 1996), and is threatened by the vulnerability of its restrictive habitat and its limited range (Nevada Natural Heritage Program 1995). As a vernal pool community, *Lepidium davisii* has been rated G1/S1 globally rare and critically imperiled (Murphy 1999, TNC 2000). Slickspot peppergrass (*Lepidium papilliferum*) G2/S2, a current federal Candidate species, may occur on slickspots—mini-playa-like natric soils—in Wyoming big sagebrush communities in the southeastern edge of the monument (Moseley 1994, Mancuso et al. 1998, BLM 1999c).

Fungi

A Preliminary RED List of Idaho’s macrofungi presented in Castellano (1997) includes *Amanita armillariformis*, *Amanita aurantiasquamosa*, *Calvatia owyheensis*, *Cyathus olla f. lanatus*, *Genabea cerebriformis*, *Psathyrella deserticola*, *Psathyrella nezpercii*, *Psathyrella owyheensis*, *Psathyrella populorum*, and *Psathyrella subradicata*, all found within the Owyhee-Bruneau Canyonlands. A RED list represents rarity for those species that are localized within restricted geographical areas or whose habitats are scattered thinly over a more extensive range. Many macrofungi are cryptic, ephemeral,

seasonal, cluster across the landscape, have limited population biology information, difficulties with identification, and destructive sampling methodologies (Castellano 1997, Wicklow-Howard 1994).

Ellen Trueblood, a respected amateur mycologist, collected extensively in the Owyhee Uplands, cataloging many rare species, with type specimens and type localities in sagebrush and other arid habitats (Trueblood 1972, Prentice 1997). Type localities for several rare species occur in the Owyhee-Bruneau Canyonlands. ICBEMP, recognizing difficulties in conservation of little-known fungi, recommends conservation of type localities and protection of biodiversity, including fungi (Quigley and Arbelbide 1997), since fungi are important elements in biodiversity, the most diverse group of organisms after arthropods (O'Dell 1997). Threats to macrofungi within the Owyhee-Bruneau Canyonlands include alteration and degradation of native vegetation communities, especially invasion by exotic species.

Microbiotic Crusts

ICBEMP has designated the restoration of microbiotic crusts in the Owyhee Uplands as an important element in the restoration of native vegetation integral in reversing broad-scale declines in terrestrial vertebrates—lizards, migratory birds, sage grouse, and mammals—in the Interior Columbia Basin. Microbiotic, or cryptogamic crusts, consist of lichens, bryophytes, algae, microfungi, cyanobacteria and bacteria growing on or just below the soil surface in arid or semi-arid environments. These crusts improve soil stability, productivity, and moisture retention. They moderate surface temperature extremes, and enhance seedling establishment.

Widely distributed in the Owyhee Uplands, these microbiotic crusts can be destroyed by livestock grazing (Wisdom et al. 1998). Native shrub-steppe vegetation, including crusts, evolved without large herds of grazing ungulates (Mack and Thompson 1982). ICBEMP (Wisdom et al. 1998) recommends restoration of “microbiotic crusts in [areas such as the Owyhee Uplands] with potential for redevelopment.” (Belnap 1993, 1995; Kaltenecker 1997; Kaltenecker and Wicklow-Howard 1994). Management recommendations for habitat restoration of species dependent on lower elevation big sagebrush and salt desert shrub communities encourage the redevelopment of microbiotic crusts by reducing or eliminating livestock grazing (Wisdom et al. 1998). Other threats to microbiotic crusts include fire and exotic species invasions.

Fauna

The diverse plant communities and unique landscape of the Owyhee-Bruneau Canyonlands support an array of wildlife ranging from the tiny—and federally Endangered—Bruneau hot springsnail, to one of the largest herds of California bighorn sheep in the world. The vast sage steppes of the proposed monument offer sage grouse the huge acreage that they and other sagebrush obligate species need for their habitat. The high cliffs of the canyonlands harbor rare species of bats, while the streams of the monument support populations of redband trout that have adapted to desert temperatures and retain genetic links to anadromous steelhead. Herds of pronghorn antelope racing across the high desert have given the sage steppes of the monument the nickname the “Serengeti of Idaho.” Identified by the Interior Columbia Basin Ecosystem Management Project (ICBEMP) as a center of biodiversity, the Owyhee-Bruneau Canyonlands must be preserved as an intact habitat for these thriving and unique communities of animals (see “Owyhee-Bruneau Canyonlands: Sensitive Species Occurrences” map).

Redband Trout

A reservoir of genetic diversity, redband trout (*Onchorhynchus mykiss gairdneri*) in Owyhee-Bruneau drainages show minimal evidence of genetic introgression (Wishard et al. 1980, Wallace 1981, Wishard et al. 1984, Behnke 1992). While redband trout within the Interior

Columbia Basin are poorly understood, many subbasins contain genetically unique strains that have declined concomitant with habitat degradation (Quigley and Arbelbide 1997). The native trout of the Owyhee-Bruneau Canyonlands should be recognized and managed as unique populations of native trout specifically adapted to harsh desert environments (Wallace 1981).

These redband populations are within the fringe of their range and in the same historical range of steelhead; thus, their unique adaptations may represent important sources of genetic diversity (Quigley and Arbelbide 1997). Summer steelhead were once found in all accessible reaches of the Snake River and its tributaries, including the Owyhee and Bruneau River systems (Quigley and Arbelbide 1997). Dams built along the Columbia and Snake River drainages within the past one hundred years have effectively isolated populations of redband trout in the Owyhee Uplands from steelhead.

Redband trout in desert habitats of Western North America are thought to have evolved adaptations to live in harsh environments. In a study of redband trout in Castle, Shoofly, Little Jacks and Big Jacks Creeks, redband trout were found to tolerate temperatures above 26 degrees C for 4.4 hours, and fish were observed actively foraging at 26.2 degrees C (Zoellich 1999), tolerating a maximum temperature 29 degrees C, higher than that previously documented by Behnke (1992) in the Owyhee River Basin. The fish also tolerated greater daily temperature fluctuations than previously described in literature for other native salmonids, including desert-adapted species (Zoellich 1999).

In many Owyhee streams, redband trout are now restricted to headwaters, and habitat connectivity has been lost (Quigley and Arbelbide 1997, Zoellich 1999). Key salmonids in the Interior Columbia Basin have experienced massive declines in abundance, loss of life history stages, local extinctions, as well as fragmentation and isolation of high-quality habitats, particularly in rangelands. Aquatic biodiversity has declined. Changes in salmonid populations are indicative of broad declines in stream habitats and riparian areas. Where redband trout still persist, they occur in highly fragmented habitat and in isolated populations. Core areas remain for rebuilding and maintaining functional aquatic systems, though, and ICBEMP has identified 20 Aquatic Strongholds in the Owyhee-Bruneau Canyonlands.

The monument contains “Known Strong”, “Predicted Strong,” spawning, and rearing areas for redband trout that stand out in sharp contrast to most other BLM rangeland areas in the Interior Columbia Basin, where most subwatersheds supporting strong populations of key salmonids are found on Forest Service lands (75%) and a substantial number within wilderness areas (29%) (USDA/USDI 1996).

Restoring and maintaining the integrity of migration corridors is important for the persistence, distribution and diversity of redband trout. Setting aside large watersheds and habitats that support remaining areas of high intrinsic value or condition is critical. ICBEMP identified restoration of productive aquatic areas, maintenance conservation of riparian condition, and conservation of aquatic strongholds and unique aquatic areas as primary opportunities to address risks in the Owyhee-Bruneau Canyonlands area (USDA/USDI 1996, Quigley and Arbelbide 1997).

Columbia Spotted Frog

The isolated population of Columbia spotted frog (*Rana pretiosa*) south of the Snake River is a federal Candidate species (Engle and Munger 1998). Highly aquatic and typically found near cool quiet water, this frog feeds on insects, mollusks, arachnids and crustaceans. Spotted frogs in the Owyhee Uplands are found in ponds, pools, and oxbows as well as sites with sandy substrate and low sagebrush cover and hideaways present. Breeding is restricted to oxbows, ponds, or slow moving pools.



Threats to Columbia spotted frogs include loss and fragmentation of habitat leading to local extinctions, exotic species, long-term effects of over-grazing, and hypothesized global phenomena such as increased ultraviolet radiation or climate change (Munger et al. 1996, Munger et al. 1997, Engle and Munger 1998). Unregulated ORV use may also pose grave problems to Owyhee amphibians. Brattstrom and Bondello (1983) recorded motorcycle sounds “that caused spadefoot toads to emerge from their burrows, a potentially detrimental impact on a population if it occurs outside the normal breeding season.”

Reptiles

Many of Idaho’s uncommon native reptiles inhabit the Owyhee-Bruneau Canyonlands. GAP analysis (Groves 1994) shows that the high species richness of reptiles in northern portions of the Owyhee-Bruneau Canyonlands is the greatest of any area in Idaho, and that double the number of reptile species are found here than in most other portions of the state (see “Owyhee-Bruneau Canyonlands: Species Richness: Reptiles and Amphibians” map). Local populations of reptiles are vulnerable to collection and export, and loss of shrub-steppe habitat from wildfires. The loss of shrub habitat may portend long-term declines for these populations (Groves 1994). 69% of the total species of reptiles and amphibians in Idaho potentially occur in the Owyhee Front and Canyonlands (Gerber et al. 1997). The greatest diversity of reptiles is associated with lower elevation Wyoming big sagebrush and salt desert shrub habitats and deep canyon environments.

Nineteen reptiles which occur in the monument include: western skink (*Eumeces skiltonius*), longnose leopard lizard (*Gambelia wislizenii*), western fence lizard (*Sceloporus occidentalis*), sagebrush lizard (*Sceloporus graciosus*), shorthorned lizard (*Phrynosoma douglasii*), Mojave black-collared lizard (*Crotaphytus bicinctores*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), desert horned lizard (*Phrynosoma platyrhinos*), common garter snake (*Thamnophis sirtalis*), western terrestrial garter snake (*Thamnophis elegans*), rubber boa (*Charina bottae*), gopher or bull snake (*Pituophis catenifer*), racer (*Coluber constrictor*), longnose snake (*Rhinocheilus lecontei*), western ground snake (*Sonora semiannulata*), night snake (*Hypsiglena torquata*), striped whipsnake (*Masticophis taeniatus*), western rattlesnake (*Crotalus viridis*).

Five of the ten species identified by ICBEMP as a unique vertebrate assemblage in the Owyhee Uplands were reptiles (Quigley and Arbelbide 1997). In the Owyhee Uplands, areas with low vegetative cover and high amounts of bare ground or rock have the highest lizard densities (Wisdom et al. 1998 citing Whitaker and Maser 1981).

Reptile species on the edge of their range appear to be especially susceptible to habitat degradation (Collopy and Smith 1995, USDA/USDI 2000). The loss of habitat has currently affected several species including the leopard lizard and the sagebrush lizard, and collecting losses resulting from the pet trade have affected the collared lizard. Cheatgrass and exotic species invasion may preclude use by reptiles such as collared lizard and longnose leopard lizard (Wisdom et al. 1998 citing Stebbins 1985, Beck and Peterson 1995). Efforts to conserve Idaho’s reptiles and amphibians should be concentrated in the southwestern portion of the state, where there is currently very little land under any sort of permanent protection, presenting a conservation challenge for maintenance of reptilian biodiversity (Groves 1994).

ICBEMP assessed broad-scale changes in source habitats for reptile species and other primarily low elevation sagebrush-grassland or salt-desert shrub vertebrates, studying the striped whip-snake, longnose snake, ground snake, Mojave black-collared lizard, white-tailed antelope squirrel, Preble's shrew, and Wyoming ground squirrel. Wisdom et al. (1998) noted "dramatic" decreasing and strongly decreasing trends in source habitats and changes in the composition and structure of vegetation in sagebrush habitats due to loss of sagebrush and microbial crusts, as well as conversion to exotic forbs and annual grasses.

Only two areas—the Owyhee Uplands and the northern Great Basin—had stable habitats. Notably, in the Owyhee Uplands, 81% of watersheds had stable trends, and 17% had moderately or strongly declining trends. The primary strategy identified to reverse broad-scale declines in habitats for these reptiles is to "identify and conserve remaining large areas of shrub-steppe where ecological integrity is still high... Large contiguous blocks of federal land in the northern Great Basin and Owyhee Uplands are the most obvious sites to consider" (Wisdom et al. 1998).

Sage Grouse

The Owyhee-Bruneau Canyonlands currently has a significant population of sage grouse (*Centrocercus urophasianus*). The Owyhee Uplands provide essential core habitat for the long-term population viability of sage grouse (Rich and Saab 2000, Wisdom et al. 1998), a species whose populations have plummeted across the West (Connelly and Braun 1997). Recognition of the disappearance and decline of sage grouse over many parts of its range has elevated the national habitat significance of the intact sagebrush habitats of the Owyhee Uplands (see "Owyhee-Bruneau Canyonlands: Sage Grouse Occurrences" map).

Since the Owyhee-Bruneau Canyonlands is composed of diverse and largely intact shrub-steppe plant communities, it provides critical year-round habitat for sage grouse, the most charismatic of shrub-steppe birds. ICBEMP analysis shows that Idaho lands within the monument contiguous with Oregon and Nevada are the only place in the 145 million acre Interior Columbia Basin where sage grouse are predicted to occur in 100 years (Rich 2000).

There is an inextricable link between sage grouse and the shrub-steppe ecosystems of western North America (Dobkin 1995). Sage grouse are dependent on large acreages—hundreds of thousands of acres—of sagebrush/grassland habitats (IDFG 1997), and sage grouse in Owyhee County use large acreages of land (Autnerieth 1981, IDFG 1999). Dependent on sagebrush as food most of the year, sage grouse also require a diversity of forbs, residual herbaceous nesting cover, and minimal disturbance during lekking and nesting periods (IDFG 1997).

The management focus for sage grouse and other shrub-steppe species should be identification and conservation of remaining core areas for sage grouse, especially those that contain large blocks of public land (Wisdom 1998 et al.). Conservation of large core areas will provide long-term habitat suitability and provide anchor points for restoration, corridor connections, and other key functions of landscape management (Wisdom et al. 1998). IDFG (1997) states: "Sage grouse habitat quality and quantity has declined throughout southern Idaho and coincided with declines in sage grouse numbers." ICBEMP data show "the amount of historical shrub-steppe habitat present in southern Idaho has declined dramatically" (Wisdom et al. 1998).



Few sage grouse strutting and mating sites, or leks, in the Owyhee Uplands are currently afforded even interim protection in Wilderness Study Areas. For example, in USAF studies north of the East Fork Owyhee River, 15 leks were identified, but only 3 were located in WSAs (USAF 1993). BLM wilderness review processes in the Owyhee Canyonlands focused largely on canyon sites, which are not sage grouse habitat, and rejected broad unroaded upland areas—precisely the lands sage grouse need—as not suitable for wilderness, so protection of leks and associated nesting habitat does not currently exist in the Owyhee-Bruneau Canyonlands. Protection of large expanses of intact shrub-steppe habitats is essential to long-term population viability of sage grouse (Wisdom et al. 1998, Paige and Ritter 1999).

Designation of a monument with an emphasis on sage grouse as an umbrella and focal species will also help produce a stronghold for shrub-steppe obligate and riparian migratory songbirds known to be declining across the West. Restoration of native grass, forb, and shrub composition within sagebrush cover types, retarding the spread of non-native vegetation, and limiting roads and human disturbance are vital strategies for ensuring sage grouse population viability (Wisdom et al. 1998).

Shrub-Steppe Birds

Declining population trends of shrub-steppe migratory birds are tied to losses of shrub habitats both regionally and across the West (Saab and Rich 1997). Much of the West's sagebrush habitat has been altered from a natural state. Migrants that inhabit shrub-steppe habitats have suffered losses through fire, livestock grazing, spraying, plowing, seeding and conversion for agriculture, and consistent long-term population declines are continuing for several species inhabiting shrub-steppe (Saab and Rich 1997).

Nationally, sagebrush and grassland birds show the most consistent population declines over the last 30 years. Broad-scale assessment of the Columbia Basin identified sagebrush-steppe as the highest priority habitat for conservation based on trends in bird populations and habitat (Saab and Rich 1997, Paige and Ritter 1999). The sagebrush shrubland bird species of concern in the Owyhee-Bruneau Canyonlands include: sage thrasher (*Oreoscoptes montanus*), sage sparrow (*Amphispiza belli*), Brewer's sparrow (*Spizella breweri*), black-throated sparrow (*Amphispiza bilineata*), gray flycatcher (*Empidonax wrightii*), and green-tailed towhee (*Chlorura chlorura*).

Shrub-steppe habitats have the highest percentage of species vulnerable to management activities in the Interior Columbia Basin: “Even under themes where aggressive restoration activities are planned, it is thought that the deterioration and loss of sagebrush habitat will outpace restoration successes” (Saab and Rich 1997). Sage-steppe habitats are restoration priorities (Saab and Rich 1997), and ICBEMP's broadscale assessment of the Columbia River Basin classified sagebrush steppe as a high priority for habitat conservation based on trends in bird populations (Saab and Rich 1997, Paige and Ritter 1999). Habitat values of the vast Owyhee sagebrush landscape, which once may have seemed so ordinary, are now highly significant—in a local, regional, and national context—for conservation of shrub-steppe migratory birds. Their juxtaposition with a dense concentration of riparian areas provides a special opportunity to protect, enhance, and study avian species and populations in a large core area.

The importance of the shrub-steppe communities in the Owyhee-Bruneau Canyonlands is indisputable. A breeding bird survey route in big sagebrush habitats southeast of Grasmere may support more sage sparrows and sage thrashers than any other breeding bird route in existence. Habitat of these extraordinary numbers of shrub-steppe birds is worthy of long-term conservation (Rich 1997). ICBEMP management guidance for sage-steppe migratory songbirds corresponds to that for sage grouse, calling for conservation of the type of large core areas found within the Owyhee-Bruneau Uplands to provide long-term habitat (Wisdom et al. 1998).

Habitat fragmentation due to fire, exotic species, livestock projects and grazing impacts, ORV use, and road building threatens these sagebrush obligates which evolved in a vast, continuous landscape of sagebrush habitat. Sagebrush-obligate birds are sensitive to habitat fragmentation, and prefer large stands with high shrub cover. They decline with increasing disturbance, due to nest predation or loss, or cowbird parasitism (Knick and Rotenberry 1995, 1997; Knick 1996; Paige and Ritter 1999).

Riparian Birds

Special status riparian-dependent birds found in the Owyhee-Bruneau Canyonlands include yellow-breasted chat, yellow warbler, willow flycatcher (BLM 1999c), and the rare yellow-billed cuckoo (Doremus, undated). Riparian forests nationwide have suffered a 70-84% decline (Ritter/IDFG), and 80-90% declines in riparian habitats and losses in riparian species diversity in western arid lands are thoroughly documented (Quigley and Arbelbide 1997). In the Interior Columbia Basin, the condition of riparian habitat has continued to decline (Quigley and Arbelbide 1997). Riparian communities comprise less than 2% of the arid landscape, yet 60 percent of Idaho's migrant landbirds are associated with them (Saab and Groves 1992), leading to a disproportional importance of riparian habitats to migratory birds and biodiversity conservation. Riparian threats include livestock grazing, recreation, fragmentation and the invasion of exotic species. (Saab and Groves 1992, Saab and Rich 1997)97). Riparian habitats for migratory songbirds have been identified as vulnerable to loss, degradation or conversion, and have suffered more degradation than any other habitat (Saab and Rich 1997).

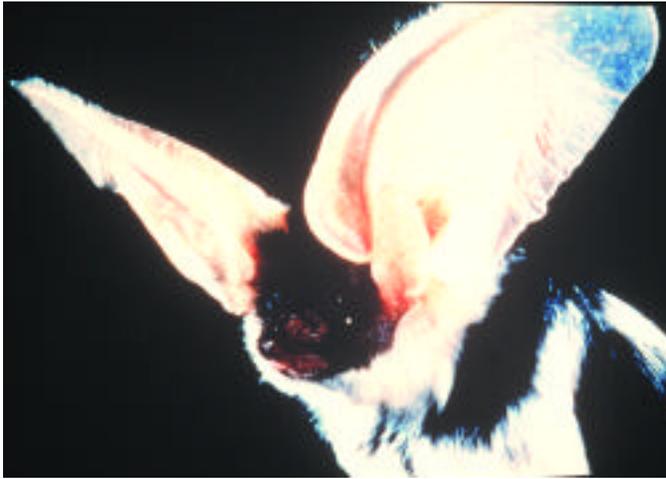
Raptors

The plateaus and sagebrush expanses of the Owyhee Canyonlands provide nesting and foraging habitat for a number of important and special status raptor species including the ferruginous hawk, prairie falcon, western burrowing owl, northern harrier, peregrine falcon, and golden eagle. Plus, the extensive canyon system provides a diversity of nesting habitat for cliff-nesters (US Air Force 1993, Klott 1996, BLM 1999a).

Loggerhead Shrike

A significant loggerhead shrike (*Lanius ludovicianus*) population still remains in areas of undisturbed sagebrush in the Owyhee-Bruneau Canyonlands (Woods 1995a, 1995b; Woods and Cade 1996; Klott 1997; Rich 1997; US Air Force 1993;). Preservation of Idaho's sagebrush steppe is important to the long-term survival of the loggerhead shrike in Idaho, where it is primarily a sagebrush species (Woods and Cade 1996). Loggerhead shrikes studied in the Owyhee Front nested in sagebrush, bitterbrush and greasewood, and had low nesting heights - a notable departure from nesting heights in many parts of the species range (Woods and Cade 1996). Shrikes are locally abundant, and shrike populations in the Owyhee-Bruneau Canyonlands—with larger clutches, more nestlings per clutch, and higher productivity—may be in somewhat better condition than populations elsewhere throughout the West where dramatic decreases have been documented (Woods 1995a, Woods 1995b).

High percentages of contiguous watersheds with source habitats for the loggerhead shrike historically occurred in the Owyhee Uplands (Wisdom et al. 1998). Populations of loggerhead shrikes have been declining significantly in the Interior Columbia Basin (-2.7%/yr.), and are of high concern to future management (Saab and Rich 1997). According to ICBEMP, conservation of large remaining areas of shrubsteppe vegetation where ecological integrity is still high in the Owyhee-Bruneau Canyonlands is a high management priority (Wisdom et al. 1998).



Spotted Bat

The Owyhee-Bruneau Canyonlands provide critical habitat for the spotted bat (*Euderma maculatum*), one of the rarest North American mammals. Over the entire range of the species, populations are concentrated in only a few areas. Spotted bats were common throughout a study area composed of the canyons and uplands of the Bruneau-Jarbridge River and Mary's Creek area, and spotted bats flew over all habitat types far from canyons, with heavy foraging detected over sagebrush uplands adjacent to riparian areas. The United States Air Force reported spotted bat observations associated with the East Fork Owyhee River and

surrounding lands (USAF 1993), and the spotted bat was also reported in a survey of bats associated with western juniper woodlands near the Mud Flat Road (Perkins and Peterson 1997). The detection of spotted bats at 5 of 11 sample sites in the Bruneau study area cannot be overstressed. Areas containing spotted bat populations should be managed for minimal disturbance. "Any region supporting populations of this species should be considered important or critical to the species" (Doering and Keller 1998).

Other Bats

The cliffs of the Owyhee River system and its major tributaries are suspected to support populations of Townsend's big-eared bat (*Corynorhinus townsendii*), and it has been found in the Bruneau-Jarbridge. This bat uses caves and cracks as day roosts, and caves and tunnels for maternity and hibernation colonies. It has a degree of site attachment, and is extremely sensitive to human activities. In addition, the canyons and uplands of the Bruneau-Jarbridge River system provide unique habitat features for other numerous bat species. High relief, plunging cliff faces and permanent water sources unique to the Owyhee-Bruneau Canyonlands create an assortment of roosting and foraging habitats for bats (Doering and Keller 1998). Bat species diversity was highest in the canyons, where seven species—Yuma myotis, common in canyons and flying and foraging over slack water; Townsend's big-eared bat; long-eared bat; long-legged bat; little brown bat; Brazilian free-tailed bat; and spotted bat—have been documented.

Kit Fox

Historic records indicate that the kit fox (*Vulpes macrotis*) the smallest of North American canids was once a widespread part of the native fauna of the Great Basin, reaching the northern limit of its distribution in southern Idaho (Davis 1939, Wilson 1985). It inhabits open areas of shadscale, greasewood, and sagebrush communities. Reasons for population decline include habitat loss and widespread poisoning directed at coyotes in the early part of the century. A sighting was made in 1992 near the South Fork of the Owyhee River (USAF 1993), and a proposal for reintroduction in northern portions of the monument has been made (Wilson 1985). The BLM's Bruneau MFP (1983) identifies reestablishment of kit fox in the "shadscale desert west of the Bruneau River."

California Big Horn Sheep

The BLM considers all the canyons of the Owyhee River system which are utilized by bighorn sheep to be habitats of national significance (BLM 1999a, 1999b), and the herds of California bighorn sheep (*Ovis canadensis californiana*) in the Owyhee Canyonlands—the largest in the United States—are of national significance. Once a common species in rugged canyons and foothill regions of the Great Basin, the California bighorn sheep was extirpated from the Owyhee due to exploitation of rangelands, disease transmission from domestic sheep, and market hunting accounted for past extirpation. Beginning in 1963, California bighorn sheep from British Columbia were reintroduced to the Owyhee Canyonlands. In 1991, twenty percent of the world population of bighorn sheep were found in the Owyhee-Bruneau Canyonlands and were the only herd used for transplants (IDFG 1991a).



California big horn sheep represent one of the most valuable game species for hunters in Idaho. According to economic studies cited by the Idaho Department of Fish and Game, the annual value of the three big horn sheep units in the Owyhee-Bruneau Canyonlands was \$18 million in 1985 (IDFG 1990). These economic studies also note that the monetary value given this species as a huntable population represents less than 1% of its total existence value to the general public. Some unexplained population declines have occurred in recent years. (Bodie et al. 1990, 1991; Taylor et al. 1998), and serious threats to California bighorn sheep in the Owyhee-Bruneau Canyonlands include human disturbance during critical lambing periods, habitat conflicts with livestock, and habitat loss.

Wild Horses

The eastern portion of the Owyhee Front is home to a significant herd of wild horses. Owyhee wild horses stand 13 to 16 hands high and weigh 750 to 1200 pounds, resulting in a very adoptable herd (BLM 1999a). The Owyhee PRMP and ROD establish a population level of 129–254 horses (96–190 within the Owyhee-Bruneau Canyonlands in the Hardtrigger and Black Mountain Wild Horse Herd Management Areas). Wild horse viewing is a growing recreational pastime in the Owyhee Front, but increased motorized use, and livestock water developments with their subsequent expansion in livestock use have created conflicts. Herd Management Areas have received a considerable increase in public use (OHV use, equestrian riders, hunters), and general recreation is projected to increase within them significantly (BLM 1999a).

Bruneau Hot Springsnail

The federally endangered Bruneau hot springsnail (*Pyrgulopsis bruneauensis*) is endemic to Hot Creek and a complex of adjacent thermal seeps along the Bruneau River. Hot Creek is also the northernmost, and one of a few, Idaho localities for the skiff beetle (*Hydroscaphis natans*). Indian Bathtub is the type locality for the creeping water bug (*Ambrysus mormon minor*), now known only from the springs near the Bathtub. “Sadly this subspecies may be as endangered or more endangered than the snail” (Bowler 1991). Threats to the springsnail include the reduction of thermal springs from agricultural-related ground water mining and livestock grazing that has “denuded soils and vegetation in the upper Hot Creek watershed to such an extent that periodic flash floods deliver sediment that cannot be flushed by the remaining weak and declining springflows... Trampling also occurs instream, causing direct Bruneau hot springsnail mortality” (USDI 1993).



Pronghorn Antelope

Lands north of the East Fork Owyhee River were observed to have the highest density of pronghorn antelope (*Antilocapra americana*) observed in Idaho (USAF 1996). In the most complete aerial surveys conducted in Owyhee Uplands in lands west of Highway 51, a population estimated at nearly 6,000 antelope was found in fawning and summer areas north of the East Fork Owyhee River (USAF 1996). The rolling, expansive terrain of the Owyhee Plateau contains the most continuous low sagebrush plant communities in Idaho, and

critical habitat for a large population of antelope (USAF 1996), and the low sagebrush communities of the proposed monument provide birth and bedding sites while adjacent wet meadows offer critical nursery areas.

Significant numbers of antelope are also found in widespread plateau areas in the Mary's Creek, Sheep Creek and West Fork Bruneau River Uplands. The Bruneau-Kuna Grazing EIS (1982) identified 1,452,000 acres as pronghorn habitat, with the largest number of wintering antelope supported in the northern portion (Owyhee Front) of the Resource Area. The Owyhee RMP (1999) identified 481,000 acres in the Owyhee Resource Area as winter habitat, and 338,000 summer habitat. The Proposed Jarbidge RMP and FEIS (BLM 1985) depicts all upland areas within the proposed monument boundary in the Jarbidge Resource Area as antelope habitat. Pronghorn are highly dependent on sagebrush for food year-round, and areas with less than 5% slope are their optimum habitats (Allen et al. 1984). Threats to pronghorn include heavy livestock grazing, fire, and loss of sagebrush habitat.

Extirpated Species

The Owyhee-Bruneau Canyonlands provide essential habitat for restoration of extirpated species that historically occurred within the boundaries of the proposed monument. Summer steelhead were once present in all accessible tributaries to the Snake River downstream from Shoshone Falls including the high desert river systems of the Owyhee and Bruneau Rivers and their tributaries. Pacific lamprey migrated into all waters in the proposed monument that once supported anadromous fish and are now extinct in land-locked areas. Stream-type chinook salmon were also found in the Owyhee and Bruneau Rivers, but construction of downstream dams led to their extinction (Melquist et al. 1993, US Air Force 1993, BLM 1991, Vander Schaaf 1996). Names such as "Salmon Creek" in the Reynolds Creek watershed, and "Salmon Creek" in a Nevada tributary to Sheep Creek, itself a tributary to the Bruneau, bear testimony to this once amazing migration of anadromous fish into high desert waters. Until dams blocking fish passage are removed or altered, anadromous aquatic species cannot inhabit these streams (Melquist et al. 1993, Vander Schaaf 1996).

In the Owyhee Uplands, Columbian sharp-tailed grouse were extirpated over 50 years ago (Vander Schaaf 1996), but lands in the Owyhee-Bruneau Canyonlands have been considered as reintroduction sites for these birds. Mountain quail were extirpated as recently as the late 1980's (Robertson 1989, Brennan 1990) with the last sightings occurring in Poison Creek, Shoofly Creek and portions of the Jacks Creek watershed. BLM identified Shoofly Creek and portions of the Jacks Creek WSA as potential mountain quail habitats (BLM 1991, 1982).

Five areas within the Interior Columbia Basin have been identified by ICBEMP as source habitat for gray wolf, including the Owyhee Uplands (Wisdom et al. 1998, USDA/USDI 2000). There have been no verified wolf sightings in the Owyhee-Bruneau Canyonlands since early Euro-American settlement, and it has not benefited from wolf translocation. However, it has low road densities and moderate to high source habitats with potential to support persistent populations, and could serve as a building block from a which a network of habitats for wide-ranging carnivores could be devised.

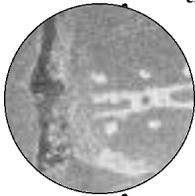
The Richest Complex of Sites in Idaho



The canyonlands and open sage steppe of the Owyhee-Bruneau system cradle the richest concentration of archaeological sites in Idaho, and arguably the greatest contiguous landscape of sites of archaeological, historical, and cultural significance in the West. The ancestors of the Shoshone and Northern Paiute have lived, hunted, worshipped, and played throughout the Owyhee Uplands and Snake River Plain for the past 7,000 years (BLM 1992), and some remnants of ancient Clovis culture, dating to 15,000 Before Present (BP) have been unearthed along the Bruneau-Jarbridge River and on the Owyhee Front (Titmus and Woods 1988, 1990; Moe 1982a).



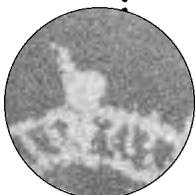
Stretching over 33,000 acres in the Owyhee Uplands, the Camas and Pole Creek Archaeological District incorporates over 500 sites of archaeological significance. The Bureau of Land Management has documented over 3,500 cultural resources throughout the region and claims that this figure is far below the actual number of sites located in the Owyhee-Bruneau Canyonlands. In addition, the region offers intriguing potentials for historical archaeology which would examine the record of Euro-American explorers and settlers who began to move into Southwestern Idaho, trade and fight with the indigenous peoples, and establish livestock operations in the 19th Century (Plew pers. com.), as well as insight into the mysterious record of Chinese, Hawaiian, and Afro-American people in the history of the State of Idaho and the American West (Shallat pers. com.).



The archaeological importance of the Owyhee-Bruneau complex is not conveyed simply through a few stunning yet isolated sites, but instead reveals itself through an expansive matrix of rock shelters, caves, rock alignments used for hunting or spiritual purposes, panels of rock art including petroglyphs and pictographs, hunting points, ceramics, remains of anadromous fish, and workshops where tools were fashioned. In addition the complex is filled with historically significant evidence of Euro-American settlers in the form of homesteads, cabins, rock walls, cairns, and historic cowboy and shepherd camps. These sites are inexorably tied to the land and their full impact cannot be transferred into a museum experience, but must be interpreted *in situ*, within the deep-cut canyons, rim rocks or dry lake playas where they are found. The synergy between the place itself and these cultural resources enhances scientific and ethnographic understanding of them.



As an intact unit, this complex provides insights into the lives of its first inhabitants as well as shifts in culture, language, art, warfare and subsistence up to the present day, yet its integrity and value are severely threatened by vandalism, illegal excavations (BLM 1989), ORV use (Huntley 1982), a lack of funding for protection and research, disturbance from military aircraft (USDI 1992, Battis 1983), erosion, and insensitivity to the traditional cultural property rights of the Shoshone and Paiute Tribes of the Duck Valley Reservation (Howard pers. com., US Air Force 1993).



National monument designation would provide better-focused management priorities, funding and recognition of the role of indigenous people in understanding the archaeological and cultural record. Monument designation would ensure and bolster legal protection for the world-class complex of archaeological and historical resources of the Owyhee-

Bruneau Canyonlands offered by the Antiquities Act of 1906 and the Archaeological Resources Protection Act of 1979, as well as the Native American Graves and Repatriation Act and the Religious Freedom Act.

Only a Fraction of the Resources Present

The sage plateaus—teeming with pronghorn and birds, cut by riparian streams filled with spawning salmon, and camas meadows—made the Owyhee Uplands an attractive and meaningful land for indigenous people, so native occupation and use was especially thick here for thousands of generations. By far, Owyhee County cradles more cultural resource sites than any other part of the State of Idaho. In a 1982 overview, the BLM identified 2,806 prehistoric and historic sites in Owyhee County, while only recording 657 sites in nearby Ada, Elmore, and Twin Falls Counties combined. The entire Shoshone District recorded 520 sites (BLM 1982). But, the thousands of cultural resource sites in the Owyhee-Bruneau complex are only a portion of the legacy spread across this vast network of canyons and steppes.

The few surveys that have been conducted in the Owyhee-Bruneau Canyonlands have been limited and tended to concentrate only on Wilderness Study Areas or on isolated areas in response to Environmental Assessments for new stock projects, pipelines or roads, so they do not give a full and accurate representation of the massive range of sites in the Owyhee-Bruneau region. Large chunks of land and systems of canyons throughout the region have been overlooked in assessments of the cultural resources present in them. In addition, most of the surveys have concentrated on canyons and the rimrock adjoining them, and, although in some cases the sage flats above the canyons have yielded few archaeological finds (Plew 1980a), significant sites have been uncovered on the sage steppes in the Bruneau and Jarbidge regions, especially in association with playas and intermittent drainages (BLM 1984).

Boise State University Archaeologist Mark Plew's investigations in the Camas and Pole Creek Archaeological District (located in the Owyhee Uplands adjacent to the Mud Flat Road) have produced valuable conclusions on the lives of indigenous inhabitants within that specific area, but surveys throughout the rest of the region have been undertaken only to identify resources, not to analyze their importance in the archaeological and cultural record. According to the BLM, sites along the Bruneau and Jarbidge Rivers and in the surrounding sagebrush uplands "may demonstrate a type of habitation and subsistence procurement activity which has not previously been described in the scientific literature for the Northern Great Basin Culture area" (BLM 1987), but the region has been largely ignored and research unfunded or discouraged in recent years.

As of 1999, only 10% of the Owyhee Resource Area had been inventoried by archaeologists, yet these surveys have identified more than 1,700 cultural resources. According to the BLM, "this figure represents only a fraction of the actual resources present" (BLM 1999). Similar surveys documented over 1,089 cultural resources in the Jarbidge Resource Area (BLM 1987), and more than 1,000 in the Bruneau Resource Area (BLM 1989). Throughout many of the BLM's Wilderness Study Areas surveys of relatively small acres of land have yielded impressive concentrations of significant cultural resources.

For example, in 1989 only 7% of the Little Jacks Wilderness Study Area had been surveyed, yet high densities of archaeological sites were documented, including the Shoofly Rock Alignments, a site of National Register Quality. Furthermore, archaeologists projected that the higher drainages in the Little Jacks WSA and the area around Wickney Tree Dome contained high densities of sites, and that the remaining area between canyons contained a medium density of

sites. Only 7% of the Big Jacks WSA had been surveyed, yet the Hole in the Rock petroglyphs of National Register quality were documented, high projections made for the major drainages, and medium density projections made for the plateaus in the southern half of the WSA. Only 1% of the Sheep Creek West WSA had been surveyed, all in conjunction with livestock management facilities, and none of Sheep Creek East WSA has been surveyed, yet the BLM projected high densities of sites along all of Sheep Creek Canyon (BLM 1989). The Owyhee-Bruneau area still holds secrets and mysteries, and can serve as a resource for future researchers as long as the sites are not trampled, robbed, defaced and lost forever.

The Southwestern corner of Idaho is not just a fantastic natural landscape, it is a unique archaeological landscape where rock alignments and petroglyph panels, lithic scatter and crumbling homesteads are as much a part of the land as rhyolite cliffs and open oceans of sage. The vast tableland complexes are seriously threatened by developments and a lack of understanding of their significance. Sadly, the management and appreciation of these resources has not been on par with their extent and significance.

The Owyhee and Bruneau Resource Areas have no archaeologists on staff—only archaeology techs—and resource management has been entirely compliance driven (Jenks pers. comm.); cultural values have been recognized only when resources of great significance end up in the line of fire. Inexplicably, the Enhanced Training Range proposed by the US Air Force in 1993 would have straddled the Camas and Pole Creek Archaeological District, the richest concentration of sites in this impressive region. Other low profile or undocumented sites are being lost like rainforests (Jenks pers. comm.). Since these sites must be understood as a comprehensive whole instead of as individual curios (Plew pers. comm.), the loss of any of the sites irrevocably affects our understanding of them as an intact whole.

The Camas and Pole Creek Archaeological District

In 1982, the 33,220-acre Camas and Pole Creek Archaeological District, the largest in the West (Plew, pers. comm.), was created in the heart of the Owyhee Uplands to protect over 500 sites of cultural significance. The District has been nominated for inclusion in the National Register of Historic Places since 1982 (USDI-National Parks 1982), and has been the focus of many scientific surveys undertaken in the Owyhee Uplands, primarily by Boise State University Archaeologist Mark Plew (Plew 1976, 1978, 1979, 1980a, 1980b, 1981). Plew identified three distinct phases of occupation in the District—Camas Creek I,II,III, and IV—each one signifying differing artifacts, tool types and habitations. According to Plew, the Camas Creek IV phase (800-175 BP) corresponds to the movement of Numic people from the Southwest into Idaho (US Air Force 1993).



The most studied site in the Camas and Pole Creek Archaeological District is Nahas Cave, where indigenous people lived seasonally and semi-permanently between 5,990-260 BP (Plew 1980b, 1981). During excavations in the cave, a deposit over 140cm deep unearthed over 350 artifacts such as projectile points, scrapers, knives, ground stones, bone tools, potsherds, stone pipe fragments, fired clay cylinders, and the remains of steelhead trout as well as 13 hearths and one fiber filled pit (BLM 1982). These finds shed important light on the history of the Numic migration into

Idaho as well aiding in the evolution of ethnographic models of the indigenous people of Idaho. Nahas cave was one site chosen to be disturbed for the sake of scientific research. Other sites just as rich in archaeological record may exist in the district but have not been excavated due both to a lack of research funding and in respect for the Shoshone and Paiute Tribes of the Duck Valley Reservation.

The Air Force's 1993 proposed North ITR (Idaho Training Range) would have straddled the Camas and Pole Creek Archaeological District. The Air Force published a survey that identified "a total of 456 cultural resources associated with the ITR, including 242 prehistoric and historic sites and 214 prehistoric site isolates," and went on to make a preliminary classification of 127 of these sites as eligible for the National Register of Historic Places (US Air Force 1993). The effect of sonic booms from aircraft on these sites is uncertain. But, according to a Forest Service report to Congress examining the potential impacts of military overflights on cultural resources identified a "potential risk to prehistoric structures from low overflights of heavy bombers" (USDA Forest Service 1992) and an Air Force study in Texas determined that structures in the process of erosion could be threatened by sonic booms (Battis 1983). The presence of new roads and heavy equipment would assuredly disrupt the naturalness and uniqueness of the Camas and Pole Creek Archaeological District as a landscape of sites. The proliferation of new roads and unrestricted ORV use in Camas and Pole Creek and elsewhere in the Owyhee-Bruneau Canyonlands allows easy access for looters and vandals (Huntley 1982) who cart off the archaeological record and defile sites of great cultural significance.

The Bruneau-Jarbidge

While the sites in the Pole and Camas Creek have been well documented and surveyed, the complex of sites along the Bruneau and Jarbidge River Canyons have been virtually ignored both in current scientific research and in published BLM agency surveys. However, the caves, rock alignments, petroglyph panels, and other cultural resource sites along the Bruneau River Canyon may rival any archaeological complex in the West. As with the other sites in the Owyhee, the Bruneau-Jarbidge Complex can best be described as a landscape of sites, the meaning of its cultural resources intertwined with their location within the canyon or playas in the sage steppe above.

In 1937, an archaeological survey by Godfrey J. Olsen documented ten caves as well as several rockshelters and caches along the Bruneau river, and the artifacts recovered were deposited at the Heye Foundation, Museum of the American Indian, Bronx, NY (Olsen 1940). More recent surveys in 1971 and 1972 by Max Pavesic and the Bureau of Land Management recorded 173 sites in the canyon which included finds such as prehistoric baskets and drying racks in a dry cave (BLM 1982).

The Bruneau River-Sheep Creek WSA alone holds 163 identified extremely significant prehistoric cultural resource sites deemed eligible for the National Register of Historic Places as contributing to the integrity of an extensive site district, and in a 1987 EIS the BLM proposed nominating 163 acres spread over a 30,000 acre area for inclusion in the NRHP (BLM 1987). The Jarbidge River and its tributaries contain a wealth of archaeological sites as well, and most of these sites are rock shelters or caves that contain important stratified deposits recording over 6,000 years of habitation. According to the BLM, special protective management is imperative for these sites because, as of 1984, close to 80% of the then-recorded caves and rockshelters had been "potted" in illegal excavations (BLM 1984).

Little to no recent study has been undertaken on the cultures represented by the sites in the

Bruneau and Jarbidge systems, but according to the Bureau of Land Management, they hold the clues to understanding a type of culture that has not yet been documented or studied in the Great Basin (BLM 1987). Most of the sites along the Bruneau and Jarbidge are situated in the canyon bottoms or in the rimrock, as are most of the sites in the Owyhee-Bruneau Canyonlands, however the Dry Lakes complex, spread between the rimrock of the Bruneau River and a series of intermittent drainages and vernal pools, offers one of “very few examples of microenvironmental adaptation between river, high plains and playas by prehistoric inhabitants of the Great Basin”(BLM 1984).

Another important resource within the complex, the Jarbidge Rock Art site consists of 29 panels with over 353 elements many of which are painted pictographs dated between AD 700-1260 that depict shielded warriors, anthropomorphs with elaborate headgear, birds, dogs, coyotes, and geometric designs among other motifs. Little study has been conducted on this area of the Idaho/Nevada border, but the artwork on these panels is unique in that it bears characteristics of the Fremont Culture associated with finds in Utah (but rarely documented in Idaho) and it could shed new light on Fremont travel routes, subsistence, and culture (Murphey 1992).

Shoshone and Paiute Tribes of the Duck Valley Reservation

The Owyhee-Bruneau Canyonlands is a dynamic and living cultural resource, the sacred homeland of the Shoshone and Paiute Tribes, and the landscape of the place maintains the cultural traditions and religious rituals of these people. At a Sierra Club gathering in the Owyhee-Bruneau Canyonlands in September 1999, Ted Howard, Cultural Resources Director of the Shoshone-Paiute Tribes of Duck Valley said, “You don’t need to ask an archaeologist to learn about the history of my people, ask me. I’m still here.”

According to archaeologists, the Numic-speaking people who are associated with the Shoshone and Paiute tribes arrived in the Owyhee-Bruneau Canyonlands sometime around 1200 to 1300 AD (BLM 1982). However, the present-day Shoshone and Paiute Tribes of the Duck Valley Reservation claim that their roots reach back even further (Howard and Gibson pers. com. 1999). The Numic, Shoshone and Paiute people—as well as the people who predated them—lived according to seasonal subsistence patterns in the Owyhee Uplands for thousands of years before Euro-American contact: hunting, gathering camas, or fishing for salmon (Steward 1938, Stratham 1981, Fowler 1986).

As Euro-American settlers moved in and hostilities increased between the indigenous people and the emigrants, the Shoshone and Paiute tribes, once separate nations were moved onto the Duck Valley Reservation in Idaho and Nevada by order of President Rutherford B. Hayes in 1877 (Shoshone and Paiute Tribes 1977). Yet, the treaties between the Bruneau and the Boise bands of the Shoshone were never ratified by Congress and many of the people who live on the Duck Valley Reservation still dispute these settlements (Howard pers. com., Peterson 1995, US Air Force 1993, Shallat pers.com.).

The Shoshone and Paiute Tribes still conduct religious and cultural ceremonies at sacred sites scattered throughout the Owyhee-Bruneau Canyonlands (Howard and Gibson pers. com., US Air Force 1993). Yet, many of these sites have been vandalized or even excavated by archaeologists, angering the tribes. Even though these sacred sites are not on the Duck Valley Reservation, they are considered traditional cultural properties of the Shoshone-Paiute. The tribes are loathe to identify these sites, fearing they will be vandalized and inappropriately used by pseudo-religious groups (Howard and Gibson pers. com. 1999). While attempting to survey these traditional cultural properties the US Air Force (1993) noted: “Native Americans associated with Southwestern Idaho have not yet revealed the locations of important traditional resources in or near the ITR and SCR study areas, mainly due to a desire to protect these sites.”

In addition, many Shoshone and Paiute were slaughtered by Indian hunting parties or killed in skirmishes with the US Army and volunteers in the Owyhee Uplands, so the Owyhee-Bruneau Canyonlands endures as sacred ground for these people (Howard pers. com., US Air Force 1993). Since the Owyhee Uplands were the traditional homeland of these people, they consider the whole place sacred—the canyon walls, the birds, the water flowing down from the mountains, the sage—and an enduring cultural resource for them as a people. ICBEMP expands on this tribal worldview: “The cultural significance of the environment is much more complex than simply a source for food or medicine. It involves social values and meanings that interlace traditional societal, political, religious, and economic areas of modern native cultures” (Haynes and Horne 1997). ICBEMP further identifies a need to accommodate this tribal worldview in

federal management of traditional cultural property lands: “One implication of differing world views between agencies and tribes is that agency data collections are commonly performed in the language of natural or social scientists, which may not sufficiently accommodate the general complexity of human behavior or differing cultural world views and sensibilities. An important element in efforts to address these differences is maintenance of meaningful and ongoing dialogue. Ecosystem management provides a sound framework for incorporating traditional environmental knowledge into decision making, but the mechanism for accomplishing this needs to be developed” (Hayes and Horne 1997).

ICBEMP has further identified that peoples’ emotional, spiritual, and cultural attachments to landscapes need to be considered in agency decisions and management (Galliano and Loeffler 1999). Management of the Owyhee-Bruneau Canyonlands should include the scientific views of the agencies as well as tribal input and ideas: “With that may come the recognition that Indians are not, at last, poignant vestiges of a lost age, but men and women of our own time, struggling to solve twentieth century problems with tools of our shared civilization” (Bordewich, undated).

The Real Old West



In the same way that the erosion of rivers and eruptions of massive calderas has shaped the geomorphology and determined the biological character of The Owyhee-Bruneau Canyonlands, the rugged landscape itself has molded the history of the people who have inhabited it for more than 12,000 years. The history of the Owyhee embodies the greatest of modern American mythologies—that Wild West of cattle drives and gunslingers—as well as the often forgotten history of the indigenous people. Within the borders of the Owyhee, the dark conflict between manifest destiny and Native American people broke into violence, fur trappers nearly starved, Shoshone and

Paiute people fished runs of salmon and harvested camas, cattlemen and Basque immigrants became potentates, homesteaders struggled to make it to spring.

Since the Owyhee has remained lonely and undeveloped, this history still persists in the physical landscape itself, in petroglyph panels, empty cabins, and most importantly in the vast space of the place which still gives a person on foot the sense of what it must have been like then. *Backpacker* magazine exclaims: “If Owyhee country is the most remote area in the lower 48 today, what must it have been like to call this place home more than a century ago? The only people you’d be likely to see for months on end would be the Indians whose land you were stealing. A crushingly lonely, physically brutal, potentially hair-raising existence. The real Old West” (Peterson 1996).

Stories in Stone

The oral histories and stories of the Numic-speaking Shoshone and Northern Paiutes hold within their very language and metaphors a reflection of this uninterrupted landscape. In recounting the tales of the indigenous people of the Columbia Plateau, Jarold Ramsey notes that “...these Paiute stories seem to be premised on the fact of sheer desert space—the ecological imagination in them seems somehow wilder, more manic than in the other repertoires, as if driven to fill up endless and nearly featureless vistas with outrageous characters and explosive events” (Ramsey 1980).

In one, the hero Cottontail slays the bright and burning sun (Crum and Dayley 1997); in another, a disembodied head chases a woman for miles across the sagebrush (Walker 1980); in still another, Wolf leaves his tracks so that both Indians and white men can see them (Ramsey 1980). More recent cowboy stories, too, evoke a charged and lonely landscape in which a phantom red stallion wanders the deep ravines of the Owyhee Front and nearby Leslie Gulch in Oregon (Adams 1979).

While these stories have been passed on by word of mouth, the only written records are more enigmatic. Indigenous people carved petroglyphs on rimrock across the Owyhee-Bruneau

Canyonlands, depicting big horn sheep, shamans, geometric swirls, handprints, anthropomorphic figures, and sunbursts. Many of these petroglyph panels make use of natural features in the surrounding rock to enhance the aesthetics within them (Erwin 1931;Plew 1979, 1980a, Murphey 1992; Pavesic and Studebaker 1993).

The mysteries of this rock art have not been revealed, but according to anthropologists could signify the sites or deeds of the hunt, and according to Idaho poet William Studebaker could symbolize the visions of dreams or sacred meanings. In both interpretations, the petroglyphs are the only written records of thousands of years of habitation by an advanced culture with a highly aesthetic imagination (Pavesic and Studebaker 1993). Some modern Native Americans claim that their people did not draw the petroglyphs at all, that people from the sky made them (Pavesic and Studebaker 1993). Later inhabitants, Cowboys and Basque shepherders, scratched their names in rocks and trees as they spent long months on the range leaving record of their passage and loneliness (Plew 1980a). Regardless of its literal meanings, this art is an essential aspect of the place, meaningful in its relationship to where it is found (Pavesic and Studebaker 1993), and infusing the landscape itself with artistic and cultural significance.

According to the archaeological record, the first humans to pass through the Owyhee-Bruneau Canyonlands were members of the Clovis culture, identified by the technology of their spear-points. These ancient people spread throughout North and South America between 15-12,000 years ago (Bonnichson and Turnmire, 1991). They used fluted points of remarkable craftsmanship (Titmus and Woods 1990) to hunt big game such as horses, camels, bison, sloths, and elephants when the climate of Southern Idaho was much more wet and lush (BLM 1982).

The earliest radio-carbon dated site of permanent habitation in the Owyhee Uplands is the Dirty Shame Rockshelter, on the Owyhee River in Oregon, dated approximately 9,500 years ago (Hall 1977, Hanes 1977). But, numerous isolated spearpoint finds from Clovis culture and the ensuing Folsom big-game horizon have been unearthed in the Owyhee Front and Bruneau-Jarbidge regions (Titmus and Woods 1990, Huntley 1985, Moe 1982). Since archaeologists have documented established Clovis culture in the neighboring Snake River Plains, these isolated finds in the Owyhee Uplands are of special importance in delimiting the extent of this Paleo-Indian culture (Huntley 1985).

Between 11,000 and 7,000 years ago, as the climate began to grow drier and pressure from human hunting continued, the large mammals of the big game period became extinct and the indigenous people began to hunt deer, big horn sheep, antelope, and small game birds in the Owyhee Uplands (BLM 1982). Archaeologist Mark Plew (1980a) has designated this period as Camas I in the Owyhee Uplands, cataloging sites that showed short-term use, probably nomadic hunting camps.

By 3,000 years ago, the native people had begun to use smaller projectile points and inhabited their camps longer, moving closer to water sources like Pole and Camas Creeks and constructing permanent habitation sites (BLM 1982). During this period, and roughly up until European contact, the indigenous inhabitants began to build rock alignments: stone walls and circular structures which scholars believe were used as hunting blinds in trapping or corralling game (Plew 1976, 1979, 1980a, 1986).

There are hundreds of these rock alignment structures across the Owyhee-Bruneau Canyonlands; some are barely discernable rock walls covered with lichen, others extensive tableland complexes (Plew 1980a, BLM 1982, US Air Force 1993). Members of the Shoshone and Paiute Tribe claim that these rock alignments serve a much more complicated spiritual and cul-

tural purpose than archaeologists can conjecture, that some are the sites of religious vision quests and tribal ceremonies (Howard and Gibson 1999, pers. com.). Since there is no written history of this region, or these people, until the arrival of Euro-Americans quite recently in the 19th Century, the archaeological records—the rock alignments, hunting points, and rock art—and oral traditions—the language and stories of the Shoshone and Paiute people—provide the only insights we have into thousands of years of human history. Preservation of these sites and cultures as a dynamic and intact cultural resource is essential in preserving our present and future understanding of this vast span of history.

Camas, Salmon, and Horses

Since the indigenous people of the Owyhee left no written record, thousands of years of their history in the region has been preserved solely through the oral traditions of the Shoshone and Paiute tribes or reconstructed in terms of migration and subsistence pattern models developed by ethnologists (Steward 1970). While the tribes that lived along the Snake River stayed mostly in dwellings yearlong, the people who used the Owyhee Uplands were much more migratory (Stewart 1938, Murphy and Murphy 1960). However, these groups in the Owyhee Uplands may have been small family units who moved to follow subsistence patterns but remained in a smaller localized area than ethnographers had once projected (BLM 1982). Sometime around 1000AD, Fremont culture, people with a distinct pottery and basketry style similar to the Anasazi, expanded from Utah into the Bruneau-Jarbidge Canyonlands (Murphey 1992). The origins and eventual decline of these people remain largely a mystery.

The Shoshone and Northern Paiute speak languages associated with the Numic people who most likely migrated from the Southwest into the Great Basin and the Owyhee Uplands around 1200 to 1300 AD (BLM 1982). However, it is probable that the migrating Numic people intermarried and that the present-day Shoshone and Paiute Tribes of the Duck Valley Reservation can trace their roots to a combination of Numic stock and that of the linguistically distinct cultures that preceded them. The Numic people and their descendants organized into small bands with a highly democratic form of tribal government (Walker 1978), and most Great Basin tribal councils still “operate on a basis of consensus rather than majority rule” (Rusco and Rusco 1986).

For thousands of years, the tribes in the Owyhee Uplands lived according to the seasons and followed the movements of natural patterns. In the spring and summer they harvested camas, a beautiful blue-purple flower with a highly nutritious root that grows in wet meadows (Statham 1981, Fowler 1986). They hunted small game with bows and arrows, crafting sharp, light points (BLM 1982). Before the damming of the Columbia and its tributaries, beginning about 100 years ago, runs of anadromous fish, salmon and steelhead trout from the Pacific, flourished in the high desert rivers of the Owyhee and Bruneau systems and indigenous people relied on fishing as a major source of subsistence (Steward 1938, Walker 1994, Fowler 1986). Even after Euro-American contact, groups of Shoshone gathered to catch salmon on Wickahoney Creek near present day State Highway 51 (Gottsch 1985, Crum and Dayley 1997).

With the coming of the horse, which had been introduced to the Southwest by the Spanish and reached the Owyhee Uplands around 1690 AD, the lives of the Shoshone people changed drastically as they ranged over wider areas and their culture developed into a society similar to that of Plains Tribes (Haines 1970). The Paiute, however, who did not own many horses, maintained a culture retaining the older cyclical patterns of Great Basin people (Walker 1978). To this day, Shoshone and Paiute from the Duck Valley Reservation speak their own language, practice ancient rituals, and preserve their culture, continuing to use and honor sacred sites

within the Owyhee Uplands (Shoshone and Paiute Tribes 1977, Howard pers. com.). Native American linguists have recorded oral histories of tribal members recounting stories about grandparents who still lived off camas, wild carrots, and other food that they gathered from the Owyhee Uplands (Crumb and Dayley 1997, Dayley 1985).

Trappers, Trails, and War

The first recorded Euro-American explorers to reach the Owyhee came to trap beaver under the command of Donald MacKenzie, a corpulent British trapper of the North West Fur Company, who traveled across the Snake River Plains from 1811-1812 (Peterson 1995). In 1826 Peter Skene Ogden, in the employ of the Hudson's Bay Company, first gave the name Owyhee to the river (and subsequently the entire area) in memory of three Hawaiian members of the 1818-20 McKenzie fur trapping expedition lost and believed murdered along the rivers banks (Hooper 1979). As part of a British plan to trap the area out and maintain a dead zone between the Americans and the disputed territory of the rich Pacific Northwest (Peterson 1995), Ogden was the first Euro-American to officially explore the Owyhee Bruneau Canyonlands. His party consisted of close to 60 freemen and servants, 268 horses, 61 guns, and 352 traps when it departed from Flathead Post to explore the Snake River and its tributaries in the fall of 1824 (Larrison 1957).

On May 28, 1826, the band entered the Owyhee-Bruneau Canyonlands, moving south up the Bruneau River, traveling into the Jarbidge Mountains of Nevada and then back up through Duck Valley, and into the Owyhee Canyonlands through the Jacks Creek complex, reaching the Snake again on the 19th of June. Ogden and his men struggled through the rugged country, finding less beaver than they had expected, suffering through snowstorms, killing their horses to eat, and trading with several bands of Shoshone and Northern Paiute along the way to survive. On May 29th, Ogden wrote in his journal "...I verily believe a more wretched country Christian—Indian or Brute ever travell'd over or probably ever will..." (Ogden 1950).

But, by June 17th, after noting the contentment of the Native Americans despite the harsh conditions of the land, and as spring opened across the desert, Ogden mellowed to the place, writing "...a more beautiful country I have not seen ...certainly a fine variety of Flowers many known and many unknown to me[,] a strange sight to see red Clover in abundance but not more than an inch in length[,] in this day's Journey a Botanist would have held full employment and probably would have many additions to his stock..." (Ogden 1950).

The fur trappers coexisted in relative peace with the indigenous people who stuck to the remote lands and canyons of the Owyhee to avoid contact with whites (Haines 1970). But in 1843, John C. Fremont surveyed the Oregon Trail, and emigrants in covered wagons along with herds of their livestock began making the journey from Independence Missouri to the Willamette Valley in Oregon traversing the high desert of Idaho en route (BLM 1992). Avoiding perilous crossings of the Snake River at Three Island and Fort Boise, the dry South Alternate Trail ran just north of the Owyhee Front along the Snake River. In the summer of 1849, 450 wagons passed through Idaho on the trail, but by 1852 the influx of settlers increased, and over 10,000 wagons crossed to Oregon with nearly 250,000 head of livestock that summer, pounding an increasingly larger swath in search of forage in the high desert (Yensen 1982).

The pressure of this mass migration on the native vegetation and wildlife, and on the native inhabitants, ignited tensions between indigenous people and the Euro-American emigrants, exploding on September 9, 1860, somewhere near Castle Creek along the Snake River, when 44 emigrants were attacked by a band of "over a hundred Snake Indians" during a 30 hour siege. Only 12 emigrants survived this attack—dubbed the Utter Massacre after one of the emigrant

families involved—and the survivors wandered down the Owyhee River, where several more died of starvation before they were rescued (BLM-ISHS 1993, Jones 1987).

After the Civil War, the US Army concentrated its focus on the frontier and protection of the settlers and miners in the West (Utley 1998). Beginning as a series of skirmishes in the Owyhee between Native Americans and the Army, bolstered by local volunteers, the so-called Snake Wars of 1866-68 brought an intensive military presence to the region. In 1866, the Army moved Fort Three Forks Owyhee from its position in Oregon to Soldier Creek in Idaho. Commanded by Brevet Lt. Colonel John J. Coppinger, an Irish-born Civil War hero honored for his valor in combat and dubbed “My Lord Poppinjay” by his men, the fort served as a base for soldiers and cavalry making forays in parties as large as 100 troops into the Owyhee Uplands in search of Native American war parties (Swanson 1987). According to a 1978 Idaho State Historical Society survey, the site of Camp Three Forks Owyhee “shows a surprising degree of archaeological integrity and high potential for historic archaeology,” (Ostrogorsky 1978) but there have been no management priorities to protect and preserve the site.

During the Snake Wars, the Owyhee became a Native American sacred refuge and martyrs’ burial ground when Shoshone and Northern Paiute families hid in its deep reaches, eluding and sometimes slaughtered by “Indian hunting parties” of civilians from Silver City pursuing bounties of “\$100 a scalp for Indian men, \$50 for women, and \$25 for children” (Howard pers.com.); although, a band of Paiute did defeat a party of these Indian hunters near Battle Creek (Trueblood 1996). The harsh anti-guerilla tactics of General George Crook, who waged winter battles and destroyed native food reserves, brought the Snake Wars to a close in 1868, but hostilities still simmered (BLM 1982).

The lands promised to the Shoshone in the Ruby Valley Treaty of 1863 were not given to them and a court decision in 1979 awarded \$26 million to the Shoshone in recompense, although many tribal members have protested this award and still lay claim on their ancestral lands (US Air Force 1993). The treaty of 1866 between the Bruneau and Boise bands of the Shoshone which promised a Bruneau Canyon Reservation has still never been ratified by Congress (Peterson 1995). In 1877, the Duck Valley Reservation was established for the historically distinct tribes of the Western Shoshone and the Northern Paiute in Northern Nevada and extended into Idaho in 1886 (Shoshone Paiute Tribe 1977).

The final armed conflict between indigenous people and Euro-American settlers within the Owyhee-Bruneau Canyonlands, the Bannock War of 1878, broke out when a group of Bannock from the Camas Prairie under the command of Chief Buffalo Horn went on the warpath protesting the preponderance of settlers and livestock decimating their sacred land. Moving across the Owyhee, and hoping to meet up with allied tribes in Oregon, the Bannock sent farmers into hiding in Roberson Cave on the Bruneau, fought and killed anyone in their way, and burned homesteads.

After the joining of tribes in Oregon fizzled, the Bannocks defeated a group of Silver City volunteers near South Mountain, but both Chief Buffalo Horn and the leader of the civilians, O.H. Purdy, a prominent miner and explorer, died in the battle and the warriors returned to the Fort Hall Reservation (Adams 1986). The close of the Bannock War left settlers “free to homestead, harness the rivers and tip the balance of nature that once sustained Indian lands” (Peterson 1995), paving the way for Idaho Statehood in 1890 (Wells 1965).

Cows, Sheep, and Gunslingers

In *The Border Legion*, novelist Zane Grey writes of the Owyhee: “It was indeed a wild place, that southern border of Idaho, and that year was to see the ushering in of the wildest time ever known in the West” (Grey 1916). The history of Owyhee with its expansive spaces and labyrinths of rimrock canyons embodies this mythological representation of the Wild West of gunslingers, horse wranglers, honest workers, and boomtowns. In 1863, Michael Jordan’s discovery of gold in the Owyhee Mountains began the rush of miners into the town of Silver City, which sprang up overnight (BLM 1982).

These mining boomtowns brought diverse populations to the Idaho territory and a large population of Chinese immigrants worked both as businesspeople and miners in Silver City and throughout the Owyhee (Adams 1986). Some prospectors did strike it rich, and silver lodes like the Poorman of 1865, which produced more than a half million dollars worth of ore in six days, further swelled the population of the town (Wells 1965). Soon after the miners came cows and agriculture (Larrison 1957). Con Shea, a Silver City blacksmith, ran the first legendary herds of longhorns up to the Owyhee from Texas in 1867 and again in 1869 (Hanley and Lucia 1973) followed by David Shirk in the late 1860’s and 70’s (Shirk 1956), beginning a long history of ranching in the area.

The Homestead Act of 1862 beckoned would-be ranchers with 160 acres adjacent to public grazing lands, and the Desert Land Act of 1877 offered up to 640 acres at \$1.25 per acre if a settler would build an agricultural development such as an irrigation system (Yensen 1982). Homesteaders built ranches at Mahogany, Fairylawn, the Star Ranch in the Junipers, the Big Springs Ranch, and all across the Owyhee (Adams 1986), most now empty cabins. Still others were bought out by rancher barons such as Miller and Lux who had their cowboys sign homestead rights over to them or waited out small landowners who had rights to springs (Yensen 1982).

The practice of large corporate ranches buying out family operations has continued in the Owyhee, most notably at Wickahoney, a homestead listed on the National Register of Historic Places, which had been the residence of rancher and homeopathic doctor Dow Dunning and his brother George who fought in the Wyoming Cattle Wars of 1892. A private party has since bought the property and obliterated the small cemetery that once stood there (Gottsch 1985, Adams 1986).

In the late 19th century, while cattle ranchers struggled with the difficulties of raising their stock in a high desert, sheep ranchers succeeded, because their operations did not require a headquarters, large numbers of men and horses, or the owning of land. Before the reforms of the Taylor Grazing Act, sheepherders could range freely across the unfenced public lands of the Owyhee Uplands (Yensen 1982).

Many Euskaldunak or Basque immigrants to Idaho took positions as sheepherders who, with a small investment were able to succeed in the high desert. Many of these Basques, branded “tramps,” “drifters,” and “floaters,” found themselves the target of racial hatred at the hands of frustrated cattlemen (Wentworth, 1948), but, thanks to their success, the descendants of these sheepherders were able to become influential merchants and landowners throughout Idaho (Peterson 1995). These wandering sheepherders and cowboys left signs of their legacy across the Owyhee Uplands in the form of rock walls, cabins, campsites and historic petroglyphs in English and Spanish scratched onto rocks and trees (Plew 1980a).

Yet, the most famous and colorful of the early ranchers in the Owyhee Bruneau Canyonlands raised horses. Kittie Wilkins, known as the “Horse Queen of Idaho” and the “Queen of

Diamonds” thanks to her diamond brand, attained worldwide fame as a horse trainer and exporter. She never married and could ride sidesaddle over the range just as effectively as cowboys riding astride (Adams 1986). The Wilkins operation, consisting of more than 4,000 head of horses on the open range, grazed the Diamond A Desert on the Bruneau in the late 19th Century and sold mounts to the US cavalry, and even to the British military for use in the Boer Wars (Adams 1979, Peterson 1995). But, the advent of the automobile eventually put Ms. Wilkins out of business, although her legacy lives on at Murphy Hot Springs, the site of her family headquarters known as Kittie’s Hot Hole, which contains a wealth of as yet unstudied possibilities for historical archaeology (Plew pers. comm.).

The mazes of deep canyons and rugged topography of the Owyhee-Bruneau Canyonlands served as a base for outlaws and rustlers as well, infusing the place with a history of tall tales and outright disregard for the law. Bigfoot, a semi-legendary mixed-blood murderer rumored to have feet 14 inches long and a ghostly ability to escape the law, haunted the Owyhee Front and eventually met his end along Reynolds Creek (Adams 1986). George Dunning, a local gunslinger, lived at the Wickahoney homestead, brought the outlaw Billy Vickers—who had dragged a Chinese miner to death—to justice, and briefly taught elementary school, maintaining order with a demonstration of his marksmanship on the blackboard (Adams 1979).

The notorious wild country of Juniper Mountain, just south of the Mud Flat Road in the Owyhee Canyonlands, served as a base and hideout for horse wranglers running highly organized operations that moved stolen herds between Idaho and Wyoming (Trueblood 1996). Jane Mason, who squatted on the Star Ranch in the late 19th century, masterminded a failed robbery in Jordan Valley, and reportedly beat a man with a rock in her stocking while her ranch hands held him at gun point. According to local legend, it wasn’t until 1910 that a lawman dared to apprehend a criminal in the Junipers (Adams 1979).

This outlaw landscape of the frontier embodied in Juniper Mountain persists as a myth in the American cultural imagination, still lurking, and sometimes expressed. In January 1981, Claude Dallas shot and killed two Fish and Game officers who had come to arrest him for poaching on the South Fork of the Owyhee. Dallas eluded authorities before capture, escaped from prison, was then recaptured, and gained notoriety as a modern day outlaw in the Owyhees (Conley 1994) dragging the Wild West into the present. It is this lingering history, this landscape that still holds onto the often violent and sometimes hopeful passions of 100 years ago that Americans continue to associate with some deep and romantic aspect of our cultural origins.

The Sagebrush Ocean



The Snake River Plains were the most arduous leg of the Oregon Trail for early pioneers (BLM and ISHS 1993), some even called it the devil's landscape (Peterson 1995), while still other travelers were amazed by the huge expanses of sagebrush. In 1864, Arabella Fulton wrote of the sage steppes with a sense of wonder: "...we beheld sagebrush as far as the eye could see! A veritable ocean of sagebrush." (Fulton 1965). But, most of the farmers and ranchers who settled in this high desert plowed or burned off the sage, seeing it only as a nuisance taking up space good for crops or forage (Yensen 1982). This conception of the sagebrush ocean as a dark and evil place needing to be

cleared has mirrored the American idea of wildlands both as places to be bent into submission and simultaneously as icons of the uniquely American sense of freedom epitomized by the open lands of the west, a place not just for fear but for fulfillment (Nash 1982). The Owyhee-Bruneau Canyonlands is one of the last vestiges (Quigley, Haynes, and Graham 1996) of that great sagebrush ocean, a reminder of the vast spaces that defined the American psyche, a watershed for our cultural imagination.

The intangible sense of space one experiences standing within this sagebrush ocean has permeated American literature and provided poets with a metaphor for the deep reaches of the emotional landscape. Gary Snyder has expressed the restorative power of the open miles of the Great Basin as "the space in the heart" (Snyder 1997), and in the "The Bruneau Desert" William Studebaker writes "There is something God loves here ... a place where even he can brood" (Studebaker 1997).

The Owyhee-Bruneau Canyonlands possesses a certain subtlety of landscape that cannot be entirely conveyed through photographs or by driving by it, but only through immersion in it. Short distances extend underfoot, then something takes on significance: a bitterroot in bloom, an ancient arrowhead, the sudden and gaping expanse of a canyon, the fluttering wings of a sage grouse. Mary Austin wrote: "None other than this long brown land lays such a hold on the affections. The rainbow hills, the tender bluish mists, the luminous radiance of the spring have the lotus charm. They trick the sense of time so that once inhabiting there you always mean to go away without quite realizing that you have not done it" (Austin 1998).

The experiential shift in the way we have grown to view this landscape emotionally has paralleled a scientific shift in our understanding of sagebrush communities. As author Stephen Trimble notes: "With remarkable variety in combinations of species, the metaphorical sagebrush ocean embraces currents, tides, eddies, and embayments. This is a complex and dynamic sea" (Trimble 1989).

Space as a Value

These metaphorical conceptions of the land are not confined to the language of poets. The need to associate landscapes with emotions and memory is a basic and scientifically documented human need which plays into land management decisions. According to the Interior Columbia Basin Ecosystem Management Project, "...peoples' sense of place is identifiable at the community scale and also meaningful within larger ecological units," and management decisions need to reflect this sense of place not just as an economic value but as a cultural-symbolic and spiritual value as well (Galliano and Loeffler 1999). The Owyhee-Bruneau Canyonlands fulfill this need for an open and wild landscape not just in the local sense but in the national sense as well, in our association of the Wild West with an essential aspect of the American psyche.

On a local level, the space and solitude offered by the Owyhee-Bruneau Canyonlands is important to the nearly 500,000 residents of the rapidly growing urban center of Boise and the Treasure Valley. The *Idaho Statesman* included an Owyhee Canyonlands National Monument on its wish list for the year 2000, and in a December 15, 1999 editorial urged the lawmakers of Idaho and the Department of the Interior to come to consensus in order to create an Owyhee Canyonlands National Monument.

The Owyhee lures Idahoans with its great open space and whitewater rafting. Edward Abbey considered the Owyhee one of the great rivers of the world, and one he wanted to run (Abbey 1991). The Owyhee-Bruneau Canyonlands beckon boaters with "legendary whitewater like Five Mile Rapids on the Bruneau River and Widowmaker on the Owyhee River" (Bossick 1998). Greg Moore, a local river guide, imparts the sense of solitude a float in the canyonlands instilled in him: "We floated from one canyon into another, each having walls higher, more precipitous and more spectacular than the last. Day-glow green lichen were painted across the black basalt. We craned our necks, awed by the unexpected splendor. And it was all ours" (Moore and McClaran 1989).

But, the Owyhee can also be experienced on foot. In his guide *Exploring Idaho's High Desert*, Sheldon Bluestein includes spectacular hikes in the Tules, Triplet Butte, Little Blue Table, the South Fork of the Owyhee, and the Jarbidge Forks, exclaiming: "Nowhere does the high desert blend into the mountains so imperceptibly as in the Jarbidge River drainage" (Bluestein 1991). To retain its pure value of untrammeled space for reflection, adventure, and escape, the Owyhee-Bruneau Canyonlands needs to remain open and unfettered, a watershed not just for scientific research, biological diversity, history, archaeological and geological records, but for our cultural and creative imagination as well.



Conclusions

The scientific evidence provided in this document demonstrates that the Owyhee-Bruneau Canyonlands should be protected and preserved under the Antiquities Act as a national monument due to the outstanding and imperiled qualities of its geography, geology, paleontology, biology, archaeology, history, and culture. The Owyhee-Bruneau Canyonlands is a dynamic and intact ecosystem and the unique values of the place can be best preserved and strengthened if it is envisioned and managed as a complete landscape. Designation as a national monument with BLM management would maintain the integrity of the place as an interlocked and interconnected landscape.

National Monument status would link the vast expanses of sage steppe with other diverse biological communities. The ecology of the Owyhee-Bruneau Canyonlands must be managed to preserve its phenomenal integrity and protect it from fragmentation due to exotic species, ORV use, overgrazing, fire, human development and administrative practices. The geology and geomorphology of the Owyhee-Bruneau Canyonlands must be studied as an entire system, incorporating the succession of lakes and paleontological flora and fauna as well. Likewise the archaeological and historical records of the place are inexorably tied to the landscape, and best understood in situ. No one of these scientific values can be isolated and preserved. They must be envisioned as a comprehensive and dynamic whole. In addition, if preserved, this landscape can serve as a natural laboratory, an anchor point for species restoration, and a base for further, as of yet, unrealized research and discovery.

