

the great basin
restoration initiative



Out of Ashes, An Opportunity



bureau of land management
national office of fire and aviation
boise, idaho

november · 1999

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*“Imagine a gnarled and venerable
live oak-tree reduced to
a little shrub two feet high,
with its rough bark,
its foliage,
its twisted boughs,
all complete...
It is an imposing monarch
of the forest
in exquisite miniature...”*

*Mark Twain (of sagebrush)
Roughing It, 1872*

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“The interior of the Great Basin, so far as explored, is found to be a succession of sharp mountain ranges... They are thinly wooded with some varieties of pine..., cedar, aspen, and a few other trees, and afford an excellent quality of bunch grass, equal to any found in the Rocky Mountains. Black-tailed deer and mountain sheep are frequent in these mountains; which...may be called fertile, in the radical sense of the word...Sterility, on the contrary, is the absolute characteristic of the valleys between the mountains – no wood, no water, no grass, the gloomy artemisia the prevailing shrub... Such is the Great Basin, heretofore characterized as a desert, and in some respects meriting that appellation, but already demanding the qualification of great exceptions, and deserving the full examination of a thorough exploration.”

*—John Charles Fremont,
Geographical Memoir, 1848*

executive summary

The Great Basin is facing a crisis.

A century ago, it consisted of a network of dynamic ecosystems that supported diverse species of plants and animals. Today, the Great Basin's vast landscape is changing with alarming momentum.

Encompassing most of Nevada, the lower third of Idaho, the western half of Utah and southeast corner of Oregon, the Great Basin has arrived at the threshold of a critical, and potentially permanent, change. Huge wildland fires the summer of 1999 burned at least 1.7 million acres of land, wiping out much of the remaining native shrublands.

Although these fires were devastating, they are only partially at fault for the condition of Great Basin rangelands today. The blame must be shared with noxious weeds and exotic annual grasses that have crept persistently across native shrublands the past few decades. These invasive species quickly gained a foothold in lands where fire weakened or removed native shrubs and perennial grasses and forbs. A wildland fire/annual grass cycle was begun that accelerates with increased weed and annual grass invasions.

Ultimately, the loss of native shrub habitat means loss of wildlife species; unstable watersheds and degraded water quality; less forage for wild horses; reduced livestock grazing; fewer recreation opportunities; and more dangerous and costly wildland firefighting.

The remedies currently used to battle invasive species and restore native habitat are not enough to slow or stop the downward spiral of native shrublands in the Great Basin:

- Emergency fire rehabilitation, which occurs immediately following a fire, focuses on stabilizing soils but doesn't always meet long-term restoration goals.
- The weed program, with its effectiveness limited by cost and the overwhelming presence of invasive species, cannot be used to protect plant communities susceptible to invasive species.
- Hazardous fuels treatments, which allow land managers to create fuel breaks to isolate critical native plant communities from cheatgrass invasion, or reintroduce fire where exclusion has degraded vegetation, cannot alone meet long-term restoration goals.

Altogether, these options do not provide land managers with the necessary tools to restore native shrublands that have been in decline for decades.

Funding is needed to support a long-term restoration program that will lead to diverse and resilient plant communities. BLM believes this solution will help restore the health and productivity of Great Basin rangelands by allowing the agency to gradually return lands dominated by weeds and annual grasses to its native character.

Millions of dollars would be needed for a 10 year restoration project to achieve these goals. Eventually an estimated 500,000 acres could be treated annually using private contractors. To facilitate habitat restoration, treatments would

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vary from mechanical to chemical and include seedings, plantings, fence and water developments.

Restoration efforts would be done in conjunction with emergency fire rehabilitation. Efforts would protect areas with high-resource values from noxious weed and exotic annual grass invasions, and restore crucial areas and native shrublands degraded by invasive species. Restoration priorities would be set based on inventories and assessments; public involvement; proximity to adjacent landowners; level of community support; places where wildlife habitat, especially threatened and endangered species, are a concern; and wildland-urban interface.

The bottom line is that unless and until an aggressive, well-planned and long-term restoration is begun:

- Native shrubs, plants and grasses will continue to decrease, making room for noxious weeds and exotic annual grasses. This habitat change will severely impact watersheds, soils, wildlife and wild horses, and human uses such as livestock grazing and recreation.
- Watersheds will become more unstable and water quality will suffer. This will affect livestock industries and recreationists, such as anglers, who depend on healthy waterways. Worse, people who live at the base of burned hillsides could find themselves and their property in danger from flooding that often occurs when soil-stabilizing vegetation is burned.

- Drastic and extremely expensive measures will have to be taken to reverse the downward spiral of sage grouse, which is now teetering on the edge of being listed as an endangered or threatened species. Big game, such as mule deer, elk and bighorn sheep, will continue to decline as shrub habitats, upon which they depend, diminish. When more than 165,000 hunters within the Great Basin each year pursue mule deer alone, this means an annual \$145 million injected into the region's economies through retail sales and jobs.
- Wild horse populations will shrink as native vegetation is replaced by cheatgrass and competition for forage among wild horses, wildlife and domestic livestock increases.
- Invasive species will continue to move in and dominate wildlands previously characterized by native shrublands, costing taxpayers millions of dollars in weed treatments and job losses. In the West, livestock and wildlife grazing capacity is commonly reduced between 35 to 90 percent. In Montana, North Dakota, Wyoming and Oregon, these invasions are resulting in annual treatment costs ranging from \$42 million to \$155 million annually and potential job losses nearing 2,000.

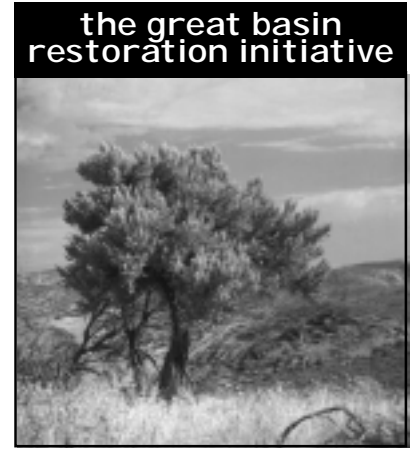
- Many Great Basin communities that are completely dependent on the livestock industry and income of ranchers will suffer. These losses will strike at the heart of many rural communities in the Great Basin.
- Losses in income from hunting, camping and fishing will continue to affect not only those who live in the Great Basin, but the region's tourism industry.
- Fire frequencies and intensities will continue to increase, triggering fire behavior that's more unpredictable, more erratic, and increasingly more dangerous to firefighters and the public, and to natural resources and public property. The costs of fighting these fires will increase as well.

Without a doubt, costs of implementing this massive, long-term restoration would be substantial. However, the alternative looks worse. Nearly \$71 per acre is spent each year in wildland fire management, \$64 per acre in emergency fire rehabilitation, and \$70 per acre for weed treatments. Add to that millions of dollars in lost natural resources and public property. These numbers will only increase as noxious weeds and exotic annual grasses continue to spread and dominate public lands, perpetuating the wildland fire cycle.

Although the habitat loss we're facing in the Great Basin has not occurred overnight and is not a new problem, the 1.7 million acres of land scorched in the 1999 wildland fire season may be the last wake-up call. What we've tried before hasn't worked very well. A restoration effort like none ever tried before must begin now, before the downward spiral becomes irreversible.

what's next

As critical rehabilitation proceeds on lands burned in 1999, the implementation of the Great Basin Restoration Initiative must begin with the development of a strategy. To develop this strategy, an interagency, interdisciplinary team will be established. This team will develop the steps required to identify and inventory plant communities needing protection or restoration, partnerships necessary to obtain critical research and increase seed production, develop a monitoring strategy, and determine how priorities for restoration will be decided. Throughout this process, the BLM will continue to work closely with its partners and the public.



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In this desert lies an ocean of shrubs, several hundred mountain ranges, ...and considerably more dune grasshoppers, kangaroo rats, and Pinyon Jays. More than anything else, however, in this Great Basin lies a message about time.

Stephen Trimble

historical perspective: an ocean of sagebrush

The Great Basin has been described as one of the least novelized, least painted, and least eulogized of American landscapes. Stretching from the Sierras to the Rockies, the Snake River Plain to the Mojave Desert, the Great Basin features “an ocean of sagebrush,” native bunchgrasses and plants, woodlands and forests.

Early settlers may have described the Great Basin as “wild and barren,” and Native Americans may have appreciated the Great Basin’s sustaining bounty in game animals, but to many today, the sagebrush country of the Great Basin symbolizes something entirely different. And the region’s value is certainly reflected in the words of author Stephen Trimble: “Beyond the sagebrush horizon the pale ranges go on and on, in rhythms that give the silent land its music.”

The Great Basin’s values are also reflected in its vast, wide-open spaces that support a mix of plant communities, wild animals and birds, wild horses, and human uses such as ranching, hunting, camping and wildlife viewing.

The nature of the Great Basin’s plant communities changes with remarkable

subtlety. Shadscale may spread across one basin while sagebrush fills a valley on the other side of the hill. Perennial bunchgrasses and plants speckle the ground between large shrubs in sagebrush areas of southern and central Nevada and become more frequent in the northern Great Basin. Pinyon-juniper woodlands lap the flanks of mountains while forests of pines, spruce, firs and aspen saddle their peaks.

Subtlety in the Great Basin’s wildlife has never been a factor. The region is home to many diverse species of wildlife. Black-tailed jackrabbits, sagebrush voles and pygmy rabbits as well as sage grouse, pronghorn, elk, mule deer, and mountain lion still thrive in some Great Basin areas. The Snake River Birds of Prey National Conservation Area in southwest Idaho hosts the nation’s largest population of nesting raptors including golden eagles, ferruginous hawks and red-tailed hawks, and one of the largest populations of badgers in the world.

Diverse plants, animals and climate dominated the Great Basin’s past. The effects of human presence dominate it today. Tomorrow, however, the Great Basin must be dominated by a concern

for its future or this area “deserving the full examination of a thorough exploration,” will suffer, as well as the wildlife and humans who depend upon it for survival.



The Great Basin supports a mix of shrubs, and perennial bunchgrasses and forbs.

out of ashes, an opportunity

Much of the Great Basin burned in the summer of 1999, in part because a low-pressure weather system anchored itself off the shore of northern California in early August, and spun enough moisture inland to create perfect conditions for hatching thunderstorms. When the thunderstorms rolled northward from California through northern Nevada and into southern Idaho, southeastern Oregon and western Utah, they often were accompanied by high, gusty winds and lightning with little or no moisture.

You don't need to be a weather forecaster or firefighter to recognize what usually happens next: wildland fires. And in the case of the Great Basin in 1999, they were numerous, large, intense and destructive. By mid-August, about 1.7 million acres of the Great Basin in four states had burned. Nevada, in particular, was hard hit. In the space of five days in early August, more than one million acres were scorched.

A million-and-a-half acres of black present a formidable challenge to land managers. The fires burned in areas dominated by annual weeds and in areas composed of native perennial vegetation. The fires and subsequent annual grass invasions affect an array of resources: wildlife, vegetation, forage for livestock, wild horses, watersheds, soils, and others. The effects on communities and families may not be realized fully for years. The threat of an unprecedented invasion of annual weeds may be the most severe consequence of all in the Great Basin. If annual weeds are not checked now, the incidence of wildland fire will increase in the future, perhaps setting the stage for domination by an even more imposing foe, noxious weeds.

If noxious weeds gain a greater foothold and spread further in the Great Basin, "We'll long for the days when we only had cheatgrass to deal with," one federal manager pointed out.

Yet among the ashes of the big burns in the Great Basin — Sadler, Dun Glenn, Mule Butte, Jungo, Poker Brown and dozens of others — federal land managers and others familiar with natural resources see an opportunity. The Great Basin wildland fires represent more than the chance to merely rehabilitate the burned areas, which essentially amounts to measures taken to stabilize soils. The vision is to restore the land to its proper functioning condition.

Restoration, of both burned rangeland and other Great Basin areas at risk, must be the goal. A commitment must be made now to benefit the next generation. Settling for less will allow the wildland fire cycle to perpetuate at an ever-increasing rate — fire disturbs the land, allowing cheatgrass and other highly flammable annual weeds to invade. They cure quickly, making the area more susceptible to devastating wildland fire, which, when lightning strikes the Great Basin, begins the cycle anew. What happened in the Great Basin in 1999 is, in some ways, natural. What may happen because of the wildland fires is not. If the cycle is not broken, then fire managers and the public in the Great Basin face more frequent wildland fires of longer duration and intensity, causing more damage and disruption than was witnessed even in the summer of 1999.

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Doing nothing is not an option. No less than the natural and economic health of the northern Great Basin may be at stake.

“We need to look at the whole picture in the Great Basin,” said one fire specialist. “Emergency fire rehabilitation only comes after the fire and it is limited in what it can do. The weed fund only kicks in when weeds appear. The fuels management program is designed to reduce hazardous fuels, primarily in forests and woodlands.

“You add it up and the sum of the three programs doesn’t meet the needs of the whole,” he added. “In the Great Basin, we need to fill in the gaps left by the other programs through restoration.”

Restoration will not be easy, nor will it be inexpensive. It will be a multi-year effort. It will not magically transform 1.7 million acres of blackened earth into a pristine rangeland. What it will do is help restore the land to a naturally functioning condition and, in some places, reverse the trend of cheatgrass followed by wildland fire, followed by more cheatgrass and more wildland fire,

with the specter of noxious weeds taking over larger chunks of the Great Basin.

Doing nothing is not an option. No less than the natural and economic health of the northern Great Basin may be at stake.

**rangeland restoration:
a definition**

Restoration has a different meaning and connotation to many people. For this report, restoration is defined as:

“Implementation of a set of actions that promotes plant community diversity and structure that are more resilient to disturbance and invasive species over the long term.”

Restoration work in the Great Basin would not be limited to areas that burned in the summer of 1999. The work will also target unburned areas that are especially vulnerable to invasive species and areas with a high potential to attain proper functioning condition.

**1999 major wildland fires
in the great basin**

Fire Name	Location	Size
Dun Glenn Complex	S. of Winnemucca, NV	361,658
Sadler Complex	S. of Elko, NV	209,500
Corridor Complex	NE of Winnemucca, NV	171,442
Battle Mtn. Complex	E. of Battle Mtn., NV	156,958
Mule Butte	N. of Aberdeen, ID	138,915
Slumbering Hills	NW of Winnemucca, NV	103,641
Jungo	NW of Winnemucca, NV	83,939
Eureka Complex	S. of Battle Mtn., NV	82,000
Denio	S. of Denio, NV	77,244
New Pass Complex	SW of Battle Mtn., NV	74,900
Frenchie	SW of Elko, NV	50,000
Cedar Butte	NW of Blackfoot, ID	49,727
Rose	SW of Elko, NV	48,480
TOTAL		1,608,404
Other Fires	Great Basin	160,064
TOTAL GREAT BASIN		1,768,468

the great basin: what it is, how it is changing, and why

The Great Basin is changing more rapidly now than at any other time in the last 150 years. Millions of acres in the Great Basin have changed from healthy, functioning ecosystems primarily consisting of native species to biological systems dominated by annual weeds. Certainly, wildland fire has been one of the major factors in the transformation, and, ironically, the nature of wildland fire has changed because of the transformation. The changes affect virtually every natural resource, plus the economic and social health of Great Basin communities.

Eight resource concerns are of special interest in the wake of the Great Basin wildland fires. They are:

- loss of native plant communities;
- stability of watersheds and soils;
- declining habitat for wildlife;
- less forage for wild horses;
- increase of noxious weeds and exotic annual grasses;
- reduced livestock grazing;
- fewer recreation opportunities;
- more dangerous and costly wildland firefighting.

Those concerns are addressed in this section of the report, with special attention paid to resource conditions up to the time of the wildland fires, the projected condition of the resources, and the consequences of doing nothing beyond basic rehabilitation.

native plant communities

How an ecosystem functions can be as complex as the workings of the human brain. Yet the components, or pieces, that form an ecosystem are really pretty basic: plants, wildlife, watersheds, climate. These pieces are each critical to an ecosystem, for without one, the others cannot thrive. Plants, for example, provide food and cover for wildlife, help hold soils in place, and help the soil recycle nutrients and water.

Within the Great Basin, there are three major plant communities: sagebrush, salt desert shrub and pinyon-juniper woodland. Where these communities are found depends largely on temperature and moisture. For instance, salt desert shrub is usually found in low, dry elevations, while sagebrush, spread across much of the Great Basin, grows in areas that receive at least seven inches of moisture each year. Pinyon-juniper woodlands, the Great Basin's only widespread tree community, stretch across higher elevations in areas with more rain or snowfall. Although junipers grow mostly in the lower elevations, both pinyon and juniper grow in the mid-elevations, and eventually pinyon replaces juniper at the higher elevations.

Of the three vegetation types, sagebrush communities, consisting of a mix of shrubs, and perennial grasses and forbs, are the Great Basin's most common. However, grazing practices in the late 1800s changed sagebrush and salt desert shrub communities. Grazing removed much of the perennial grasses, and native shrubs expanded, allowing cheatgrass and other exotic species to move in. Now, where cheatgrass has gained a

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The threat of an unprecedented invasion of annual weeds may be the most severe consequence of all in the Great Basin.

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without treatment,
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the degraded condition
of Great Basin rangelands.*

foothold, fire frequency has been reduced from 40 to 100 years to 10 years or less eliminating most shrubs and native bunchgrasses.

Pinyon-juniper woodlands tell a somewhat different story. Fire in these areas was reduced or eliminated by livestock grazing — which removed grassy fuels — and active fire suppression, which began in the 1960s. The frequent, large, and low-intensity fires of pre-settlement years no longer checked the new growth of these trees, and they began moving into shrub communities. The trees robbed the surrounding native shrubs and plants of vital water, and many of the plants perished. This has led to increased soil erosion and weed invasion and overall degraded habitat.

Fire, either too much or too little of it, affects many of the other Great Basin plant communities. Aspen stands, though not considered a major plant community in the Great Basin, are essential habitat for many wildlife species, including most big game animals. Experts say that aspen stands today amount to only 40 percent of what existed 150 years ago. One reason is that aspen need fire to regenerate but fire often has been excluded from their habitat. In some areas, they are being crowded out by advancing pinyon-juniper woodlands.

Increased fire frequency and cheatgrass invasion in sagebrush and salt desert shrub communities, and spread of pinyon-juniper woodlands prevents native shrubs from reestablishing, and gradually reduces any surviving native bunchgrass plants. “What this means is that plant communities have virtually no potential to be restored to their native condition without aggressive restora-

tion,” said a natural resource specialist from southwest Idaho’s Lower Snake River District.

The bottom line is simple: without restoration, native grasses and plants will continue to decrease. Cheatgrass and other exotic species will continue to spread, triggering a wildland fire cycle that will only accelerate the degraded condition of Great Basin rangelands. And the impact of this habitat loss will reverberate throughout the entire ecosystem, dramatically affecting wildlife, and eventually, the other inhabitants of the area — humans.

watersheds and soils

In the Great Basin, watersheds and soils are highly variable in their nature and in how they work or function. Topography, climate, soils and vegetation all affect how a watershed functions. Watersheds that retain a large proportion of native vegetation, especially grasses, generally function well. When precipitation falls, healthy watersheds handle the basic functions of infiltration, percolation, and storage, while helping to reduce major problems such as flooding, scouring, channelization and sedimentation. Perennial grasses provide a variety of benefits: cover; above-ground structure; material from dead plants, which protect the soil surface and enrich it as they decompose; and roots, which aid in holding soils in place. All of these benefits work to shield the soil from wind and water erosion.

When native plants are replaced by exotic annual grasses or noxious weeds, watersheds are jeopardized. Watersheds dominated by annual grasses offer far less

protection than native plants. It all begins when a single raindrop strikes the ground. The reduced cover provided by annual grasses allows more raindrops to more often directly strike the soil surface, rather than be deflected by vegetation.

As raindrops hit the soil, they loosen particles and, in effect, form a seal over the “pores” at the soil surface.

With the pores sealed, infiltration decreases, which leads to more run off and loss of available moisture in the ecosystem. Eventually the loosened soil enters streams or rivers, increasing sedimentation. With decreased infiltration, the possibility of flooding increases.

Another important factor in the health of a watershed is its ability to store precipitation. A properly functioning watershed acts like a sponge, holding on to moisture, and later releasing it through prolonged flows in streams, springs and other water bodies. A healthy watershed also recharges ground water sources. By contrast, a dysfunctional watershed tends to repel water and does not provide as much moisture to streams and springs.

Soil erosion varies in the Great Basin. The most common form is sheet erosion, which is what takes place when soil particles are displaced during rainfalls. Another, more serious, kind of erosion is rill erosion. Rill erosion is characterized by rivulets carved into the soil a few inches deep and running vertically to the slope. The most severe form of erosion is gully erosion, which is typified by deeper, more carved surfaces than those created by rill erosion. Gully erosion is isolated

in the Great Basin but is difficult to correct once it begins. All three kinds of erosion are more likely to occur in areas dominated by exotic annual grasses or noxious weeds.

Most areas dominated by undesirable annual species are more susceptible to large and frequent wildland fires, which strip watersheds of their protective vegetation. That leads to a loss of soil and high run-off events. While riparian areas are usually resilient and vegetation in them resprouts, wildland fire can be the catalyst for erosion that begins unraveling the entire watershed. Even riparian areas are at risk when major erosion occurs. In short, wildland fire can be the start of a chain of events that is devastating to watersheds.

As watersheds dominated by native plants are transformed to watersheds dominated by undesirable plant species the outcome is predictable: loss of soil, more sediment in streams and rivers, and an increase in the frequency and severity of flooding in the Great Basin.

If the trend is not reversed, the long-term stability and productivity of ecosystems may be lost. Agriculture, livestock production, water quality and recreation would suffer. The damage to property and threat to human life also likely would increase.



Wildland fire can be the start of a chain of events that is devastating to watersheds.

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Native shrublands that appeared endless to early settlers have become vast expanses of annual grasslands that provide little or no cover and food for wild animals.

wildlife

One of the best indicators of healthy or unhealthy wildlands is the presence or absence of wild animals. Lands enhanced with a mix of shrubs, grasses and plants attract wildlife and fill their needs. Lands devoid of this mix do not provide food for deer and elk, or cover for jackrabbits and ground squirrels, which are the main food for birds of prey.

“Not unlike humans, wild birds, mammals and reptiles will find land that supports their needs, or they will disappear,” said a wildlife biologist assigned to the Snake River Birds of Prey National Conservation Area.

The Great Basin, an area of many subtly diverse ecosystems, supports a wide array of plants. Of these, sagebrush is one of the most important for wildlife. Sagebrush and native plants and grasses in the Great Basin provide food and cover for about 100 bird, 70 mammal, and 23 amphibian and reptile species. Some of these include sage grouse, pronghorn, black-tailed jackrabbit and mule deer.

However, the balance of healthy land and wildlife in the Great Basin is tipping dramatically. One reason is that annual grasses such as cheatgrass are gaining ground across the rangeland. Because cheatgrass is highly flammable, carries fire quickly, and even increases following fire, wildland fire in cheatgrass-infested areas is becoming more and more frequent, adding yet another dimension to the problem. Native shrublands that appeared endless to early settlers have become vast expanses of annual grasslands that provide little or no cover and food for wild animals.

Mule deer provide a perfect example of the effect of degraded rangelands on wildlife. “Mule deer populations have decreased within the Great Basin. We believe this is because of the huge loss of sagebrush habitat,” said one Nevada wildlife biologist. He added that during the past 30 years, more than 60 percent of the sagebrush that deer use as winter range within the Great Basin has burned. That means for cheatgrass-infested ranges in northeast California and northwest and north-central Nevada, deer populations have dwindled from about 60,000 deer to 21,000. And biologists say that if the current weed invasion/fire cycle continues, the remaining sagebrush winter ranges for deer will be almost gone within 20 years.

Yet another example of the devastating effect these habitat changes have on wildlife is found in the Snake River Birds of Prey National Conservation Area (NCA) in southwest Idaho. This area was established by Congress to conserve, enhance, and protect raptors and their habitats, yet fires in the NCA have destroyed more than half of its shrub communities since 1979. Cheatgrass moved into the burned area and the expected annual grass/wildland fire cycle began. The effects of this habitat change are shown clearly in the declining populations of golden eagles and their prey, black-tailed jackrabbits. Prairie falcons have also decreased since the 1970s.

Sage grouse populations, decreasing more than 33 percent in just the last 15 years, also indicate to land managers the seriously degraded state of the Great Basin’s rangelands. Sage grouse cannot survive outside of healthy sagebrush habitat. Because of a loss of habitat in the past combined with 1999’s Great Basin

fires, sage grouse is being considered for listing as a threatened and endangered species. “If the annual grass/wildland fire cycle continues to devour sagebrush habitat, the sage grouse populations may not recover,” said one wildlife biologist. “If the downward spiral of sage grouse cannot be reversed in the near future, then drastic and extremely expensive measures will have to be implemented to bring back the sage grouse and restore its habitat.”

One final, and important, consideration regarding the future of wildlife in the Great Basin—much of the wildlife found in this area is critically important to the

region’s economies. Big game such as mule deer, elk, and bighorn sheep, and upland game birds are sought by thousands of hunters each year. For example, more than 165,000 hunters each year pursue mule deer within the Great Basin. This means \$145 million every year is returned to local economies through retail sales and the 3,500 jobs needed to support hunting. In short, loss of habitat through the annual grass/wildland fire cycle and increase in noxious weeds means loss of wildlife. And loss of wildlife means loss of income to the people who call the Great Basin home.



“Not unlike humans, wild birds, mammals and reptiles will find land that supports their needs, or they will disappear.”

wild life of economic concern in the great basin			
Species	Species Heavily Dependent on Sagebrush/Grassland Habitats.	Current Status	Projected Status
Big Game			
Mule deer	✓	Declining	Declining
Prognhorn antelope	✓	Declining	Declining
Rocky Mountain Elk		Stable	Stable
Rocky Mountain Bighorn Sheep	✓	Stable	Declining
California Bighorn Sheep	✓	Stable	Declining
Upland Game Birds			
Mourning dove		Declining	Declining
Columbian sharp-tailed grouse	✓	Declining	Declining
Sage grouse	✓	Declining	Declining
Gray partridge	✓	Stable	Declining
Wild turkey		Stable	Stable
California quail	✓	Stable	Declining
Mountain quail	✓	Declining	Declining
Chukar partridge	✓	Stable	Declining
Blue grouse		Stable	Stable
Ring-necked pheasant		Declining	Declining

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If restoration of burned areas does not take place, cheatgrass will replace much of the native vegetation lost in wildland fires. Drops in wild horse populations almost certainly will follow, as higher quality forage is replaced by cheatgrass.

wild horses

The Great Basin is home to about 60 percent of the estimated 46,000 wild horses on BLM land. Roughly half of all wild horses in the West are in Nevada. Stated simply, the Great Basin is wild horse country.

Wild horses feed predominantly on grasses and forbs. During late fall and winter, their diet shifts to a mixture of shrubs and grasses. When wild horse populations exceed “appropriate management levels,” or AMLs, damage to vegetation often occurs and BLM conducts a gathering operation.

The BLM manages and monitors wild horse populations in specific geographic locations called “Herd Management Areas” (HMAs).

Wildland fire hit hard some HMAs in 1999. In a few cases, the entire HMA burned. In BLM’s Battle Mountain and Elko districts alone, all or part of four HMAs were burned, affecting almost 1,000 wild horses.

“Wild horses won’t wait until someone comes and feeds them. They’ll move,” said a BLM wild horse specialist from northern Nevada. “Legally, we can’t allow them to move outside of the HMAs.

And we can’t allow them to leave and then come back to a rehabilitated area. They’ll head right for the green, succulent vegetation. The rehabilitated area could be trashed.”

It generally takes two or three years for a burned area to be rehabilitated.

“Our only option is to gather every one of them, adopt those we can, and then house the remainder in corrals or pastures until the rangeland comes back,” the wild horse specialist said.

Wild horse specialists must move quickly to gather the animals displaced by the fires. While restoration of the Great Basin ecosystems has little bearing on the short-term needs of the wild horses, it certainly figures in the bigger picture. In three years, if restoration is well underway in burned areas, the displaced animals not adopted this year could be turned back to their native ranges if the animals can be cared for in a near natural setting (i.e., no supplemental feeding, no medical intervention, etc.)

If restoration of burned areas does not take place, cheatgrass will replace much of the native vegetation lost in wildland fires. Drops in wild horse populations almost certainly will follow, as higher quality forage is replaced by cheatgrass. Further, increased competition for forage among wild horses, wildlife and domestic livestock is also likely.

But the goal is still to return wild horses to rangelands after they have recovered. That only will be possible if the restoration effort is successful.

noxious weeds and exotic annual grasses

Explosive, devastating, disastrous. These words are the ones used most often today to describe the current spread and infestation of noxious weeds and exotic annual grasses. Millions of acres of invasive weeds and grasses already infest BLM lands within the Great Basin, and their populations are multiplying at tremendous rates. Sadly, these invasions are wreaking severe and often permanent impacts on native plant communities, wildlife and, though indirectly, on people.

Invasive weeds and grasses thrive in the climate and soils found in the Great Basin. Unfortunately, they also corrupt the region's critical ecological processes. They rob the soil — and native plants — of vital nutrients and water, changing the structure and dynamics of plants and wildlife. Annual grasses such as cheatgrass, and to a lesser degree medusahead wildrye, often dominate native plants by their sheer numbers alone. For example, they can produce millions of seeds per acre, and their seeds can stay viable in the soil for up to five years.



Cheatgrass gradually moves into shrublands.

“Cheatgrass,” the Idaho Statesman newspaper noted in May 1928, “grows in a day, ripens in a day, and blows away in a day.”

Annual grasses also help accelerate wildland fire cycles, and in many cases, their populations increase dramatically where wildland fire has swept through a habitat and left bare ground. When compared with native perennials, cheatgrass becomes flammable four to six weeks earlier. “Cheatgrass not only extends wildland fire seasons, but carries fire quickly,” said a BLM Utah state office wildland fire specialist.

Current research indicates noxious weed infestations are increasing by at least 14 percent annually. For example, rush skeletonweed spread from a few plants in Idaho in 1964 across four million acres today. Squarrose knapweed, first discovered near Tintic Junction in Utah, has spread from a few hundred acres in 1954 to more than 150,000 acres today.

Annual grass invasions are equally, if not more, serious. A 1994 survey of public lands in the Great Basin found 17 million acres either dominated by or heavily



Invasive weeds and grasses thrive in the climate and soils found in the Great Basin.

Unfortunately, they also corrupt the region's critical ecological processes.

the great basin restoration initiative



Nothing less than long-term restoration will slow this spread and allow native plants to return and thrive.

infested with cheatgrass and medusahead wildrye. An additional 20 million acres is estimated to be vulnerable to cheatgrass/medusahead wildrye invasion.

Treating the massive areas currently infested with noxious weeds or exotic annual grasses is no small task. This undertaking will take determination, persistence, and — yes — money. Weed control costs currently range from \$25 per acre for large aerial treatments to more than \$250 per acre for small isolated sites. The average cost for treating noxious weeds is typically about \$70 per acre, but treatments are generally required annually for several years.

The ecological impacts of invasive weeds and grasses illustrate a harsh reality. Yet another more tangible effect is how these invasions impact land uses and economies. Although the economic impact of noxious weeds is not well documented in the Great Basin, studies done in other states show:

- Leafy spurge has affected grazing and wildlands in Montana, North Dakota, and Wyoming resulting in an estimated annual cost of \$129.5 million and potential loss of 1,433 jobs.
- Knapweed infestations on grazing land and wildlands in Montana cost \$42 million annually, which represents 518 full-time jobs. If knapweed infested all highly susceptible lands in Montana, the economic loss potentially could be \$155 million.

- In Oregon, a ranch heavily infested with leafy spurge recently sold at 85 percent below market value.
- Throughout the West where weed infestations are occurring, livestock and wildlife grazing capacity is commonly reduced between 35 to 90 percent.

Invasive species will continue moving into susceptible wildlands. Their aggressive and prolific nature will persist in dominating native plants. Their spread will increase weed management costs, and continue to damage land and resources.

“Short-term and site-specific treatments represent a band-aid on a life-threatening wound,” said a weed specialist from Vale, Oregon. “Noxious weeds and exotic annual grasses have affected millions of acres thus far, but the potential for them to affect millions more exists.” Nothing less than long-term restoration will slow this spread and allow native plants to return and thrive.

Livestock grazing

Many communities throughout the Great Basin traditionally depend on public land grazing. Small communities in each of the Great Basin states – Nevada, southern Idaho, southeastern Oregon and western Utah – rely partially or totally on public rangelands. BLM manages about 75 million acres in the Great Basin, the vast majority of them within grazing allotments. All told, BLM supplies almost 10 million animal unit months (AUMs) for livestock grazing in the Great Basin. In many cases, the public land AUMs are the mainstay of a ranch, and by extension, a community. The economic and social fabric of many communities in the Great Basin is often woven around the livestock industry and public land grazing.

A recent Nevada study found the gross market value of livestock to be \$21 per AUM. The study also quoted the U.S. Department of the Interior Incentive-Based Grazing Fee study that estimated the market value of Nevada grazing permits as \$37 per AUM for BLM land and \$42 for the U.S. Forest Service land. When an agricultural economic multiplier is applied, it is easy to see the value of public land AUMs and permits. Without public land grazing, many small communities would wither.

Large wildland fires have the potential to unbalance that equation. For example, early estimates are that 50 to 60 large grazing allotments were burned in Nevada during August 1999. Numerous others were damaged in Utah, Idaho and Oregon. Many of those allotments were being grazed at the time the wildland fires broke out, and others were scheduled for grazing this fall and winter after livestock were moved from higher-elevation pastures.

Lost AUMs cannot be replaced easily. AUMs on private land in the Great Basin generally cost eight to 10 times more than

comparable public rangeland forage. Transportation costs also must be factored in. If ranchers are forced to buy hay, not only the cost of the hay but the labor to feed livestock must be considered.

The cost of doing nothing or of a minimal restoration of the Great Basin would be tremendous. Annual weeds would invade, changing the rangeland's forage values. "Catastrophic fire on a large scale completely removes the forage for cattle and sheep," said a rangeland manager. "As the cycle continues, it is like a cancer that will turn the Great Basin into an expanse of annual grasses that are palatable to livestock for only a short time in the spring."

Many communities scattered throughout the Great Basin are almost completely dependent on the livestock industry and the income of ranchers. If the resources sustaining these communities are lost, the toll would be high. It would far exceed just the loss of forage and the impacts to livestock grazing. It would strike at the heart of many rural communities in the Great Basin.

On the other hand, if restoration proceeds and the Great Basin is ecologically functional, the benefits would go far beyond ensuring forage for livestock. It would help maintain communities, livelihoods, lifestyles and help supply the nation with important agricultural commodities. Other resources, such as wildlife and watersheds, would also benefit.

The impacts of not restoring Great Basin ecosystems will quickly become apparent in the consequences for livestock grazing and people and communities who depend on it.



The cost of doing nothing or of a minimal restoration of the Great Basin would be tremendous. Annual weeds would invade, changing the rangeland's forage values.

the great basin restoration initiative



The longer-term consequences of the fires on recreation may be tied to water quality. If rehabilitation and restoration are not successful, sediment loads will increase and water, perhaps the most scarce resource of all in the Great Basin and one linked closely to much of the recreation that occurs there, will suffer a decline in quality.

recreation

The open country and solitude that pervades much of the Great Basin makes it a natural for dispersed recreation. It's not a place to visit if you're looking for manicured parks with all the facilities of home. Hunting, hiking, camping, fishing and dispersed off-highway vehicle (OHV) use are the main recreational activities of this high, dry land.

When wildland fire swept through northern Nevada and other parts of the Great Basin, many of these activities came to a halt.

Not only were traditional recreation activities affected, but some special events were altered or canceled. A wagon train crossing the West could not continue, for example. Signs were destroyed, hiking and camping areas burned over, and scenery in the Great Basin marred. Hunting, probably the most popular of all recreational activities in the Great Basin, will change for many outdoor enthusiasts. Wildlife habitat was damaged and game displaced. OHV use will be discontinued temporarily in some areas.

If restoration is not completed, "Recreationists will continue to be displaced from favorite hunting, camping and fishing sites," said a federal recreation planner. The longer-term consequences of the fires on recreation may be tied to water quality. If rehabilitation and restoration are not successful, sediment loads will increase and water, perhaps the most scarce resource of all in the Great Basin and one linked closely to much of the recreation that occurs there, will suffer a decline in quality.

wild and fire

Wildland fire, though unpredictable, powerful and sometimes devastating, is a natural part of the Great Basin landscape. It's as vital to an ecosystem as climate, land formations, plants and animals. Fire was a part of the land hundreds and thousands of years ago, and it's a part of the land today. And yet its character, its very nature, on Great Basin rangelands is changing.

Today, wildland fire, how and where it occurs, and its impact on plant and wildlife habitat and humans is a major cause of concern for land managers, wildland firefighters, and the public. Reasons for the difference are several: invasion of noxious weeds and exotic annual grasses; agriculture practices at the turn of the century; aggressive fire suppression as opposed to allowing fire to remove vegetation that's grown dense or unhealthy.

"In short, finer fuels, such as cheatgrass, and the build-up of vegetation have disrupted the natural cycle of fire, increasing its frequency and expanding its range, and beginning a vicious cycle of increased invasive plant species and wildland fire," said one fire crew leader. "To wildland firefighters and managers this means fire behavior that's more unpredictable, more erratic, and increasingly more dangerous to both firefighters and the public."

Three instances of potentially serious firefighter injuries in the summer of 1999 illustrate well the crew leader's point, as does the loss of 14 wildland firefighters on Colorado's South Canyon fire in 1994. Where lives are not lost, examples of the destructive behavior of Great Basin wildland fire is demonstrated in the loss of two homes, and destruction of 600 miles of livestock management fence and several water developments in the 1999 Nevada fires. Worse cases of property loss occurred outside of the Great Basin in 1996, when the Millers Reach fire in Alaska claimed 344 structures, and a fire near San Diego, California, destroyed 98 structures.

One additional aspect of fighting wildland fires may not be as obvious, but affects every taxpayer in the country: more fires means more people and equipment are needed to fight the fires. In southern Idaho, for example, BLM manages 10 million acres. On these 10 million acres cheatgrass has increased by 50 percent in the last 30 years. Resources for fighting wildland fires — people and equipment — have doubled in this same time period, and there's no end in sight.

The solution is clear: rangeland fuels must be changed to resemble their natural condition. And the only way they will change is through aggressive, long-term restoration. As finer fuels are removed and replaced with shrubs and native grasses and plants, and fire is allowed to work naturally in areas where it's needed to reduce dense vegetation, fire intensities and frequencies will lessen. This means the potential for threatening the lives of firefighters and the public, and natural resources and public property, will also lessen. Over time, it also means the cost of fighting wildland fires and rehabilitating burned land will decrease.

Changing the current character of wildland fire in the Great Basin will take time. It took more than 100 years to shape the nature it reveals today. But with determination, patience and persistence, this change is possible.



“...this means fire behavior that's more unpredictable, more erratic, and increasingly more dangerous to both firefighters and the public.”

the great basin restoration initiative



These are not the predictions of alarmists, nor are they the forecasts of people seeking more dollars to promote their own programs and agendas. They are the best judgments and projections of experienced scientists and managers and concerned citizens who understand the issues...

a proposal for restoration: why restoration is needed

The case for restoration in the Great Basin best comes into focus when one question is asked: What happens if restoration does not occur?

The general answer is that virtually all natural resources will suffer, with potentially acute consequences for some local communities and economies.

If restoration doesn't occur, noxious weeds and annual exotic grasses will spread at the expense of native vegetation, launching a whole new set of resource challenges. The wildland fire cycle not only will be perpetuated, it will be accelerated.

Livestock grazing on public land will be curtailed in some areas. Rural communities that depend on public land livestock grazing will be hard hit, with some of them perhaps disappearing over time.

Watersheds and soils will be degraded, increasing the possibility of soil loss, more sediment in streams, and boosting the chance of severe flooding.

Wildlife habitat will decline as unfavorable changes take place. More animals and plants could be considered for listing as threatened and endangered.

Forage for wild horses will be lost as exotic annual grasses take over areas previously dominated by preferred grasses, shrubs and forbs.

Recreation opportunities will diminish, especially as the wildland fire cycle repeats itself at shorter intervals.

The nature of wildland fire will continue to change. More wildland fires could be expected, with more erratic fire behavior. The wildland fires will be of greater duration and intensity, putting firefighters and the public at risk. More homes and other structures will be in jeopardy of burning. More personnel and equipment will be required to fight wildland fires, and the bill for suppressing wildland fires will increase steadily.

These are not the predictions of alarmists, nor are they the forecasts of people seeking more dollars to promote their own programs and agendas. They are the best judgments and projections of experienced scientists and managers and concerned citizens who understand the issues and hope to avert further natural resource and economic decline in the Great Basin.

What happens if restoration doesn't occur?

"We're going to end up watching a lot of our native range turn to cheatgrass," said a wildlife manager who works for the Nevada Division of Wildlife. "It would be a huge problem."

what must be done in the great basin

Up to this point, it's been mostly talk.

Somewhere and sometime, the restoration work — above and beyond what rehabilitation teams have already accomplished — must begin. If restoration is given the green light and funded, what must be done? What is the price tag? How will priorities be set? And how will the work be measured?

Without a complete restoration plan, it's difficult to say exactly what should be done. But some steps seem obvious.

- *Begin restoration efforts, in conjunction with emergency rehabilitation, immediately following a wildland fire.*

Rehabilitation is geared toward stabilizing soils; restoration reaches beyond that. The estimated cost of additional treatments is \$36 to \$50 per acre, depending on factors such as seed availability and method of application. Treating exotic annual grass prior to seeding, and reconstruction of burned structures are two examples of actions not allowable with emergency fire rehabilitation funds.

Restoration treatments following wildland fire vary greatly and depend on the intensity of the fire. If a mosaic of shrubs is left following a burn, restoration may consist of aerially seeding grasses to stabilize soils until the native shrubs reestablish. If the burn was hot, it may be necessary to seed shrubs through drill or aerial seeding.

- *Protect areas with high-resource values from invasion of undesirable vegetation.*

Several steps can help protect unburned areas with important resource values from invasive species. Establishing

or maintaining existing fuel breaks, greenstripping, and mowing or managing fuel breaks through livestock grazing are examples of how high-quality areas can be protected. No new funding is required for these activities. They are currently supported by the Hazardous Fuels Reduction Operations Fund.

- *Restore crucial areas degraded by invasions of noxious weeds and exotic annual grasses.*

Some areas that burned 10, 20 or 30 years ago received little or no rehabilitation work. With weed control and seeding, they have the potential to recover. Restoring such areas would require more planning and perhaps a position to manage the program. The treatment cost is estimated at about \$75 per acre.

Areas typical of this situation are native shrublands converted to annual grasslands. Staged treatments would be required. An initial treatment may be necessary to reduce the cheatgrass, possibly through the use an herbicide.

- *Restore degraded shrublands.*

These areas may have a cheatgrass understory, are areas with no perennial grass understory, or sites where overly dense shrub stands are forcing out perennial grasses. They are prime candidates for takeover by annual weeds if they burn. Degraded sites also could include pinyon-juniper encroachment into shrublands and seeded areas that are missing a critical vegetation component.

Several treatment options are available including fuel breaks, prescribed burning, mechanical treatments, brushland plowing, herbicide application combined with seed drilling, roller chopping, hydromowing, chaining, brushbeating, or prescribed fire



Somewhere and sometime, the restoration work — above and beyond what rehabilitation teams have already accomplished — needs to begin.

the great basin restoration initiative



“Restoration of the Great Basin will be a huge task,” said a federal rangeland specialist.

“If we want to be successful, we’ll need to develop a comprehensive plan and program that includes partners, research and education. But we really don’t have a choice. The costs are too high not to take action.”

followed by reseeding perennial grasses. The cost for such treatment is generally about \$80 an acre. Restoration in these areas would focus on thinning shrubs and strengthening perennial grasses.

Setting restoration priorities must consider: results of inventories and assessments; areas adjacent to cooperative landowners; level of community support; places where wildlife habitat, especially threatened and endangered species, are a concern; and areas in the wildland/urban interface.

Native plants will be emphasized in restoration projects where seed is available, and native plants are adapted to the environment and able to survive in competition with weeds. Research and native plants sources are needed to accomplish this task.

Measuring success is another important step. That can be done through monitoring, and whether the results show an increase of acres with perennial grass and native shrubs, and a decline or slowing of annual weed invasions. Changes in sage grouse populations or other key wildlife species can also be accurate indicators of success. Within BLM, goals in land-use management plans and standards and

guidelines for rangeland health could serve as another important gauge of accomplishment.

All restoration activities will involve the public, and comply with pertinent laws, such as the National Environmental Policy Act, the Endangered Species Act, and others.

We must know more about the Great Basin and other western ecosystems to make the best use of restoration efforts. “Research has to be a part of it, for both the short term and long term,” one federal researcher said.

“Restoration of the Great Basin will be a huge task,” said a federal rangeland specialist. “If we want to be successful, we’ll have to develop a comprehensive plan and program that includes partnerships, research and education. But we really don’t have a choice. The costs are too high not to take action.”



Successful native plant restoration.

proposal

At the heart of restoration is funding. Without adequate funding, it will be difficult to reverse the ecological slide of the Great Basin.

Several funding sources currently used to rehabilitate public lands include:

- The Hazardous Fuels Operations Fund helps isolate critical native plant communities from cheatgrass expansion. It also can fund work to reintroduce fire or remove vegetation to prepare for reseeded.
- The Weeds Program provides limited funding for combating noxious weeds.
- The Emergency Fire Rehabilitation Program is intended to stabilize soils in burned areas, but does not address long-term restoration.
- The Management, Lands and Resources (MLR) account pays salaries, funds facilities and other support functions, and provides very limited funding for land treatments.

However, these four funding sources combined cannot support a long-term restoration effort. They were not designed nor established to address the growing problem of degraded rangelands as a result of invading noxious weeds and exotic annual grasses.

“These funds are, indeed, critical components, or parts, of rangeland rehabilitation. Unfortunately the sum of these parts is less than the whole. In other words, they do not meet long-term restoration needs,” said a budget analyst from BLM’s National Office of Fire and Aviation. “A whole new approach is required.”

Additional funding could be used to address emergency, post-wildland fire site-specific needs not covered by emergency fire rehabilitation. This funding would not be used for studies, monitoring, administrative or managerial support. The majority of the work would be completed by regional and local businesses through contracts. Examples of emergency restoration actions include rebuilding fences and water developments critical to wildlife, wild horses and livestock; treatments to stop invasion of



At the heart of restoration is funding. Without adequate funding, it will be difficult to reverse the ecological slide of the Great Basin.

**the great basin
restoration initiative**



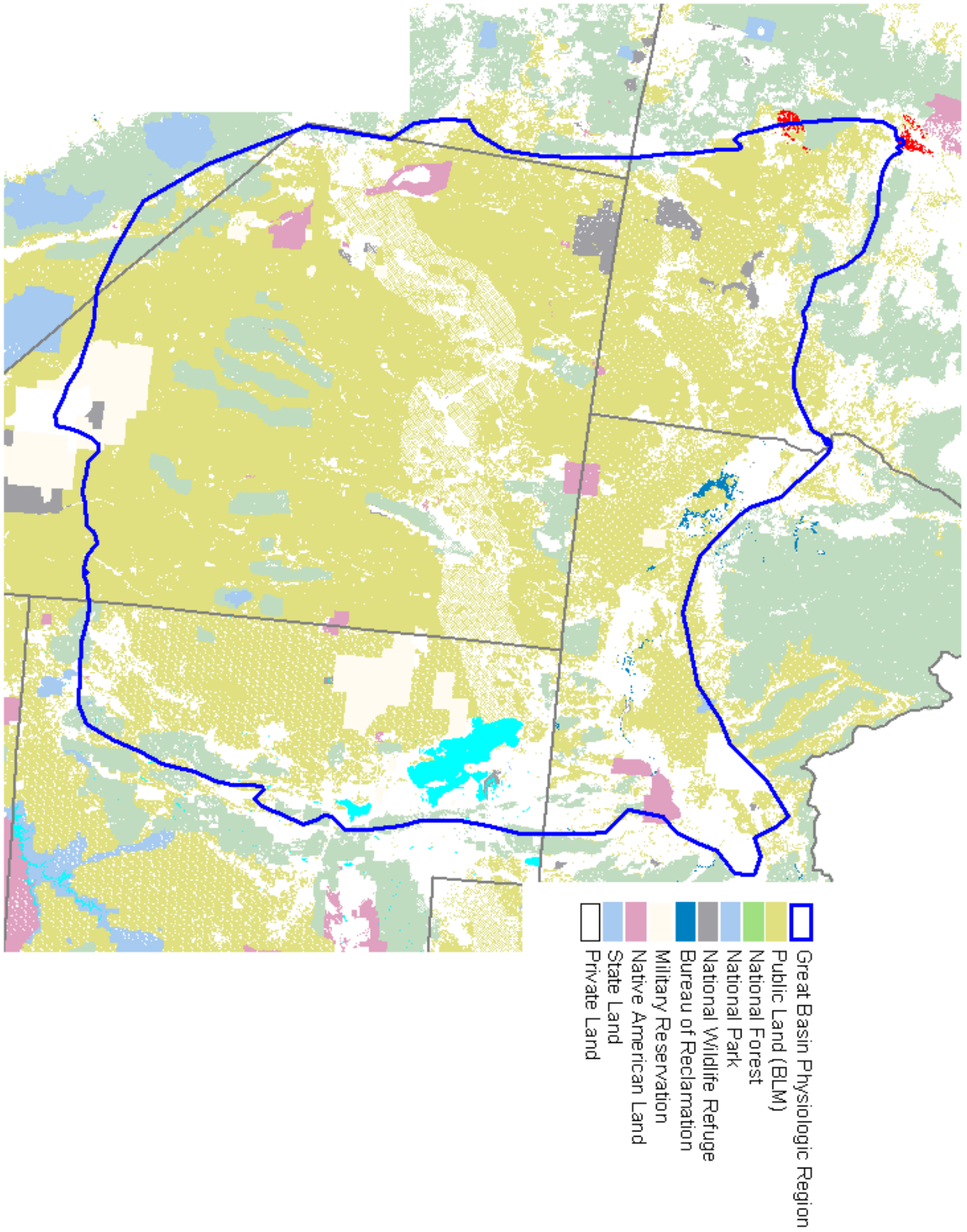
To some, the costs associated with this restoration initiative might appear steep. But compared to the total annual cost of wildland fire management..., rehabilitation..., weeds treatment..., and the loss of resources and damage to property in the millions of dollars, it is not an extravagant sum. If restoration work is not started soon, the annual costs will soar in the future as the health of the Great Basin deteriorates. Today's price tag could very well represent a bargain basement sum by the end of the decade.

noxious weeds and exotic annual grasses; and replanting critical vegetation such as shrubs.

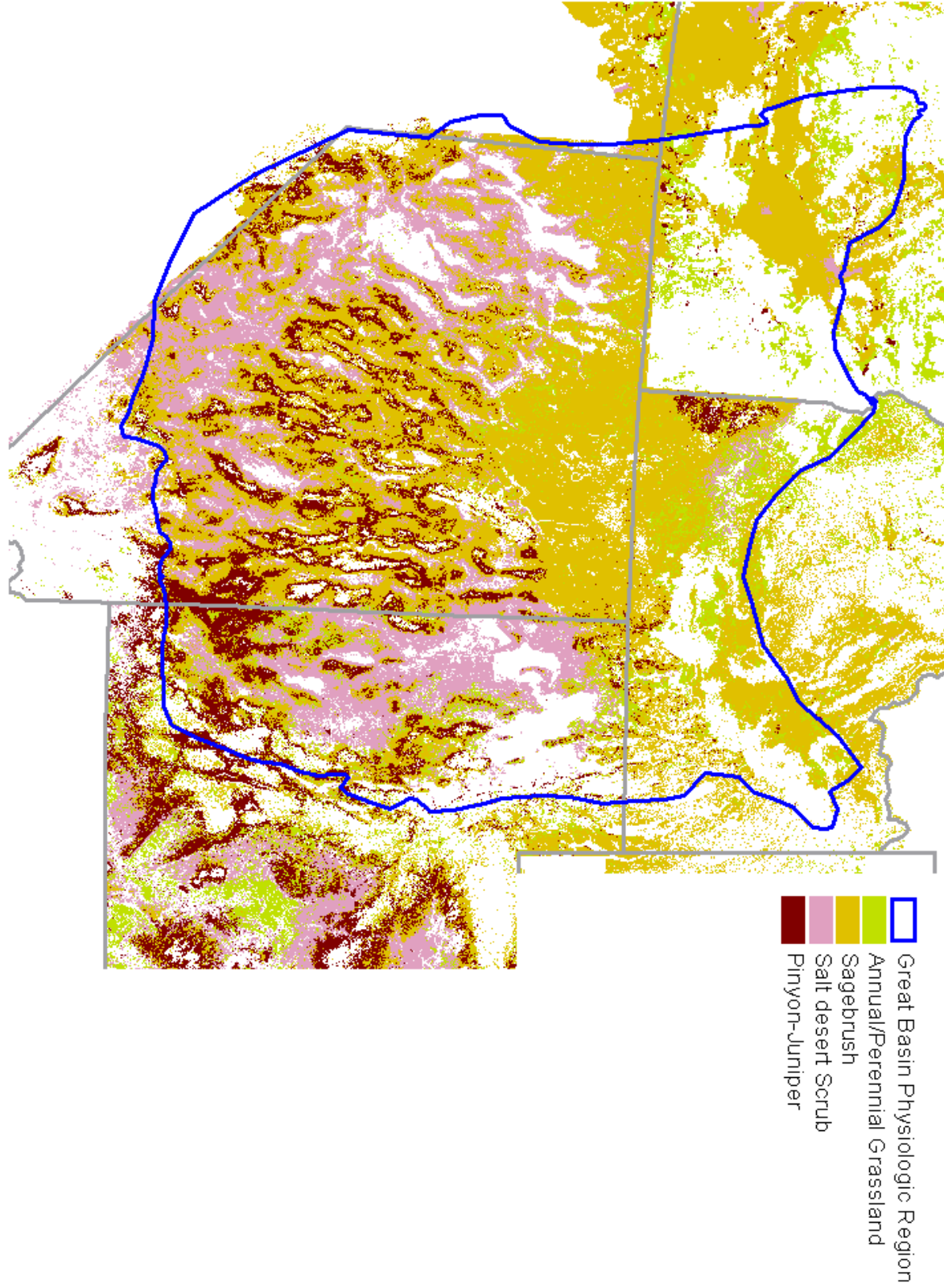
It would also be used for restoration science funding, which would be directed at identifying areas at risk or those requiring restoration and for developing guidance for consistent and efficient treatment techniques. The restoration science funding would gradually diminish as technology improves.

The costs associated with this restoration initiative will be steep. But, in the long term compared to the total annual cost of wildland fire management (\$71 per acre), rehabilitation (\$64 per acre), weeds treatment (\$70 per acre), and the loss of resources and damage to property in the millions of dollars, it is not. If restoration work is not started soon, the annual costs will soar as the health of the Great Basin deteriorates. Today's price tag could very well represent a bargain basement sum by the end of the decade.

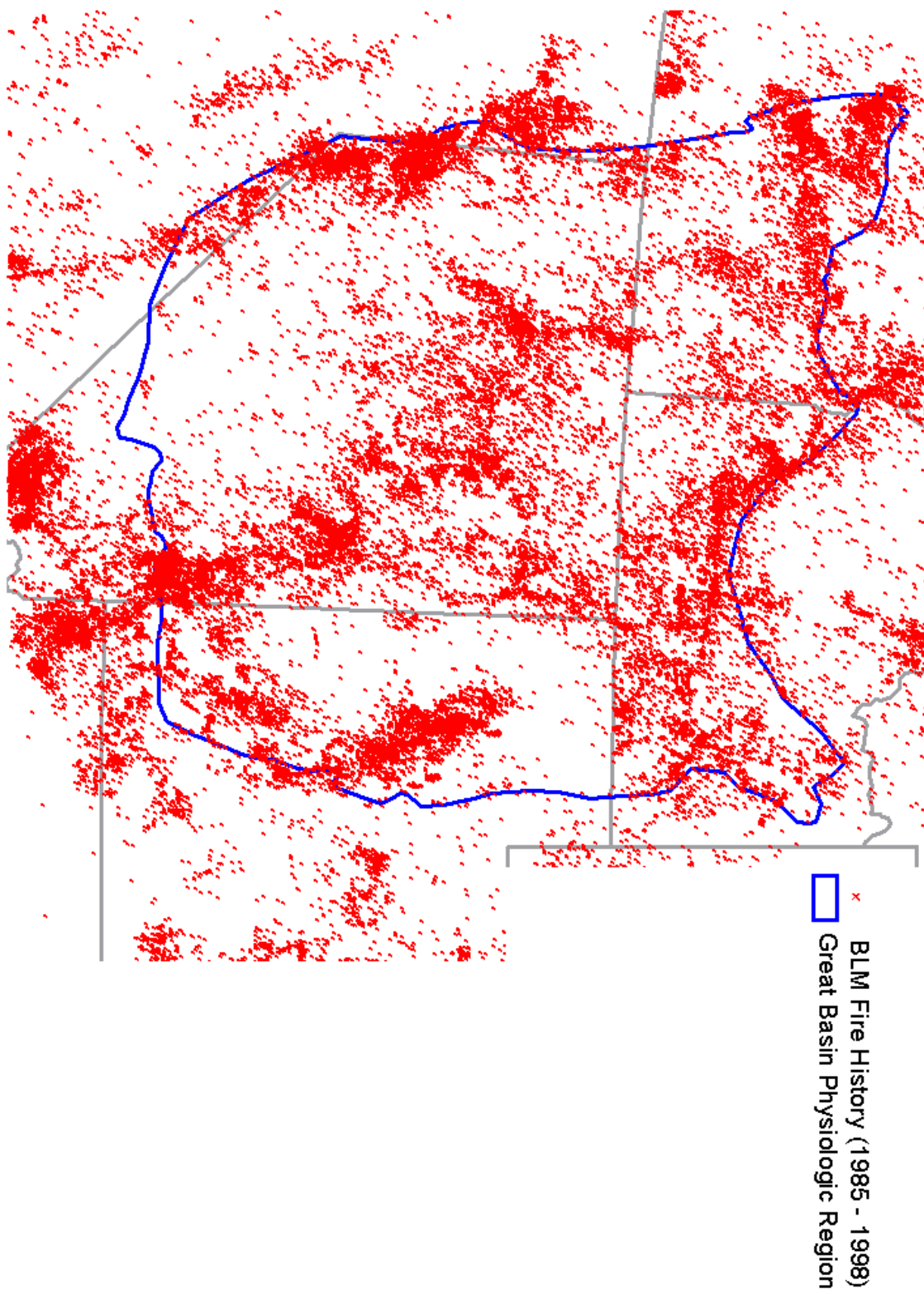
great basin I and ownership map



great basin vegetation map



great basin fire history map



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key contacts for the great basin restoration initiative

program directors

Les Rosenkrance, Director
Bureau of Land Management
National Office of Fire and Aviation
3833 South Development Avenue
Boise, Idaho 83705
(208) 387-5446

Henri Bisson, Assistant Director
Renewable Resources & Planning
Bureau of Land Management
Washington Office
1620 L Street Northwest
Washington, DC 20036
(202) 208-4896/208-5010

Ron Dunton, Fire Program Manager
Bureau of Land Management
National Office of Fire and Aviation
3833 South Development Avenue
Boise, Idaho 83705
(208) 387-5154

Tim Hartzell, Group Manager
Rangeland Resources
Bureau of Land Management
Washington Office
1620 L Street Northwest
Washington, DC 20036
(202) 452-5191

technical issues

Mike Pellant, Rangeland Ecologist
Bureau of Land Management
Idaho State Office
1387 South Vinnell Way
Boise, Idaho 83709-1657
(208) 373-3823

Cal McCluskey, Senior Wildlife Specialist
Fish, Wildlife and Forests
Bureau of Land Management
Idaho State Office
1387 South Vinnell Way
Boise, Idaho 83709-1657
(208) 373-4042

budget issues

Gardner Ferry, Budget Analyst
Bureau of Land Management
National Office of Fire and Aviation
3833 South Development Avenue
Boise, Idaho 83705
(208) 387-5161

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team members of
the great basin restoration initiative

great basin restoration
initiative working team

Roy Johnson

BLM Office of Fire and Aviation

Gardner Ferry

BLM Office of Fire and Aviation

Karen Steenhoff

U.S. Geological Survey

Paul Seronko

BLM, Lower Snake River District

Mike Pellant

BLM, Idaho State Office

Sheldon Wimmer

BLM Utah State Office

Tim Hartzell

BLM Washington, D.C., Office

Don Smurthwaite

BLM, Office of Fire and Aviation

Nancy Lull

BLM, Office of Fire and Aviation

Tom Roberts

BLM, Washington, D.C., Office

Cal McCluskey

BLM, Washington, D.C., Office

Melanie Miller

BLM, Office of Fire and Aviation

Rick Tholen

BLM, Washington, D.C., Office

Kenneth J. Gray

Nevada Division of Wildlife

Jerry Erstrom

BLM, Vale (Oregon) District

Carl Gossard

BLM, Office of Fire and Aviation

Bob Kindschy

Southeast Oregon Resource

Advisory Council

Sue Tholen

Interior Columbia Basin

Ecosystem Management Project

Tom Zimmerman

National Park Service

Carol Spurrier

BLM, Washington, D.C., Office

Bruce Durtsche

BLM, National Applied Resource

Science Center

Steve Knick

U.S. Geological Survey

