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Restoring the common ground: The creation of a Greater Yellowstone Restoration Corps

Kirstin Leonard

The University of Montana

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RESTORING THE COMMON GROUND:
THE CREATION OF A GREATER YELLOWSTONE RESTORATION CORPS

by
Kirstin Leonard
B.A. Vanderbilt University, 1992

presented in partial fulfillment of the requirements
for the degree of
Master of Science
The University of Montana
1995

Approved by:

[Signatures]
Chairperson
Dean, Graduate School
Date
November 15, 1995
Restoration work is not fixing beautiful machinery—replacing stolen parts, adding fresh lubricants, cobbling and welding and rewiring. It is accepting an abandoned responsibility. It is a humble and often joyful mending of biological ties, with a hope, clearly recognized, that working from this foundation we might, too, begin to mend human society...We can sense, in other words, salvation here. And we can imagine too, latent in this movement, a potential not simply to change the direction of Western culture but to alter its foundation.

Barry Lopez (1991)
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EXECUTIVE SUMMARY

The elections of 1994, and the resulting political initiatives made to undermine existing environmental protection laws, prove the transience of legislation and its vulnerability to short-term, self-serving motives of those deeply detached from the long-term interests of natural ecosystems and human communities. Although a powerful tool that can contribute to social and environmental advances, legislation should not be relied upon as the sole approach by which to restore and defend the health of our inextricably linked natural and human communities.

Environmental degradation pervades our world, and to some degree is unavoidable for, like all life, humans depend upon the earth and must use land, air, and water for survival. However, short-sighted development lacking sustainable, ecological foundations devastates present and future generations of human communities and all other life forms dependent upon relatively-intact ecological systems.

Ultimately, environmental protection and human communities based on the sustainable use of natural resources can only be achieved through the commitment of local people to their landscapes and to each other -- through an acceptance of ownership and responsibility established through personal engagement and tangible experience. The process of ecological restoration provides a medium through which these ends may be attained, previous environmental degradation is reversed, and future human interaction with landscapes becomes based upon an increased awareness of and desire to avoid past forms of ecological destruction.

This project focuses on the Greater Yellowstone Ecosystem (GYE) -- approximately eighteen million acres covering parts of Idaho, Montana, and Wyoming and comprising primarily public lands. Presently, the GYE suffers from over a century of environmental degradation as well as from a lack of communication and cooperation among its residents. Despite these roadblocks, it still stands as one of the few regions in our country where human communities retain the potential to create sustainable interactions with their landscape and to protect the rare aesthetics and high quality of life that define the area and support the majority of its economies. However, past and present activities, such as mining, unsustainable timber harvesting, grazing, oil and gas development, and rapid population growth, have impaired the region's water quality, fragmented and destroyed wildlife habitat, and now threaten the sustainability of the ecosystem's natural resources and human communities.

This project examines the potential impact of ecological restoration upon the human and natural communities of the Greater Yellowstone Ecosystem, as it reverses past ecological degradation and plants seeds for an environmental ethic based on respect for the limits of natural systems and the desire to change commodity-biased management of the ecosystem's natural resources. In cooperation with the Greater Yellowstone Coalition (GYC) and the Montana Conservation Corps (MCC), I have assessed the ability
of a Greater Yellowstone Restoration Corps (GYRC) to implement an ecosystem-based restoration effort. I have worked to identify ecologically-appropriate restoration projects for a Greater Yellowstone Restoration Corps that could provide meaningful (and ideally long-term) work for the residents of the Greater Yellowstone Ecosystem (GYE).

Specifically, my goals were to: 1) assess the needs and interest for restoration on GYE public lands by soliciting project proposals; 2) establish a working definition of restoration for a GYRC; 3) develop appropriate criteria to evaluate restoration project proposals; 4) apply criteria to proposed projects; 5) develop a ranking system to prioritize both present and future restoration projects; and 6) to make recommendations for how a GYRC might use restoration as a strategy to establish common ground within a polarized region and protect ecosystem health.

My findings confirm a need for large-scale, ecosystem-based restoration planning and a consistent vision for restoration in the GYE. A Greater Yellowstone Restoration Corps (GYRC) can work to provide these missing ingredients to the GYE; yet, to do so, it must adhere to a clear, substantive vision of restoration and execute projects that support that vision. Therefore, projects chosen for GYRC implementation must meet four screening criteria: ecological importance, clear and realistic goals, a commitment (in the case of public lands, from the governing agency) to protect the restored area, and the potential to train and employ local people. Moreover, GYRC planners must work to provide a consistent vision of restoration, foster community involvement and investment, develop model community demonstration projects, and incorporate past (and present) resource-extractive workers into ecosystem restoration efforts.

Given the extent and severity of the environmental degradation, divisive political climate, and transitional economic period the Greater Yellowstone Ecosystem is experiencing, I propose that a Greater Yellowstone Restoration Corps (GYRC) offers a unique and timely approach to confronting problems facing the GYE. Engaging local people to work for the long-term health of an ecosystem, as well as their region's quality of life, can begin to weave the strongest foundation of all -- one built on the commitment of communities. If implemented with clear goals and a strong commitment to reversing environmental degradation (and preventing recurrence), a Greater Yellowstone Restoration Corps will serve as a model for other ecosystems and communities around the country and world which are beginning to understand, value, and work for sustainable relationships between their human and natural communities.
FOREWORD

April 24, 1995

Thoughts on Restoration After the Oklahoma City Bombing

As I begin the academic countdown in the quickly disappearing final days of the semester, I cannot erase the past five days from my mind and heart. And I cannot make sense of how the restoration notes strewn across my room can ever have any real meaning, as hundreds of lives and my understanding of home have forever changed. No restoration effort can ever begin to compensate, or reverse this tragic destruction and annihilation. Never.

I was awakened this past Wednesday morning to a nightmare: my brother Ryan's 9 AM call from Washington DC telling me that a bomb just exploded at a federal building in Oklahoma City. "Dad is OK... ran an errand before work... not sure... will call back... Love you, Kirs." The hours following: Watching CNN all day at Laundra Queen, staring unbelievably at the bloody bodies and heaps of shattered glass -- wrecked buildings and lives -- emerging from 5th and Robinson, a very familiar and frequently visited downtown intersection.

How many times have I put 2 quarters in the meter on that one-way street, sprinted across it, rushed through the metal detector of the courthouse, mindlessly pushed "5", and emerged in my dad's office to meet him for lunch? A quick hello to Janie, Carmelita, Cherice, Sheila, and sometimes Judge Thompson before Dad and I would begin to weave our way through the underground downtown tunnels, to avoid traffic, and emerge a few blocks away to share a sandwich at Inter-Urban followed by a frozen yogurt at the
bagel place. A routine that I always look forward to, counted on, and never questioned. Time spent with my dad, an extraordinary influence in my life, in a very ordinary, fairly nondescript place.

My dad is the only judge I know who will sign his name in bubble-letters on official stationary. He has written me several letters from his 5th floor courthouse office overlooking the recently blasted Murray Federal Building--talking about the windy Oklahoma spring weather, how the little kids from the day-care playing outside brightened his day and helped put judicial life in perspective, how one of the biggest white-collar scandals in the state had just been assigned to him, and...how was Montana?

Reporters call it an "assault on the Heartland." Clinton describes it as "an attack on the United States, our way of life and everything we believe in." For me, it represents a frightening violation of a sense of place and stands as the saddest event I have ever experienced. I realize that tragedies equal in violence and unjustness strike deep and often all over the globe, but this one hit my home, making it impossible to ignore or turn into just another news story abstraction. This bombing shakes the foundation of many of my beliefs about our world and everyday life and challenges my optimism in social and environmental progress. It gives me a personal realization of the tremendous real and symbolic power of destruction and of its immense ability to intimidate, terrify, and dishearten.

In the face of such overwhelming and destructive forces, how can we believe in the significance of small, positive, individual acts? When a significant part of our world shatters, leaving us feeling shaken and powerless, how do we begin to put back the pieces and protect ourselves from further disruption? How will restoring the condition of a half-mile of stream
in the Bridger-Teton National Forest ever really affect the La Barge Watershed, the Greater Yellowstone Ecosystem, much less the world?

This recent event proves that humans have tremendous power, both for destruction as well as for creation of strong relationships between individuals and communities. As relief workers and other Oklahomans dig through the rubble and begin to piece their community back together, the horror of violence and senseless slaughter becomes replaced gradually by the human display of tremendous strength, bravery, and care for the world. Working to restore the physical, social, and spiritual components of a community offers the medium through which relationships between people and their environment and with each other can grow in meaning, deepen and flourish.

The creation of a Greater Yellowstone Restoration Corps, an Oklahoma City Restoration Corps, or any other similar coalition will never be able to compensate for what happened five days ago. Yet groups such as these can begin to tackle and reverse the many reckless forms of devastation that have been occurring for years, some more chronic in nature but nevertheless forceful. Numerous assaults have been waged against our physical environment and inhabitants (including ourselves) by resource-extractive industries that have planned their invasion with little respect for the future quality of the environment and lives of the people who call an area home. Whether the attack has taken the form of cyanide leaking into our waters, massive erosion and loss of habitat due to clearcutting, or riparian areas that have been completely hammered by cattle, the result has been careless disregard for life and excessive abuse to our natural communities—all under the guise of supposed economic and regional progress.
Human actions that destroy our homes, communities, and environment, however explosive or seemingly subtle, should shock us all. What we as individuals justify each day for the sake of short-sighted and unsustainable "progress" should equally disturb us. As environmentalists, we must reach out to other people within our communities and work together, as the Oklahoma aid workers, to rebuild parts of our environment that have been senselessly destroyed. We must challenge ourselves and others to build more respectful relationships with our natural world and with each other. And we must thank the people of Oklahoma City for reminding us all of the tremendous capacity of humans to work together to restore devastated communities, to rebuild what was destroyed...leaving a stronger foundation through the difficult yet ultimately rewarding process of restoration.
INTRODUCTION

Vast, diverse, and wondrous, the Greater Yellowstone Ecosystem (GYE) represents one of the few remaining symbols of all that is rugged and wild. Rich in beauty, wildlife, rivers and human communities as well as economically valuable timber, minerals, and rangelands, it embraces parts of three states, Yellowstone and Grand Teton National Parks, eleven wilderness areas, three wildlife refuges, and eleven million acres of roadless landscape (see Figure 1). It represents home to seven officially threatened and endangered species, including the grizzly bear, gray wolf, bald eagle, and peregrine falcon as well as many other rare animals and plants. Just as these and many other species depend on this ecosystem's land, air, and water for survival, so do its 314,000 human inhabitants. Many families depend on the environmental health of this area for sustenance, as their daily lives and work are closely intertwined with the elements.

While to urban eyes the GYE landscape may appear biologically abundant and ruggedly tough, in reality the area is extremely fragile and suffers from extensive environmental degradation (Glick et al. 1991). Although political designations, including National Park, Wilderness, and Wildlife Refuge classifications offer some areas protection from development impacts, these political constructs cannot shield the ecosystem from the massive environmental destruction and habitat fragmentation that has often accompanied the activities of the region's resource extractive industries.

Past public and corporate environmental policies have compromised the overall health of the GYE and lives of its inhabitants. Irresponsible timber and mining operations have greatly impaired water quality in many GYE rivers and streams by clogging them with sediment and poisoning them
with toxic metals and acid drainage. National Forests, most notably the Targhee, show scars from extensive clearcutting, over-harvesting and poor regeneration efforts. Abandoned and existing mines leak sulfuric acid, heavy metals, and cyanide which contaminate surrounding soil, water, wildlife, and people. Riparian areas and grasslands, critical for wildlife habitat, healthy streams and groundwater, suffer from poorly managed livestock grazing. The growing recreation and tourism industries, although based on the aesthetics and wildlife of the ecosystem, also degrade the environment. Roads and trails built to allow backcountry access often displace wildlife habitat, increase erosion and sedimentation, and result in numerous other impacts linked inevitably to human presence.

Individuals, families, and communities within the GYE depend upon the surrounding environment and its resources for their economic subsistence, aesthetic enjoyment, and overall quality of life. While the ecosystem's natural processes appear to work together as part of a larger, unified whole, the same cooperation does not exist among the people who live within its boundaries. Clashes between conservationists and extractive industries result in numerous conflicts between residents of the area as well as with outsiders. A fundamental question lies at the core of these debates: How should humans interact with their landscape, in this case the Greater Yellowstone Ecosystem, to foster both long-term community and personal well-being?

Based on the proven capacity of ecological restoration to benefit biological and human communities, the Greater Yellowstone Coalition (GYC) and the Montana Conservation Corps (MCC), two nongovernmental organizations based out of Bozeman, Montana, initiated the creation of a Greater Yellowstone Restoration Corps (GYRC) in November 1994. A GYRC
will aim to employ past resource-extractive workers and other residents of the region to reverse environmental degradation. As a process which yields tangible results, restoration may offer a medium through which polarized groups of people within the GYE can acknowledge common ground and achieve ecosystem sustainability.

In January 1995, I began to assist the Greater Yellowstone Coalition (GYC) and Montana Conservation Corps (MCC) with early project planning. Specifically, at the request of these two groups, I worked to:

• Assess the need and interest for restoration on the public lands within the GYE by soliciting restoration project proposals from public agencies

• Conduct a literature review to develop a working definition and better understanding of restoration

• Develop appropriate criteria to evaluate restoration project proposals for their potential to impact natural and human communities

• Apply criteria to proposed projects to identify potential restoration projects for the GYRC

• Develop a ranking system to prioritize both present and future restoration projects for a GYRC

• Make recommendations for how a GYRC might use restoration as a strategy to establish common ground and protect ecosystem health

Due to the urgency and necessity to identify specific projects for a grant deadline, the implementation of this project took a different course than I would have planned if I had been working only under an academic timeline. Consequently, I had to conduct the initial project solicitation before completing a literature review of restoration and developing "screening" and "ranking" criteria to determine project suitability and significance. (The
difference between the first solicitation letter and the second one- proposed for future use- reflect this timing.) Nonetheless, I completed the development of the criteria and ranking system in time for grant inclusion and now provide a screening process and framework for future project solicitation and planning for a GYRC.

The following chapters will describe this process and discuss the project objectives stated previously. Specifically, Chapter One will present an environmental and cultural overview of the Greater Yellowstone Ecosystem (GYE). Chapter Two will offer a Greater Yellowstone Restoration Corps (GYRC) as a timely mechanism to address ecological degradation and economic changes and then describe the interest for restoration among GYE public land managers, concluded from my initial project solicitation and subsequent correspondence. Chapter Three will examine the history and meaning of restoration. Chapter Four will offer both screening criteria and a ranking system for restoration projects for a GYRC. Finally, Chapter Five will offer conclusions and recommendations for successful implementation of a GYRC.
CHAPTER I
AN ENVIRONMENTAL AND CULTURAL OVERVIEW OF THE GREATER
YELLOWSTONE ECOSYSTEM (GYE)

Once called the Greater Yellowstone Area (GYA), the Greater
Yellowstone Ecosystem (GYE) has only recently been acknowledged as a single
ecosystem -- a dynamic, functional ecological unit comprised of living and
nonliving elements which interact through a wide variety of processes that
work to maintain a crucial balance between living organisms, water,
atmosphere, and earth (Patten 1991a). Defining the area as an ecosystem
implies that the GYE's eighteen million acres share important connections
and that the natural structures and functions work together to create an entity
whose ecological value exceeds the sum of its parts. Managing the area as an
ecosystem demands thoughtful planning and an understanding of ecosystem
relationships, complexity, and cumulative effects.

Ecosystem boundaries rarely exist as rigidly as we draw them, yet
certain characteristics help to separate one ecosystem from another (see Figure
1). While it is difficult to delineate the exact boundaries for the Greater
Yellowstone Ecosystem, it is evident that the GYE differs dramatically from its
surrounding plains. Defined by its unique geology, climate, physiography,
and plant and animal communities, the ecosystem is characterized by its
high-elevation mountain ranges. Serving as the headwaters for three major
continental-scale river systems: the Missouri-Mississippi, Snake-Columbia,
and Green-Colorado, the region's ecological significance extends to the entire
continent.

The GYE houses a mosaic of many different types of ecosystems, each
with its associated animal and plant communities. In all, it contains more
than 1,200 plant species, over 300 birds, 128 species of butterflies, two dozen reptiles and amphibians, 94 mammals, and countless invertebrates and microorganisms. Forests make up about 60 percent of the vegetation. The following Key Habitat and Vegetation classifications provide a brief overview of the GYE's flora and fauna (Glick et al. 1991):

**Grasslands and Shrublands**

Grasslands and shrublands primarily cover floodplains and adjacent terraces while alpine meadows exist above treeline. Because most grasses thrive in sunlight, they provide important revegetation for areas that have been burned or disturbed. Common grass species include bluegrass, wheatgrass, bentgrass, and fescue. Large ungulates of the GYE depend upon grasses for forage, as grasses make up 60-80 percent of the winter diet for elk, 70 percent of the winter diet of bighorn sheep, and nearly 100 percent of the winter forage for bison.

**Low-elevation Forests**

Juniper, Douglas fir, and aspen, predominate low-elevation fertile areas such as glacial till or fluvial soils. Rich in plant species and understory growth, these communities are found in areas with higher moisture than grasslands and shrublands.

**Lodgepole Forests**

Lodgepole forests, found at mid-elevations, comprise 60 percent of the tree cover in the Ecosystem. Able to recolonize quickly after fires and to grow in nutrient-poor soils, lodgepole pines thrive where other tree species and vegetation cannot. Because of the density of their stands, only a few species of shrubs and herbs live in the understory of these forests.
Subalpine and Old-growth Forests

Found at increasing elevations, from 4,500 to 9,000 feet, subalpine forests dominated by Engleman spruce, subalpine fir, and whitebark pine play an important role in maintaining the numbers and diversity of the Ecosystem. Many species of wildlife depend upon the large areas of old-growth conditions these forests provide.

Alpine Habitats

Above 9,000 to 10,000 feet, where trees can no longer grow, alpine tundra begins. Alpine tundra consists primarily of hardy plant life that grows slowly and remains close to the ground in order to survive the harsh alpine conditions of thin soils, extreme seasonal temperatures, high wind, intense sunlight, and short growing seasons. Because of their inherent fragility, alpine habitats are extremely sensitive to disturbance.

Riparian Areas

Riparian areas exist as transition zones between aquatic systems and adjacent upland terrestrial zones. Linking the two together, they stabilize streambanks and minimize erosion with their root systems, filter and purify runoff from adjacent lands, and support a rich flora and an abundance of wildlife. Water quality, fish, and wildlife species depend on the health and abundance of riparian acreage. Heavy cattle grazing, mining, logging, road-building, off-road vehicle use and recreation all degrade riparian systems.

Other Wetlands

Other important wetland habitat types include bogs and smaller wetland areas. These areas influence hydrological cycles, house rare plant species, and serve as foraging areas for ungulates and bears.
Thermal Habitats

Marked by poor or scanty soil, uneven precipitation, high evaporation stress, high water temperatures, high salinity, wide-ranging pH, and low oxygen and nitrogen, thermal habitats exist as unique habitats that support important fungi, bacteria, and algae, as well as other ecosystem vegetation.

Wildlife

The GYE represents home to much wildlife, including the largest herds of elk in North America, one of only two remaining sizable populations of grizzly bears, the only U.S. wintering ground for North America's rare trumpeter swan, and the largest herd of free-ranging bison in the United States (Glick et al. 1991). Other GYE species include: ungulates — native elk, bighorn sheep, mule deer, white-tailed deer, pronghorn antelope, Shira's moose, and the introduced mountain goat; mammal predators — the cougar, wolverine, Townsend's Big-Eared Bat, and masked shrew; rodents — the beaver, pocket gopher, and red squirrel; birds — the bald eagle, Ferruginous Hawk, burrowing owl, and hermit thrush; fish — the redside shiner, Montana grayling, mountain whitefish, and seven trout species including the Yellowstone cutthroat; as well as thousands of insects and other invertebrates (Glick et al. 1991).

Although not as species diverse as the Eastern United States, the basic patterns of species distribution within the GYE have been relatively stable during the last 5,000 years (Baker in Clark 1994). Except for the gray wolf (for which restoration efforts are in process), the GYE has retained its full complement of carnivorous mammal species. However, human impacts over the past century have altered the Ecosystem significantly, compromised its ecological integrity, and "threatened" and "endangered" several plant and
animal species, while many others exist "unofficially" threatened (see Appendix A).

Human Communities

In the past, the cold, harsh winters of Greater Yellowstone's high-elevation country offered some protection from excessive human impact. Characterized by rural landscapes and relatively isolated towns, the ecosystem's residents and others rarely considered the need to protect or restore the area's natural resources which were assumed to be abundant and everlasting. However, this assumption has quickly taken its place among other Western myths.

The isolation and natural character of the Greater Yellowstone Ecosystem have been quickly disappearing as mild summers and romantic impressions of pristine terrain lure many visitors and new residents each year. Approximately 314,000 people now live and work in the region, although only a fraction of these residents actually live within GYE boundaries. (Many towns lie right outside.) The region's population has grown steadily over the past twenty years, and it is projected that seventy thousand more people will live there by the year 2,000--a twenty-three percent increase in the current population (Clark 1994). Cities near Yellowstone and Grand Teton National Parks, such as Jackson, WY, are especially affected by this rapid growth. In addition to this influx of new residents, approximately 10 million visitors migrate to the GYE each year.

While the spectrum of values and beliefs held by the ecosystem's residents is wide and diverse, for the purposes of this paper I will present three groups of inhabitants: the "extractive users," "aesthetic users," and "sustainable users."
Following in the frontier tradition, extractive users view the land's resources as boundless and oppose measures which limit timber harvest, mineral extraction, grazing, etc. They argue that their local, state, and regional economies depend on the jobs provided by the timber, mining, ranching, and oil and gas industries. In sum, they believe that the ecosystem's natural wealth can best be translated into the economic wealth of the nearby communities through the extraction and sale of commodities.

Aesthetic users value the ecosystem for its beauty and relatively undeveloped "wildness," pursuing opportunities for backcountry recreation including hiking, skiing, fishing, and hunting. They want the chance to escape urban settings and experience the grandeur and peacefulness of Nature without massive human development. They advocate conservation and preservation of the ecosystem's natural areas and seek to protect the ecosystem's waters, air, flora and fauna from further destruction by resource extraction.

Sustainable users recognize the economic value and human need for natural resources but also respect the ecosystem's natural systems and processes and their limits to support human demands and absorb human impact. Because many of these people reside in (or near) the GYE, their lives and livelihoods are deeply rooted to their surrounding environment. They depend upon the ability of the ecosystem's natural resources to replenish themselves, as they cannot relocate their lives as easily as out-of-state or foreign corporations can move their machinery.

Economic Trends

Over the past twenty years GYE rural economies have transformed to reflect a decline in the relative importance of extractive industries and a rise
in the importance of service industries including recreation, sales, banking, and health services (Power 1991). The primary economic activity tied to the GYE is not timber or mining but recreation. According to Forest Service estimates, recreation is responsible for 83% of forest-related jobs while timber harvest is responsible for only 11% (Power 1991).

The Wilderness Society (Rasker et al. 1992) conducted an economic study of jobs and income for the twenty GYE counties in Idaho, Montana, and Wyoming that comprise the GYE. The report, The Wealth of Nature: New Economic Realities in the Yellowstone Region, concludes that from the twenty year period from 1969 to 1989:

- The total number of jobs in the study counties grew by almost 66,000, an increase of 68 percent, and total personal income (income from labor and nonlabor sources) doubled to nearly $2.2 billion (in 1989 dollars).

- Income from nonlabor sources (primarily retirement benefits and investment earnings) grew to almost 35 percent of total personal income, surpassing income from the region's agricultural and extractive industries combined.

- Ninety-six percent of the new jobs and 89 percent of the growth in labor income occurred in sectors other than agriculture and the extractive industries.

- Direct employment in the region's agricultural and extractive industries dropped from nearly one of every three workers in 1969 to one of every six in 1989.

- Income generated by direct employment in the region's agricultural and extractive industries dropped from 23 to 12 percent of total personal income.

Although recent studies show a decline in the economic importance of resource extraction and a rise in recreation and other service industries, managers of the GYE's public lands have not altered their policies enough to
reflect this shift. Public land agencies spend a disproportionate percentage of their financial and human resources to support resource extraction—a fact exemplified by the management of the region's national forests.

Seven national forests, managed by the U.S. Forest Service, cover more than 11 million acres of the 18-million-acre Greater Yellowstone Ecosystem. Because national forests represent the majority of the public land in the GYE, they exert a substantial influence on the ecosystem's human communities and economies. However, present policies manage the forests with a bias towards resource extraction.

A Congressional Research Service study found that commodity resource programs in the ecosystem's national forests, including timber harvesting, water developments, grazing, and energy and mineral development "are of minor importance," because, compared to recreation, few jobs are derived from these industries (Corn and Gorte 1987). Specifically, the total number of jobs tied directly and indirectly to oil and gas, mining, timber, and grazing on the region's seven national forests represents only five percent of the total regional employment (Rasker et al. 1992).

On the other hand, although recreation generates the majority of direct jobs on six of the seven national forests in the ecosystem,1 the total revenue spent on recreation and conservation in 1989 fell 29 percent from the 1980 level (in constant dollars). During that same time period, spending for commodity production rose nine percent. Additionally, the Forest Service estimates that timber sale programs on the Yellowstone national forests cost taxpayers $7.3 million in 1989 and $8.1 million in 1990 (Rasker et al. 1992).

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1 Recreation accounts for the following percentages of jobs on the GYE forests: Beaverhead (86 percent), Gallatin (92 percent), Custer (99 percent), Shoshone (91 percent), Bridger-Teton (79 percent), and Targhee (76 percent).
This evidence supports the well-acknowledged fact that we subsidize degradation on our national forest (as well as other public) lands. Moreover, we hurt the most vigorous part of the economy by doing so. In other words, we have, and continue to use our taxpayer dollars to create resource extraction jobs that degrade the GYE at the expense of many other long-term jobs and industries which depend upon the ecosystem's high quality of natural resources and aesthetics.

In sum, the GYE is a beautiful area with exceptional habitat for wildlife and an abundance of opportunities for recreation as well as for sustainable resource extraction. Up to this point, it has been managed primarily for extractive uses (primarily timber), creating communities that claim dependence upon historical timber, mining, and ranching industries. However, years of degradation have taken their toll, and the ecosystem can no longer support such wide-scale extraction with little regard for natural limits and consequences. Moreover, increasing mechanization means that resource extraction generates fewer jobs — a trend especially detrimental to GYE's rapidly growing population. Given current economic realities, management of the GYE should be tailored to reflect the dependence of local economies upon the ecosystem's aesthetics.
Ecological Degradation in the GYE

Sensitive human dwelling is an important component of many ecosystems. The environmental problems that motivate many restorationists are not about human presence, but about the quality and intensity of human involvement.

Eric S. Higgs (1993)

Both natural and human disturbances have played a significant role in shaping the Greater Yellowstone Ecosystem. However, the magnitude and forms of human disturbance the past century have dramatically exceeded past levels. Some argue that because much disturbance is natural, and humans are also part of the ecosystem, that Nature will be able to recover from these impacts. However, human disturbances have grown in the GYE to the point of creating ecosystem stresses that Nature cannot rebound from quickly, if at all (see Figure 2).

A serious threat to both biodiversity and to ecosystem processes is "habitat modification beyond the levels of natural disturbance—modifications that fragment or break up habitats in such a way that populations of plants and animals become isolated from each other and cut off from processes necessary for survival" (Harker 1993). A Congressional Research Service report documents that human activities in the GYE have disturbed many animal species in this and other ways. Specifically, the populations of many animals have been reduced by human activities in the area, and "further effects on their populations appear likely" (Corm and Gorte 1987). The same study also defines grizzly bears as an important indicator of the health of the GYE, because (a) their heavy use areas correspond with important habitats for many other animals; (b) grizzlies are more sensitive to human disturbance than most other species in the area; and (c) grizzlies often die in human-bear
Development Impacts to Greater Yellowstone

Legend

- Intensive Subdividing
- Oil and Gas Development
- Intensive Logging
- Active Mines
- Major Dams
- Large Scale Recreation Development
- Ski Resorts

Base Map © 2014 Great Divide Graphics Helena, Montana

Figure 2
encounters. In other words, grizzly population trends prove useful as indicators of the effects of human activities on the ecosystem. Sadly, the GYE's management has been inadequate to assure the survival of grizzlies, and consequently other species' as well (Corn and Gorte, 1987). (See Appendix A.)

**Activities that Degrade the GYE**

Maser (1988) explains that "we focus so narrowly on products that we are destroying the processes that produce them." By doing so, the following activities have degraded and continue to impact many facets of the GYE as they fragment and destroy habitat, threaten biological diversity and water quality, decrease the sustainability of resources, and reduce the overall quality of life for many of GYE's inhabitants (Glick et al. 1991).

**Hardrock Mining**

Over twelve thousand active and abandoned hardrock mining claims are located on Greater Yellowstone federal lands, and two-thirds of GYE national forests remain available for leasing mineral rights and mining (Glick et al. 1991). Hardrock mining can take several forms (see Figure 3). Strip mining removes entire mountains, and in doing so impacts water quality, watershed integrity, plant and animal communities, and visual quality. The cyanide heap-leach procedure, used to extract gold ore, can leak deadly cyanide into waters. Through these and other mining processes, mining wastes contaminate ground and surface waters, as toxic metals attach to sediment and get transported by streams and rivers to pollute other lands and waters. (see Figure 4).
Figure 3. Hardrock mining in the GYE.

Figure 4. Mining often contributes to surface and groundwater contamination.
Hardrock mining also impacts human communities, as it tends to follow a boom-and-bust cycle which hurts the long-term stability of communities. The opening of a mine brings people into an area, increasing the demand for services, etc. Inevitably when the bust comes, people (taxpayers) leave, and long-term residents are left behind with a high tax burden, little tax base, a degraded environment, ailing industries dependent on high water quality, and health hazards and illnesses resulting from mine pollution.

Timber Harvest

In the GYE, timber harvest occurs primarily on national forest lands, although a significant amount takes place on private lands as well. In the past century, an estimated five billion board feet of timber have been removed from Greater Yellowstone national forests. The current ten year planning cycle slates one hundred and fifty thousand more acres of these national forest lands for timber harvest (Glick et al. 1991). Timber harvesting, practiced primarily in the GYE by clearcutting (Glick et al. 1991), destabilizes forest ecosystems by replacing mixed age/type communities with all the same age and species, removes needed nutrients and organic matter, fragments wildlife habitat, reduces cover for large mammals, and contributes to erosion and increased sedimentation of streams (see Figure 5). The Montana Water Quality Bureau (1986) claims that "accelerated road building and timber harvesting on the U.S. Forest Service lands now pose the greatest single threat to aquatic life [in Montana]."

The "scarred and wounded" landscape of the Targhee National Forest stands as testimony to the consequences of overharvesting and clearcutting in the GYE (Willcox 1992). What began in the 1960's as an aggressive effort to
harvest timber killed by a mountain pine beetle epidemic, the Targhee "salvage" program gained momentum, unraveling and destroying forest habitat. Management goals aimed only at "cut" quotas displaced grizzly bears, elk, and other animal and plant species. Massive clearcuts, many spanning 400 acres (ten times above the forty-acre limit in Forest Service regulations), and the roads built to create them, increased erosion and run-off into surrounding water sources, choking formerly healthy fish populations and degrading water quality in many stream segments.

Figure 5. Clearcuts in the Gallatin National Forest, Montana
Forest and Mining Roading

Consequences of decades of past development and commodity extraction in the GYE include logging and mining roads which penetrate even the highest forest landscapes and displace grizzlies and other species from their historic habitat (Rasker et al. 1992). Over seven thousand miles of roads exist on Greater Yellowstone federal lands, and plans call for an additional eight hundred miles to be built in the next decade (Glick et al. 1991). Road construction and use contribute to sedimentation of streams, wildlife habitat fragmentation, loss of wildlife habitat cover, severing of migratory corridors, the creation of disturbance corridors (accompanied by weed invasion), and increased access to areas which facilitates both legal and illegal activities, such as poaching (Glick et al. 1991). Moreover, the most significant effects of GYE development activities results from access created by roads (Corn and Gorte 1987).

Oil and Gas Exploration and Development

As of 1991, two hundred wells had been drilled on Greater Yellowstone public land, six million acres of national forest lands remained open to leasing, and there were seven thousand existing or pending leases (Glick et al. 1991).² Environmental impacts of oil and gas exploration and development include road construction and preparation of drilling sites which cause increased erosion and sedimentation; drilling muds which often enter watercourses, degrade water quality, and harm aquatic organisms; and movement of equipment and people which fragments habitat and disturbs

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² Within the GYE, most oil and gas activity has occurred on the Bridger-Teton National Forest in Wyoming, particularly the southern half of the forest in the Wyoming and Salt River ranges (GYC 1991).
and displaces wildlife. As with mining, oil and gas activity is usually marked by short-term booms, followed by economic busts, to communities.

Grazing

Approximately fifty percent of GYE public lands are leased for livestock grazing, including all three national wildlife refuges, BLM lands, parts of all seven national forests, and even Grand Teton National Park (Noss and Cooperrider 1994). Roughly two hundred thousand cattle, sheep and horses grazed on Greater Yellowstone public lands in 1989 (Glick et al. 1991). Additionally, the Greater Yellowstone Coordinating Committee (1987) estimates indicate that 40 percent of the livestock range on the seven national forests is in only fair, poor, or very poor condition.

Corn and Gorte (1987) report that increased attention needs to be given to protecting riparian habitats. Overgrazing and grazing in unsuitable areas have destroyed GYE riparian areas, which are important and fragile transition zones needed to maintain high water quality (see Appendix B). Grazing impacts also extend beyond the direct effects on vegetation. Noss and Cooperrider (1994) cite livestock production in the GYE as responsible for the extermination of the wolf and black-footed ferret, endangerment of the grizzly bear, declines in bighorn sheep, management conflicts with bison and elk, decline of native fishes due to dewatering of streams for irrigation and degradation of riparian zones, invasion of weedy plants and exotics, and soil erosion. They also refer to livestock production and grazing as "perhaps the greatest threat to biodiversity in the GYE" (Noss and Cooperrider 1994).
Dispersed and Developed Recreation

According to the Congressional Research Service estimates, ten million people visit Greater Yellowstone federal lands each year (Glick et al. 1991). Two main categories of recreation exist: dispersed (backcountry) and developed (close to roads and/or towns). Dispersed impacts, caused both by backcountry use by horses and hikers, are usually localized. Common dispersed impacts include trampling and removal of vegetation and disturbance and displacement of wildlife. Horses often overgraze meadows, introduce noxious weeds, and erode trails. Hikers pollute water sources, contribute to trail erosion, litter, leave fire rings and engage in other high impact camping practices. Developed impacts, although greater, still tend to be localized. They include poorly planned and/or managed campgrounds, conflicts between wildlife and humans, and additional development associated with the sites.

Figure 6. Recreation in the Bridger-Teton National Forest, Wyoming
Agriculture and Irrigation (Private Lands)

Agriculture alters natural habitats by removing native vegetation and replacing it with a monoculture of cultivated plants. Other agricultural consequences include fertilizer and pesticide use, groundwater contamination, and high rates of topsoil erosion. Additionally, most agriculture in the GYE requires irrigation. Irrigation techniques, such as catch basin reservoirs, alter natural water systems, remove wildlife habitat, and destroy riparian zones and aquatic habitat.

Rural Subdivision (Private Lands)

In the twenty counties that encompass the GYE, over two million acres of land is subdivided into plots of two hundred acres or less (Glick et al. 1991). Destruction of habitat, conflicts with wildlife, fencing, septic systems, roads, and improper garbage disposal represent just a few of the environmental impacts caused by rural subdivision. Unlike impacts resulting from public land resource extraction, impacts of subdivisions are largely irreversible.

Cumulative and Synergistic Effects

As population and development increases, seemingly insignificant impacts become significant. The concept of "multiple-use" allows for a combination of practices and uses, which creates dangerous cumulative or synergistic impacts on the entire GYE (Patten 1991b). Cumulative effects refer to the accumulation of individual impacts that may be insignificant alone but when added together result in significant impact or degradation. For example, within a particular watershed, some trout streams may suffer

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3 Cumulative and synergistic effects can also result when multiple human perturbations interact and/or overlap with natural ones.
damage from mining, others from timber harvesting, or grazing, or road development, or all of the above. Ultimately, the damage adds up and the fish no longer have adequate habitat because their entire watershed has been destroyed by seemingly disparate activities.

Synergistic effects refers to the end consequence that results when two activities react to produce an exaggerated, more harmful impact than the addition of their separate effects. A common example in the GYE, the co-existence of timber harvesting and grazing, results in severe erosion. Clearcuts (the primary logging method in the GYE) open an area for invasion by herbaceous plants and tree species that regenerate in open sites. Land managers frequently allow grazing shortly after a clearcut harvest, which halts forest regeneration and increases erosion. Consequently, the entire system suffers. The combination of extractive and recreation activities also proves disastrous, as degradation from each exaggerates the other.

Adequate consideration to cumulative, or synergistic impacts has not been given during GYE planning processes. For example, Corn and Gorte (1987) found that "road construction and access decisions are determined for each resource...rather than as an integrated issue which is broadly examined for its effects on the ecosystem." Moreover, many agencies have managed GYE public lands with inconsistent and unsustainable goals (see Figure 7).

Figure 7. The unmistakable boundary separating Yellowstone National Park and the Targhee National Forest.
**Common ground: Ecosystem Health and Sustainability**

My vision of land healing involves a process of building on traditions in which human beings are not at the center, but part of a complex interconnected web of life. It is about fostering and establishing relationships among all communities—plant, animal, mineral, insect, and human. It is a healing process that begins at home, integrated into sustainable practices, one that aims to restore not only an ecological balance but a cultural balance as well.

Barbara Westfall (1994)

The Greater Yellowstone Coalition (1994) describes its overall goal to be "maintaining a healthy landscape while accommodating a sustainable economy." Yet, what do the terms "health" and "sustainability" imply? Costanza (1992) states that an ecological system is healthy and free from "distress syndrome" if it is stable and sustainable—that is, if it is active and maintains its organization and autonomy over time and is resilient to stress. "Distress syndrome" refers to the state a system reaches where it can no longer recover and therefore collapses. Simply put, a healthy, sustainable ecosystem is one that can maintain habitat for a diversity of wildlife, a nonshrinking resource base for a variety of human uses, and clean air, water, and productive soil to support both human and nonhuman life.

The Greater Yellowstone Ecosystem (GYE) cannot continue to weather the stress placed upon it by historic methods of resource extraction. Even as existing degraded areas continue to worsen, the ecosystem continues to face constant bombardment by those who want to continue "business as usual." Yet, "business as usual" means that sustainable users get crushed by mismanagement from higher powers such as some Forest Service decision-makers and large extractive-oriented corporations. "Business as usual" also means that workers in the fisheries and recreation sectors struggle as the environment they depend upon becomes increasingly degraded. For the
health of the ecosystem and all of its inhabitants, business as usual cannot continue. Yet humans have always been, and will continue to be "part of natural processes and keystone players in ecosystem dynamics" (Martinez 1994). The challenge lies in assuring that human influence on ecosystem dynamics is one that the natural systems can handle.

Because of the consequences of past management actions, Patten (1991b) calls for the establishment of a coordinated long-term ecosystem redevelopment program for the GYE to bring degraded ecosystems back to an acceptable level of sustainability. He believes that, although pristine, primeval conditions can no longer be achieved, a reasonably natural, sustainable ecosystem is achievable. In other words, to achieve sustainability in the GYE, we must attempt to lessen and reverse numerous past and present impacts to a level that improves the functioning of the ecosystem as a whole.

The Greater Yellowstone Coordinating Committee (GYCC), in its effort to establish a common focus for the individual national park and forest plans, expressed a similar perspective in its 1990 Draft Vision report: Vision for the Future: A Framework for Coordination in the Greater Yellowstone Area. The three main goals pronounced in the Vision were: 1) to conserve the sense of naturalness and maintain ecosystem integrity; 2) to encourage biologically and economically sustainable opportunities; and 3) to improve coordination. Although political manipulation from commodity resource interests and western Congressman diluted these and other progressive "draft ideas," these statements represent the power of public comments to encourage discourse and the willingness of some public land managers to alter their previous commodity-biased policies to reflect other ecosystem values.
Thomas Power (1991), Professor of Economics at the University of Montana, argues that protecting the integrity of the GYE is not in conflict with local economic well-being but rather a crucial element in any economic development strategy for the region. Rasker et al. (1992) agree, and state that "contrary to traditional ways of viewing the region's economy, protection of biological resources, ecological functions, and scenic open space in the ecosystem is consistent with, indeed, vital to, economic well-being." As Robert Barbee, former Superintendent of Yellowstone National Park, explains: "Considering the area's extraordinary values, we believe that the entire Yellowstone area may well be best managed...[by] protecting the integrity of the natural systems which are the area's single most important resource" (Rasker et al. 1992).

Many long-time residents of the region feel that these sentiments and reports are expressed by "environmentalists" looking after their own self-interest and attainment of lofty aesthetic goals. They see their traditional way of life threatened by romantic ideals of vacationers and wealthy newcomers-not people who physically work each day to make a living. Consequently, they resent being limited because they do not have gigantic retirement funds or the luxury of the "footloose" lifestyle shared by many of the new residents. While there may be elements of truth to these feelings, their past work, centered on unsustainable resource extraction, cannot continue to support them or their families for much longer (Glick et al. 1991). However, despite the fact that many factors threaten their livelihoods, these long-time residents will never support any proposal that alienates them from their landscape, regardless of any official economic studies. Yet they depend on the health of the GYE for their survival.
Damaging the environment is not consistent with long-term economic growth or sustainability for anyone, including these long-time residents. Wendell Berry (1990) explains that "there can be no successful human economy apart from Nature." However, to date, no comprehensive, coordinated management structure for the Greater Yellowstone Ecosystem exists -- nor does a unified effort to protect the integrity of the GYE's human and biotic communities and to ensure that successful human economies persist. Furthermore, the residents of the GYE have rarely, if at all, acknowledged their common ground -- the health of the land which supports them. It is possible that the practice and process of environmental restoration may provide the medium through which such a coordinated effort can be made and common ground among GYE residents becomes realized, experienced, and cultivated. As Dr. M. Dombeck, Acting BLM Director (U.S. BLM 1994) explains, "We cannot hope to meet the long-term health of society without first securing the health of the land."
CHAPTER 2

A GREATER YELLOWSTONE RESTORATION CORPS (GYRC)

Our understandable wish to preserve the planet must somehow be reduced to the scale of our competence.

Wendell Berry (1990)

A complex tapestry of agencies and private groups manage and attempt to influence the management of the GYE (see Appendices C, D). These agencies -- both federal and state -- often lack coordination and work for incompatible objectives (Keiter and Boyce 1991). Corn and Gorte (1987) cite fragmented decision making as one of the most serious problems facing the GYE and find that "existing coordinating committees are not comprehensive in either membership or approach, and therefore are inadequate for providing complete, coordinated management of the Yellowstone ecosystem." Increased coordination among GYE land managers is needed -- to address both human and biotic communities and recognize their shared ecosystem and interests (Mumma and Grigsby 1994). Until we create a coordinated management strategy based on a long-term regional vision of sustainability, the area will continue to operate piecemeal, driven by short-sighted goals with short-lived rewards.

The ideological polarization that exists between the GYE's residents stands as another obstacle to achieving ecosystem sustainability. Members of GYE's human communities have rarely, if at all, acknowledged (much less

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4 Keiter and Boyce (1991) describe one of many instances where GYE agencies lacked coordination. The Bridger Teton National Forest made a commitment to restore elk migration routes in the Jackson elk herd, but the Wyoming Game and Fish Department defeated the objective by, in turn, encouraging increased hunter harvests of the eastern portion of the Jackson herd. Simultaneously, the U.S. Fish and Wildlife Service aimed to reduce the herd's size to decrease their feeding costs on the Elk Refuge. Time, money, and morale were spent working towards inconsistent, contradictory plans.

5 A Greater Yellowstone Coordinating Committee (GYCC), created in the early 60's, provides some unified structure but only includes the National Forest and Park Services.
worked for) their common ground -- the health of the land which supports them. However, this common ground cannot be established intellectually; rather, it must be cultivated through personal experience.

A Greater Yellowstone Restoration Corps (GYRC) can provide this experience. Initiated by a collaborative effort between the Greater Yellowstone Coalition (GYC) and the Montana Conservation Corps (MCC), a GYRC advisory group has already been established to address the GYE as an ecosystem and encourage discourse between the currently fragmented political authorities. A GYRC may also provide a mechanism through which common ground can be established among the GYE's diverse residents, who all depend on the health of the ecosystem for their long-term economic and personal well-being but have not yet united to work for this goal.

Members of the GYRC Planning Committee (1994) believe that "Nature's restorative powers remain our best hope for repairing these landscapes, but humans can accelerate this process." Given this belief, the committee seeks to develop a GYRC to: 1) mobilize the human, technical and financial resources needed to carry out ecological restoration on public and private lands and in the communities of Greater Yellowstone; 2) provide opportunities for employment, community service and training to corps members; 3) restore the ecosystem's ability to provide a sustainable flow of resource related goods and services to help meet local development needs; 4) assure that restoration work is done in a manner that effectively addresses priority problems; 5) fine-tune restoration techniques appropriate for the

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6 Presently, the GYRC Advisory Committee includes representatives from the following: U.S. Forest Service (USFS), National Park Service (NPS), Bureau of Land Management (BLM), Teton County (Idaho) Economic Development Council, Montana Rural Development Council, Henry's Fork (Idaho) Watershed Council, Shoshone and Arapaho Wind River Environmental Quality Council, and the Wyoming Outdoor Council.
Greater Yellowstone Ecosystem and transfer this information to land stewards; and 6) assist in creating agency and governmental policies needed to expedite restoration work.

As a starting point, I worked with GYRC founders to find whether a need and interest for restoration existed in the GYE; and, if so, to decide on the criteria to determine restoration project appropriateness.

**Interest of GYE Public Land Managers in Ecosystem Restoration**

Future visitors and residents of the Greater Yellowstone Area will encounter a landscape where natural processes are operating with little hindrance on a grand scale....The overriding mood of the Greater Yellowstone Area will be one of naturalness, a combination of ecological processes operating with little restraint and humans moderating their activities so that they become a reasonable part of, rather than encumbrance upon, these processes.

Greater Yellowstone Coordinating Committee (1990)

To determine the interest in restoration for the GYE public lands, I sent a letter to GYE public land managers introducing the GYRC and asking them to submit restoration project proposals that might be suitable for such a cooperative effort between GYE agencies and a GYRC (see Appendix E). Another purpose of this letter was to establish a baseline understanding of how the ecosystem’s federal and state agencies defined, perceived, and implemented restoration, if at all.

I sent letters (74) to all GYE Forest Service offices (Regional, Forest, and Ranger District levels), BLM State Offices and Resource Areas, U.S. Fish and Wildlife Refuges, Grand Teton and Yellowstone National Parks, the Wind River Indian Reservation, state parks, state environmental agencies, and several other referrals including Soil Conservation Districts (see Appendix F). I asked the recipients to describe five to ten restoration projects that might be
suitable for a cooperative effort with a GYRC. Specifically, I asked them to indicate project type, location, environmental need or expected ecological benefit, estimated cost, estimated scope, future plans for the area (land-use categorization), and to include any additional relevant project information.

Seventy percent of the survey recipients responded either by phone or mail. While respondents exhibited a varied response, many agency representatives expressed support for a GYRC cooperative effort, and restoration in general. However, through all of the letters sent, responses received, and personal interviews, I did not come across anyone in the GYE agencies who specialized in restoration. I learned that agency staff working in the field, as opposed to those in more bureaucratic offices, had the most interest in restoration and knowledge of potential projects.  

I discovered a wide range of commitment to restoration among these GYE public land managers. Although the GYE agencies have "radically different cultures, different histories, different clienteles, different legislative mandates, different problems, different personalities, and different perceptions of ecosystem condition" (Anderson in House of Representatives 1986), I found less discrepancy in a commitment to restoration between different agencies than between different offices and jurisdiction areas within the same agency. For example, whereas the Beaverhead, Bridger-Teton, and Caribou National Forests identified priority watersheds and submitted several restoration projects, other national forests, such as the Custer and Targhee, did not appear to have given restoration much thought or planning. Even within forests, individual ranger districts showed varying degrees of commitment, interest, and planning for restoration. (Ranger districts that did

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7 For example, within the National Forest System, staff in the Regional Offices consistently directed me to the Forest Offices, which then referred me to Ranger Districts, which then referred me to a resource "specialist"- often the district hydrologist.
submit projects usually had a "pioneering" staff member interested in restoration.) BLM offices also varied in their commitment to, and understanding of, restoration. One BLM staff member even told me that, "Although folks in the office are real excited about the project [GYRC], some are a little leery of a few words in the title...'ecosystem' and 'restoration' " (Ty Bryson, telephone interview, 17 March 1995).

Jordan (1992) acknowledges that in reality restoration, rehabilitation and reclamation efforts often display "considerable latitude with respect to objectives." Of those agencies that did submit project proposals for GYRC consideration, this proved true. Some proposals sought to construct snowmobile trails and irrigation ditches (to increase impact on ecosystem's resources), others to confront degradation with piecemeal, short-term projects, and still others aimed to complement larger landscape restoration efforts (see Appendix B).

The majority of projects identified were riparian, water quality/fisheries habitat related. Of those, most planned to plant riparian species (e.g. willows) to stabilize banks and decrease erosion and to build fence to exclude cattle. Several recreation-related projects were submitted, including trail repair to prevent erosion and campsite repair to reduce human impact. Although no road closure/obliteration proposals were submitted, staff from two of the Shoshone National Forest's Ranger Districts identified road closure/obliteration as a restoration priority. A single reforestation project, the Tobacco Root Aspen Regeneration project in the Beaverhead National Forest, was submitted.

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8 Scott Mackey (Washakie Ranger District), 307-332-5460; and Phyllis Roseberry (Greybull Ranger District, (307-868-2379)
Some proposals seek to involve a GYRC in the first steps of project planning, such as the South Pass Area Abandoned Mine Inventory and the Slough Creek Drainage Survey in Yellowstone National Park. Although the Shoshone National Forest was not prepared to submit specific projects, staff expressed interest in having a GYRC participate in baseline data collection for restoration efforts.

A few project proposals incorporate community outreach and education. The Caribou National Forest (Soda Springs Ranger District) plans to make interpretive signs and design other educational efforts for the Tincup Creek Fish Habitat Restoration project. The Bridger-Teton National Forest (Kemmerer Ranger District) seeks to incorporate outreach and educational efforts into the LaBarge Watershed Restoration projects. Projects such as the Popo Agie River Trail and Park in Lander are important because they aim to bring people in communities together to interact with the natural world in a way they may have not experienced.

The two most frequent explanations from those who did not submit restoration projects were: 1) lack of time due to other agency commitments (issuing grazing permits monopolizing staff resources, etc.); and 2) lack of comprehensive planning needed for such identification. As John Augsburger with the BLM Snake River Resource Area explained, "We are busy doing pieces of things but need to put better management in place on a larger scale.

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9 This project has two parts. The first part involves restoring a severely degraded area by the river, turning it into a park with interpretive signs about restoration, the Popo Agie river, and the surrounding environment. The other part of the project involves building a bike trail to connect other city-wide bike trails and to travel through the restored area. Although constructing the bike trail itself cannot be classified as restoration, it's construction will make the restored area (and interpretive signs) more accessible and visible, and therefore contribute to environmental education efforts in the community by drawing attention to restoration (and facilitating bike travel instead of automobile traffic). Building a bike trail complements the true restoration effort.
We must begin to fix real problems instead of putting band-aids on the little ones" (John Augsburger, telephone interview, 7 March 1995).

Others in the ecosystem also realize the need for larger-scale planning for restoration. Dr. Bob Schiller, Chief of the Division of Science and Natural Resource Management for Grand Teton National Park, acknowledges that up to now restoration projects in the Park have been planned by a "piecemeal approach based on funding, but next year's goal is to set priorities" (Bob Schiller, personal interview, 13 March 1995). Additionally, Barry Davis, Shoshone National Forest Supervisor comments that

"in the course of implementing ecosystem management, we will be (my emphasis) doing integrated resource assessments on a landscape basis. Through these efforts, we will develop an implementation schedule with prioritized actions needed to address issues, resolve problems, and attain opportunities. Some of these actions will probably be for the purpose of ecosystem restoration. With such actions identified, we will be in a better position to identify possible cooperative efforts with the Greater Yellowstone Restoration Corps" (Barry Davis, letter to author, 20 March, 1995).

The long-term success of any ecosystem-based restoration effort depends upon comprehensive planning and priority-setting. While agencies are beginning to inventory ecological degradation, expanded inventories of disturbed sites are still needed. 11 Too often, agencies prioritize restoration

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10 An inventory of disturbed sites in Grand Teton National Park's flat area has been completed. The final report documenting both disturbed and restored areas is titled: "Plant Community Disturbance Evaluation, Grand Teton National Park: Successional Responses to Natural and Induced Vegetation Recovery, Final Report, February 1994." Sites awaiting restoration are now being prioritized. No equivalent study or inventory has been completed for high country areas but is needed. Schiller expressed that, with decreased agency budgets, partnerships are becoming a high priority. He also noted that, in addition to cost-share funds, the Park could contribute "in-kind" resources such as materials and housing at the AMK Ranch (University of Wyoming Research Center) in the Park.

11 Presently, the BLM is contracting with state agencies to inventory and rank abandoned mine sites. GYE national forests have identified some restoration projects for Americorps proposals.
projects based on funding (although undoubtedly necessary for project success) rather than ecologically-based decisions.

In sum, my communication with GYE agency representatives confirms a lack of ecosystem-based restoration and planning efforts. My findings also reveal a lack of understanding and consensus of the definition and goals of restoration as well as varying levels of commitment to its implementation. Of all GYE agency offices, the Bridger-Teton National Forest seems to have the best grasp on the meaning and management implications of restoration, inventories and plans needed to carry out specific projects, and a forest-wide commitment to doing so. 12

The Greater Yellowstone Ecosystem (GYE) has a long way to go before "Vision" goals become realized, and the "overriding mood...[becomes] one of naturalness, a combination of ecological processes operating with little restraint and humans moderating their activities so that they become a reasonable part of, rather than encumbrance upon, these processes" (Greater Yellowstone Coordinating Committee, 1990). However, fertile ground with which to begin work exists among some GYE agency representatives. What's missing is coordinated planning efforts among GYE land managers to restore degraded parts of the environment. 13 GYRC planners and advisory board members can help to provide and foster increased coordination among GYE agency managers, at least with respect to restoration goals and

12 Three individuals particularly committed to restoration in the Bridger-Teton include: Gloria Flora, Forest Office, (307) 739-5500; George Walker, Kemmerer Ranger District, (307) 877-4415; and Dave Cunningham, Jackson Ranger District, (307) 739-5413.
13 Although, the "Bring Back the Natives" program is a good start: A national, cooperative aquatic species restoration campaign that emphasizes interagency coordination (between the BLM, Forest Service, and National Fish and Wildlife Foundation), watershed management, and improved land use practices to conserve and restore aquatic and riparian habitats on Federal lands. A GYRC can cooperate with and complement this program.
implementation, as well as to guard against incompatible restoration and planning objectives.
CHAPTER 3
WHAT IS RESTORATION?

Restoration defined

Ultimately, our words, and the way we define them, shape the landscapes we inhabit. Indeed, the future of any landscape occupied by our species hangs on a word.

William Jordan III (1992)

The challenge of defining "restoration" is a difficult and complex one. The term carries with it significant scientific and ethical questions, environmental and social importance, and highly political (and contested!) management implications. The Society for Ecological Restoration (SER) defines ecological restoration as "the process of repairing damage caused by humans to the diversity and dynamics of indigenous ecosystems" (SER News 1994). In other words, ecological restoration seeks to return both the structural and functional characteristics to a disturbed area, creating the conditions necessary for natural succession to occur as it would have prior to the (usually human) disturbance (Harker 1993). Restoration should also "lead to the re-establishment of sustainable and healthy relationships between nature and culture" (SER News 1994).

Land managers, politicians, and legislative and administrative directives often use the term restoration interchangeably with other "re-words" such as reclamation, rehabilitation, and recovery. However, these terms, and the goals and values they imply, differ in significant ways even though they may serve as varying stages in the same overall mission. Restoration is the most ambitious and encompassing and demands the most commitment to an area. Therefore, it is helpful to view restoration as the
focal point and then define reclamation, rehabilitation, and recovery by reference to it.

Jordan (1992) helps clarify the differences between these terms and associated goals. He makes the following observations and distinctions:

**Restoration** is the deliberate attempt to compensate in an ecologically precise and effective way, for human influence on a natural ecosystem. To restore something means to bring it back into some prior condition, usually with the understanding that it is for some reason preferable to its present condition. Therefore, ecological restoration means to do this to an ecological system, whether defined as an ecosystem, an ecological community, a landscape, or any combination of these. Specifically, restoration:

- Acknowledges that the system in question has been altered in some way—usually as a result of human activities
- Makes an explicit commitment to a particular objective—recapturing historic or model system
- Represents a commitment to recreation of the whole system, species, structure, function and process—not just a few preferred elements
- Recognizes that this will involve an active, deliberate effort, not merely the natural recovery of the system

**Rehabilitation** is a process designed to make the system work again—to make it more "livable." While rehabilitation may improve the condition of a particular area, or even ecosystem, its application and end goals may fall short of a full restoration process.

**Reclamation** is an attempt to make a severely degraded site more useful, more attractive, or in some way more desirable. Frequently, reclamation occurs on sites that have been mined. Reclamation alone rarely qualifies as complete restoration, yet reclamation and restoration do not have to be separate processes but instead different phases of an overall process that begins with reclamation and culminates in restoration.

**Recovery** is often called "passive restoration," which lets the system repair itself through successional processes, usually after the source or cause of

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14 The definitions presented here are not assumed to be definitive. The field of restoration can always benefit from new perspectives. However, for the purpose of this paper and the GYRC, I feel they are appropriate and useful.
disruption has been abated or removed. It differs from restoration in two ways: it entails no deliberate or active participation in the recovery process and its objectives are often extremely vague.

**Historical View**

The Curtis Prairie Restoration project, started in 1934, is generally regarded as the first systematic attempt to restore native ecological communities on disturbed land (Jordan 1991). Under the guidance of Aldo Leopold, members of the Civilian Conservation Corps (CCC) began replanting tallgrass prairie on overused and eroded farmland that the University of Wisconsin had acquired for an arboretum. The purpose of this project was to establish a collection of all the area's native ecological communities. To reach this goal, some communities merely needed protection from further disturbance, yet others needed complete restoration. Over the years, the University of Wisconsin Arboretum has served as a training ground for restorationists and a focal point for the development of restoration as a discipline. It stands today as evidence that it is possible to reverse environmental destruction.

More recent restoration efforts also demonstrate the capacity for humans to reverse environmental degradation. One particularly

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15 A GYRC is not just a reincarnation of the Civilian Conservation Corps (CCC). Although the CCC of the 1930's made important contributions to our country, including treeplanting and other environmental projects, it does not serve as an adequate model for a GYRC. The CCC, created to alleviate unemployment hardships during the Depression, worked primarily on non-controversial activities such as building park infrastructures, firefighting, etc. True ecosystem restoration projects may share common themes with those of the CCC, but restoration as defined in this paper carries with it several requirements that will likely raise more controversy due to their holistic approach and future environmental management implications. Another difference between the two "corps" is that a GYRC is committed to employing people within the region's communities, whereas the CCC moved large numbers of people great distances which resulted in outsiders working on unfamiliar and faraway land. A GYRC will seek to complete visible, substantial restoration projects but it will also go a step further by attempting to influence the way people within the ecosystem's communities interact with, use, and understand their surrounding environment and each other.
A comprehensive and successful example is the large-scale watershed restoration effort at Redwood National Park in Northern California. There have been numerous other individual successful restoration projects and reports detailing new techniques, but through my research I have not found an existing ecosystem-based restoration effort such as one proposed as a Greater Yellowstone Restoration Corps. If restoration is to tackle large-scale environmental degradation and to really reach the heart of environmental problems, we must plan for it on ecosystem-based scales. In this way, individual projects prove even more powerful when they complement each other to work for a larger mission.

**Restoration as Cultural Ritual and Process**

Restoration may itself provide the basis for the rituals and narratives needed to achieve and maintain a sustainable relationship with nature.

Christopher C. Norden (1993)

Land-based communities, such as many within the Greater Yellowstone Ecosystem, have often sacrificed ecological integrity for immediate economic or legislative pressures based on little regard for long-term sustainability. As we work to restore parts of the ecosystem, we must always remember the strong link between social and environmental concerns and work to make a connection between ecological restoration and cultural change. Just as restoration has the capacity to set things back on course when

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16 Each summer a field seminar on watershed rehabilitation is presented at Redwood National Park in cooperation with Humboldt State University. Also, a number of park-published reports evaluate watershed rehabilitation progress and related research and monitoring programs. Many are available upon request. For more information, contact: Superintendent, Redwood National Park, 1111 Second Street, Crescent City, California, or telephone (707) 464-6101.

17 Restoration projects at the Pikes Peak Research Station and the Mountain Research Station have proven that the restoration of a formerly degraded ecosystem can help preserve biological diversity (Cairns 1988).
short-sightedness has muddied the waters, so can it facilitate the repair of human communities. Human communities, like their biotic counterparts, are dynamic, subject to change and different stages of development, sometimes even decline. Restoration can influence the direction of these communities by directly impacting their inhabitants. 18

This influence occurs because restoration offers the medium through which relationships can build and strengthen between individuals, communities, and with their natural world. "Above all, it keeps human beings in the picture, in intimate contact with nature, changing the landscape unapologetically as all creatures do, but with humility and an abiding respect for ourselves as well as for the rest of nature" (Jordan 1985). Restoration inherently expands our focus and encourages us to become other-centered -- to work for the welfare of others and for something greater, increasing our own welfare without focusing on it (Maser 1988). It also inevitably forces planners as well as workers to acknowledge their surrounding environments and communities.

"The key to and the value of restoration...is in the thought process it implies" (Maser 1988). Restoration entails putting something back. Because this process requires an exact understanding of what ecological structures and processes should be returned, the area must be carefully studied and understood. This examination encourages deeper awareness and insight into the structures, functions, and dynamics of an environment. This acquired knowledge illustrates the area's limits to human-caused stress and provokes discussion as to how past mistakes can be avoided in the future. As a process, restoration work engages people, touches them, and creates much more than

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18 There are many examples of successful community-based restoration projects. See Revel (1993) and Berger (1990).
a mere replication of a former state or lone product. It produces citizens who are deeply connected and committed to both their environmental and cultural landscapes.  

Embracing restoration as both an ecological and cultural ritual offers the opportunity to impact the Greater Yellowstone Ecosystem, human and other species' lives, and ultimately the world. However, we must realize that, like other significant cultural rituals, restoration takes time. This investment of time and commitment "is an eternal vigil...an act of hope and optimism" (Harker 1993).

**Restoration Goals**

The ideal of restoration is not to 'preserve' a static entity but instead to protect and nurture Nature's capacity to change (Falk in Harker 1993). As restoration aims to restore ecosystem integrity, it should use the past not as goal but as a reference point for the future. Ultimately, restoration seeks to return some degree of "naturalness" to an area-to return "natural" structures and functions to an area where they have been eliminated or have at least deteriorated.

We determine the naturalness of an area by measuring the impacts of human intrusion, development, and resource extraction as well as the ability of the system's structural and functional components to rebound from the impacts. What exactly does it mean to say an ecosystem is "natural" or "essentially intact"? Anderson (1991) proposes three indices of naturalness:

- The degree to which the system would change if (technological) humans were removed.

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19 For example, the Mattole River Restoration project has been described as "the essential first step in a concurrent process of social and economic transformation" (Nilsen 1991).
• The amount of cultural energy required to maintain the functioning of the system as it currently exists.

• The complement of native species currently in an area compared with the suite of species in the area prior to settlement.

Some argue that because humans are part of the natural world, there is no difference between disturbances caused by Nature and those by humans. Of course there is. Environmental disturbance is inevitable, and sometimes even desired, but our present concern should be with human disturbances whose impacts have been temporally narrow but spatially wide...the widespread nature and intensity of these disturbances threatens human and all life systems (Wali 1992).

Some environmentalists fear that restoration may be used as an argument against preservation of existing natural areas, as an excuse for destruction, destined to become the next corporate scapegoat (Westfall 1994). We can fight against these justifications by explaining that ecological restoration should only be understood as a last resort and compromise that seeks to make the best of a bad situation (Katz 1991). It is much better to aim for policy that prevents destruction in the first place; but, if degradation has happened, restoration can be positive as long it is acknowledged that a restored environment is never equal to a natural one. We can (and should) restore, preserve, and advocate simultaneously.

The issue of "control" is another concern raised regarding restoration. Higgs (1994a) warns that although restoration ecology (the ensemble of scientific practices that contribute to ecological restoration) can teach a lot about how ecosystems function, and therefore teach us how to manipulate them, we should never view this control as an end in itself. Restoration should not be motivated by the desire or ability to control but rather by
ecological and social considerations. Although the practice of restoration does imply human manipulation—it is not manipulation without respect and never for selfish gain. The ultimate goal of real restoration is a decline in the need for future restoration—not more opportunities to exhibit control.

As a process that yields tangible environmental benefits, restoration, combined with other political and land management initiatives, can be a key component to achieving long-term ecosystem sustainability. By working to restore natural processes and systems as well as to build common ground among diverse residents, restoration offers promise to influence both the human and ecological communities of the Greater Yellowstone Ecosystem.
CHAPTER 4
SCREENING AND RANKING CRITERIA FOR RESTORATION PROJECTS

Based on the previous discussion of restoration as a process to foster sustainable human and natural communities within the GYE, a Greater Yellowstone Restoration Corps (GYRC) should work on restoration projects designed to repair damage caused by humans to the diversity and natural processes of indigenous ecosystems and those designed to lead to the establishment of sustainable relationships between nature and culture. In other words, a GYRC restoration project must be ecologically sound and also provide meaningful work for people in GYE communities.

With both environmental and cultural emphases in mind, I have developed four screening criteria to help determine the suitability of proposed restoration projects for a GYRC. All projects must have these four screening criteria to be considered: 1) ecological importance and benefit; 2) clear and realistic goals; 3) agency commitment to protect restored area/assure sustainable use; and 4) potential to train and employ GYE residents.

Discussion of Screening Criteria

Ecological Importance and Benefit

To qualify as ecological restoration, a project must aim to benefit ecological systems, simply put, the environment. Examples of projects that might meet this criteria include those designed to: 1) protect and increase biodiversity/endangered species; 2) protect and expand critical habitat areas such as migratory corridors (important for genetic exchange and species survival); 3) restore the processes of natural succession and evolution that occur in wild, self-regulating systems; 4) protect and improve water and/or air...
quality; and 5) protect human and nonhuman health by removing toxic and other harmful materials.  

**Clear and Realistic Goals**

A project with the most ambitious promises will not be successful without clear and realistic goals. The goals should consider both the existing and desired condition of the area -- including both its structural and functional components. The overall driving objective should be to return the structures, functions, and associated environmental values that have been lost from the disturbance, not to return the area to some 'static' state or precondition. Finally, the project must have the potential to be successful which is important to accomplish the desired end goals as well as for the morale of all those involved.

**Agency Commitment to Protect Restored Area/Assure Sustainable Use**

"The purpose of restoration is to repair previous damage, not to legitimize further destruction" (Berger in Nilsen, 1991). This point cannot be overemphasized. A GYRC must ask and understand the agency's or private groups' motives for restoring an area and take precautions not to promote or encourage a philosophy that justifies or facilitates future degradation. A project should not be considered if it's being done simply to be "undone," for monetary profit or any other reason.

The agency or group submitting a project proposal must assure protection or sustainable use for the restored area. If the project area remains classified for some type of designated use, GYRC directors must determine if  

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20 In reality these benefits often complement one another.
adequate precautions are planned and if a sincere commitment to protect and/or guarantee sustainable use for the area exists.

Potential to Train and Employ GYE Residents

If the nation embraces a massive effort in ecological restoration which disregards its potential for social transformation, then, no matter how many trees are planted, species enhanced, or people employed, it will have missed its real goals.

Richard Nilsen (1991)

Grassroots restoration efforts prove most effective when they work to establish common purpose, destiny, and shared aesthetic experience within community members (Norden 1993). Part of the long-term success of a GYRC lies in a commitment to train and employ local (and regional) people. Involving local people in the process and physical work of restoration allows them a means to visibly alter their landscape in a direction opposite from what most of them have witnessed personally in the past. Employing the GYE's own residents to restore degraded parts of their environment also offers them a unique opportunity to build deeper connections with their surrounding natural communities as well as the chance to better understand how their own lives and decisions influence natural systems.

GYE residents have the power to provide and generate political and public pressure within their communities as well as on state and national levels. Restoration can offer a medium through which a community's political discourse begins to change, or at least expand. Past efforts illustrate that restoration can help workers to develop ownership, pride, and the desire to protect a particular project area, as well as other surrounding areas. In other words, choosing to employ local people to restore a nearby area creates a
population "whose identity has been extended to include their habitat" (Nilsen 1991). These human and political transformations will not appear overnight and may not even after a single restoration project, but they will happen over time (Nilsen 1991).

**Ranking System to Prioritize GYRC Restoration Projects**

In addition to the four screening criteria, I have chosen to use the following three "ranking criteria" to determine a project's environmental and cultural significance: 1) severity of degradation; 2) scope of degradation/scope of restoration; and 3) effort to incorporate outreach and education.  

**Discussion of Ranking Criteria**

**Severity of Degradation**

The severity of degradation describes the seriousness of degradation with respect to its impact on the ecosystem's natural and/or human communities. Some questions for GYRC planners to ask to determine severity include: To what extent have an area's structures and functions been altered as a result of disturbance? Would delaying restoration exaggerate the problem(s)? Does the area pose an existing or immediate health threat?

I use the following scale to score the severity of degradation:

1=Low Severity

2=Moderate Severity

3=High Severity

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21 Financial and other organizational logistics remain important but should never motivate or justify project acceptance.
Scope of Degradation/Scope of Restoration

The first thing we learned from salmon was the importance of the watershed as a unit of perception... The salmon were telling us we were going to have to understand them as an integral part of their habitat, and that habitat was the entire watershed, extending all the way to the ridgelines above us, including the human settlements.

Freeman House (1991)

This category attempts to understand how the scope of the planned restoration effort will address/account for the scope (extent) of degradation. I have made the assumption that a project which seeks to tackle the breadth and/or depth of the degradation proves more desirable than one which confronts only a segment, or symptom, of the problem. This does not imply that more localized restoration efforts cannot produce environmental and cultural benefits, especially the latter. However, while restoration of many small sites can serve as a beginning and even important part of a larger restoration effort, without coordination aimed at tackling larger problems, the individual project successes will be temporary and therefore unsatisfactory (Cairns 1988).

It is important to understand how local decisions and restoration efforts affect the larger ecosystem, in this case, the Greater Yellowstone Ecosystem. Yet, grandiose planning must not delay projects forever, replacing actual work with mere paperwork. Questions for GYRC planners to ask include: Is the project planned with more of a "localized" or "landscape" approach? What is the character of the surrounding area? How is the project area affected by its surroundings, including resource activities, degradation, and intact areas?

I use the following scale to score the relationship between the scope of degradation and that of the proposed restoration effort:
1=Scope of restoration project does little to address scope of degradation

2=Scope of restoration project acknowledges and attempts to address larger landscape dynamics and influences on site

3=Scope of restoration project corresponds well to scope of degradation and/or is part of a larger restoration effort

Technically, we could say that all proposed GYRC projects deserve the highest score (3) because they would serve as part of a larger, ecosystem-based restoration effort. However, due to the sheer size of the GYE, GYRC planners must view these projects with respect to the context of their surrounding landscapes- always keeping in mind their ultimate relevance to the ecosystem as a whole.

Effort to Incorporate Outreach and Education

It is here that I now see the greatest value of restoration— not in its ability to transform the landscape (or at least not only in that), but in its ability to transform it indirectly through the education and transformation of the human beings who inhabit and shape it.

William Jordan III (1991)

As discussed throughout this paper, ecological restoration does not occur in a sterile scientific laboratory or social vacuum. We must acknowledge and approach restoration for what it is- an engaging process that extends far beyond technological practice and provides an often forgotten link between culture and nature. Restoration offers the ability to transform both individuals and landscapes, as well as presents an opportunity to form new alliances between diverse residents. However, this transformation will not happen automatically and must be facilitated by the planners and other
leaders' efforts for outreach and education within the ecosystem's communities.

Restoration efforts can take various forms and approaches and should be planned with a background knowledge of the constituency and economic and social issues facing each community. Examples of groups to target include: watershed councils, planning boards, schools (public and private serving all ages, vo-techs, junior colleges, universities, other), 4-H and FFA (Future Farmers of America) clubs, service organizations such as Rotary and Kiwanis Clubs, women's groups, senior citizens, group homes for at-risk youth and others, and other local/regional organizations within the ecosystem's communities. 22

When doing outreach and education, GYRC planners should acknowledge and, when possible, incorporate the whole process of restoration into projects- including the initial data collection and planning, implementation, and monitoring. Planners should also develop curriculum to analyze and integrate a project's substantive issues with corps members' everyday lives. Questions to raise and discuss include:

• What is the nature of the degradation? What has been harmed or lost?

• What caused the degradation? This may include the actual physical impact, decisions made, and values acted upon, etc.

• Can it be avoided in the future? If so, how? If not, why not?

• Do I think it should be avoided in the future?

• Are there any alternatives to implement and advocate?

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22 To learn more about a successful restoration program involving the public school system, contact Donn Kesselheim, ConServe Wyoming, (307) 332-6518; Wyoming Riparian Association, Pheasant Run Drive, Lander, WY 82520.
• Realizing the collective power of groups, is there anything my group or community can do to prevent future degradation and protect this area as well as other surrounding vulnerable areas?

• How can I as an individual work to prevent future degradation and protect this area, as well as other surrounding vulnerable areas?

I use the following scale to score the effort to incorporate community outreach and education:

1 = Minimal effort has been made to incorporate outreach/education
2 = Moderate effort has been made to incorporate outreach/education
3 = Significant effort has been made to incorporate outreach/education (For ex. It has been incorporated into project plans and/or is championed by an enthusiastic staff representative.)

Screening and Ranking of Restoration Projects

I used these screening and ranking criteria to review specific project proposals submitted by survey respondents to identify and prioritize appropriate projects for a Greater Yellowstone Restoration Corps (see Appendix B). First, I eliminated those projects that did not meet the four "screening criteria." Those proposals that did, I then scored from 1 (low) to 3 (high) for each of the "ranking criteria." To determine the final score for each project, I totaled the individual scores and then divided this number by the total number of categories scored. (For example, if a project was scored 3-2-2, I added 3+2+2 to get 7, and then divided 7 by 3 to get a final score of 2.3.)

The screening and ranking criteria proved helpful in assessing proposed restoration projects. However, the criteria will be more useful in

23 In some cases, one of the ranking criteria may not be known at the time of analysis. If the necessary information cannot be obtained, then add the two scores known and divide by two. At least two ranking criteria scores should be known for project consideration.
future project solicitation efforts because agency representatives will be asked
to justify each "screening criteria" and score each "ranking criteria." GYRC
planners will also share involvement in this process (see Appendix G).
CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

The purpose of my paper was to identify ecologically-appropriate restoration projects for a Greater Yellowstone Restoration Corps (GYRC) that could reverse past environmental degradation while providing meaningful and long-term work for residents of the Greater Yellowstone Ecosystem (GYE). I worked with the Greater Yellowstone Coalition (GYC) and the Montana Conservation Corps (MCC) to: 1) assess the needs and interest for restoration on the public lands within the GYE by soliciting project proposals by mail, telephone, and personal correspondence; 2) establish a working definition of restoration for a GYRC; 3) develop appropriate criteria to evaluate restoration project proposals; 4) apply criteria to proposed projects to identify potential GYRC restoration projects; 5) develop a ranking system to prioritize both present and future GYRC restoration projects; and 6) make recommendations for how a GYRC might use restoration as a strategy to establish common ground within a polarized region and protect ecosystem health.

I found a need for comprehensive ecosystem-based management and restoration planning in the GYE. A Greater Yellowstone Restoration Corps (GYRC) presents an ecosystem-wide initiative that can begin to address this need, in working to unite diverse residents and agency representatives to work for their common ground-the health of the land which supports them. As a process that aims to engage the polarized residents of the GYE to provide ecological benefits, restoration offers a starting point to develop new relationships between culture and nature -- in the Greater Yellowstone Ecosystem.
Because GYRC planners recognize the connection between environmental and social problems and seek to work for a common solution, a GYRC can play a key role in a larger vision of reaching and maintaining sustainability for the ecosystem’s human and nonhuman inhabitants. Not a mandate from Washington, or even from Helena, the creation of a GYRC stems from the energy and ideas of local residents who want to work at the community level to engage the people of the ecosystem in substantial restoration projects. In a world with large-scale environmental problems, personal experience with restoration work offers the opportunity for individuals to interact both directly and personally with Nature. As people work to reverse damage to an area, they will become immediately invested in working for an improved environment, without ever signing a petition or attending a rally. Those steps will come next, but there must first be a transition.

For most people in the GYE this transition will not happen quickly, or without resistance. Furthermore, it will never happen unless they are allowed a bridge, built from personal experience, to provide a change of perspective and the ability to traverse at their own speed. Restoration work offers the framework to build this bridge, by teaching environmental vulnerability, complexity, and balance through experience and by demonstrating the devastating repercussions of past resource-based practices through personal observation. For many workers, from youth to agency staff, restoration work has the potential to plant seeds for an environmental ethic whose roots will extend far beyond a specific project.

In sum, a GYRC offers opportunities to benefit all life that depends on the ecosystem for survival — by actively involving those inhabitants who know it best. Based on the acknowledgment that personal experiences shape
people's actions on personal, professional, and political levels, a GYRC will work with people rather than alienate them. It will provide employment opportunities for local residents, including past resource-extractive workers, that should remain for many years (given the attainment of adequate funding, preferably from private sources). Finally, implementation of a GYRC fits into the larger vision of ecosystem management which emphasizes environmental values other than those based on resource extraction.

However, for restoration to move beyond this starting point, and reach its promise for all GYE communities, the following must happen. A GYRC must:

1. Provide a consistent vision of restoration.

Because agency interpretations have proven inconsistent, GYRC planners must initiate this dialogue with ecosystem agencies and communities by bringing people together to discuss restoration goals and project planning. GYRC planners must always guard against agencies trying to get cheap labor for projects with improper motives -- projects that, if implemented, would work against GYRC's substantive ecological and cultural goals.

2. Foster community involvement and investment.

To achieve tangible and far-reaching environmental and societal benefits for the Greater Yellowstone Ecosystem's natural and human communities, hands-on restoration work must be accompanied by extensive community outreach. In other words, we must "avoid the inconsistency of accepting ecological restoration as a revolutionary practice on one hand, but be unwilling to engage provocative political discourse on the other" (Higgs
GYRC planners must work creatively to involve various constituents and groups of GYE communities in restoration by initiating town meetings, workshops, demonstration projects, etc. They must saturate and educate the diverse and polarized communities about environmental degradation and the economic realities facing their ecosystem, about defining restoration and its subsequent management implications, and about the value in and need to establish sustainable interactions with their exceptional landscape.  

3. Develop model community demonstration projects.

When trying to change cultural practices and political views, GYRC planners must start small and target approaches with potential for success. Initial planning efforts should develop model demonstration restoration projects in a few GYE communities—ideally, at least one in each of the three states of Idaho, Montana, and Wyoming. To determine specific communities most suitable for model demonstration projects, planners should focus on those with existing organizational groups, such as the Henry’s Fork’s Watershed Council, Teton Economic Development Council, and the Wind River Reservation’s Green Earth Corps. Planners should also work to involve agency offices with proven commitment to community outreach, such as the Kemmerer Ranger District of the Bridger-Teton National Forest.

Efforts should also be concentrated in geographic areas with "clusters" of interest and cooperation from agency and community leaders.

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24 They must also be prepared to handle those who object to restoration on the grounds that it will make resources less available for extraction.
25 For further information, council participant list, watershed matrices inventory, etc. contact Janice Brown, Executive Director at P.O. Box 61, Island Park, ID 83429; Phone # (208) 558-9041; Fax # (208) 558-9041.
26 For further information, contact Richard Clark at (208) 356-2026.
27 For further information, contact Leona Buckman at (307) 332-6228.
28 For further information regarding the Kemmerer Middle School Demonstration Project and other community outreach efforts, contact George Walker at (307) 877-4415.
One GYE "cluster" area with significant potential for cooperation is the Lander Area (Wyoming). Here, positive responses and expressed interest were received from the BLM Lander Resource Area, Wind River Indian Reservation, Wyoming DEQ, and Popo Agie Conservation District. (The Washakie Ranger District of the Shoshone National Forest, in Lander, also expressed interest in future cooperation.) Other state and federal programs may complement a GYRC effort, such as Idaho's Gem Communities Program. Sponsored by the Idaho State Department of Commerce and founded on the belief in the importance of local community investment, it assists community efforts to diversify local economies and encourages grassroots planning by offering matching state grants for specific projects designed for these purposes.

4. Incorporate resource-extractive workers.

Restoration presents the opportunity for past (and present) resource-extractive workers to use their knowledge of the land and technical skills to benefit the environment while broadening their historic perspective of the natural world. Although this may be a difficult transition for some, both the ecosystem's human and natural communities stand to gain by forming this rare alliance.

With these recommendations in mind, a Greater Yellowstone Restoration Corps (GYRC) can work to assure that both "native" biological and human populations survive, prosper, and remain healthy inhabitants of the GYE. The success of a GYRC lies in actively involving the diverse residents of the GYE, keeping a firm ecological commitment, and providing a consistent vision for the practice of restoration. This vision of restoration
does not remove humans from their environment, but rather encourages, and demands, that they interact directly and personally with it. Creating a GYRC represents a first step in determining whether "ecological restoration can provide the base for rural and urban communities [in this case, of the GYE] to create, organize, and maintain sustainable communities" (Westfall 1994).
APPENDIX A – Rare, Threatened and Endangered Species in Greater Yellowstone (Glick et al. 1991)

Case Study: Rare, Threatened and Endangered Species in Greater Yellowstone

The Endangered Species Act, passed by Congress in 1973, provides a program for the conservation of threatened and endangered species as well as a means to protect the ecosystems upon which such species depend. According to the U.S. Fish and Wildlife Service, an endangered (E) species is any species in danger of extinction throughout all or a significant portion of its range. A threatened (T) species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Species may also be designated as candidate species if available data suggest that T & E designation is appropriate or if additional data are needed to verify suspected threatened status.

Other management agencies employ different terminology to identify the status of rare species. The U.S. Forest Service maintains a list of sensitive species for which there are significant current or predicted downward trends in population numbers, density, or habitat capability. The states of Idaho and Montana have lists of species of special concern, while in Wyoming, rare species are placed into one of three priority classes according to the available data on each species’ population status, distribution, habitat status and sensitivity to disturbance. The Nature Conservancy uses a more complex numerical ranking (1-5) to indicate a species’ relative rarity at the global (G), national (N), and state (S) levels. Definitions of each of these classifications are provided below.

It is encouraging that state and federal agencies have developed systems to classify rare species. However, the non-uniformity of the various classification systems can undermine the potential for cohesive management when a species’ formal status changes abruptly at administrative boundaries. In addition, many of these species still lack recovery programs.

Codes used in Table 1

A. Endangered Species Act status
1. LE: listed as endangered species
2. LT: listed as threatened species
3. C2: being considered for listing as endangered or threatened but lacking conclusive data on biological vulnerability

B. U.S. Forest Regional lists: indicates species listed as sensitive in Northern Region (R1) or Intermountain Region (R4). Sensitive species list for Rocky Mountain Region (R2) not available.

C. State Designations (note: The Nature Conservancy rankings are given first; state agency rankings follow slash. Montana Fish, Wildlife and Parks list was under revision and not available at publication time.)

1. Nature Conservancy Heritage Program rankings
   a. S1: critically imperiled; extreme rarity or special vulnerability
   b. S2: imperiled because of rarity or vulnerability
   c. S3: rare or uncommon
   d. S4: apparently secure, with many occurrences
   e. SE: endangered within the state
   f. SH: of historical occurrence; formerly part of established biota
   g. SU: possibly in peril but status uncertain; need more information

2. State game agency rankings
   a. Idaho
      1) SSC: species of special concern; native species either low in numbers, limited in distribution, or having suffered significant habitat losses. Bird and mammal SSC species divided into three categories:
      A: priority species; Idaho contains or formerly constituted a significant portion of the species’ range
      B: peripheral species; Idaho is on edge of breeding range
      C: undetermined status; may be rare in Idaho but data lacking
      2) T&E: threatened or endangered in Idaho
   b. Wyoming
      1) Priority 1: active management required to avoid extirpation or significant decline in breeding population
      2) Priority 2: need additional study to determine if intensive management is warranted
      3) Priority 3: knowledge too limited for adequate evaluation.
### Rare, Threatened and Endangered Vertebrate Animals in Greater Yellowstone

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<td>C2</td>
<td>—</td>
<td>S2/—</td>
</tr>
<tr>
<td>Trumpeter swan</td>
<td>—</td>
<td>R1,R4</td>
<td>S1/A S2</td>
</tr>
<tr>
<td>Harlequin duck</td>
<td>C2</td>
<td>R1,R4</td>
<td>S1/A S2</td>
</tr>
<tr>
<td>Ferruginous hawk</td>
<td>LE</td>
<td>R1</td>
<td>S3/A S3</td>
</tr>
<tr>
<td>Bald eagle</td>
<td>LE</td>
<td>R1,R4</td>
<td>S3/T&amp; E S3</td>
</tr>
<tr>
<td>Peregrine falcon</td>
<td>LE</td>
<td>R1,R4</td>
<td>S1/T&amp; E S1</td>
</tr>
<tr>
<td>Merlin</td>
<td>—</td>
<td>—</td>
<td>S1/B S3?/2</td>
</tr>
<tr>
<td>Whooping crane</td>
<td>LE</td>
<td>R1,R4</td>
<td>SE/T&amp; E SH S1</td>
</tr>
<tr>
<td>Mountain plover</td>
<td>C2</td>
<td>—</td>
<td>S3/— S3</td>
</tr>
<tr>
<td>Longbilled curlew</td>
<td>C2</td>
<td>—</td>
<td>S3/— S4</td>
</tr>
<tr>
<td>Upland sandpiper</td>
<td>—</td>
<td>—</td>
<td>S1/A S2/2</td>
</tr>
<tr>
<td>Burrowing owl</td>
<td>—</td>
<td>—</td>
<td>S4/— S3</td>
</tr>
<tr>
<td>Great gray owl</td>
<td>—</td>
<td>R4</td>
<td>S2/C S3</td>
</tr>
<tr>
<td>Boreal owl</td>
<td>—</td>
<td>R1,R4</td>
<td>S2/A S3</td>
</tr>
<tr>
<td>Pileated woodpecker</td>
<td>—</td>
<td>—</td>
<td>—/—</td>
</tr>
<tr>
<td>Blackbacked woodpecker</td>
<td>—</td>
<td>—</td>
<td>—/—</td>
</tr>
<tr>
<td>Three-toed woodpecker</td>
<td>—</td>
<td>R4</td>
<td>S3?/C S3</td>
</tr>
<tr>
<td>Pygmy nuthatch</td>
<td>—</td>
<td>—</td>
<td>S3?/C S4</td>
</tr>
<tr>
<td><strong>Reptiles and Amphibians</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spotted frog</td>
<td>—</td>
<td>—</td>
<td>—/—</td>
</tr>
<tr>
<td><strong>Mammal Species</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Dwarf shrew</td>
<td>—</td>
<td>—</td>
<td>S3/2</td>
</tr>
<tr>
<td>Pygmy shrew</td>
<td>—</td>
<td>—</td>
<td>S1/C S1?/—</td>
</tr>
<tr>
<td>Preble’s shrew</td>
<td>C2</td>
<td>—</td>
<td>S1/C S1/3</td>
</tr>
<tr>
<td>Fringed myotis</td>
<td>—</td>
<td>—</td>
<td>S1?/C S2 SU/3</td>
</tr>
<tr>
<td>California myotis</td>
<td>—</td>
<td>—</td>
<td>S1?/C S2 SU/3</td>
</tr>
<tr>
<td>Spotted bat</td>
<td>C2</td>
<td>R1,R4</td>
<td>SH/C S1</td>
</tr>
<tr>
<td>Townsend’s big-eared bat</td>
<td>C2</td>
<td>R1,R4</td>
<td>S2/C S2</td>
</tr>
<tr>
<td>Uinta chipmunk</td>
<td>—</td>
<td>—</td>
<td>S1?/B S3?</td>
</tr>
<tr>
<td>Gray wolf</td>
<td>LE</td>
<td>R1,R4</td>
<td>S1/T&amp; E S1</td>
</tr>
<tr>
<td>Grizzly bear</td>
<td>LT</td>
<td>R1,R4</td>
<td>S1/T&amp; E S3</td>
</tr>
<tr>
<td>American marten</td>
<td>—</td>
<td>—</td>
<td>—/—</td>
</tr>
<tr>
<td>Fisher</td>
<td>—</td>
<td>R4</td>
<td>S1/A S2</td>
</tr>
<tr>
<td>Wolverine</td>
<td>C2</td>
<td>R1,R4</td>
<td>S2/A S4</td>
</tr>
<tr>
<td>River otter</td>
<td>—</td>
<td>—</td>
<td>S4/—</td>
</tr>
<tr>
<td>Mountain lion</td>
<td>—</td>
<td>—</td>
<td>—/—</td>
</tr>
<tr>
<td>Lynx</td>
<td>C2</td>
<td>R4</td>
<td>SU/B S3</td>
</tr>
</tbody>
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<th>Duration/People Power Required</th>
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<tr>
<td><strong>Beaverhead National Forest</strong></td>
<td></td>
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</tr>
<tr>
<td>Westfork/Buford Riparian Restoration (1996)</td>
<td>Madison RD Ron Schott (406) 682-4253</td>
<td>Build 1 mile fence to protect upper Buford Creek. Plant willows.</td>
<td>3</td>
<td>2</td>
<td>2.5</td>
<td>Requested funding: Equipment 3,000 Labor 5,000 Total 8,000</td>
<td>10 days for 1 crew **</td>
</tr>
<tr>
<td>Westfork/Landon Restoration (1996)</td>
<td>Madison RD Ron Schott (406) 682-4253</td>
<td>Build fence and plant willows along 1/2 mile of the westfork of the Madison River.</td>
<td>3</td>
<td>2</td>
<td>2.5</td>
<td>Requested funding: Equipment 2,000 Labor 3,000 Total 5,000</td>
<td>5-7 days for 1 crew</td>
</tr>
<tr>
<td>Gorge Creek Headcut and Gully Restoration (1997)</td>
<td>Madison RD Ron Schott (406) 682-4253</td>
<td>Rip rap gully with natural material.</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>Requested funding: Equipment 1,000 Labor 4,000 Total 5,000</td>
<td>5-10 days for 1 crew; Also some other small projects in area</td>
</tr>
<tr>
<td>Spring Branch Riparian/Fish Habitat Improvement (1997)</td>
<td>Madison RD Ron Schott (406) 682-4253</td>
<td>Build fence and plant willows along 3/4 mile of stream. Rock harden 2 stream crossings.</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>Requested funding: Equipment 2,000 Labor 4,000 Total 6,000</td>
<td>10 days for 1 crew</td>
</tr>
<tr>
<td>Cottonwood RNA Protection (1997)</td>
<td>Madison RD Ron Schott (406) 682-4253</td>
<td>Reconstruct fences to exclude livestock from Research Natural Area of ARTTSA/FESID habitat (160 acres).</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>Requested funding: Equipment 12,000 Labor 12,000 Total 24,000</td>
<td>4 weeks for 1 crew</td>
</tr>
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*Scoring: 1-low; 2-moderate; 3-high  
**1 crew = 8-10 people
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<th>Effort to Incorporate Outreach &amp; Education</th>
<th>Score</th>
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<tbody>
<tr>
<td>Tobacco Root Aspen Regeneration (1998)</td>
<td>Madison RD Ron Schott (406) 682-4253</td>
<td>Regenerate aspen on 300 acres by burning, cutting, and fencing.</td>
<td>Benefit to all aspen-associated species.</td>
<td>2</td>
<td>2</td>
<td>?</td>
<td>2</td>
<td>Requested funding: Equipment 2,000 Labor 8,000 Total 10,000</td>
<td>4 weeks for 1 crew</td>
</tr>
<tr>
<td>Bridger-Teton National Forest</td>
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<tr>
<td>Spring Creek Exclosure/La Barge Watershed Restoration (1995)</td>
<td>Kemmerer RD George Walker (307) 877-4415</td>
<td>Construct 1 mile of 4-wire, barb wire fence around 2 spring areas at the headwaters of Spring Creek to alleviate livestock trampling</td>
<td>Protection of habitat for a population of native, genetically-pure cutthroat trout; Enhancement of water quality.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Equipment and Supplies (3,000) provided Labor- 2,500 (can cost-share)</td>
<td>2 weeks for 1 crew</td>
</tr>
<tr>
<td>Big Fall Creek Exclosure/La Barge Watershed Restoration (1995)</td>
<td>Kemmerer RD George Walker (307) 877-4415</td>
<td>Construct 1/2 mile of buck and rail fence to exclude livestock from aquatic and riparian habitats.</td>
<td>Protection of travertine terraces and a series of falls; Increased streambank stability.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Equipment and Supplies (500) provided Labor- 2,500 (can cost-share)</td>
<td>2 weeks for 1 crew</td>
</tr>
<tr>
<td>Granite Creek Trail Maintenance</td>
<td>Jackson RD Dave Cunningham (307) 739-5413</td>
<td>Maintain wilderness trail and decrease environmental impact through waterbar installation, tread work, and minor relocations.</td>
<td>Reduced impact and erosion associated with trail existence/use in Gros Ventre Wilderness.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Equipment and Supplies provided Labor- 2,000</td>
<td>1 crew for 1-2 weeks</td>
</tr>
</tbody>
</table>

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**1 crew = 8-10 people
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<thead>
<tr>
<th>PROJECTIONS</th>
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<th>Severity of Degradation (1-3) *</th>
<th>Scope of Degradation/Restoration (1-3) *</th>
<th>Effort to Incorporate Outreach &amp; Education (1-3) *</th>
<th>Score</th>
<th>Cost of Project/Availability of Funding</th>
<th>Duration/People Power Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystal Creek Trail Maintenance</td>
<td>Jackson RD Dave Cunningham (307) 739-5413</td>
<td>Maintain wilderness trail and decrease environmental impact through waterbar installation, tread work, minor relocations, and construction of single log foot bridges.</td>
<td>Reduced impact and erosion associated with trail existence/use in Gros Ventre Wilderness.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Equipment and Supplies provided</td>
<td>1 crew for 2-3 weeks</td>
</tr>
<tr>
<td>Dry Fork Trail Maintenance</td>
<td>Jackson RD Dave Cunningham (307) 739-5413</td>
<td>Maintain wilderness trail and decrease environmental impact through waterbar installation and tread work.</td>
<td>Reduced impact and erosion associated with trail existence/use in Gros Ventre Wilderness.</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2.7</td>
<td>Equipment and Supplies provided</td>
<td>Labor- 1,500</td>
</tr>
<tr>
<td>Turquoise Lake Campsite Restoration</td>
<td>Jackson RD Dave Cunningham (307) 739-5413</td>
<td>Perform campsite restoration; Break up compaction, transplant plugs of plants, install checkdams, and cover sites with debris and matting.</td>
<td>Reduced impact and erosion associated with degraded campsite in Gros Ventre Wilderness.</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2.7</td>
<td>Equipment and Supplies provided</td>
<td>Labor- 1,000</td>
</tr>
<tr>
<td>Chateau and Brewster Lake Campsite Restoration</td>
<td>Jackson RD Dave Cunningham (307) 739-5413</td>
<td>Perform campsite restoration; Break up compaction, transplant plugs of plants, install checkdams, and cover sites with debris and matting.</td>
<td>Reduced impact and erosion associated with degraded campsite in Gros Ventre Wilderness.</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2.7</td>
<td>Equipment and Supplies provided</td>
<td>Labor- 1,000</td>
</tr>
</tbody>
</table>

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<tbody>
<tr>
<td>Caribou National Forest</td>
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<tr>
<td>Diamond Creek -- Bear and Stewart Creek Channel and Riparian Restoration (1995-1996)</td>
<td>Soda Springs RD Don Luhrsen (208) 547-4356</td>
<td>Place cattle deterring structures and plant willows and other riparian plants to stabilize and improve banks. Project area includes two 1/4 mile sections of treated streambanks and 10 acres of riparian riparian planting.</td>
<td>Improved water quality and fisheries habitat. Diamond Creek is a stream segment of concern as it is a major spawning tributary for cutthroat trout.</td>
<td>3</td>
<td>3</td>
<td>?</td>
<td>3</td>
<td>Requested funding: 95- 3,000 96- 1,000 Total 4,000</td>
<td>1 crew for 1 week</td>
</tr>
<tr>
<td>Jacknife Creek Fish Habitat Restoration (1996-1997)</td>
<td>Soda Springs RD Don Luhrsen (208) 547-4356</td>
<td>Build 1 mile fence, plan riparian species on 20 acres (2 miles of the most degraded reaches), and construct 5 bank revetment structures to stabilize streambanks and allow area to recover from extensive over-grazing.</td>
<td>Improved water quality, fine-spotted cutthroat trout habitat, and wildlife riparian habitat.</td>
<td>3</td>
<td>3</td>
<td>?</td>
<td>3</td>
<td>Requested funding: Total- 10,500</td>
<td>1 crew for 1 week</td>
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</tbody>
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<th>Score</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Tincup Creek Fish Habitat Restoration (1997-1998) *</td>
<td>Soda Springs RD Don Luhrsen (208) 547-4356</td>
<td>Build 1/2 mile fence, plant willows on 20 acres, and construct 5 bank revetment structures to stabilize streambanks and allow area to recover from extensive over-grazing. Place interpretive signs along Tincup Scenic Byway.</td>
<td>Improved water quality, fine-spotted cutthroat trout habitat, and wildlife riparian habitat.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Requested funding: Total- 8,500</td>
<td>1 crew for 4 months</td>
</tr>
<tr>
<td>Stump Creek Fish Habitat Restoration (1998)*</td>
<td>Soda Springs RD Don Luhrsen (208) 547-4356</td>
<td>Build 1 mile fence, plant riparian species on 10 acres, and construct 5 bank revetment structures to stabilize streambanks and allow area to recover from extensive over-grazing. (Agency is working to extend scope of project.)</td>
<td>Improved water quality, fine-spotted cutthroat trout habitat, and wildlife riparian habitat.</td>
<td>3</td>
<td>3</td>
<td>?</td>
<td>3</td>
<td>Requested funding: Total- 8,000</td>
<td>1 crew for 4 months</td>
</tr>
<tr>
<td>McCoy Creek Channel Restoration -- Below Caribou Basin Guard Station (Project on hold due to mining conflicts)</td>
<td>Soda Springs RD Don Luhrsen (208) 547-4356</td>
<td>Recontour stream (remove tailings piles) to allow meandering and restore a functioning, 10-acre floodplain.</td>
<td>Restored valley floodplain with a large riparian area; Improved fine-spotted cutthroat habitat.</td>
<td>3</td>
<td>3</td>
<td>?</td>
<td>3</td>
<td>Requested funding: Total- 21,000 (for 2 years)</td>
<td>1 crew for 2 summers</td>
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<th>Effort to Incorporate Outreach &amp; Education (1-3) *</th>
<th>Score</th>
<th>Requested funding: Total-</th>
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<tbody>
<tr>
<td>McCoy Creek Riparian and Fish Habitat Restoration -- O&amp;G Camp to Iowa Creek (Project on hold due to mining conflicts)</td>
<td>Soda Springs RD Don Luhrs  (208) 547-4356</td>
<td>Plant 20 acres of riparian species and construct 25 bank stability structures to speed stream system and riparian habitat recovery.</td>
<td>Improved health of stream system and riparian habitat.</td>
<td>3</td>
<td>3</td>
<td>?</td>
<td>3</td>
<td>17,000 (for 2 years)</td>
<td>1 crew for 2 summers</td>
<td></td>
</tr>
<tr>
<td>Gallatin National Forest</td>
<td>Bozeman RD Wally McClure (406) 587-6920</td>
<td>Improve fish habitat by planting willows and fencing lower reach of Willow Creek. Establish 10-15 pool habitats to restore Yellowstone cutthroat trout populations.</td>
<td>Increased quality/quantity of fisheries habitat and riparian vegetation to improve summer hiding/security cover and overwintering capability of a genetically pure population of Yellowstone cutthroat trout (sensitive species).</td>
<td>3</td>
<td>3</td>
<td>?</td>
<td>3</td>
<td>10,000</td>
<td>1 crew for 10 days</td>
<td></td>
</tr>
<tr>
<td>Hyalite Creek Large Woody Debris Reintroduction (1996)</td>
<td>Bozeman RD Wally McClure (406) 587-6920</td>
<td>Deliver woody debris to a 2,500 foot reach of creek to restore presence of Large Woody Debris (LWD) and associated pool habitat types.</td>
<td>Fisheries habitat improvement. (LWD contributes to both the physical and biological integrity of salmonid streams.)</td>
<td>3</td>
<td>3</td>
<td>?</td>
<td>3</td>
<td>2,000</td>
<td>1 crew for 5 days</td>
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<th>Effort to Incorporate Outreach &amp; Education (1-3) *</th>
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<th>Cost of Project/ Availability of Funding</th>
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<tbody>
<tr>
<td>Lick Creek Westslope Cutthroat Trout Habitat/ Hyalite Watershed Restoration (1995-1996)</td>
<td>Bozeman RD Wally McClure (406) 587-6920</td>
<td>Establish pool habitats to restore westslope cutthroat trout populations. Riparian planting and road closures/obliteration also planned.</td>
<td>Improved fisheries habitat for westslope cutthroat trout (sensitive species) populations. Decreased erosion and run-off.</td>
<td>3</td>
<td>3</td>
<td>?</td>
<td>3</td>
<td>Requested funding: Total- 7,000</td>
<td>1 crew for 3 weeks for 2 summers (More work depending on available funding)</td>
</tr>
<tr>
<td>Bureau of Land Management</td>
<td></td>
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<tr>
<td>South Pass Area Abandoned Mine Inventory (1995-1999)</td>
<td>Lander RA Fred Georgesman, Sue Oberlie (307) 332-7822</td>
<td>Inventory and prioritize abandoned gold and uranium mines for future reclamation. Cooperative effort between BLM and Wyoming Department of Environmental Quality.</td>
<td>Restoration/ Reclamation of abandoned mines and tailings; Improved water quality; Decreased threat to human health.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Committed funding from Abandoned Mine Lands Program. Estimated cost of 40,000/year.</td>
<td>1-2 crews from May-October for 4-5 years.</td>
</tr>
<tr>
<td>Grays Lake National Wildlife Refuge</td>
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<table>
<thead>
<tr>
<th>PROJECTS</th>
<th>Agency/Contact Person</th>
<th>Brief Project Description</th>
<th>Benefit to Environment</th>
<th>Severity of Degradation</th>
<th>Scope of Degradation/Restoration</th>
<th>Effort to Incorporate Outreach &amp; Education</th>
<th>Score</th>
<th>Cost of Project/Availability of Funding</th>
<th>Duration/People Power Required</th>
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</thead>
<tbody>
<tr>
<td>Willow Planting/Restoration (1995)</td>
<td>M. Fisher (208) 574-2775</td>
<td>Plant willows in 4 sites to restore native willow community lost to grazing. Entering year 3 of project, with 3-5 more years expected.</td>
<td>Restored native willow community; Improved riparian habitat.</td>
<td>2</td>
<td>3</td>
<td>?</td>
<td>2.5</td>
<td>To complete project: Labor-140 hours + Tools 100 Fuel 300 Total 400</td>
<td>140 hours. Approx. 1 crew for 1 week for 2 years</td>
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<tr>
<td>Wind River Indian Reservation</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Big Windy River Riparian Fencing</td>
<td>Office of Tribal Water Engineer Preston Smith (307) 332-3164</td>
<td>Fence 10-12 miles along river to remove cattle.</td>
<td>Increased water quality; Decreased erosion of streambank.</td>
<td>3</td>
<td>2</td>
<td>?</td>
<td>2.5</td>
<td>? (Efforts to coordinate with USFWS)</td>
<td>?</td>
</tr>
<tr>
<td>Willow Replanting Project</td>
<td>Wind River Env. Quality Division Don Aragon (307) 332-7579</td>
<td>Plant willows on several riparian areas to restore willow community lost to over-harvesting for ceremonial purposes. Implement rules moderating future harvest.</td>
<td>Restored native willow community; improved riparian habitat</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>?</td>
<td>1 crew for 1-2 summers</td>
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</table>

*Scoring: 1=low; 2=moderate; 3=high

**1 crew = 8-10 people
<table>
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<tr>
<th>PROJECTS</th>
<th>Agency/Contact Person</th>
<th>Brief Project Description</th>
<th>Benefit to Environment</th>
<th>Severity of Degradation (1-3) *</th>
<th>Scope of Degradation/Restoration (1-3) *</th>
<th>Effort to Incorporate Outreach &amp; Education (1-3) *</th>
<th>Score</th>
<th>Cost of Project/Availability of Funding</th>
<th>Duration/People Power Required</th>
</tr>
</thead>
</table>

*Scoring: 1=low; 2=moderate; 3=high

**1 crew = 8-10 people
APPENDIX C -- Key Agencies and Groups Affecting GYE Management
(Clark 1994)

U.S. Government-Independent Agencies
Environmental Protection Agency (two regions) EPA

Inter-Agency Groups
Greater Yellowstone Coordinating Committee GYCC
(National Park Service-U.S. Forest Service)

Federal Agencies
Department of the Interior USDI
National Park Service NPS
Yellowstone National Park YNP
Grand Teton National Park GTNP
Bureau of Land Management BLM
U.S. Fish and Wildlife Service FWS
Bureau of Indian Affairs BIA
Bureau of Mines
Bureau of Reclamation
Department of Agriculture USDA
U.S. Forest Service FS
Three regions, seven national forests
Animal Damage Control ADC
Soil Conservation Service SCS

Department of the Army
Army Corps of Engineers

Department of Justice
Land and Natural Resources Division

Council of Environmental Quality CEQ

State Agencies
Idaho Fish and Game Department
Montana Department of Fish, Wildlife, and Parks
Wyoming Game and Fish Department

Nongovernmental Organizations
Conservation
Greater Yellowstone Coalition GYC
Jackson Hole Alliance for Responsible Planning JHARP

National: The Wilderness Society, Sierra Club, National Wildlife Federation, Defenders of Wildlife

Commodity (local and national--various associations and ad hoc groups)--Fiber extraction, livestock/ranching, hunting/outfitting, mineral, energy
### APPENDIX D -- Land Ownership (acres) in the Greater Yellowstone Ecosystem/Area According to Congressional Report (Corn and Gorte 1987) and Greater Yellowstone Coordinating Committee (1987, 1990)

<table>
<thead>
<tr>
<th>Landowner or Manager</th>
<th>GYE (Corn &amp; Gorte)</th>
<th>GYA (GYCC)</th>
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<tbody>
<tr>
<td><strong>U.S. Department of Interior:</strong></td>
<td></td>
<td></td>
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<tr>
<td>National Park Service</td>
<td></td>
<td></td>
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<tr>
<td>Yellowstone National Park</td>
<td>2,219,803</td>
<td>2,221,700</td>
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<tr>
<td>Grand Teton National Park</td>
<td>306,865</td>
<td>345,600</td>
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<tr>
<td>J.D. Rockefeller Parkway</td>
<td>27,777</td>
<td>*</td>
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<tr>
<td><strong>Subtotal</strong></td>
<td>2,554,445</td>
<td>2,567,000</td>
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<tr>
<td>Bureau of Land Management</td>
<td></td>
<td></td>
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<tr>
<td>Idaho BLM Lands</td>
<td>4,500 est.</td>
<td></td>
</tr>
<tr>
<td>Montana BLM Lands</td>
<td>76,500 est.</td>
<td></td>
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<tr>
<td>Wyoming BLM Lands</td>
<td>45,000 est.</td>
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<tr>
<td><strong>Subtotal</strong></td>
<td>126,000 est.</td>
<td></td>
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<tr>
<td><strong>U.S. Fish and Wildlife Service:</strong></td>
<td></td>
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<tr>
<td>National Elk Refuge</td>
<td>24,247</td>
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<tr>
<td>Red Rock Lakes N.W.R.</td>
<td>32,467</td>
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<tr>
<td>Grays Lake N.W.R.</td>
<td>16,153</td>
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<tr>
<td><strong>Subtotal</strong></td>
<td>72,867</td>
<td><strong>907,000</strong></td>
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<tr>
<td>Bureau of Indian Affairs</td>
<td></td>
<td></td>
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<tr>
<td><strong>Wind River Indian Reservation</strong></td>
<td>***</td>
<td>880,000</td>
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<tr>
<td><strong>U.S. Department of Agriculture:</strong></td>
<td></td>
<td></td>
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<tr>
<td>U.S. Forest Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beaverhead N.F.</td>
<td>473,250 est.</td>
<td>426,800</td>
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<tr>
<td>Gallatin N.F.</td>
<td>1,550,100 est.</td>
<td>1,735,400</td>
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<tr>
<td>Custer N.F.</td>
<td>509,500 est.</td>
<td>517,500</td>
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<tr>
<td>Rocky Mountain Region</td>
<td></td>
<td></td>
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<tr>
<td>Shoshone N.F.</td>
<td>2,433,029 est.</td>
<td>2,223,900</td>
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<tr>
<td>Intermountain Region</td>
<td></td>
<td></td>
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<tr>
<td>Bridger-Teton N.F.</td>
<td>3,400,110 est.</td>
<td>2,740,800</td>
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<tr>
<td>Caribou N.F.</td>
<td>628,250 est.</td>
<td>x</td>
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<tr>
<td>Targhee N.F.</td>
<td>1,193,900 est.</td>
<td>1,477,200</td>
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<td><strong>Subtotal</strong></td>
<td>10,188,139 est.</td>
<td><strong>xx9,121,600</strong></td>
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<tr>
<td>State:</td>
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<tr>
<td>Idaho State Lands</td>
<td>44,600 est.</td>
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<tr>
<td>Montana State Lands</td>
<td>69,250 est.</td>
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<tr>
<td>Wyoming State Lands</td>
<td>3,000 est.</td>
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<tr>
<td><strong>Subtotal</strong></td>
<td>116,850 est.</td>
<td>685,000</td>
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<td>Private:</td>
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<tr>
<td>Champion Timberlands</td>
<td>142,000 est.</td>
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<tr>
<td>Other Private Landowners</td>
<td>800,000 est.</td>
<td></td>
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<tr>
<td><strong>Subtotal</strong></td>
<td>942,000 est.</td>
<td>4,838,000</td>
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<tr>
<td><strong>Total Land in the GYE/GYA</strong></td>
<td>14,000,000 est.</td>
<td>19,000,000</td>
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</table>

Notes: N.F. = National Forest; est. = estimated acreage
* Included in other Park acreage. ** Subtotal lumps all other Federal Government land area.
*** No Indian Reservation land was tabulated in Corn and Gorte (1987). x Administered by Targhee N.F. xx This subtotal was 10,029,000 in Greater Yellowstone Coordinating Committee (1987). All from Clark (1994).
APPENDIX E — Copy of Survey Letter Sent (February/March 1995)

February 12, 1995

Mr. Greg Clark, District Ranger  
Bridger-Teton National Forest, Big Piney Ranger District  
315 Front Street  
P.O. Box 281  
Big Piney, WY 83113

Kirstin Leonard  
1101 W. Greenough Dr., Apt. B-10  
Missoula, MT 59802

Dear Mr. Clark:

I am a graduate student pursuing an M.S. degree in Environmental Studies at the University of Montana. My graduate thesis involves working with the Greater Yellowstone Coalition, Montana Conservation Corps, and several other organizations, agencies, and individuals to create a Greater Yellowstone Restoration Corps (GYRC). I am writing to ask for your assistance with this project.

The guiding principle behind the development of the Corps is the belief that an ecosystem-based restoration corps will greatly benefit both the social and environmental communities of the Greater Yellowstone Area. Past efforts have proven that restoration projects can provide jobs, stimulate economies, and enhance many other public land values including improved water quality and scenic values, increased fish and wildlife populations, and a greater understanding and appreciation of environmental complexity and balance. We believe the Corps will also benefit both state and federal agencies by providing additional technical and financial support to existing as well as future restoration efforts.

We are excited about this project and greatly appreciate your participation. My role in the planning process is to identify potential restoration project sites that are appropriate for such a combined effort. Specifically, I need you to indicate your top 5-10 priority restoration projects. Please read the questions included on page two carefully.

Because of both graduate school and grant deadlines, your prompt reply will be greatly appreciated. My hope is to receive your input and responses to my questions by February 22-24. Please contact me at (406) 728-1011 if this time frame is difficult for you, or for any other reason. Thank you for your time and consideration.

Sincerely,

Kirstin Leonard

Please complete and return to:  
Kirstin Leonard  
1101 W. Greenough Dr., Apt. B-10  
Missoula, MT 59802
POTENTIAL RESTORATION PROJECTS

In thinking about your priority restoration projects, please respond using the following classifications and criteria:

TYPE

Riparian Restoration
Stream/Fisheries Restoration
Reforestation
Road Closure/Obliteration
Grassland/Meadow Restoration
Recreation-Related Restoration

LOCATION

Please indicate on a map if possible

ENVIRONMENTAL NEED/EXPECTED BENEFIT FROM COMPLETION OF PROJECT

Effect on Habitat/Fisheries/Wildlife

ESTIMATED COST

Equipment
Labor

ESTIMATED SCOPE OF PROJECT

Duration
Size (acres)

FUTURE PLANS FOR PROJECT AREA

Land-use categorization (natural area, recreation, timber harvest, grazing, etc.)

Please feel free to include additional categories and/or restoration criteria you feel I may have overlooked. I would also appreciate any information you have concerning the potential restoration project opportunities, such as:

• Relevant Scientific Studies
• Restoration Planning Documents
• Maps
• Other Contacts or References
APPENDIX F -- Recipients of Survey Letters/Responses

NF=National Forest
RD=Ranger District
RA=Resource Area (BLM)
Contact=Person responding (if other than receiver of letter)

U.S. FOREST SERVICE

RESPONSE  PROJECTS

Region I

Northern Region USFS
Federal Building, Box 7669
Missoula, MT 59807
(406) 329-3511
Attn: David Jolly, Regional Forester

BEAVERHEAD

Beaverhead National Forest
610 N. Montana St.
Dillon, MT 59725
(406) 683-3900
Attn: Dick Owenby, Forest Supervisor
Contact: Pete Benjeyfield, Hydrologist

Dillon Ranger District
610 N. Montana St.
Dillon, MT 59725
(406) 683-3900
Attn: Barry Hicks, District Ranger

Madison Ranger District
5 Forest Service Rd.
Ennis, MT 59729
(406) 682-4253
Attn: Mark Petroni, District Ranger
Contact: Ron Schott

Sheridan Ranger District
Box 428
Sheridan, MT 59749
(406) 842-5432
Attn: Mark Petroni, Acting DR
Contact: Debbie Johnson

Refer to Forests

No immediate

Yes

No immediate

Yes

No immediate
CUSTER

Custer National Forest Yes No immediate
P.O. Box 2556
Billings, MT 59103
(406) 657-6361
Attn: Stephen Solem, Acting Supervisor
Contact: Cheri Bashor

Beartooth Ranger District Yes No immediate
Rt. 2, Box 3420
Red Lodge, MT 59068
(406) 446-2103
Attn: Ms. Linda Ward Williams, District Ranger
Contact: Kim Reid

GALLATIN

Gallatin National Forest No
P.O. Box 130
Bozeman, MT 59771
(406) 587-6702
Attn: Mr. Dave Garber, Forest Supervisor
Contact: Mark Story

Big Timber Ranger District No
P.O. Box A
Big Timber, MT 59011
(406) 932-5155
Attn: Mr. Steve Brady, District Ranger

Bozeman Ranger District Yes Yes
601 Nickles, Box C
Bozeman, MT 59715
(406) 587-6920
Attn: Mr. Gene Gibson, District Ranger

Gardiner Ranger District No
P.O. Box 5
Gardiner, MT 59030
(406) 848-7375
Attn: John Logan, District Ranger
Hebgen Lake Ranger District  Yes  No immediate
P.O. Box 520
West Yellowstone, MT 59758
(406) 646-7369
Attn: Mr. Gary (Stan) Benes, District Ranger

Livingston Ranger District  No
Route 62, Box 3197
Livingston, MT 59047
(406) 222-1892
Attn: Fred Salinas, District Ranger

Region II

Rocky Mountain Region USFS  Yes  Refer to Forests
11177 W. 8th Ave.
Lakewood, CO 80225
(303) 236-9431
Attn: Elizabeth Estill, Regional Forester

SHOSHONE

Shoshone National Forest  Yes  No immediate
808 Meadow Lane
Cody, WY 82414
(307) 527-6241
Attn: Barry Davis, Forest Supervisor
Contact: Kevin Elliot

Clarks Fork Ranger District  No
1002 Road 11
Powell, WY 82435
(307) 754-2407
Attn: Randall R. Herzberg, District Ranger

Greybull Ranger District  Yes  No immediate
2044 S. State
Meeteetse, WY 82433
(307) 868-2379
Attn: Phyllis Roseberry, District Ranger

Wapiti Ranger District  No
225 W. Yellowstone
Cody, WY 82414
(307) 527-6921
Attn: Jay F. Carlton, District Ranger
<table>
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<tr>
<th>District</th>
<th>USFS</th>
<th>Contact</th>
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<td>Washakie Ranger District</td>
<td>Yes</td>
<td>No immediate</td>
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<tr>
<td>333 Highway 789 South</td>
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<td>Larry J. Klock, District Ranger</td>
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<tr>
<td>Lander, WY 82520</td>
<td></td>
<td>Scott Mackey, Hydrologist</td>
</tr>
<tr>
<td>(307) 332-5460</td>
<td></td>
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<tr>
<td>Wind River Ranger District</td>
<td>No</td>
<td>Brent Larsen, District Ranger</td>
</tr>
<tr>
<td>P.O. Box 186</td>
<td></td>
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<tr>
<td>Dubois, WY 82513</td>
<td></td>
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<tr>
<td>(307) 455-2466</td>
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<td>Region IV</td>
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<td>Intermountain Region USFS</td>
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<td>Federal Building</td>
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<tr>
<td>324 25th St.</td>
<td></td>
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<tr>
<td>Ogden, UT 84401</td>
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<tr>
<td>(801) 625-5603</td>
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<tr>
<td>Bridger-Teton National Forest</td>
<td>Yes</td>
<td>Refer to Districts</td>
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<td>P.O. Box 1888</td>
<td></td>
<td></td>
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<tr>
<td>Jackson, WY 83001</td>
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<tr>
<td>(307) 739-5500</td>
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</tr>
<tr>
<td>Big Piney Ranger District</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>315 Front Street</td>
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<tr>
<td>P.O. Box 281</td>
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<tr>
<td>Big Piney, WY 83113</td>
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<tr>
<td>(307) 276-3375</td>
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<td>Buffalo Ranger District</td>
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<td>Big Piney, WY 83113</td>
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<td>(307) 276-3375</td>
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<tr>
<td>Blackrock Ranger Station</td>
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<tr>
<td>Moran, WY 83013</td>
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<tr>
<td>(307) 543-2386</td>
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Greys River Ranger District  No
125 Washington
P.O. Box 338
Afton, WY  83110
(307) 886-3166
Attn: Walter Rogers, Acting District Ranger

Jackson Ranger District  Yes  Yes
25 Rosencrans Lane
P.O. Box 1689
Jackson, WY  83001
(307) 733-4755
Attn: Charles Jones, District Ranger
Referred Contact: Dave Cunningham

Kemmer Ranger District  Yes  Yes
455 Highway 189
P.O. Box 31
Kemmerer, WY  83101
(307) 877-4415
Attn: Jim Wickel, District Ranger
Contact: George Walker

Pinedale Ranger District  No
P.O. Box 220
Pinedale, WY  82941
(307) 367-4326
Attn: Bob Reese, District Ranger

CARIBOU

Caribou National Forest  Yes  No immediate
Federal Building, Suite 282
250 S. Fourth Ave.
Pocatello, ID  83201
(208) 236-7500
Attn: Paul R. Nordwall, Forest Supervisor
Contact: Paul Oikes

Montpelier Ranger District  Yes  No immediate
431 Clay
Montpelier, ID  83254
(208) 847-0375
Attn: Mark L. Johnson, District Ranger
Contact: Mark Booth, Wildlife Program
Pocatello Ranger District  Yes  Not much land in
Federal Building, Suite 187  GYE
250 South Fourth Ave.
Pocatello, ID 83201
(208) 236-7500
Attn: Jerald D. Tower, District Ranger

Soda Springs Ranger District  Yes
Cedar View Plaza
421 W. Second St.
Soda Springs, ID 83276
(208) 547-4356
Attn: Toni Varilone, District Ranger
Contact: Don Luhrs

TARGHEE

Targhee National Forest  Yes
420 North Bridge St.
P.O. Box 208
St. Anthony, ID 83445
(208) 624-3151
Attn: Jerry Reese, Forest Supervisor
Contact: Ed Fisher, Assistant Planner

Ashton Ranger District  No
20 S. Yellowstone Highway
P.O. Box 858
Ashton, ID 83420
(208) 652-7442
Attn: Dave Dillard, District Ranger

Dubois Ranger District  No
P.O. Box 46
Dubois, ID 83423
(208) 374-5422
Attn: Mac Murdock, District Ranger

Island Park Ranger District  Yes
P.O. Box 20
Island Park, ID 83429
(208) 558-7301
Attn: Adrienne Keller, District Ranger
Contact: Dan Trochta
Palisades Ranger District
3659 E. Ririe Highway
Idaho Falls, ID 83401
(208) 523-1412
Attn: Ronald D. Dickemore, District Ranger

Teton Basin Ranger District
P.O. Box 777
Driggs, ID 83422
(208) 354-2431
Attn: Brad Merrill-Exton, District Ranger

BUREAU OF LAND MANAGEMENT

IDAHO

BLM-Idaho State Office
3380 Americana Terrace
Boise, ID 83706
(208) 384-3092
Attn: State Director

BLM-Idaho Falls District Office
940 Lincoln Road
Idaho Falls, ID 83401
(208) 524-7500
Attn: Director

BLM-Snake River Resource Area
C/o Idaho State Office
3380 Americana Terrace
Boise, ID 83706
(208) 677-6625
Attn: Resource Area Manager
Contact: John Augsburger

MONTANA

BLM-Montana State Office
Granite Tower, 222 North 32nd St.
P.O. Box 368000
Billings, MT 59107-6800
(406) 255-2916
Attn: State Director
<table>
<thead>
<tr>
<th>BLM-Butte District Office</th>
<th>Yes</th>
<th>Contact Resource Area Managers</th>
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<tbody>
<tr>
<td>P.O. Box 3388</td>
<td></td>
<td></td>
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<tr>
<td>Butte, MT 59702</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(406)-494-5059</td>
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<tr>
<td>Attn: District Manager</td>
<td></td>
<td></td>
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<tr>
<td>Contact: Gary Gerth</td>
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<tr>
<th>BLM-Dillon Resource Area</th>
<th>Yes</th>
<th>No immediate -- Interested in future cooperation</th>
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<tbody>
<tr>
<td>1005 Selway Drive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dillon, MT 59725</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(406) 683-2337</td>
<td></td>
<td></td>
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<tr>
<td>Attn: Resource Area Manager</td>
<td></td>
<td></td>
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<tr>
<td>Contact: John Simmons</td>
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<th>BLM-Headwaters Resource Area</th>
<th>Yes</th>
<th>No immediate -- Interested in future cooperation</th>
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<tr>
<td>P.O. Box 3388</td>
<td></td>
<td></td>
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<tr>
<td>Butte, MT 59702</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(406) 494-5059</td>
<td></td>
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<tr>
<td>Attn: Resource Area Manager</td>
<td></td>
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<tr>
<td>Contact: Mr. Brad Rixford</td>
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**WYOMING**

<table>
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<tr>
<th>BLM-Wyoming State Office</th>
<th>Yes</th>
<th>No -- Not much GYE land managed by Wyoming BLM</th>
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<td>P.O. Box 1828</td>
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<tr>
<td>Cheyenne, WY 82003</td>
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<tr>
<td>(307) 775-6096</td>
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<tr>
<td>Attn: State Director</td>
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<td>Contact: El Spencer</td>
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<th>BLM-Cody Resource Area</th>
<th>Yes</th>
<th>No -- Only 5% of RA in GYE; Interested in future cooperation</th>
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<tbody>
<tr>
<td>P.O. Box 518, 1714 Stampede Ave.</td>
<td></td>
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<tr>
<td>Cody, WY 82414</td>
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<tr>
<td>(307) 587-2216</td>
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<tr>
<td>Attn: Resource Area Manager</td>
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<tr>
<td>Contact: Tom Hare</td>
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<th>BLM-Grass Creek Resource Area</th>
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<tr>
<td>P.O. Box 119, 101 South 23rd</td>
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<tr>
<td>Worland, WY 82401</td>
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<tr>
<td>(307) 347-9871</td>
<td></td>
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<tr>
<td>Attn: Resource Area Manager</td>
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</table>
BLM- Lander Resource Area
P.O. Box 589, 125 Sunflower
Land, WY 82520
(307) 332-7822
Attn: Resource Area Manager
Contact: Greg Boutz

BLM- Pinedale Resource Area
P.O. Box 768, 431 West Pine St.
Pinedale, WY 82941
(307) 367-4358
Attn: Resource Area Manager
Contact: Ty Bryson

BLM- Washakie Resource Area
P.O. Box 119, 101 South 23rd
Worland, WY 82401
(307) 347-9871
Attn: Resource Area Manager

NATIONAL PARK SERVICE

Grand Teton National Park
P.O. Box 170
Moose, WY 83012
(307) 739-3481
Attn: Dr. Robert Schiller

Yellowstone National Park
P.O. Box 168
Yellowstone National Park, WY 82190
(307) 344-7381
Attn: Mr. Tom Olliff

U.S. FISH AND WILDLIFE SERVICE

Grays Lake National Wildlife Refuge
74 Grays Lake Road
Wagner, ID 83285
(208) 574-2755
Attn: Director
Contact: M. Fisher
National Elk Refuge  No
U.S. Fish and Wildlife Service
P.O. Box C
Jackson, WY  83001
(307) 733-9212
Attn: Director

Red Rock Lakes  Yes  No
National Wildlife Refuge
Box 15, Monida Star Route
Lima, MT  59739
(406) 276-3536
Attn: Director
Contact: Daniel Gomez, Refuge Manager

STATE of IDAHO

Department of Lands  No
1215 West State St.
Boise, ID  83720-7000
(208) 334-0200
Attn: Director

Eastern Idaho Area Office  Yes  No
3563 Ririe Highway
Idaho Falls, ID  83401
(208) 523-5398
Attn: Director

State house Mail  Yes  No
Boise, ID  83720-8000
(208) 327-7444
Attn: Director

Harriman State Park  Yes  No immediate
HC 66, Box 500
Island Park, ID  83429
(208) 558-7368
Attn: Director
<table>
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<th>Location</th>
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<th>Immediate Cooperation</th>
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<td>Henry's Lake State Park</td>
<td>Yes</td>
<td>No</td>
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<td>HC 66, Box 500</td>
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<tr>
<td>Island Park, ID 83429</td>
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<tr>
<td>(208) 558-7532</td>
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<tr>
<td>Attn: Director</td>
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<tr>
<td><strong>STATE OF MONTANA</strong></td>
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<td>Department of Fish, Wildlife,</td>
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<tr>
<td>1420 East Sixth St.</td>
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<tr>
<td>Helena, MT 59620</td>
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<tr>
<td>(406) 444-2944</td>
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<tr>
<td>Attn: Director</td>
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<tr>
<td>Department of Fish, Wildlife,</td>
<td>Yes</td>
<td>No</td>
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<td>and Parks -- Region 3</td>
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<td>1400 South 19th</td>
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<tr>
<td>Bozeman, MT 59715</td>
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<td>(406) 994-4042</td>
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<td>Attn: Director</td>
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<tr>
<td>Department of Natural Resources</td>
<td>Yes</td>
<td>No</td>
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<td>and Conservation</td>
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<tr>
<td>Director's Office</td>
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<tr>
<td>1520 E. Sixth Ave.</td>
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<tr>
<td>Helena, MT 59620</td>
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</tr>
<tr>
<td>(406) 444-6699</td>
<td></td>
<td></td>
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<tr>
<td>Attn: Ms. Carol Byrnes</td>
<td></td>
<td></td>
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<td><strong>STATE OF WYOMING</strong></td>
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<tr>
<td>Buffalo Bill State Park</td>
<td>Yes</td>
<td>No</td>
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<td>47 Lakeside Rd.</td>
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<tr>
<td>Cody, WY 82414</td>
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<tr>
<td>Attn: Director</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact: Mr. Ron Livesay</td>
<td></td>
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<tr>
<td>Dubois-Crowheart Conservation</td>
<td>Yes</td>
<td>No</td>
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<td>P.O. Box 27</td>
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<tr>
<td>Dubois, WY 82513</td>
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<tr>
<td>(307) 455-2388</td>
<td></td>
<td></td>
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<tr>
<td>Attn: Marilee Sorenson</td>
<td></td>
<td></td>
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<tr>
<td>Organization</td>
<td>Interested</td>
<td>Contact Information</td>
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<tr>
<td>Popo Agie Conservation District</td>
<td>Yes</td>
<td>600 N. Highway 287, Lander, WY 82520, (307) 332-3114, Attn: Karen Luce</td>
<td></td>
</tr>
<tr>
<td>Public Lands Office-Forestry Division</td>
<td>No</td>
<td>1100 W. 22nd St., Cheyenne, WY 82002, (307) 777-6247, Attn: Director</td>
<td></td>
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<tr>
<td>State Land and Farm Loan Office</td>
<td>Yes</td>
<td>Herschler Building, 122 W. 25th St., Cheyenne, WY 82002, (307) 777-7331, Attn: Director, Contact: Jim Magagna, Director</td>
<td></td>
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<tr>
<td>US Fish &amp; Wildlife</td>
<td>Yes</td>
<td>170 N. First St., Lander, WY 82520, (307) 332-2159, Attn: Kathy Firchow</td>
<td></td>
</tr>
<tr>
<td>Wyoming Department of Environmental Quality</td>
<td>Yes</td>
<td>250 Lincoln St., Lander, WY 82520, (307) 332-3144, Attn: Director, Contacts: John Erickson, Linda Hewitt</td>
<td></td>
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<tr>
<td>WIND RIVER INDIAN RESERVATION</td>
<td>Yes</td>
<td>Natural Resource Conservation Service, P.O. Box 127, Fort Washakie, WY 82514, (307) 332-3114, Attn: Mr. Don Gaddie</td>
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No immediate -- Interested in future cooperation
<table>
<thead>
<tr>
<th>Organization</th>
<th>Contact</th>
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<tr>
<td>Tribal Water Engineers Office</td>
<td>Yes</td>
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<tr>
<td>P.O. Box 217</td>
<td>Yes</td>
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<tr>
<td>Fort Washakie, WY 82514</td>
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</tr>
<tr>
<td>(307) 332-3164</td>
<td></td>
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<tr>
<td>Attn: Mr. Preston Smith</td>
<td></td>
</tr>
<tr>
<td>Wind River Environmental</td>
<td>Yes</td>
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<td>Quality Commission</td>
<td>Yes</td>
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<tr>
<td>P.O. Box 217</td>
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<tr>
<td>Fort Washakie, WY 82514</td>
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<tr>
<td>(307) 332-3164</td>
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<tr>
<td>Attn: Mr. Don Aragon, Director</td>
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</table>
APPENDIX G -- GYRC Project Proposal Form (Revised)

The Greater Yellowstone Restoration Corps (GYRC) welcomes restoration projects designed to:

- Repair damage caused by humans to the diversity and natural processes of indigenous ecosystems -- creating the conditions necessary for natural succession to resume.
- Lead to the re-establishment of sustainable and healthy relationships between nature and culture.

PROJECT CHECKLIST/DESCRIPTION

1. Describe project's ecological importance/benefit to the environment.

2. Does project have clear and realistic goals? Please identify.

3. Is the agency committed to protecting the restored area from similar or other degradation? Please describe protective measures to be taken.

4. What are the skills needed to complete project? Is there potential to employ and/or train past resource-extractive workers and/or local people?

   Please score the following factors on a scale of 1-3 (1=low, 2=moderate, 3=high). Explain score given and include additional relevant information.

5. What is the severity of degradation?

6. How does the scope of the restoration project address the scope of degradation?

7. What opportunity exists for community outreach and education?

LOGISTICS

8. Cost of the project

9. Availability of funding

10. Duration

11. People power required (Crews are usually 8-10 corps members)

Please include maps and/or additional information.
REFERENCES


Davis, Barry, U.S. Forest Service, Forest Supervisor, Shoshone National

Glick, Dennis, Mary Carr, and Bert Harting, eds. 1991. An environmental
profile of the Greater Yellowstone Ecosystem. Bozeman, MT: Greater
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Forest management plans. USDA Forest Service and USDI Park
Service. Distributed by The Yellowstone Association, Yellowstone
National Park, WY.

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Greater Yellowstone Restoration Corps: A draft project paper.
Bozeman, MT: Greater Yellowstone Coalition.

Lewis Publishers.


Higgs, Eric S. 1994 (a). Expanding the scope of restoration ecology. Restoration
Ecology 2:3 (September): 137-146.

Higgs, Eric S. 1994 (b). The politics of restoration. Restoration and

House, Freeman. 1991. To learn the things we need to know: Engaging the
nature heal: An introduction to environmental restoration. Berkeley:
Ten Speed Press.


