Survey of Selected Seeps and Springs within the Bureau of Land Management's Gunnison Field Office Management Area (Gunnison and Saguache Counties, CO)

Colorado Natural Heritage Program
Colorado State University
8002 Campus Delivery
Fort Collins, Colorado 80523-8002
April 18, 2003

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Prepared for:
Bureau of Land Management, Gunnison Field Office
216 N. Colorado
Gunnison, Colorado 81230

Prepared by:
Georgia Doyle
April 18, 2003

Colorado Natural Heritage Program
Colorado State University
Campus Delivery 8002
Fort Collins, Colorado 80523-8002
970-491-1309
Email: heritage @lamar.colostate.edu
http://www.cnhp.colostate.edu

ACKNOWLEDGEMENTS

Financial support for this study was provided by the Bureau of Land Management's State Office. We greatly appreciate the support and assistance of Jay Thompson at the BLM State Office and Art Hayes and Sandy Hayes of the BLM Gunnison Field Office. The Gunnison Wetlands Focus Area Committee of the Colorado Division of Wildlife Wetlands Program was helpful in recommending high quality springs to include in the survey. Special thanks go to Lynn Cudlip of the Wetlands Focus Area Committee for sharing her local expertise. We also are very appreciative of the time and effort Dr. Rob Guralnick and Gene Hall of the University of Colorado Museum of Natural History – Invertebrate Zoology and Paleontology –contributied in identifying the snails collected during this project.

Cover photos: Cabin Creek spring C-311 (left) and Willow Creek spring C-805 (right).

EXECUTIVE SUMMARY

Springs and seeps are unique habitats and serve many important hydrological, biological, and biogeochemical functions. In addition to serving as water sources, specific interest in seeps and springs in the Gunnison Basin is driven by their potential importance as brood rearing habitat for Gunnison Sage Grouse (*Centrocercus minimus*). The range and number of individuals of Gunnison Sage Grouse have been undergoing long-term decline and the largest remaining population is within the Gunnison Basin. The Gunnison Sage Grouse use riparian areas, wet meadows, seeps, and springs as brood rearing habitat (Gunnison Sage Grouse Working Group 1997).

All of the seeps and springs presented in this report are within the Gunnison Sage Grouse overall habitat range and the Colorado Natural Heritage Program Gunnison Basin Potential Conservation Area (PCA) (Appendix A). The Gunnison Basin PCA is considered of Irreplaceable Biodiversity Significance (CNHP Biodiversity Rank B1) due to its importance as Gunnison Sage Grouse habitat.

The objective of this project was to survey selected seeps and springs within two miles of known Gunnison Sage Grouse leks and comment on their condition and restoration potential. These seeps and springs are within the BLM Gunnison Field Office Management Area in Gunnison and Saguache counties. The project was completed in conjunction with a Survey of Critical Wetlands and Riparian Areas in Gunnison County (Rocchio et al. 2003).

A total of 74 seeps and springs were visited during the 2002 field season. Of these, seven are new springs not included in the 1983 BLM Water Source Inventory. Site assessments include a general description, grazing exclosure recommendation, notes on Gunnison Sage Grouse, plant species list, rating of Proper Functioning Condition, collection of water chemistry data and macroinvertebrates, and restoration and management needs.

Factors affecting the quality of the seeps and springs in the Gunnison Basin include spring development and livestock grazing. Most of the seeps and springs on BLM land in the Gunnison Basin have been developed for use as livestock water sources. Many changes occur at seeps and springs that are developed or disturbed from their natural condition. For example, non-native taxa comprise a greater proportion of the riparian vegetation at disturbed springs. Because human activity has been focused on these ecosystems, leading to alteration and loss of native species, it is important to identify any seeps and springs in good condition, and to assess impacted areas for restoration potential.

The highest quality springs from a hydrologic and vegetative standpoint are listed in the following table. These springs are undeveloped (not excavated or bermed or piped to a tank) and support relatively dense wetland vegetation.

Surveys conducted in the Great Basin have shown that seeps and springs are often hot spots of biological diversity, especially for rare and endemic species of springsnails (Sada et al. 2001). However, snails collected from Gunnison Basin seeps and springs are from genera that have widespread distributions and are common in Colorado.

Highest quality seeps and springs

Spring ID	Water Source Inventory Spring Name	Top Priority Grazing Exclosure Recommendation	Comments
B-868	State	X	Excavated pond at source but large stand of wet sedges remains – evidence of sage grouse use
B-925	Hondo	X	Nice stand of aspen with alder – spring undeveloped and within an exclosure – threatened by channel entrenchment and bare ground (grazing) at additional springs immediately outside of exclosure
B-965	Cochetopa Needle		Large willow/sedge stand – undeveloped spring - some hummocking and willow hedging
C-311	Taylor Park 32		Above Cabin Creek – spring in good condition – historic pond downhill from spring silted in and now sedge stand
F-452	Down the Line	X	Large willow and sedge stand along spring-fed creek. Banks compacted – evidence of sage grouse use
Birch	New to WSI		Undeveloped spring with river birch, giant angelica, and hops
Cabin 1	New to WSI		Undeveloped spring with aspen and giant angelica

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INTRODUCTION

Springs and seeps are unique habitats and provide many important hydrological, biological, and biogeochemical functions. In dry regions, such as the Gunnison Basin, springs and seeps may be the only water source within miles.

In addition to serving as water sources, specific interest in seeps and springs in the Gunnison Basin is driven by their potential importance as brood rearing habitat for Gunnison Sage Grouse (*Centrocercus minimus*). The range and number of individuals of Gunnison Sage Grouse have been undergoing long-term decline. Currently, the species occurs in 8 isolated populations with a total estimated spring breeding population of less than 4,000 individuals with the largest population (~2,500) in the Gunnison Basin (Gunnison and Saguache counties) (Young 2002). The sage grouse use riparian areas, wet meadows, seeps, and springs as brood rearing habitat from early June into the fall (Gunnison Sage Grouse Working Group 1997).

The seeps and springs presented in this report are within the Gunnison Sage Grouse overall habitat range as outlined by the Colorado Division of Wildlife (CDOW 2002a). This area has been designated a Potential Conservation Area (PCA) of Irreplaceable Biodiversity Significance (B1) by the Colorado Natural Heritage Program (CNHP) and is within the portfolio of conservation areas designated by The Nature Conservancy (Neely et al. 2001). The Gunnison Basin PCA, presented in Rocchio et al. (2003) and included in this report as Appendix A, summarizes the biological importance of the area. CNHP methodology is summarized in Appendix B.

Wetlands perform many functions beyond providing habitat for plants and animals. It is commonly known that wetlands act as natural filters, helping to protect water quality, but it is less well known that wetlands perform other important functions. (Adamus et al. 1991) list the following functions performed by wetlands:

- Groundwater recharge--the replenishing of below ground aquifers.
- Groundwater discharge--the movement of ground water to the surface (e.g., springs).
- Floodflow alteration--the temporary storage of potential flood waters.
- Sediment stabilization--the protection of stream banks and lake shores from erosion.
- Sediment/toxicant retention--the removal of suspended soil particles from the water, along with toxic substances that may be adsorbed to these particles.
- Nutrient removal/transformation--the removal of excess nutrients from the water, in particular nitrogen and phosphorous. Phosphorous is often removed via sedimentation; transformation includes converting inorganic forms of nutrients to organic forms and/or the conversion of one inorganic form to another inorganic form (e.g., NO_3^- converted to N_2O or N_2 via denitrification).
- Production export--supply organic material (dead leaves, soluble organic carbon, etc.) to the base of the food chain.
- Aquatic diversity/abundance--wetlands support fisheries and aquatic invertebrates.
- Wildlife diversity/abundance--wetlands provide habitat for wildlife.

Factors affecting the quality of the seeps and springs in the Gunnison Basin include spring development, livestock grazing, and drought. Most of the seeps and springs on BLM land in the Gunnison Basin have been developed for use as livestock water sources. The springs have either been dug out to create a pond or a box has been installed around the spring to capture the water and pipe it to a trough. Many changes occur at seeps and springs that are developed or disturbed from their natural condition. For example, non-native taxa comprise a greater proportion of the

riparian vegetation at disturbed springs (Sada and Nachlinger 1996, 1998 as cited in Sada et al. 2001). Additionally, functional changes in spring biota occur when flowing habitats are impounded. Species that require lotic (flowing water) habitats are extirpated and replaced by lentic (standing water) taxa (Sada et al. 2001).

Domestic livestock grazing has been a traditional livelihood in the Gunnison Basin since the 1870s (Sowell 2002) and has left a broad and sometimes subtle impact on the landscape. Many riparian areas, seeps, and springs are used for rangeland. Because there is little surface water available in the basin, riparian areas, seeps, and springs often serve as the only available water. Additionally, riparian areas are often areas of the highest production of grasses and forbs. Long-term, incompatible livestock use of wetlands can potentially erode stream banks, cause streams to downcut, lower the water table, alter channel morphology, impair plant regeneration, establish non-native species, shift community structure and composition, degrade water quality, and diminish general riparian and wetland functions (Windell et al. 1986). Depending on grazing practices and local environmental conditions, impacts can be minimal and largely reversible to severe and irreversible, such as extensive gullying and introduction of non-native or noxious species.

Many of the seeps and springs in the Gunnison Basin were dry during the 2002 field season due to extended drought conditions. According to the Colorado Climate Center (2002), Colorado is in the third consecutive year of a drought cycle and in the fifth year of below-average snow pack. Drying up of springs changes the vegetation and increases the grazing pressure at the remaining flowing springs.

Surveys conducted in the Great Basin have shown that seeps and springs are often hot spots of biological diversity, providing habitat for many uncommon species of plants and animals, including some that proved to be new to science. Of particular interest are springsnails, which have been little studied to date, and may prove to be unique to particular seeps and springs (Sada et al. 2001). Snails were collected at seeps and springs in the Gunnison Basin and sent to the University of Colorado for species identification.

Because human activity has been focused on these ecosystems, leading to alteration and loss of native species, it is important to identify any seeps and springs in good condition, and to assess impacted areas for restoration potential. In this report, high quality springs are noted and restoration and management concerns, including recommendations for grazing exclosures, are discussed.

This project was completed in conjunction with the Survey of Critical Wetlands and Riparian Areas in Gunnison County for the Colorado Department of Natural Resources funded via a grant from the Environmental Protection Agency, Region VIII (Rocchio et al. 2003). Similar biological surveys have been conducted for seeps and springs in Mesa and Garfield counties on BLM lands in the Grand Junction Field Office Management Area (Rocchio et al. 2001; Doyle el al. 2002).

PROJECT BACKGROUND

Location and Physical Characteristics of Study Area

The study area includes the sagebrush shrublands of the Upper Gunnison Basin in west central Colorado (Figure 1). Specifically, about 860 square miles (553,000 acres) of sagebrush shrublands designated as the overall habitat range for the critically imperiled Gunnison Sage Grouse are within the study area (Appendix A). The area is best characterized as rolling hills of sagebrush shrublands dissected by river, creeks, and ephemeral drainages. Big sagebrush (*Artemisia tridentata*) is the dominant shrub throughout most of the area with shallow clay soils on the slopes usually dominated by black sagebrush (*Artemisia nova*) (Johnston et al. 2001). The sagebrush shrublands generally fall within the elevation range of about 7500 to 9000 feet. About 52 percent of the study area shown on Figure 1 is owned and managed by the BLM.

The basin lies in the rain shadow caused by the surrounding mountains. Annual precipitation in Gunnison is approximately 10 inches (~25 cm) and July and August are typically the wettest months (period of record 1901-2001) (Colorado Climate Center 2002; Western Regional Climate Center 2002). Annual precipitation for the 2001-2002 water year (Oct-Sept) was 6.86 inches at the Gunnison station and 6.14 inches at the Cochetopa Creek station, 68% and 53% of the average annual precipitation at each station, respectively (Colorado Climate Data Center 2002).

Seeps/Springs Ecology

Seeps and springs are small wetland ecosystems that are hydrologically supported by groundwater discharge (Sada et al. 2001; Hynes 1970). They are distinctive from other wetland and riparian habitats by the relatively constant water temperature and chemistry of the discharging groundwater (Sada et al. 2001). This results from the groundwater being in contact with minerals for an extended period of time, which equilibrates solute concentrations. Thus, spring water tends to have constant concentrations of dissolved minerals while surface-fed streams vary in response to rainfall and snowmelt (McCabe 1998).

Seeps differ from springs in that they often periodically dry and consequently support a lower diversity of wetland vegetation. Springs often have a more persistent source of water and thus support a greater diversity of wetland vegetation and provide aquatic habitat (Sada et al. 2001). However, springs supported by local aquifers may periodically dry, since local aquifers are comparatively small and shallow, and the amount of groundwater discharge associated with them varies in response to local precipitation levels. Springs supported by regional aquifers, or aquifers covering thousands of square kilometers, rarely dry, even during droughts, since the quantity of water within the aquifer is high and the groundwater flow is typically slow (Sada et al. 2001).

Many springs in western North America, below an elevation of 7000 feet, are isolated from other wetlands, frequently flow a short distance before infiltrating back into the ground, and periodically dry out (Hendrickson and Minckley 1984). This lack of connectivity restricts dispersal of many macroinvertebrates and fishes and thus, along with unique environmental characteristics (water chemistry, geology, etc.), has resulted in many unique and endemic species occupying isolated spring wetlands.

Spring environments (water temperature, water chemistry, etc.) are typically less variable than other aquatic habitats such as lakes, ponds, and streams. This results in low variability in macroinvertebrate populations at spring sources while downstream habitats typically show more

variability in population dynamics (Sada et al. 2001). In addition, the factors that lead to the evolution of endemic species or to the value of these isolated wetlands as refugia for relict species, can also result in low species richness due to the small size, isolation, and adverse conditions of these wetlands (Myers and Resh 1999). Martinson (1980) found that macroinvertebrate populations in the Piceance Basin, Colorado had greater density and biomass but fewer species (less diversity) at spring sources than in downstream habitats. This may be attributed to various factors: (a) constant, or less variable, environmental conditions at spring sources may prevent the initiation or completion of the life cycles of some species; (b) those organisms able to survive these conditions may be able to expand their populations due to less competition; (c) the absence of suspended particles in discharging groundwater does not allow filter feeding organisms to survive; and (d) drift patterns may play a role, since there are no upstream sources of macroinvertebrates for the springs (many occur at the headwaters of first-order streams) (Martinson 1980). In that study, Martinson also found that, although many spring sources had similar water temperatures and water chemistry, they often exhibited a different suite of macroinvertebrate species. This may be due to the variation in topographic gradients in which the springs occur, which influence water depth, water velocity, seasonal fluctuations, and substrate type (e.g. gravel vs. silt).

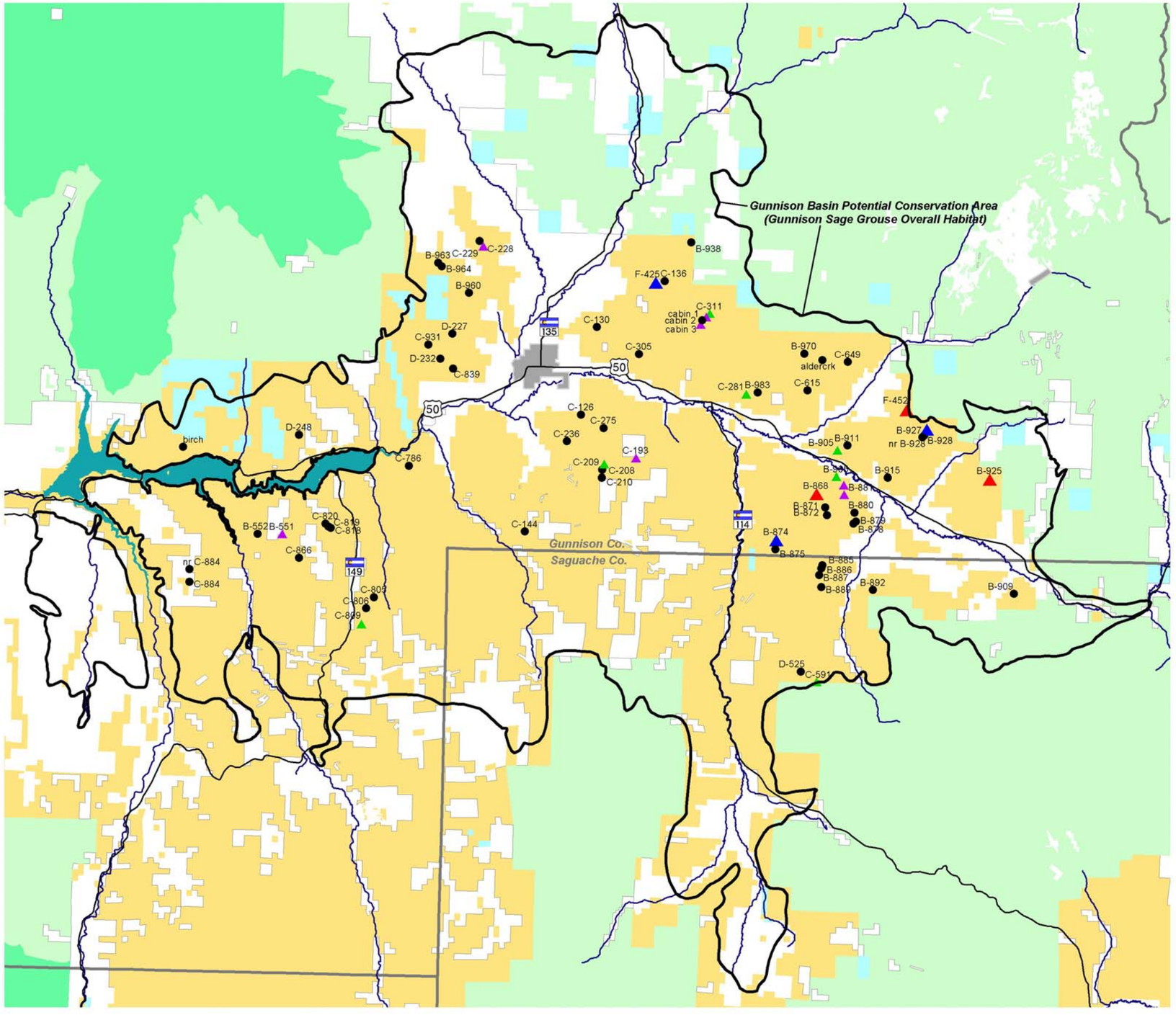
Seeps and springs often exhibit diverse flora composition and structural characteristics that provide potential cover for resting, nesting, and feeding for many different organisms, especially birds (Sada et al. 2001). For example, submergent vegetation such as pondweed (*Potamogeton* sp.), duckweed (*Lemna* sp.), ditch-grass (*Ruppia* sp.), horned-pondweed (*Zannichellia* sp.), and watercress (*Rorippa* sp.) provide a food source for waterfowl, while watercress has been shown to be a critical resource for mollusks (Sada 1996). Sedges (*Carex utriculata*), rushes (*Juncus balticus* and *J. saximontanus*), grasses (*Agrostis gigantea* and *Glyceria striata*), and other herbaceous species such as alkali crowfoot (*Halerpestes cymbalaria* subsp. *saximontana*), which are often found growing along the banks of springbrooks and in spring wetlands, help regulate water temperatures and provide areas for hiding and nesting, in addition to the habitat they provide for macroinvertebrates (Sada and Nachlinger 1996). Some springs in the project area support an overstory of occasional trees (*Populus angustifolia*) and shrubs such as thinleaf alder (*Alnus incana*) and various willows (*Salix* spp.), which provide excellent habitat for birds and browse for large mammals.

Many seeps and springs in the Gunnison Basin have been altered and/or modified from their natural condition due to anthropogenic disturbances such as livestock grazing and diversions and impoundments to capture water for human or livestock use. These disturbances can result in an increase in non-native species, decrease in vegetation cover, inundation of springbrook habitat, replacement of species requiring flowing water with those more adapted to stagnate or slow moving water (lakes, ponds, etc.), and cause the extirpation of endemic spring species (Sada and Vinyard in press). Sada and Nachlinger (1996) found higher levels of biodiversity in undisturbed springs while disturbed springs had a high percentage of non-native species present.

Diversions, which decrease flow from spring sources, can result in greater variation of water temperature which causes a shift in the composition of macroinvertebrate species from those adapted to spring source habitats, where water temperature is fairly constant, to those adapted to downstream habitats, where water temperature exhibits more variation. In addition, typically an increase in water temperature, which often occurs when water flow is decreased, decreases the number of aquatic invertebrate species found in that location (Myers and Resh 1999). Seeps and springs which are isolated, are especially susceptible to disturbances since they lack connectivity, and thus, have few mechanisms for recolonization via drift and upstream movements. Restoring disturbed wetlands can result in the reestablishment of wetland plant species and adequate

vegetation structure, however it does not guarantee the restoration of endemic fauna, especially for species that have limited dispersal capabilities (Myers and Resh 1999).

Figure 1
Gunnison Basin BLM
Seeps and Springs
visited by CNHP in 2002



Legend

BLM seeps and springs by grazing exclosure recommendation

- top priority
- high priority
- medium priority
- low priority
- not recommended

Highways
Streams

County Boundary

Land Ownership Status

- Bureau of Land Management
- National Forest
- Wilderness Area
- State Land
- Private Land

5 0 5 10 Miles

Map date: December 2002

METHODS

Survey Site Selection

More than 600 seeps, springs, and water development projects identified by the BLM 1983 Water Source Inventory occur within the Gunnison Basin. Fifty-two of the seeps and springs were selected by the BLM to be included in this survey. The BLM chose seeps and springs spanning the geographic range of the basin and within two miles of known Gunnison Sage Grouse leks. An additional 22 seeps and springs were added to the survey throughout the field season by CNHP. Additions were made based on recommendations by Gunnison Wetland Focus Area committee members or added because of their close proximity to BLM-selected survey sites.

Site Assessment

Site assessments include a general description, grazing exclosure recommendation, notes on Gunnison Sage Grouse, plant species list, rating of Proper Functioning Condition (Bureau of Land Management 1998a, 1998b, 1998c; Bureau of Land Management 1999), collection of water chemistry data and macroinvertebrates, and restoration and management needs.

The following information was collected and is described in this report:

General Description

- GPS location (GPS units were set to NAD 27 using UTM coordinates).
- Elevation (from 7.5 min. USGS topographic maps or GPS unit)
- Current and historic land use (e.g., grazing, recreational use) when apparent
- Indicators of disturbance such as grazing, flooding, spring "development," etc.
- Hydrological characteristics of the site
- Landscape context
- Snail species identified (where present)
- Reference photos of the site

Johnston Classification

Ecological type and community type were keyed for most sites using Johnston (2001), "Field Guide to Ecological Types of the Upper Gunnison Basin." In some cases, the types described by Johnston are a good fit for the observed community and in other cases the sites did not key well to the Johnston system.

Grazing Exclosure Recommendation

A recommendation for prioritization of grazing exclosures was made based on qualitative criteria. Factors contributing to high priority include the following:

Spring not developed – in relatively natural condition
Evidence of use by Gunnison Sage Grouse high
Vegetation showing signs of extreme stress due to grazing.

The rating system includes the following categories: top, high, medium, low, and no. The seeps and springs with a "no" recommendation already have a grazing exclosure, are locations with no spring evident (e.g. berms in ephemeral channels), or are in very poor condition.

Gunnison Sage Grouse notes

Sightings of sage grouse and a tally of fecal pellets noted are included here. Additionally, the number of known leks (Colorado Division of Wildlife 2002b) within two miles is noted.

Plant Species Observed
Plant species at each site were noted along with a rough estimate of percent cover. This information is presented in tabular form.

Proper Functioning Condition
Each seep/spring visited was assessed using the BLM's wetland/riparian functional assessment, "Process for Assessing Proper Functioning Condition" (Bureau of Land Management 1998a, 1998b, 1998c; Bureau of Land Management 1999). Thus, each site was given a rating of:

(1) **Proper Functioning Condition** – riparian/wetland area is in functional condition.
(2) **Functional-At Risk** – riparian/wetland area is in functional condition but some attribute of the site makes it susceptible to degradation.
(3) **Nonfunctional** – riparian/wetland area is clearly not performing functions.

(See Bureau of Land Management 1998a, 1998b, 1998c; Bureau of Land Management 1999 for more details).

The PFC analysis is not designed to evaluate natural ecological functioning but physical functioning instead. Therefore, a highly altered spring (excavated and bermed) can be rated as Proper Functioning Condition even though the functions the spring performs excavated and bermed can be very different than the functions of an unaltered spring. Conditions that lead to ratings of Functioning at Risk and Nonfunctional include hummocking and excessive bare ground.

Restoration and Management Comments
- Cause of disturbances, if any (e.g., alteration of hydrology, peat/soil removal, fill material, improper grazing, presence of non-native species, etc.)
- Feasibility of rectifying the disturbance (re-establishing natural hydrological regime, remove fill material, plant native species, altering grazing regime, etc.)

Water Chemistry and Macroinvertebrates
Using a Myron L EP11 pH/Conductivity Meter the following were measured:
- pH
- Conductivity

Also, the following was determined:
- Temperature (measured using standard thermometer)
- Estimate of flow volume using a drop weir or ocular estimate
- Species of targeted macroinvertebrates (mussels and snails) observed and/or collected (sent to Dr. Rob Guralnick and Gene Hall, at University of Colorado for identification).

RESULTS

A total of 74 seeps and springs were visited during the 2002 field season. Locations of the seeps and springs are shown on Figure 1. Of these, seven are new springs not included in the 1983 BLM Water Source Inventory. Individual summaries for 65 of the seeps and springs are included in this section of the report as well as brief comments on an additional 9 seeps and springs.

The highest quality springs from a biodiversity standpoint are listed in Table 1. These springs are undeveloped (not excavated or bermed or piped to a tank) and support relatively dense wetland vegetation. Most of the seeps and springs visited were developed (usually excavated and bermed) and about one-third of the sites were dry.

Table 1. Highest quality seeps and springs

Spring ID	Water Source Inventory Spring Name	Comments
B-868	State	Excavated pond at source but large stand of wet sedges remains – evidence of sage grouse use
B-925	Hondo	Nice stand of aspen with alder – spring undeveloped and within an exclosure – threatened by channel entrenchment and bare ground (grazing) at additional springs immediately outside of exclosure
B-965	Cochetopa Needle	Large willow/sedge stand – undeveloped spring - some hummocking and willow hedging
C-311	Taylor Park 32	Above Cabin Creek – spring in good condition – historic pond downhill from spring silted in and now sedge stand
F-452	Down the Line	Large willow and sedge stand along spring-fed creek. Banks compacted – evidence of sage grouse use
Birch	New to WSI	Undeveloped spring with river birch and hops
Cabin 1	New to WSI	Undeveloped spring with aspen and giant angelica

Mollusks collected from the seeps and springs included several globally common freshwater snails and one globally common peaclam (Table 2). The species all have widespread distributions and are common in Colorado.

Table 2. Mollusks collected from seeps and springs

Spring ID	Mollusk species	Common name	Global and State Rarity Rank
B-880	*Physa* sp.	A freshwater snail	
B-905	*Lymnaea ?elodes*	Marsh pondsnail	G5 S5
B-963	*Gyraulus ?parvus*	Ash gyro (a freshwater snail)	G5 S5
B-964	*Lymnaea* sp. *Gyralus* sp.	A freshwater snail A freshwater snail	
B-965	*Lymnaea* sp. *Pisidium casertanum*	A freshwater snail Ubiquitous peaclam	 G5 S5
C-193	*Gyraulus* sp. *Physa* sp.	A freshwater snail A freshwater snail	
C-228	*Gyraulus* sp.	A freshwater snail	
C-866	*Gyraulus parvus*	Ash gyro (a freshwater snail)	G5 S5

Identifications provided by G. Hall at University of Colorado Invertebrate Museum. ? indicates species ID tentative.

A summary table of grazing exclosure recommendations and Proper Functioning Condition ratings is included below (Table 3). Grazing exclosures are recommended for 20 seeps and springs with the following priority ratings:

Top priority	3 seeps/springs
High priority	3 seeps/springs
Medium priority	7 seeps/springs
Low priority	7 seeps/springs

Factors contributing to higher priority ratings for grazing exclosures include the following:
Spring not developed – in relatively natural condition
Evidence of use by Gunnison Sage Grouse high
Vegetation showing signs of extreme stress due to grazing.
Repairs on existing exclosures are needed at three of the seeps and springs visited (Table 3).

Of the 65 seeps and springs summarized, 31 were rated as Proper Functioning Condition, 24 as Functional at Risk, 9 as Nonfunctional, and one spring was not found (Table 3). Proper Functioning Condition analysis is not designed to evaluate natural ecological functioning but physical functioning instead. Therefore, a highly altered spring (excavated and bermed) can be rated as Proper Functioning Condition even though the functions the spring performs excavated and bermed can be very different than the functions of an unaltered spring. Conditions that lead to ratings of Functioning at Risk and Nonfunctional include hummocking, excessive bare ground, and gullying.

All of the seeps and springs visited are within the overall habitat range for the globally imperiled Gunnison Sage Grouse and within two miles of known lek sites (see Gunnison Basin Potential Conservation Area summary in Appendix A). Grouse were seen at four BLM seep/spring sites and two additional sites not located on BLM land. Signs of grouse (fecal pellets) were noted at about 25 of the seeps and springs (Table 3).

Some ponds with dense growth of aquatic vegetation exhibited high (>9.0) pH values. These high values are likely a result of photosynthesis of the aquatic plants in the pond and not a reflection of the water quality of the spring water itself. Photosynthesis, which occurs only during daylight hours, produces oxygen and consumes carbon dioxide, causing pH to increase. Respiration and decomposition, which occur 24 hours a day, consume oxygen and release carbon dioxide, causing pH to decrease. Therefore, pH levels can be elevated during the day and low at night.

Table 3. Seeps and springs surveyed 2002

Seep/Spring ID	Flow rate (gpm)*	Grouse sign	Developments	Grazing Exclosure Recommended	Priority	PFC rating
B-551	~½	None	Stock tank	YES	LOW	FAR no apparent trend
B-552	Pond	None	Excavation, berm	NO		Nonfunctional
B-868	Pond ~1	>50 pellets	History not clear, appears not developed but may have been excavated	YES	TOP	FAR no apparent trend
B-874	Pond	None	Excavation, berm	YES	HIGH	FAR downward trend
B-875	~1/4	None	Stock tanks downhill	Existing exclosure		PFC
B-880	Pond	None	Excavation, berm	NO		Nonfunctional
B-881	Puddle	1 pellet	Berm	YES	LOW	FAR downward trend
B-882	<1/4	2 grouse + 10 pellets	Stock tank	YES	LOW	FAR downward trend
B-885	Dry	None	Berms in dry channel	NO		FAR downward trend
B-886	<1/4	None	Berm	Existing exclosure	Repair	Nonfunctional
B-887	3	1 pellet	Not developed	Existing exclosure		PFC
B-892	Full tank	None	Excavation, stock tank	NO		Nonfunctional
B-905	<1/4	None	Excavation, berm	YES	MEDIUM	FAR no apparent trend
B-909	Dry	None	Stock tanks (outside of exclosure)	Existing exclosure		PFC
B-911	Dry	None	Stock tanks (outside of exclosure)	Existing exclosure		FAR no apparent trend
B-915	Tank full pond dry	None	Berm, stock tank	NO		Nonfunctional
B-925	10	3 pellets	Not developed	YES	TOP	FAR downward trend
B-927	Pond	None	Excavation, berm	YES	HIGH	FAR downward trend
B-928	<1/4	1 pellet	Berm outside of exclosure	Existing exclosure	Repair	PFC
B-938	Dry	Nearby pellet piles	Excavation, berm	NO		Nonfunctional
B-960	Dry	None	Excavation, berm	NO		PFC
B-963	Pond	None	Excavation, berm	Existing exclosure		PFC
B-964	Pond	None	Excavation, berm	NO		PFC
B-965	Puddle	10 pellets	Not developed	YES	MEDIUM	FAR no apparent trend
B-970	Full tank	1 pellet	Berm, stock tank	Existing exclosure		PFC
B-983	<1/4	None	Berm	NO		FAR no apparent trend

Table 3. Seeps and springs surveyed 2002

Seep/Spring ID	Flow rate (gpm)*	Grouse sign	Developments	Grazing Exclosure Recommended	Priority	PFC rating
C-126	Pond	2 pellets	Berm, French drain	NO		PFC
C-130	Dry	3 pellets	Berm in dry channel	NO		FAR downward trend
C-136	<1/4	None	Excavation, berm, stock tanks	Existing exclosure		Nonfunctional
C-144	Dry	1 pellet	Excavation, berm, stock tanks	Existing exclosure		Nonfunctional
C-193	Pond	10 pellets	Excavation, berm	YES	LOW	PFC
C-208	<1/4	1 pellet	Not developed	YES	MEDIUM	PFC
C-209	Dry	None	Not developed, dry channel	NO		Spring not located
C-210	Pond	None	Excavation, berm	NO		FAR no apparent trend
C-228	Pond	2 pellets	Excavation, berm	YES	LOW	PFC
C-229	Dry	5 pellets	Berms in dry channel	NO		PFC
C-236	Dry	None	Berm, stock tanks	Existing exclosure		PFC
C-275	Pond	1 pellet	Excavation, berm	Existing exclosure		PFC
C-281	Puddle	None	Berm	YES	MEDIUM	FAR no apparent trend
C-305	Dry	None	Berm in dry channel	NO		FAR no apparent trend
C-311	<1	1 pellet	Not developed – old berm downstream	YES	MEDIUM	PFC
C-591	Puddle	None	Not developed – stock tank below	YES	MEDIUM	PFC
C-615	Dry	None	Berm in dry channel	NO		FAR no apparent trend
C-649	Dry	None	Berm in dry channel	NO		FAR no apparent trend
C-786	Dry	None	Berm in dry channel	NO		FAR no apparent trend
C-805	Pond	2 pellets	Excavation, berm	NO		FAR no apparent trend
C-806	Dry	None	Not developed	Existing exclosure	Repair	PFC
C-809	Puddle	None	Not developed	YES	MEDIUM	FAR no apparent trend
C-820	Pond	None	Excavation, berm	NO		FAR no apparent trend
C-839	Dry	None	Not developed	NO		PFC
C-866	Pond	None	Excavation, berm	NO		PFC
C-884	Dry	None	Not developed	NO		PFC
D-227	Pond	2 pellets	Excavation, berm	NO		PFC

Table 3. Seeps and springs surveyed 2002

Seep/Spring ID	Flow rate (gpm)*	Grouse sign	Developments	Grazing Exclosure Recommended	Priority	PFC rating
D-232	Dry	None	Not developed, dry channel	NO		PFC
D-248	Dry	None	Berm in dry channel	NO		PFC
D-525	Dry	None	Not developed, drying meadow	Existing exclosure		PFC
F-425	~2	None	Stock tanks	YES	HIGH	FAR downward trend
F-452	~1	9 grouse + abundant pellets	Not developed	YES	TOP	PFC
NEW TO Water Source Inventory						
Alder Creek	~2	2 grouse + pellets	Not developed – excavated by road cut	NO		FAR no apparent trend
Birch	~1	None	Not developed	NO		PFC
Cabin Creek 1	~1	None	Not developed	YES	LOW	PFC
Cabin Creek 2	Dry	None	Not developed	NO		PFC
Cabin Creek 3	<1/4	1 pellet	Not developed	YES	LOW	PFC
Near B-928	Pond	None	Excavation, berm	NO		Nonfunctional
Near C-884	Dry	1 pellet	Not developed	NO		PFC
ADDITIONAL BRIEF COMMENTS						
B-871	Pond	---	Excavation, berm	NO		---
B-872	Full tank	---	Stock tanks	Existing exclosure		---
B-878	Full tank ~½ gpm	---	Stock tank	NO		---
B-879	Damp	---	Excavation	NO		---
Near B-889	Meadow	8 grouse + pellets	Spring itself not visited	Existing exclosure		---
C-818	Dry	---	Berm in dry channel	NO		---
C-819	Pond	---	Berm in channel	NO		---
C-931	Pond	None	Excavation, berm	NO		---
D-526	Dry	---	Could not locate spring	NO		---

* Approximate flow rate in gallons per minute (gpm), where reported as "pond" with no numeric value, no pond outflow was noted.
# pellets = # Gunnison Sage Grouse fecal pellets found
PFC = Proper Functioning Condition FAR = Functioning at Risk --- = information not recorded

Seep/Spring Surveys

B-551 (Kezar Spring)

Location: Gunnison County. Kezar Basin drainage. About 14 miles southwest of Gunnison. UTM Zone 13, 313521E, 4255709N.

Legal Description: USGS 7.5' quadrangle: Carpenter Ridge. T48N R2W Section 7 NE4.

Elevation: 8078 feet. **Date Visited:** 10 August 2002

Exclosure recommendation: Yes. Low priority. Area heavily used for livestock grazing. Vegetation stressed.

Dominant Plant Species: Woods rose, Baltic rush, wild iris.

Johnston Classification: not classified.

General Description: This spring is developed and piped to a stock tank. Water flows into the stock tank at about ½ gpm and overflows to a small bermed pond and wetland on the opposite side of the nearby dirt road. The area is used intensively by cattle: there is a lot of bare ground, willows are mushroom-shaped, and increaser plants such as Woods rose, are grazed to the ground. The wetland at the spring source is very small and dry with one Geyer willow, sparse Baltic rush and wild iris, and a patch of Canada thistle. The pond across the dirt road (UTM 313445E, 4255795) receives overflow from the stock tank but may also receive inflow from an additional spring. The pond is well vegetated and diverse (see table below) though the banks are trampled. The spring is just under a powerline. Birds noted at the pond include bluebirds, Northern Flicker, and hummingbirds. Stubble height at the edge of the pond was 2 inches.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Willows			*Urtica dioica* ssp. *gracilis*	stinging nettle	1
Salix bebbiana	Bebb willow	1	*Veronica americana*	American speedwell	1
Salix geyeriana	Geyer willow	5		unknown aquatic	5
Shrubs			**Graminoids**		
Amelchier utahensis	Utah serviceberry	1	*Beckmannia syzigachne*	American sloughgrass	10
Artemisia tridentata	big sagebrush	1	*Carex* sp.	sedge	1
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	3	*Eleocharis palustris*	common spikerush	15
Ericameria (=Chrysothamnus) nauseosus	rubber rabbitbrush	1	*Glyceria striata*	fowl mannagrass	2
Ribes inerme	whitestem gooseberry	1	*Hordeum jubatum*	foxtail barley	10
Rosa woodsii	Woods rose	5	*Juncus balticus*	Baltic rush	15
Forbs			*Juncus bufonius*	toad rush	1
Achillea millefolium (=lanulosa)	western yarrow	1	*Pascopyrum smithii*	western wheatgrass	1
Argentina anserina	silverweed cinquefoil	1	**Non-native grasses**		
Aster sp. (purple)	aster	1	*Agropyron cristatum*	crested wheatgrass	1
Cirsium sp.	thistle	1	*Agrostis gigantea*	redtop	1
Epilobium ciliatum	hairy willowherb	1	**Non-native forbs**		
Hackelia floribunda	manyflower stickseed	1	*Artemisia biennis*	biennial wormwood	1
Iris missouriensis	wild iris	2	*Chenopodium* sp.	goosefoot	1
Lupinus sp.	lupine	1	*Cirsium arvense*	Canada thistle	5
Potamogeton sp.	pondweed	5	*Plantago major*	common plantain	1

Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1	*Taraxacum officinale*	dandelion	1
Rorripa teres	blunt-leaved yellowcress	1	*Trifolium repens*	white clover	1

Proper Functioning Condition Rating: Spring B-551 is rated as Nonfunctional. The flow is diverted to a stock tank and no riparian vegetation grows at the spring source. The spring (or may just be overflow pond from stock tank) is rated as Functional at Risk with no apparent trend. The ground is trampled disturbing flow patterns and the wetland is likely smaller than it would be under more natural conditions.

Restoration and Management Comments: Bare ground and grazed to the ground shrubs surrounding the stock tank indicate that livestock use is very heavy at this spring. It is not clear whether the pond on the north side of the road is fed solely by overflow from the stock tank or whether there is an additional spring. If there is an additional spring, removal of the berm and fencing the wetland is recommended as the spring is in relatively good condition but shows signs of trampling and vegetative stress. The powerline overhead (and its potential for serving as a raptor perch) may make this spring undesirable for sage grouse brood rearing.

Water Chemistry: Spring discharge to the stock tank was measured as 0.6 gpm. The water chemistry measured at the pipe discharging to the stock tank was as follows:

pH	7.8
Conductivity	140 µS/cm
Temperature	11 C

Photos: Roll 4 # 7

B-552 (Floating Duck Spring)

Location: Gunnison County. Kezar Bain drainage. About 15 miles west southwest of Gunnison. UTM Zone 13, 311777E, 4255715N.

Legal Description: USGS 7.5' quadrangle: Carpenter Ridge. T48N R3W Section 12 NE4.

Elevation: 8110 feet. **Date Visited:** 10 August 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Bare ground.

Johnston Classification: not classified.

General Description: A spring within a deeply excavated pit. The water in the pond is stagnant and contains a lot of algae. There is over 90% bare ground with sparse goosefoot and biennial wormwood as cover. I counted four salamanders in the water and saw aquatic beetles and flatworms. The berm on this pond is very large and there is no associated channel. The bench above the excavation is sparsely vegetated with foxtail barley, Baltic rush, shrubby cinquefoil, rabbitbrush, and western wheatgrass.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site. The spring is close to a powerline.

Plant Species Observed (with rough estimate of percent cover):

Shrubs			**Graminoids**		
Chrysothamnus viscidiflorus	green rabbitbrush	5	*Hordeum jubatum*	foxtail barley	5
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	1	*Juncus balticus*	Baltic rush	5
Ericameria (=Chrysothamnus) nauseosus	rubber rabbitbrush	1	*Pascopyrum smithii*	western wheatgrass	1
Forbs			**Non-native forbs**		
Potamogeton sp.	pondweed	20	*Artemisia biennis*	biennial wormwood	5
			Chenopodium sp.	goosefoot	5
	algal mat	20			

Proper Functioning Condition Rating: This spring is rated as Nonfunctional. Modifications to the hydrology and vegetation are extreme.

Restoration and Management Comments: Restoration of this spring to its natural condition would include filling in the excavation, removing the berm, and allowing native vegetation to reestablish itself.

Water Chemistry: Partially full bermed pond. The water chemistry measured at the pond was as follows:

pH	8.6
Conductivity	440 µS/cm
Temperature	28 C

Photos: Roll 4 # 6

B-868 (State Spring)

Location: Gunnison County. Houston Gulch drainage. Take Highway 50 to County Road 43 (just east of Parlin). Travel about two miles south then turn east on road up Houston Gulch. Wetland is visible from the road. UTM Zone 13, 351933E, 4258566N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T49N R2E Section 36 NW4SE4.

Elevation: 8120 feet. **Date Visited:** 29 July 2002

Exclosure recommendation: Yes. Top priority. The spring is still in good condition but soils are compacted at the edge of the wetland and some hummocking has occurred within the wetland indicating a downward trend with the existing livestock usage pattern. Recommend including the entire pond and wet meadow within the exclosure.

Dominant Plant Species: Beaked sedge is the dominant plant species in the wet meadow.

Johnston Classification: RI9. Non-forested riparian - sedge wetland – deep cold gleyed soils – concave water bowls. The community keys to type B (beaked sedge-water sedge). This classification is not a good fit for this site (the elevation range for the described ecological type is 9530-12,040 feet).

General Description: A spring discharges to a deep pond about 30 feet in diameter. There is no berm on the pond and it discharges at least one gpm to a wet meadow continuing about 500 feet down a shallow swale. The wet meadow suppports a dense stand of beaked sedge with patches of clustered field sedge. The pond is lined with tall mannagrass and supports aquatic plants. The pond contains dense mats of green filamentous algae. A large salamander with gills was seen in the water as well as dragonfly larvae, diving beetles, and scuds. Adult deer flies were abundant and actively feeding. The edge of the wetland (drier portion) is heavily grazed and a narrow band of short western wheatgrass and Kentucky bluegrass surrounds the sedge meadow. Soils in the vicinity of the pond are loamy with black gleying and hydrogen sulfide odor. The wetland is adjacent to flat, rolling, sagebrush shrublands and an ephemeral mildly entrenched drainage. Stubble height was less than ½ inche at the edge of the sedges and 1 foot in the wet sedges.

Gunnison Sage Grouse notes: No sage grouse were noted at the spring; however, signs of extensive use by grouse – including over 50 grouse fecal pellets scattered around the edge of the sedge meadow – were present. The spring is within two miles of two known lek sites.

Plant Species Observed(with rough estimate of percent cover):

Shrubs			**Graminoids**		
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	1	*Alopecurus aequalis*	shortawn foxtail	1
Symphoricarpos rotundifolius	roundleaf snowberry	1	*Carex aquatilis*	water sedge	5
Forbs			*Carex* cf *praegracilis*	clustered field sedge	20
Achillea millefolium (=lanulosa)	western yarrow	1	*Carex utriculata*	beaked sedge	80
Antennaria sp.	pussytoes	1	*Deschampsia cespitosa*	tufted hairgrass	1
Argentina anserina	silverweed cinquefoil	5	*Eleocharis palustris*	common spikerush	10
Cirsium sp.	thistle	1	*Equisetum (Hippochaete)* sp.	scouring rush	1
Epilobium ciliatum	hairy willowherb	2	*Glyceria grandis*	American mannagrass	2
Iris missouriensis	wild iris	1	*Glyceria striata*	fowl mannagrass	1
Lemna minor	common duckweed	1	*Hordeum brachyantherum*	meadow barley	1
Lupinus sp.	lupine	1	*Hordeum jubatum*	foxtail barley	1
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1	*Juncus balticus*	Baltic rush	10

Ranunculus hyperboreas	floating buttercup	1	*Pascopyrum smithii*	western wheatgrass	5
Rorripa nasturtium-aquaticum (=Nasturtium officinale)	watercress	1	**Non-native grasses**		
Veronica americana	American speedwell	1	*Agrostis gigantea*	redtop	2
			Poa pratensis	Kentucky bluegrass	5
			Non-native forbs		
			Cirsium arvense	Canada thistle	1
			Plantago major	Common plantain	1

Proper Functioning Condition Rating: This spring system is rated as Functioning at Risk with no apparent trend. The edge of the wetland shows sign of livestock use including soil compaction and there is some hummocking in drier portions of the sedge meadow. It is not clear when the spring was dug out to form the pond. The original spring likely was not ponded.

Restoration and Management Comments: There are some non-native species present, including Canada thistle, but no major weed problems were noted. Manage livestock grazing to maintain spring and wetland in good condition.

Water Chemistry: The flow rate from the pond overflow to the meadow was measured using the weir and found to be 1 gpm. It is likely that not all of the discharge was captured by the weir. The water chemistry was as follows:

pH	7.6
Conductivity	300 µS/cm
Temperature	17 C

Photos: Roll 3 # 4-6

B-874 (Coch Needle Razor 3)

Location: Gunnison County. Tomichi Creek drainage. Approximately five air miles south of Parlin. Access from Highway 114 and 43 road. UTM Zone 13, 349052E, 4255232N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T48N R2E Section 10 SE4.

Elevation: 8340 feet. **Date Visited:** 29 June 2002

Exclosure recommendation: Yes. High priority. Extreme hummocking and hedging of willows. Vegetation and soils could benefit from rest from livestock grazing.

Dominant Plant Species: Baltic rush and Kentucky bluegrass.

Johnston Classification: RI1 F. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. F designates the community type as Baltic rush-dandelion-yarrow-sparse willows.

General Description: The spring is located at the head of a swale on a very small drainage. The spring has been excavated and bermed. Below the berm the ground is extremely hummocked and the willows extremely hedged. The scattered willows are dead or dying. The damaged willows and extreme hummocking continue downstream for about 100 feet. Cattle trails and abundant and there is about 50% bare ground. Baltic rush grows on the hummocks with yarrow and unidentified grasses. There is one juniper tree next to the 20 foot by 10 foot pond of open water. Aquatic insects noted in the water include whirligig beetles, water striders, and damselfly larvae. Soils below the berm are black (10 YR 2/1) silty clay loam and moist. Stubble height was 3-6 inches.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Juniperus scopulorum	Rocky Mountain juniper	1	*Carex* sp.	sedge	<1
Willows			*Carex utriculata*	beaked sedge	1
Salix bebbiana	Bebb willow	1	*Eleocharis palustris*	common spikerush	1
Shrubs			*Equisetum (Hippochaete)* sp.	scouring rush	<1
Ericameria (=Chrysothamnus) nauseosus	rubber rabbitbrush	<1	*Glyceria striata*	fowl mannagrass	1
Ribes inerme	whitestem gooseberry	1	*Juncus balticus*	Baltic rush	5
Rosa woodsii	Woods rose	1	*Leymus cinerus*	basin wildrye	1
Forbs				unidentified grass	5
Achillea millefolium (=lanulosa)	western yarrow	2	**Non-native forbs**		
Antennaria sp.	pussytoes	<1	*Plantago major*	common plantain	<1
Argentina anserina	silverweed cinquefoil	2	*Polygonum* sp.	knotweed	<1
Hackelia floribunda	manyflower stickseed	<1	*Taraxacum officinale*	dandelion	1
Lemna minor	common duckweed	<1	*Trifolium repens*	white clover	1
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	<1			
Rorripa teres	blunt-leaved yellowcress	<1			

Proper Functioning Condition Rating: This spring system is rated as Functional at Risk with a downward trend. The extreme hummocking is altering the hydrological functioning. Plants are stressed and there is a lot of bare ground. The spring is rated as FAR instead of Nonfunctional

because the channel is not entrenched and it appears that the area might recover with rest from grazing.

Restoration and Management Comments: Rest from grazing is recommended to encourage recovery of the willows. Extreme hummocking indicates heavy livestock use. Restoration of the spring to its natural condition would include removing the berm, filling in the excavation, and reestablishment of native vegetation.

Water Chemistry: The pond was full but no surface outflow was noted. The water chemistry measured in the pond was as follows:

pH	8.3
Conductivity	420 μS/cm
Temperature	18 C

Photos: Roll 2 # 33-35

B-875 (Valdez Spring)

Location: Gunnison County. Tomichi Creek drainage. Approximately five air miles south of Parlin. Access from Highway 114 and 43 road. UTM Zone 13, 348988E, 4254597N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T48N R2E Section 15 NE4.

Elevation: 8480 feet. **Date Visited:** 29 June 2002

Exclosure recommendation: No. Spring already within exclosure.

Dominant Plant Species: Geyer willow and beaked sedge.

Johnston Classification: RI1 B. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. B designates the community type as Geyer willow-beaked sedge.

General Description: Valdez Spring is on a northwest-facing hillside and supports a dense patch of willows and beaked sedge. The spring is within an exclosure. Water from the spring is piped to two stock tanks. The spring is flowing both within the exclosure and overflowing at the stock tanks. The total flow is estimated at about ¼ gpm. The spring flows into a small brook that flows downhill to a flat area with dense beaked sedge and willows. Drier areas support Baltic rush. Aquatic life noted in the brook include mayfly and stonefly larvae and flatworms. Four inches of organic matter overly sandy gravel soils. Stubble height was 1 foot.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Juniperus scopulorum	Rocky Mountain juniper	5	*Carex praegracilis*	clustered field sedge	10
Willows			*Carex utriculata*	beaked sedge	50
Salix bebbiana	Bebb willow	1	*Glyceria striata*	fowl mannagrass	1
Salix exigua	Sandbar willow	5	*Juncus balticus*	Baltic rush	20
Salix geyeriana	Geyer willow	20	*Pascopyrum smithii*	western wheatgrass	1
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	5	**Non-native grasses**		
Shrubs			*Agropyron cristatum*	crested wheatgrass	1
Artemisia tridentata	big sagebrush	5	*Poa pratensis*	Kentucky bluegrass	20
Dasiphora (=Pentaphylloides) floribunda	Shrubby cinquefoil	5	**Non-native forbs**		
Ribes cereum	wax currant	1	*Cirsium arvense*	Canada thistle	1
Ribes lacustre	prickly currant	10	*Rumex* sp.	dock	1
Rosa woodsii	Woods rose	10	*Taraxacum officinale*	dandelion	1
Forbs					
Achillea millefolium (=lanulosa)	Western yarrow	2		moss	1
Argentina anserina	silverweed cinquefoil	5			
Cirsium tioganum var. *coloradense (=scariosum)*	Meadow thistle	2			
Dodecatheon pulchellum	darkthroat shooting-star	1			
Epilobium ciliatum	hairy willowherb	1			
Galium boreale (=septrionale)	Northern bedstraw	1			
Geranium sp.	geranium	1			
Iris missouriensis	wild iris	2			
Sidalcea neomexicana	New Mexican checkermallow	<1			
Urtica dioica ssp. *gracilis*	Stinging nettle	2			

Proper Functioning Condition Rating: This spring system is rated as Proper Functioning Condition as ecological processes are apparently intact.

Restoration and Management Comments: The spring is within an exclosure and the willows and other vegetation are dense and in good condition. Flow is diverted to stock tanks outside of the exclosure.

Water Chemistry: Flow from the spring was visually estimated at less than ¼ gpm. The water chemistry measured at the spring source was as follows:

pH	7.6
Conductivity	260 µS/cm
Temperature	10 C

Photos: Roll 2 # 31-32

B-880 (Steer Gulch Spring 28)

Location: Gunnison County. Tomichi Creek drainage. About seven miles southeast of Parlin or three miles west of Doyleville. UTM Zone 13, 354679E, 4257242N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T48N R3E Section 5 NW4.

Elevation: 8363 feet. **Date Visited:** 30 July 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Common spikerush.

Johnston Classification: not classified.

General Description: An excavated spring with ponded water and a sparsely vegetated berm. The center of the pond supports a stand of common spikerush with open water covered with fowl mannagrass. Snails (*Physa* sp.) were collected from the aquatic vegetation. The berm and sparsely vegetated soil surrounding the spikerush support a stand of Canada thistle. The spring is at the base of an east facing sagebrush vegetated slope. There was no stubble at the edge of the wetland, just bare ground. The spikerush was about 1 foot high.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Shrubs			*Eleocharis palustris*	common spikerush	30
Chrysothamnus viscidiflorus	green rabbitbrush	1	*Glyceria striata*	fowl mannagrass	1
Rosa woodsii	Woods rose	1	*Hordeum jubatum*	foxtail barley	1
Forbs			*Juncus balticus*	Baltic rush	1
Epilobium ciliatum	hairy willowherb	1	**Non-native grasses**		
Lemna minor	common duckweed	10	*Agrostis gigantea*	redtop	1
Ranunculus hyperboreas	floating buttercup	1	**Non-native forbs**		
Graminoids			*Chenopodium* sp.	goosefoot	1
Alopecurus aequalis	shortawn foxtail	1	*Cirsium arvense*	Canada thistle	2
Carex utriculata	beaked sedge	1	*Polygonum* sp.	knotweed	10

Proper Functioning Condition Rating: This spring is rated as Nonfunctional. The deep excavations of the spring alters its hydrologic functioning. Vegetative cover is sparse.

Restoration and Management Comments: Restoration of this spring to its natural condition would include filling in the excavation, removing the berm, and allowing recovery of native vegetation. This spring might not reach the surface without the excavation.

Water Chemistry: No flow was noted out of the excavated spring. The water chemistry measured was as follows:

pH	6.6
Conductivity	50 µS/cm
Temperature	13 C

Photos: Roll 4 # 37

B-881 (Tomichi Spring)

Location: Gunnison County. Tomichi Creek drainage. About four miles southwest of Parlin. UTM Zone 13, 353929E, 4258531N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T49N R3E Section 31 SE4.

Elevation: 8224 feet. **Date Visited:** 30 July 2002

Exclosure recommendation: Yes. Low priority. Vegetation stressed, soils hummocked.

Dominant Plant Species: Bare ground, Woods rose, beaked sedge.

Johnston Classification: RI1 D. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. D designates the community type as Geyer willow-Kentucky bluegrass-dandelion.

General Description: A dry bermed pond in a draw. The spring source (about 3'x 3' of standing water) is about 50 feet upstream from the bermed dry pond. A willow-lined channel follows the draw for about 500 feet downstream from the berm. The willows are mushroom-shaped with many of them on one- to two-foot pedestals. There is sparse cover of Baltic rush beneath and soils are moderately hummocked. Downstream from the willows the channel peters out. The channel is not entrenched. Soils are very dark brown (10YR 2/2) sandy clay loam.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were seen; however one fecal pellet was noted. The spring is within 2.1 miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Juniperus scopulorum	Rocky Mountain juniper	1	*Alopecurus aequalis*	shortawn foxtail	1
Willows			*Beckmannia syzigachne*	American sloughgrass	1
Salix geyeriana	Geyer willow	20	*Carex utriculata*	beaked sedge	10
Shrubs			*Glyceria grandis*	American mannagrass	1
Artemisia tridentata	big sagebrush	5	*Glyceria striata*	fowl mannagrass	1
Chrysothamnus viscidiflorus	green rabbitbrush	5	*Hordeum brachyantherum*	meadow barley	1
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	5	*Hordeum jubatum*	foxtail barley	1
Ribes inerme	whitestem gooseberry	2	*Juncus balticus*	Baltic rush	30
Forbs			*Pascopyrum smithii*	western wheatgrass	5
Achillea millefolium (=lanulosa)	western yarrow	1	**Non-native grasses**		
Argentina anserina	silverweed cinquefoil	5	*Agrostis gigantea*	redtop	1
Aster sp. (purple)	Aster	1	*Poa pratensis*	Kentucky bluegrass	1
Epilobium ciliatum	hairy willowherb	1	**Non-native forbs**		
Iris missouriensis	wild iris	1	*Cirsium arvense*	Canada thistle	2
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1	*Polygonum* sp.	knotweed	1
Rorripa teres	blunt-leaved yellowcress	1	*Trifolium repens*	white clover	1
Urtica dioica ssp. *gracilis*	stinging nettle	1			

Proper Functioning Condition Rating: This spring is rated as Functional at Risk with a downward trend. Hummocking of soils alters the flow patterns and vegetation is sparse and stressed.

Restoration and Management Comments: Rest from livestock grazing would likely benefit the stressed vegetation and allow recovery of hummocked soils.

Water Chemistry: The water chemistry measured in standing water at the spring source was as follows:

pH	7.0
Conductivity	150 µS/cm
Temperature	15 C

Photos: Roll 4 # 35-36

B-882 (Algodones Spring)

Location: Gunnison County. Tomichi Creek drainage. About four miles southeast of Parlin. UTM Zone 13, 353914E, 4259219N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T49N R3E Section 31 NE4.

Elevation: 8186 feet. **Date Visited:** 29 July 2002

Exclosure recommendation: Yes. Low priority. Vegetation would likely benefit from rest from grazing.

Dominant Plant Species: Geyer willow, Baltic rush.

Johnston Classification: not classified.

General Description: A spring piped to a stock tank. The stock tank is dry but the pipe is discharging to the ground creating a small wet area with foxtail barley. The spring is associated with a narrow channel flowing down the steep hill toward Tomichi Creek and Highway 50. The ephemeral drainage has mushroom-shaped Geyer willow with sparse Baltic rush and currant. The willows are on pedestals and there are a lot of cattle droppings.

Gunnison Sage Grouse notes: Two Gunnison Sage Grouse flushed from the spring and about 10 grouse fecal pellets were noted. The spring is within two miles of one known lek site.

Plant Species Observed:

Willows			**Graminoids**		
Salix geyeriana	Geyer willow	X	*Hordeum jubatum*	foxtail barley	X
Shrubs			*Juncus balticus*	Baltic rush	X
Ribes inerme	whitestem gooseberry	X	**Non-native forbs**		
Rosa woodsii	Woods rose	X	*Chenopodium* sp.	goosefoot	X
Forbs			*Rumex* sp.	dock	X
Epilobium ciliatum	hairy willowherb	X			
Hackelia floribunda	manyflower stickseed	X			
Limosella aquatica	water mudwort	X			
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	X			
Rorripa teres	blunt-leaved yellowcress	X			

Proper Functioning Condition Rating: This spring is rated as Functioning at Risk with a downward trend. The hedged willows on pedestals indicate that the vegetation is under stress. Loss of the willows would likely result in increased erosion.

Restoration and Management Comments: The riparian vegetation shows signs of excessive grazing.

Water Chemistry: Water flowing at slight drip out of stock tank pipe. The water chemistry was not measured

Photos: Roll 4 # 31

B-885 (Steer Gulch Spring 31)

Location: Saguache County. Long Gulch drainage. Approximately six miles southeast of Parlin and five miles southwest of Doyleville. UTM Zone 13, 352373E, 4253459N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T48N R3E Section 18 SW4.

Elevation: 8700 feet. **Date Visited:** 29 June 2002

Exclosure recommendation: No. Low priority for restoration. Dry seep, one old, grazed Bebb willow.

Dominant Plant Species: Bare ground and Baltic rush.

Johnston Classification: RI1 F. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. F designates the community type as Baltic rush-dandelion-yarrow-sparse willows.

General Description: A dry seep on the side of a NW-facing slope on the bank of an entrenched dry ephemeral channel. There is a series of berms in the channel including one immediately downstream of the dry seep. The stock tank at the site is dry with trampled mud on the bottom. There is one very old very gnarled Bebb willow at the site with cattle trails leading to it and primarily bare ground beneath. Bare ground is estimated at over 70 percent. Soils in a patch of Baltic rush were brown (10YR 4/3) sandy clay loam. Stubble height was about 2-6 inches in the wetland and 1 inch in the sagebrush.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Pseudotsuga menziesii	Douglas-fir	1	*Carex utriculata*	beaked sedge	<1
Willows			*Hordeum jubatum*	foxtail barley	1
Salix bebbiana	Bebb willow	5	*Juncus balticus*	Baltic rush	10
Shrubs			*Pascopyrum smithii*	western wheatgrass	5
Artemisia tridentata	big sagebrush	1	**Non-native grasses**		
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	1	*Poa pratensis*	Kentucky bluegrass	1
Ericameria (=Chrysothamnus) nauseosus	rubber rabbitbrush	1	**Non-native forbs**		
Juniperus communis	common juniper	1	*Cirsium arvense*	Canada thistle	1
Ribes cereum	wax currant	1	*Salsola tragus (australis)*	Russian thistle	1
Ribes inerme	whitestem gooseberry	2			
Rosa woodsii	Woods rose	1			
Forbs					
Achillea millefolium (=lanulosa)	western yarrow	1			
Argentina anserine	silverweed cinquefoil	1			
Iris missouriensis	wild iris	1			
Lupinus sp.	lupine	<1			
Scrophularia lanceolata	lanceleaf figwort	<1			

Proper Functioning Condition Rating: This spring system is rated as Functional at Risk with a downward trend. This rating is based on vegetation – high percentage of bare ground, one highly stressed willow. The adjacent channel appears to have no natural sinuosity, just a series of berms.

Restoration and Management Comments: The exact location of the seep or spring is not clear. The area is dry and one old Bebb willow survives but all its lower braches are removed. Monitor livestock use.

Water Chemistry: The area was dry and appears to have been dry for a long time.

Photos: Roll 2 # 30

B-886 (E Vado Spring)

Location: Saguache County. Long Gulch drainage. Approximately six miles southeast of Parlin and five miles southwest of Doyleville. UTM Zone 13, 352313E, 4253220N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T48N R2E Section 13 SE4.

Elevation: 8656 feet. **Date Visited:** 29 June 2002

Exclosure recommendation: No. Repair existing (small) exclosure.

Dominant Plant Species: Big sagebrush, sparse beaked sedge.

Johnston Classification: RI1 H. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. H designates the community type as big sagebrush-Kentucky bluegrass-yarrow-dandelion This designation is not a good fit for this small patch.

General Description: An excavated spring within a 30 foot by 10 foot pond adjacent to an entrenched dry ephemeral channel. There is a fence around the pond but the gate is broken and open and there are cattle hoof prints and droppings within the exclosure. There is piping to a stock tank but the tank has been removed. Big sagebrush grows at the edge of the pond with sparse beaked sedge and duckweed growing in the pond.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Willows			*Lemna minor*	common duckweed	2
Salix monticola	serviceberry (mountain) willow	2	**Graminoids**		
Shrubs			*Carex utriculata*	beaked sedge	5
Artemisia tridentata	big sagebrush	5	*Eleocharis palustris*	common spikerush	<1
Ericameria (=Chrysothamnus) nauseosus	rubber rabbitbrush	1	*Glyceria striata*	fowl mannagrass	1
Rosa woodsii	Woods rose	<1	*Juncus balticus*	Baltic rush	2
Forbs			*Pascopyrum smithii*	western wheatgrass	<1
Achillea millefolium (=lanulosa)	western yarrow	1	**Non-native forbs**		
Argentina anserina	silverweed cinquefoil	1	*Cirsium arvense*	Canada thistle	1
Epilobium ciliatum	hairy willowherb	<1			

Proper Functioning Condition Rating: This spring system is rated as Nonfunctional. The artificial ponding of this spring alters the natural functions.

Restoration and Management Comments: Restoration of the spring to its natural condition would include removing the berm, filling in the excavation, and reestablishment of native vegetation.

Water Chemistry: Flow from the spring was visually estimated at less than 1/4 gpm. The water chemistry measured at the spring source was as follows:

pH	7.4
Conductivity	230 µS/cm
Temperature	8 C

Photos: Roll 1 # 28-29

B-887 (Hidden Draw Spring)

Location: Saguache County. Long Gulch drainage. Approximately six miles southeast of Parlin and five miles southwest of Doyleville. UTM Zone 13, 352154E, 4252471N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T48N R2E Section 24 NE4.

Elevation: 8740 feet. **Date Visited:** 29 June 2002

Exclosure recommendation: Not needed. Existing exclosure intact.

Dominant Plant Species: Geyer willow and beaked sedge.

Johnston Classification: RI1 B. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. B designates the community type as Geyer willow-beaked sedge.

General Description: This spring emerges from a hillside and flows into an opening with small shallow pools with sedges and then a willow-lined channel. The spring flows at about 3 gpm and infiltrates in the channel. The spring and willow-lined channel are contained within a large exclosure. Many of the willows in the dry channel are dead or dying. Aquatic invertebrates noted in the pools include water fleas, diving beetles, and water striders. Soils are organic rich, black (10YR 2/1) silty clay.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however, one fecal pellet was found. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix bebbiana	Bebb willow	10	*Alopecurus aequalis*	shortawn foxtail	1
Salix geyeriana	Geyer willow	10	*Carex praegracilis*	clustered field sedge	2
Shrubs			*Carex utriculata*	beaked sedge	15
Chrysothamnus viscidiflorus	green rabbitbrush	1	*Eleocharis palustris*	common spikerush	5
Ericameria (=Chrysothamnus) nauseosus	rubber rabbitbrush	2	*Glyceria striata*	fowl mannagrass	1
Ribes cereum	wax currant	2	*Hordeum brachyantherum*	meadow barley	1
Ribes inerme	whitestem gooseberry	5	*Juncus balticus*	Baltic rush	20
Rosa woodsii	Woods rose	3	*Pascopyrum smithii*	western wheatgrass	1
Symphoricarpos rotundifolius	roundleaf snowberry	1	**Non-native grasses**		
Forbs			*Alopecurus pratensis*	meadow foxtail	1
Achillea millefolium (=lanulosa)	western yarrow	1	*Poa pratensis*	Kentucky bluegrass	5
Argentina anserina	silverweed cinquefoil	2	**Non-native forbs**		
Epilobium ciliatum	hairy willowherb	1	*Capsella bursa-pastoris*	shepherd's purse	1
Iris missouriensis	wild iris	1	*Cirsium arvense*	Canada thistle	2
Lemna minor	common duckweed	1	*Rumex* sp.	dock	1
Lupinus sp.	lupine	1	*Trifolium repens*	white clover	1
Veronica americana	American speedwell	1			

Proper Functioning Condition Rating: This spring system is rated as Proper Functioning Condition as ecological processes are apparently intact.

Restoration and Management Comments: Many of the willows within the channel are dead perhaps warranting further investigation. The exclosure effectively excludes livestock grazing.

Water Chemistry: Flow from the spring was visually estimated at 3 gpm. The water chemistry measured at the spring source was as follows:

pH	7.8
Conductivity	200 µS/cm
Temperature	18 C

Photos: Roll 2 # 25-27

B-892 (East Cochetopa Spring 11)

Location: Saguache County. Tomichi Creek drainage. About four miles southwest of Doyleville. UTM Zone 13, 356013E, 4251670N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T48N R3E Section 21 SW4.

Elevation: 8582 feet. **Date Visited:** 29 July 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Bare ground, Woods rose, beaked sedge.

Johnston Classification: not classified.

General Description: Holes were recently excavated near the spring apparently searching for a water source for the stock tank down the hill. A small corral-type exclosure surrounds the dry spring and holes. There is mostly bare, excavated ground with scattered beaked sedge, alkali buttercup, and Pacific willow at the dry spring. A small (10 feet by 30 feet) hummocked dry stand of beaked sedge occurs outside of the exclosure. A stock tank down the hill is full and had two dead flicker-sized birds in it and no escape means. About 50 feet up the hill is a small aspen stand with Rocky Mountain juniper.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Trees			*Cirsium* sp.	thistle	1
Populus tremuloides	quaking aspen	1	*Epilobium ciliatum*	hairy willowherb	1
Willows			*Ranunculus (=Halerpestes) cymbalaria*	alkali buttercup	3
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	5	**Graminoids**		
Shrubs			*Carex utriculata*	beaked sedge	10
Artemisia tridentata	big sagebrush	5	*Juncus balticus*	Baltic rush	5
Juniperus communis	common juniper	1	**Non-native grasses**		
Rosa woodsii	Woods rose	10	*Poa pratensis*	Kentucky bluegrass	5
Forbs			**Non-native forbs**		
Achillea millefolium (=lanulosa)	western yarrow	1	*Amaranthus* sp.	amaranth	1
Argentina anserina	silverweed cinquefoil	1	*Chenopodium* sp.	goosefoot	1
Aster sp. (purple)	aster	1	*Cirsium arvense*	Canada thistle	1
Chamerion angustifolium (=danielsii)	fireweed	1			

Proper Functioning Condition Rating: This spring is rated as Nonfunctional. The excavations and construction activity at the source have disrupted flow patterns and the vegetation.

Restoration and Management Comments: The ground surface is very disturbed by recent excavations. A small corral surrounds part of the excavations. Restoration would require reestablishing the ground surface and reestablishment of native vegetation. Flow from the spring is diverted downhill to a stock tank.

Water Chemistry: No flow was noted out of the stock tank. The water chemistry measured at the tank was as follows:

pH	7.2
Conductivity	340 µS/cm
Temperature	18 C

Photos: Roll 3 # 7-9

B-905 (Williams Spring)

Location: Gunnison County. Tomichi Creek drainage. About three miles east of Parlin. UTM Zone 13, 353447E, 4261719N.

Legal Description: USGS 7.5' quadrangle: McIntosh Mountain. T49N R3E Section 19 SE4.

Elevation: 8268 feet. **Date Visited:** 27 July 2002

Exclosure recommendation: Medium. Spring is highly altered (excavated and bermed) but thick peat in the berm indicates a wet meadow/peatland likely used to be here and could possibly be restored.

Dominant Plant Species: Pacific willow, common spikerush, and beaked sedge.

Johnston Classification: RI1 A. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. A designates the community type as yellow willow-Geyer willow-other willows-beaked sedge.

General Description: An excavated ponded and bermed spring on a south-facing slope overlooking Highway 50. There are chunks of peat in the berm indicating the spring has been active for a long long time and likely supported a wet meadow before it was excavated. The pond is covered with duckweed upon which large snails (*Lymnaea elodes* – tentative ID) are traveling about. The pond edge has dense growth of common spikerush and beaked sedge. Three old mushroom-shaped Pacific willows are at the edge of the pond at the spring source. The spring is uphill from an ephemeral drainage with scattered Geyer willow and aspen. Stubble height was 1 foot in the wetland and 1 inch in the sagebrush.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of three known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow (3 trees)	10	*Alopecurus aequalis*	shortawn foxtail	1
Shrubs			*Carex* sp.	sedge	10
Artemisia tridentata	big sagebrush	5	*Carex utriculata*	beaked sedge	20
Ericameria (=Chrysothamnus) nauseosus	rubber rabbitbrush	1	*Eleocharis palustris*	common spikerush	40
Rosa woodsii	Woods rose	10	*Glyceria grandis*	American mannagrass	5
Forbs			*Hordeum jubatum*	foxtail barley	1
Achillea millefolium (=lanulosa)	western yarrow	1	*Juncus balticus*	Baltic rush	5
Argentina anserina	silverweed cinquefoil	5	*Sparganium emersum*	burreed	1
Epilobium ciliatum	hairy willowherb	5	**Non-native grasses**		
Lemna minor	common duckweed	100 in pond	*Agrostis gigantea*	redtop	20
Potamogeton sp.	pondweed	50	**Non-native forbs**		
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1	*Cirsium arvense*	Canada thistle	5

Proper Functioning Condition Rating: Functioning at Risk with no apparent trend. There is a lot of bare soil. The ponding/excavation changes the natural functioning.

Restoration and Management Comments: Livestock droppings are abundant at the spring and there is a stand of Canada thistle on the berm. Restoration to natural conditions would require filling in the excavation, removal of the berm, and reestablishment of native vegetation.

Water Chemistry: Flow from the spring was visually estimated at less than ¼ gpm. The water chemistry measured at the spring source was as follows:

pH	7.2
Conductivity	120 µS/cm
Temperature	10 C

Photos: Roll 3 # 21-22

B-909 (Pilony Irby Spring)

Location: Saguache County. Needle Creek drainage. Approximately five miles southeast of Doyleville on a tributary to Needle Creek. UTM Zone 13, 4251391N, 366143E.

Legal Description: USGS 7.5' quadrangle: Doyleville. T48N R4E Section 21 SE4.

Elevation: 8380 feet. **Date Visited:** 17 June 2002

Exclosure recommendation: No. Spring is already within an exclosure. Willows are hedged within the exclosure.

Dominant Plant Species: Dominant graminoids at the dry seep included Kentucky bluegrass and Baltic rush. A few willows were present including Geyer willow and Pacific willow.

Johnston Classification: RI1 F. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. F designates the community type as Baltic rush-dandelion-yarrow-sparse willows.

General Description: The seep is located on a west-facing sagebrush dominated slope overlooking Needle Creek. The seep was dry during the site visit and appeared to have been dry for an extended period. A small grassy area supporting primarily non-native pasture grasses occurs at what appeared to be the wettest area. A few scattered willows grow within and surrounding the grassy area. There are two exclosures in the vicinity of the seep. One occurs around the spring and bisects a stock tank that was dry. The other exclosure is just downslope from the spring surrounding a small patch of aspen. The sagebrush within the exclosure appeared to be taller than the sagebrush outside the exclosure but willows within the exclosure were mushroom-shaped. Cattle and elk droppings were observed within the exclosure. The stubble height at the spring within the Kentucky bluegrass was about 18 inches. The stubble height within the surrounding sagebrush was about 6 inches.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix geyeriana	Geyer willow	5	*Carex* cf. *praegracilis*	clustered field sedge	1
Salix cf. *ligulifolia (=lutea, eriocephala*)	yellow (strapleaf) willow	1	*Equisetum (Hippochaete)* sp.	scouring rush	2
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	2	*Hesperostipa comata*	needle-and-thread grass	<1
Shrubs			*Juncus balticus*	Baltic rush	10
Amelchier utahensis	Utah serviceberry	2	*Leymus cinerus*	basin wildrye	3
Artemisia tridentata	big sagebrush	10	*Pascopyrum smithii*	western wheatgrass	5
Chrysothamnus viscidiflorus	green rabbitbrush	3	**Non-native grasses**		
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	2	*Agrostis gigantea*	redtop	2
Ericameria (=Chrysothamnus) nauseosus	rubber rabbitbrush	3	*Phleum pratense*	common timothy	1
Ribes inerme	whitestem gooseberry	2	*Poa pratensis*	Kentucky bluegrass	10
Rosa woodsii	Woods rose	2			
Symphoricarpos rotundifolius	roundleaf snowberry	2			
Forbs					
Achillea millefolium (=lanulosa)	western yarrow	1			
Cirsium sp.	thistle	1			
Hackelia floribunda	manyflower stickseed	<1			

Iris missouriensis	wild iris	2			
Mainthemum stellatum	false Solomon's seal	1			
Urtica dioica ssp. *gracilis*	stinging nettle	<1			

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition as ecological processes are apparently intact. The spring and associated stock tank were dry.

Restoration and Management Comments: The spring is within an exclosure that is effectively excluding cattle grazing. The willows nevertheless are mushroom-shaped indicating that the exclosure was recently constructed, the gate is often left open, or that elk and other herbivores are causing the hedged willows. Both cattle and elk droppings were abundant within the exclosure. A small patch of non-native pasture grasses (e.g. Kentucky bluegrass, redtop, and timothy) occurs in what is probably the wettest area in wet years.

Water Chemistry: The seep was dry during the site visit and appeared to have been dry for an extended period.

Photos: Roll 1 # 36-37

B-911 (Powerline Spring and Exclosure)

Location: Gunnison County. Wood Gulch drainage. About three miles east of Parlin. UTM Zone 13, 354188E, 4262061N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T49N R3EW Section 20 NW4.

Elevation: 8510 feet. **Date Visited:** 27 July 2002

Exclosure recommendation: Not needed. Dry spring within an existing exclosure.

Dominant Plant Species: Aspen, Baltic rush, smooth brome.

Johnston Classification: FR2 C. Aspen-cottonwood-deep alluvial soils-floodplains. C designates the community type as aspen-Kentucky bluegrass.

General Description: A dry, developed spring on an east-facing hillside. The spring is within an exclosure. Stock tanks below the spring are also dry. Adjacent to the cement culvert of the spring is an aspen stand with an understory of Baltic rush and smooth brome with Woods rose, wax currant, snowberry, serviceberry, and big sagebrush. Uphill from the dry spring is a strip of serviceberry following an elevation contour. Soils near the spring are brown (10YR 4/3), sandy clay loam. Stubble height was 1 foot in the wetland and 4 inches in the sagebrush (within the exclosure).

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Populus tremuloides	quaking aspen	20	*Juncus balticus*	Baltic rush	30
Shrubs			**Non-native grasses**		
Amelchier utahensis	Utah serviceberry	1	*Bromus inermis*	smooth brome	30
Artemisia tridentata	big sagebrush	5			
Chrysothamnus viscidiflorus	green rabbitbrush	1			
Ribes cereum	wax currant	1			
Rosa woodsii	Woods rose	5			
Symphoricarpos rotundifolius	roundleaf snowberry	1			

Proper Functioning Condition Rating: This spring is rated as Functioning at Risk with no apparent trend. The vegetation at the spring source is dominated by upland species. It is not clear whether the spring is dry due to natural water level fluctuation/drought or due to below ground diversion of the spring to the tank.

Restoration and Management Comments: The dry spring is within an exclosure.

Water Chemistry: The spring was dry.

Photos: Roll 3 # 23-24

B-915 (East Side Wood Gulch Spring)

Location: Gunnison County. Wood Gulch drainage. About two miles northwest of Doyleville. North of Road 44. UTM Zone 13, 357075E, 4259744N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T49N R3E Section 28 SE4.

Elevation: 8150 feet. **Date Visited:** 30 June 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Narrowleaf cottonwood and bare ground.

Johnston Classification: not classified.

General Description: A dry bermed pond with a full stock tank below. The spring source was not found. The bermed pond was rimmed with mature narrowleaf cottonwoods with a few small sandbar willow and Pacific willow. The dry pond bottom was primarily bare ground with small patches of beaked sedge, Baltic rush, and an unidentified dry grass. There are ATV tracks up the berm and the area apparently is heavily used by humans and cattle. Stubble was very sparse but about 6 inches high in the dry bermed pond and 1 inch in the sagebrush.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of three known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Populus angustifolia	narrowleaf cottonwood	10	*Carex utriculata*	beaked sedge	2
Willows			*Eleocharis palustris*	common spikerush	1
Salix exigua	sandbar willow	1	*Juncus balticus*	Baltic rush	2
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	1		unidentified grass	2
Shrubs			**Non-native grasses**		
Artemisia tridentata	big sagebrush	2	*Poa pratensis*	Kentucky bluegrass	2

Proper Functioning Condition Rating: This spring system is rated as Nonfunctional. The spring is diverted to a stock tank and no flow remains at the spring source. Bare ground at the spring source is excessive.

Restoration and Management Comments: The area is heavily used by livestock and the spring has been routed to a stock tank. Restoration to natural conditions would require filling in the excavation, removal of the berm, and reestablishment of native vegetation.

Water Chemistry: The spring and bermed pond were dry. There was no overflow at the tank and the water chemistry was not measured.

Photos: Roll 2 # 18

B-925 (Hondo Spring)

Location: Gunnison County. Monson Gulch drainage. At head of Monson Gulch on southwest slope of Tomichi Dome. Take Road 3094 north from Highway 50 east of Doyleville. UTM Zone 13, 364393E, 4259606N.

Legal Description: USGS 7.5' quadrangle: Doyleville. T49N R4E Section 29 NE4SW4.

Elevation: 9055 feet. **Date Visited:** 8 July 2002

Exclosure recommendation: Yes. Top priority. The existing exclosure protects the majority of the springs but immediately adjacent springs are degraded and channel entrenchment threatens to dewater the spring system. Recommend expansion of the existing exclosure.

Dominant Plant Species: Aspen, alder, and giant angelica. CNHP described the community as aspen/alder (*Populus tremuloides/ Alnus incana*) montane riparian forest, a globally vulnerable (G3 S3) plant community. This location is documented as a good (B-ranked) example of this community in the CNHP Biological Conservation Database.

Johnston Classification: FR2. Riparian forests - Aspen-cottonwood-deep alluvial soils-floodplains. The community keys to type D (aspen-rose-Kentucky bluegrass-dandelion), which is not a good fit for this site.

General Description: A series of springs/seeps flowing at an estimate rate of about 10 gpm emerges from the southwest face of Tomichi Dome at the head of Monson Gulch. The springs occur at the interface of aspen forest and sagebrush shrublands. A dense patch of aspen and alder with giant angelica and a variety of other forbs and grasses grows at the springs and seepage areas. An exclosure surrounds the uppermost springs protecting the springs and dense vegetative community. Birds were abundant including cavity-nesting Red-naped Sapsuckers and Broad-tailed Hummingbirds feeding on monkshood. Just downstream from the exclosure, vegetative cover is sparse and springs emerge from bare ground. Channel entrenchment occurs outside of the exclosure and appears to threaten to dewater the springs. A patch of Canada thistle occurs outside of the exclosure.

Gunnison Sage Grouse notes: No sage grouse were noted at the spring; however, three fecal pellets were noted. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			*Geranium* sp.	geranium	1
Populus tremuloides	quaking aspen	10	*Iris missouriensis*	wild iris	1
Willows			*Mainthemum stellatum*	false Solomon's seal	1
Salix bebbiana	Bebb willow	5	*Mimulus* sp.	monkeyflower	1
Salix drummondiana	Drummond (blue) willow	2	*Polemonium* sp.	Jacob's ladder	1
Salix geyeriana	Geyer willow	5	*Ranunculus (=Halerpestes) cymbalaria*	alkali buttercup	1
Shrubs			*Ranunculus* sp.	buttercup	1
Alnus incana ssp. *tenuifolia*	thinleaf alder	20	*Urtica dioica* ssp. *gracilis*	stinging nettle	2
Artemisia tridentata	big sagebrush	1	*Veronica americana*	American speedwell	3
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	2	**Graminoids**		
Juniperus communis	common juniper	2	*Carex* sp.	sedge	1
Prunus (=Padus) virginiana	chokecherry	1	*Equisetum arvense*	field horsetail	1
Ribes cereum	wax currant	5	*Glyceria striata*	fowl mannagrass	2
Ribes inerme	whitestem gooseberry	10	*Hordeum brachyantherum*	meadow barley	1

Rosa woodsii	Woods rose	10	*Juncus balticus*	Baltic rush	5
Rubus ideaus	American red raspberry	1	*Juncus tracyi*	Tracy rush	1
Symphoricarpos rotundifolius	roundleaf snowberry	1	**Non-native grasses**		
Forbs			*Phleum pratense*	common timothy	1
Achillea millefolium (=lanulosa)	western yarrow	1	*Poa pratensis*	Kentucky bluegrass	10
Aconitum columbianum	Columbian monkshood	1	**Non-native forbs**		
Angelica ampla	giant angelica	50	*Rumex* sp.	dock	1
Cirsium sp.	thistle	1	*Taraxacum officinale*	dandelion	2
Epilobium ciliatum	hairy willowherb	1	*Trifolium* sp.	clover	1
				moss	1

Proper Functioning Condition Rating: This spring system is rated as Functioning at Risk with a downward trend. Functions at the springs within the exclosure are intact - no hydrologic modifications or intense livestock grazing have occurred. Channel entrenchment and sparse vegetative cover outside of the exclosure are the primary concerns. The springs within the exclosure are at Proper Functioning Condition but are their status is threatened by the conditions immediately outside the exclosure.

Restoration and Management Comments: The springs within the exclosure are in excellent condition with dense and diverse vegetative cover. The springs outside of the exclosure have sparse vegetative cover and the adjacent channel is deeply entrenched. Expanding the exclosure to include all the springs is highly recommended. Measures to stem channel entrenchment are also recommended. The severe entrenchment threatens to dewater the groundwater system supporting the springs. A patch of Canada thistle (about 100 square feet) occurs just outside of the exclosure.

Water Chemistry: Flow from the springs was visually estimated at about 10 gpm. The water chemistry was as follows:

pH	7.0
Conductivity	66 µS/cm
Temperature	9 C

Photos: Roll 2 # 7-10

B-927 (Blue Monday Spring)

Location: Gunnison County. Tomichi Creek drainage. About three miles north of Doyleville. UTM Zone 13, 359878E, 42631904N.

Legal Description: USGS 7.5' quadrangle: Pitkin. T49N R3E Section 14 SE4.

Elevation: 8977 feet. **Date Visited:** 29 July 2002

Exclosure recommendation: Yes. High priority. The willows at this excavated spring are severely hedged and dying and would likely benefit from rest from grazing.

Dominant Plant Species: Aspen, Geyer willow, sedge, Baltic rush.

Johnston Classification: RI3 C. Non-forested riparian serviceberry willow-deep alluvial soils-concave bottoms and swales. C designates the community type as Bebb-Geyer willows-shrubby cinquefoil-Baltic rush-dandelion-yarrow.

General Description: The spring has been recently reexcavated and there is standing water in the pond with sparse cover of fowl mannagrass and duckweed at the edge. A few aspen are growing around the pond with sparse Baltic rush. Geyer willow grow along about 50 feet of the channel downstream from the pond but are severely hedged, have a lot of die back, and are covered with aphids and ants. The ground is very hummocked and has sparse cover of sedges. There is a powerline immediately above the spring and a magpie nest in an aspen indicating that this is not an ideal brood-rearing area for grouse regardless of the low ground cover. An adjacent channel is about 10 feet entrenched and has sparse vegetation. The sparse stubble was 4 inches high in the wetland and 2 inches high in the sagebrush.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Populus tremuloides	quaking aspen	10	*Alopecurus aequalis*	shortawn foxtail	1
Willows			*Carex* sp.	sedge	20
Salix geyeriana	Geyer willow	10	*Glyceria striata*	fowl mannagrass	5
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	1	*Hordeum brachyantherum*	meadow barley	1
Salix monticola	serviceberry (mountain) willow	1	*Hordeum jubatum*	foxtail barley	1
Shrubs			*Juncus balticus*	Baltic rush	20
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	5	**Non-native grasses**		
Ribes inerme	whitestem gooseberry	5	*Agrostis gigantea*	redtop	10
Symphoricarpos rotundifolius	roundleaf snowberry	1	*Poa pratensis*	Kentucky bluegrass	10
Forbs					
Achillea millefolium (=lanulosa)	western yarrow	1			
Argentina anserina	silverweed cinquefoil	1			
Aster sp. (purple)	aster	1			
Epilobium ciliatum	hairy willowherb	2			
Iris missouriensis	wild iris	1			
Lemna minor	common duckweed	2			
Rorripa teres	blunt-leaved yellowcress	5			
Veronica americana	American speedwell	1			

Proper Functioning Condition Rating: This spring is rated as Functional at Risk with a downward trend. Livestock grazing is affecting the health of the willows and other vegetation and cover is becoming sparse. Hummocking of the soils alters flow patterns.

Restoration and Management Comments: The vegetation at this spring is severely stressed by grazing. Willows are hedged, dying, and covered with aphids and ants. Shrubby cinquefoil is grazed to the ground. Other vegetative cover is sparse. Restoring this spring to its natural condition would include filling in the excavation, removing the berm, and allowing recovery of native vegetation. The spring currently functions as a livestock water source.

Water Chemistry: No surface flow from the pond was noted. The water chemistry measured at the pond was as follows:

pH	7.2
Conductivity	20 µS/cm
Temperature	17

Photos: Roll 3 # 11-12

B-928 (Coats Spring and Exclosure)

Location: Gunnison County. Tomichi Creek drainage. About three miles north of Doyleville. UTM Zone 13, 359970E, 4262774N.

Legal Description: USGS 7.5' quadrangle: Pitkin. T49N R3E Section 14 SE4.

Elevation: 8760 feet. **Date Visited:** 29 July 2002

Exclosure recommendation: Minor repairs needed on existing exclosure.

Dominant Plant Species: Geyer willow, Baltic rush, and beaked sedge.

Johnston Classification: RI3 C. Non-forested riparian serviceberry willow-deep alluvial soils-concave bottoms and swales. C designates the community type as Bebb-Geyer willows-shrubby cinquefoil-Baltic rush-dandelion-yarrow.

General Description: A spring emerging from a southeast facing sandstone ledge and flowing a short reach through a small willow stand. An livestock watering hole has been dug outside of the exclosure but is dry. The spring flow reinfiltrates quickly and does not flow outside of the exclosure. Cattle have entered the exclosure through a breach in the fence. Willows are mushroom-shaped and there are cattle hoof prints and green filamentous algae in standing water. Soils are very dark brown (10 YR2/2) sandy clay loam with few mottles. The stubble height was 4 inches to 1 foot in the wetland and 1 inch in the sagebrush.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however, one grouse fecal pellet was found. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix geyeriana	Geyer willow	30	*Carex* sp.	sedge	5
Shrubs			*Carex utriculata*	beaked sedge	10
Amelchier utahensis	Utah serviceberry	1	*Glyceria striata*	fowl mannagrass	1
Artemisia tridentata	big sagebrush	5	*Juncus balticus*	Baltic rush	20
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	5	*Juncus tracyi*	Tracy rush	1
Prunus (=Padus) virginiana	chokecherry	5	**Non-native grasses**		
Purshia tridentata	antelope bitterbrush	1	*Agrostis gigantea*	redtop	10
Ribes cereum	wax currant	1	*Phleum pratense*	common timothy	1
Ribes inerme	whitestem gooseberry	2	*Poa pratensis*	Kentucky bluegrass	5
Rosa woodsii	Woods rose	10	**Non-native forbs**		
Symphoricarpos rotundifolius	roundleaf snowberry	1	*Cirsium arvense*	Canada thistle	1
Forbs			*Melilotus officinalis*	yellow sweetclover	1
Achillea millefolium (=lanulosa)	western yarrow	1			
Aster sp. (purple)	aster	1			
Castilleja (red)	paintbrush	1		moss	dry
Cirsium sp.	thistle	<1			
Epilobium ciliatum	hairy willowherb	1			
Iris missouriensis	wild iris	5			
Lupinus sp.	lupine	1			
Rorripa teres	blunt-leaved yellowcress	1			
Scrophularia lanceolata	lanceleaf figwort	1			
Thermopsis divaricarpa	golden banner	5			
Veronica americana	American speedwell	1			

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition as ecological processes are apparently intact. However, there is some alteration of flow patterns by hoof action and the construction of the pond outside of the exclosure.

Restoration and Management Comments: Minor repairs of the existing exclosure would limit livestock activity within the spring area.

Water Chemistry: Flow from the spring was visually estimated at less than ¼ gpm. The water chemistry measured at the spring source was as follows:

pH	7.0
Conductivity	120 µS/cm
Temperature	15C

Photos: Roll 3 # 13-14

B-938 (Taylor Park Spring 1)

Location: Gunnison County. Lost Canyon Gulch drainage. Approximately nine air miles northeast of Gunnison and three air miles southwest of Almont. North of Road 743. UTM Zone 13, 342954E, 4276693N.

Legal Description: USGS 7.5' quadrangle: Almont. T50N R1E Section 1 NE4.

Elevation: 9097 feet. **Date Visited:** 27 June 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Shrubby cinquefoil and Baltic rush (in the ephemeral channel downstream from the depression). The depression/spring itself dominated by beaked sedge.

Johnston Classification: : RI3 D. Non-forested riparian serviceberry willow-deep alluvial soils-concave bottoms and swales. D designates the community type as shrubby cinquefoil-sparse Geyer willow-Kentucky bluegrass.

General Description: The spring is located in a depression (about 5 feet deep) in an ephemeral channel next to an aspen stand. Within the depression was mainly bare ground (about 20 feet by 50 feet) with a patch of beaked sedge at the spring source. The spring and pond were dry with the very dark gray (10 YR 3/1) moist silty clay below the surface. The soils were mottled indicating seasonal wetland conditions. The ephemeral drainage below the spring was very hummocked with shrubby cinquefoil growing on top of the hummocks and Baltic rush and unidentified dried grasses (Kentucky bluegrass?) between the hummocks. Wild iris and false-hellebore are also abundant within the channel. One patch of heavily grazed Bebb willows survives. Grasshoppers, and deer, elk, and cattle droppings are abundant. The uplands are rolling hills of sagebrush. The stubble height in the sedges within the depression was about 1 foot. The general stubble height within the ephemeral channel was about two inches.

Gunnison Sage Grouse notes: About ½ mile downstream from the spring but within the channel were ten piles of sage grouse fecal pellets, two of the piles with what appeared to be secal pellets. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix bebbiana	Bebb willow	<1	*Beckmannia syzigachne*	American sloughgrass	<1
Shrubs			*Carex* sp.	sedge	1
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	10	*Carex utriculata*	beaked sedge	1
Rosa woodsii	Woods rose	2	*Hordeum jubatum*	foxtail barley	1
Forbs			*Juncus balticus*	Baltic rush	5
Achillea millefolium (=lanulosa)	western yarrow	1	*Pascopyrum smithii*	western wheatgrass	1
Iris missouriensis	wild iris	5	**Non-native grasses**		
Veratrum tenuipetalum	false hellebore	2	*Agrostis gigantea*	redtop	1
			Phleum pratense	common timothy	1
			Non-native forbs		
			Plantago major	common plantain	1
			Rumex sp.	dock	1
			Taraxacum officinale	dandelion	1

Proper Functioning Condition Rating: This spring system is rated as Nonfunctional. The spring is excavated, altering its natural functioning. Hummocking of the soils indicates heavy livestock use. This spring probably functions as a water source during non-drought years.

Restoration and Management Comments: Restoration of the spring to its natural condition would include filling in the excavation and reestablishment of native vegetation. The spring would not likely function as a livestock water source under natural conditions.

Water Chemistry: The seep was dry during the site visit and appeared to have been dry for an extended period.

Photos: Roll 1 # 6-8

B-960 (Steers Gulch Spring 19)

Location: Gunnison County. Antelope Creek drainage. About five miles northwest of Gunnison. UTM Zone 13, 326956E, 4273056N.

Legal Description: USGS 7.5' quadrangle: Gunnison. T50N R1W Section 17 SE4.

Elevation: 8311 feet. **Date Visited:** 6 August 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Cattail.

Johnston Classification: not classified.

General Description: A dry bermed pond about 50 feet south of an ephemeral channel. The pond has apparently recently dried because the center of the pond is moist and a small stand of cattail and tall mannagrass is still alive. The berm and surrounding uplands are mainly bare ground with Woods rose. The stubble in the sagebrush was about 3 inches high.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted at the spring; however, five grouse fecal pellets were found on the adjacent hillside. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix geyeriana	Geyer willow	2	*Alopecurus aequalis*	shortawn foxtail	1
Shrubs			*Equisetum (Hippochaete)* sp.	scouring rush	1
Rosa woodsii	Woods rose	5	*Glyceria striata*	fowl mannagrass	5
Forbs			*Hordeum brachyantherum*	meadow barley	1
Achillea millefolium (=lanulosa)	western yarrow	1	*Hordeum jubatum*	foxtail barley	5
Argentina anserina	silverweed cinquefoil	1	*Typha latifolia*	cattail	30
Epilobium ciliatum	hairy willowherb	1	**Non-native grasses**		
Hackelia floribunda	manyflower stickseed	1	*Agrostis gigantea*	redtop	1
Ranunculus gmelinii	water crowfoot	1	*Phleum pratense*	common timothy	1
Senecio eremophilus	desert ragwort	10	*Poa pratensis*	Kentucky bluegrass	5
Urtica dioica ssp. *gracilis*	stinging nettle	1	**Non-native forbs**		
Veronica americana	American speedwell	1	*Cirsium arvense*	Canada thistle	5
			Thlapsi arvense	penny cress	5
			Trifolium sp.	clover	1

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition as an excavated, bermed dry spring. The wetland would likely be larger and support different vegetation if the spring were unaltered hydrologically.

Restoration and Management Comments: Restoration of this spring to its natural condition would include filling in the excavation, removing the berm, and allowing native vegetation to reestablish itself.

Water Chemistry: Dry bermed pond.

Photos: Roll 4 # 10

B-963 (Steer Gulch Spring 22)

Location: Gunnison County. Deep Gulch drainage. Approximately six miles northwest of Gunnison. UTM Zone 13, 324756E, 4275238N.

Legal Description: USGS 7.5' quadrangle: McIntosh Mountain. T50N R1W Section 7 NW4.

Elevation: 8742 feet. **Date Visited:** 26 July 2002

Exclosure recommendation: Not needed. Existing exclosure intact.

Dominant Plant Species: Aspen, common spikerush, fowl mannagrass.

Johnston Classification: FR2 D. Aspen-cottonwood-deep alluvial soils-floodplains. D designates the community type as aspen-rose-Kentucky bluegrass-dandelion.

General Description: A spring flows from a northeast-facing hillside immediately into a bermed impoundment about 20 feet by 30 feet in size. The spring supports a stand of monkeyflower. The pond edge has dense cover of common spikerush and fowl mannagrass with duckweed and pondweed covering the pond surface and sits within an aspen stand. Aquatic invertebrates noted at the pond include snails (*Gyraulus parvus* – tentative ID), water striders, scuds, and dragonflies. The spring and pond are contained within an exclosure; a dry, cracked stock tank sits outside of the exclosure. The soils at the pond are black (10YR 2/1) silty clay loam with abundant organic matter. The stubble in the wetland was over 1 foot tall.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Populus tremuloides	quaking aspen	10	*Eleocharis palustris*	common spikerush	30
Shrubs			*Glyceria striata*	fowl mannagrass	20
Ribes inerme	whitestem gooseberry	1	*Hordeum brachyantherum*	meadow barley	5
Rosa woodsii	Woods rose	5	**Non-native grasses**		
Forbs			*Poa pratensis*	Kentucky bluegrass	10
Achillea millefolium (=lanulosa)	western yarrow	1	**Non-native forbs**		
Artemisia ludoviciana	white sagebrush	1	*Chenopodium* sp.	goosefoot	1
Dracocephalum parviflorum	American dragonhead	1	*Cirsium arvense*	Canada thistle	patch
Epilobium ciliatum	hairy willowherb	5	*Madia glomerata*	tarweed	1
Galium boreale (=septrionale)	northern bedstraw	1	*Rumex* sp.	dock	1
Lemna minor	common duckweed	50 (in pond)			
Mimulus sp.	monkeyflower	1			
Potamogeton sp.	pondweed	50 (in pond)			
Sidalcea candida	white checkermallow	1			
Urtica dioica ssp. *gracilis*	stinging nettle	5			

Proper Functioning Condition Rating: This spring system is rated as Proper Functioning Condition as ecological processes are apparently intact. The berm and pond likely decrease the size of the potential wetland and change the ecological functioning but the system appears stable.

Restoration and Management Comments: The spring and bermed pond are within an exclosure.

Water Chemistry: Flow from the spring was visually estimated at less than ¼ gpm. The water chemistry measured at the spring source was as follows:

pH	7.8
Conductivity	260 µS/cm
Temperature	10 C

Photos: Roll 3 # 26-28

B-964 (Steer Gulch Spring 21)

Location: Gunnison County. Deep Gulch drainage. Approximately six miles northwest of Gunnison. UTM Zone 13, 325009E, 4274971N.

Legal Description: USGS 7.5' quadrangle: McIntosh Mountain. T50N R1W Section 7 SE4.

Elevation: 8703 feet. **Date Visited:** 26 July 2002

Exclosure recommendation: No. Vegetation would likely benefit but this spring is low priority for restoration.

Dominant Plant Species: Beaked sedge, common spikerush, and burreed at ponded spring. Willows at associated meadow.

Johnston Classification: RI3 C. Non-forested riparian serviceberry willow-deep alluvial soils-concave bottoms and swales. C designates the community type as Bebb-Geyer willows-shrubby cinquefoil-Baltic rush-dandelion-yarrow.

General Description: An excavated spring on a northeast-facing slope is bermed forming a pond with open water and dense vegetation. Dominant species at the pond include beaked sedge, common spikerush, burreed, duckweed, and pondweed. Snails (*Gyraulus* sp. and *Lymnaea* sp.) were collected from the aquatic vegetation. The spring supports a small meadow with mixed willows and other shrubs. Songbirds are abundant in the shrubs. The spring is at the head of a drainage and is within ¼ mile of the 2002 Antelope Creek burn area. The uplands are sagebrush shrublands with aspen stands fingering out into the sagebrush. The wetland vegetation was about 1 foot high.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Trees			*Geranium* sp.	geranium	1
Populus tremuloides	quaking aspen	1	*Hackelia floribunda*	manyflower stickseed	1
Willows			*Iris missouriensis*	wild iris	1
Salix bebbiana	Bebb willow	5	*Lemna minor*	common duckweed	5
Salix drummondiana	Drummond (blue) willow	1	*Lupinus* sp.	lupine	1
Salix geyeriana	Geyer willow	1	*Mentha arvensis*	wild mint	1
Salix monticola	serviceberry (mountain) willow	1	**Graminoids**		
Shrubs			*Carex utriculata*	beaked sedge	20
Chrysothamnus viscidiflorus	green rabbitbrush	5	*Eleocharis palustris*	common spikerush	20
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	1	*Hordeum brachyantherum*	meadow barley	5
Juniperus communis	common juniper	1	*Juncus balticus*	Baltic rush	5
Rhus trilobata	skunkbrush sumac	1	*Sparganium emersum*	burreed	20
Ribes inerme	whitestem gooseberry	1	**Non-native grasses**		
Rosa woodsii	Woods rose	5	*Agrostis gigantea*	redtop	1
Symphoricarpos rotundifolius	roundleaf snowberry	5	*Phleum pratense*	common timothy	1
Forbs			**Non-native forbs**		
Achillea millefolium (=lanulosa)	western yarrow	1	*Artemisia biennis*	biennial wormwood	1
Argentina anserina	silverweed cinquefoil	1	*Chenopodium* sp.	goosefoot	1
Corydalis sp.	fumewort	1	*Rumex* sp.	dock	1
Epilobium ciliatum	hairy willowherb	5	*Trifolium pratense*	red clover	1
Galium boreale (=septrionale)	northern bedstraw	1			

Proper Functioning Condition Rating: This spring system is rated as Proper Functioning Condition as ecological processes are apparently intact. The berm and pond likely decrease the size of the potential wetland and change the ecological functioning but the system appears stable.

Restoration and Management Comments: Livestock usage does not appear excessive at this spring. Some non-native species present.

Water Chemistry: The pond was full with no visible surface outflow. The water chemistry measured in the pond was as follows:

pH	9.0 (see page 16 for discussion of elevated pH)
Conductivity	220 µS/cm
Temperature	22 C

Photos: Roll 3 # 29-30

B-965 (Cochetopa Needle Razor 18)

Location: Gunnison County. Tomichi Creek drainage. About three miles southwest of Parlin. UTM Zone 13, 353364E, 4259820N.

Legal Description: USGS 7.5' quadrangle: Houston Gulch. T48N R3E Section 21 SW4.

Elevation: 8269 feet. **Date Visited:** 30 July 2002

Exclosure recommendation: Yes. Medium priority. An undeveloped spring with moderate grazing pressure.

Dominant Plant Species: Geyer willow and beaked sedge.

Johnston Classification: RI1 B. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. B designates the community type as Geyer willow-beaked sedge.

General Description: An undeveloped spring supporting a willow/sedge stand for about 500 feet downstream from the spring. The spring is at the head of a draw on a northwest-facing slope. Soils are saturated at the spring and support a stand of sedges and grasses. Snails (*Lymnaea* sp.) and peaclams (*Pisidium casertanum*) were collected at the spring source. Saturated soils continue downstream into the willows. Many of the willows are hedged and mushroom shaped and the soils are hummocked. Soils are very dark gray (10YR 3/1) sandy clay loam with mottles. The wetland vegetation was over 1 foot tall with the stubble in the sagebrush about 2 inches.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however about 10 sage grouse pellets were found. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix bebbiana	Bebb willow	2	*Carex utriculata*	beaked sedge	60
Salix geyeriana	Geyer willow	40	*Deschampsia cespitosa*	tufted hairgrass	2
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	1	*Glyceria grandis*	American mannagrass	2
Shrubs			*Glyceria striata*	fowl mannagrass	1
Amelchier utahensis	Utah serviceberry	1	*Hordeum brachyantherum*	meadow barley	1
Artemisia tridentata	big sagebrush	5	*Hordeum jubatum*	foxtail barley	1
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	5	*Juncus balticus*	Baltic rush	10
Ribes inerme	whitestem gooseberry	5	**Non-native grasses**		
Rosa woodsii	Woods rose	5	*Agrostis gigantea*	redtop	5
Forbs			*Phleum pratense*	common timothy	1
Achillea millefolium (=lanulosa)	western yarrow	1	*Poa pratensis*	Kentucky bluegrass	1
Argentina anserina	silverweed cinquefoil	1	**Non-native forbs**		
Cirsium sp.	thistle	1	*Plantago major*	common plantain	1
Heracleum maximum (=sphondylium)	common cowparsnip	1	*Polygonum* sp.	knotweed	1
Iris missouriensis	wild iris	1	*Rumex* sp.	dock	2
Orthocarpus luteus	yellow owl-clover	1			
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1			
Ranunculus hyperboreas	floating buttercup	1			
Rorripa teres	blunt-leaved yellowcress	1			

Proper Functioning Condition Rating: This spring is rated as Functioning at Risk with no apparent trend. The spring is not developed (no excavation, piping, or berm) and supports a

dense stand of Geyer willow and beaked sedge for about 500 feet of channel. However, there is some hummocking altering flow patterns and the willows are mushroom shaped.

Restoration and Management Comments: An exclosure is recommended for this spring to limit grazing impacts. Most springs within the Gunnison Basin are developed and heavily altered from their natural functioning condition. This spring is not developed and is in relatively good condition vegetatively. There is some alteration due to grazing (hummocking and mushroom-shaped willows) but the sedge cover is still relatively dense and rest from grazing would likely allow the long-term persistence of this spring and associated willow/sedge stand in good condition.

Water Chemistry: No flow surface flow at the spring. The water chemistry measured in standing water at the spring was as follows:

pH	7.0
Conductivity	130 µS/cm
Temperature	10 C

Photos: Roll 3 # 7-9

B-970 (Big Seep Spring-Exclosure)

Location: Gunnison County. Sewell Gulch drainage. Approximately four miles north-northeast of Parlin. 1.1 mile north on road from Pitkin then 3.8 miles west and north on dirt road. UTM Zone 13, 351070E, 4268673N.

Legal Description: USGS 7.5' quadrangle: Parlin. T50N R2E Section 36 NW4.

Elevation: 8840 feet.

Date Visited: 26 June 2002

Exclosure recommendation: No. The spring is already within an exclosure.

Dominant Plant Species: Beaked sedge is the dominant cover along with Baltic rush.

Johnston Classification: not classified.

General Description: The spring occurs within an exclosure. A pipe carries water to a stock tank immediately outside the exclosure. The spring was dry during the site visit but a small dense stand of beaked sedge occurred at the center with spikerush and Baltic rush at the edges. The soil has been bermed close to the spring source to promote ponding. A Sage Thrasher was noted, as were abundant elk and deer droppings. The stock tank outside of the exclosure had 6 inches of water with three dead ravens and two dead songbirds floating in it. The uplands are big sagebrush with antelope bitterbrush. The stubble height within the dry wetland within the exclosure was about 5 to 10 inches. The stubble height outside the exclosure was about 1 inch.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however one fecal pellet was found. The spring is within two miles of four known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Shrubs			**Graminoids**		
Amelchier utahensis	Utah serviceberry	1	*Carex utriculata*	beaked sedge	20
Artemisia tridentata	big sagebrush	1	*Eleocharis palustris*	common spikerush	2
Purshia tridentata	antelope bitterbrush	1	*Hordeum jubatum*	foxtail barley	1
Forbs			*Juncus balticus*	Baltic rush	10
Achillea millefolium (=lanulosa)	western yarrow	1	*Pascopyrum smithii*	western wheatgrass	1
Eriogonum umbellatum	sulfur buckwheat	1	**Non-native grasses**		
Iris missouriensis	wild iris	1	*Agropyron cristatum*	crested wheatgrass	1
Potentilla sp.	cinquefoil	1	*Agrostis gigantea*	Redtop	1
			Bromus inermis	smooth brome	1
			Phleum pratense	common timothy	1
			Poa pratensis	Kentucky bluegrass	1
			Non-native forbs		
			Melilotus officinalis	yellow sweetclover	1
			Rumex sp.	Dock	1

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition as all ecological processes are apparently intact.

Restoration and Management Comments: The exclosure around the spring has apparently been there since at least 1964 (shows on Parlin USGS quad dated 1964). The berm at the spring and piping to the stock tank outside of the exclosure likely alter the spring functioning. The gate to the exclosure was open but no cattle were present in the area.

Water Chemistry: The spring was dry and the stagnant water in the stock tank was not sampled.

Photos: Roll 1 # 23-24

B-983 (Taylor Park Spring 64)

Location: Gunnison County. Sewell Gulch drainage. Approximately nine miles east of Gunnison. Take Sewell Gulch Road to top of drainage and hike down trail to spring. UTM Zone 13, 347728E, 4265881N.

Legal Description: USGS 7.5' quadrangle: Parlin. T49N R2E Section 10 NW4.

Elevation: 8238 feet. **Date Visited:** 28 June 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Beaked sedge at spring. Cattail at pond. Narrowleaf cottonwood and sandbar willow nearby.

Johnston Classification: RI1 F. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. F designates the community type as Baltic rush-dandelion-yarrow-sparse willows. With patches of FR1 E. Cotttonwood/willow-water layered soils-floodplains. E designates the community type as shrubby cinquefoil-sparse cottonwood-Kentucky bluegrass-Baltic rush.

General Description: A patch of Rocky Mountain juniper and narrowleaf cottonwood trees marks this spring area. A small, developed spring flows about 50 feet from a spring box to a round pond with dense cover of dry cattails. Just the center of the pond contains water. The spring supports beaked sedge with common spikerush and Baltic rush. Many narrowleaf cottonwood and sandbar willow plants are very short and grazed. Soils are silty clay and gleyed with abundant fibrous roots. The Baltic rush was about 1 foot high with dry grasses about 2 inches high. Stubble height in the sagebrush was about 2 inches.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Juniperus scopulorum	Rocky Mountain juniper	2	*Carex praegracilis*	clustered field sedge	2
Populus angustifolia	narrowleaf cottonwood	5	*Carex utriculata*	beaked sedge	30
Populus tremuloides	quaking aspen	1	*Eleocharis palustris*	common spikerush	5
Willows			*Equisetum (Hippochaete)* sp.	scouring rush	1
Salix exigua	sandbar willow	3	*Juncus balticus*	Baltic rush	5
Shrubs			*Juncus tracyi*	Tracy rush	1
Artemisia tridentata	big sagebrush	2	*Pascopyrum smithii*	western wheatgrass	1
Rhus trilobata	skunkbrush sumac	1	*Typha* sp.	cattail	30
Rosa woodsii	Woods rose	2	**Non-native grasses**		
Forbs			*Phleum pratense*	common timothy	1
Achillea millefolium (=lanulosa)	western yarrow	1	*Poa pratensis*	Kentucky bluegrass	1
Galium boreale (=septrionale)	northern bedstraw	1	**Non-native forbs**		
Mentha arvensis	wild mint	1	*Cirsium arvense*	Canada thistle	1
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	<1	*Taraxacum officinale*	dandelion	1
Veronica americana	American speedwell	<1	*Trifolium repens*	white clover	1

Proper Functioning Condition Rating: This spring system is rated as Functional at Risk with no apparent trend. The berm alters the spring functioning but vegetation is dense and diverse and

many natural functions are likely occurring. However, many narrowleaf cottonwoods and willows are very stunted due to grazing.

Restoration and Management Comments: Restoration of the spring to its natural condition would include removing the berm, filling in the excavation, and reestablishment of native vegetation. Hummocking around the cattail pond and stunting of cottonwoods and willows indicates changes in the grazing regime could be beneficial to the vegetation.

Water Chemistry: Flow from the spring was visually estimated at less than ¼ gpm. The water chemistry measured at the spring source was as follows:

pH	7.4
Conductivity	320 µS/cm
Temperature	9 C

Photos: Roll 1 # 3-4

C-126 (Hidden Spring)

Location: Gunnison County. Tomichi Creek drainage. About three miles southeast of Gunnison, one mile southeast of Tenderfoot Mountain. UTM Zone 13, 335022E, 4264287N.

Legal Description: USGS 7.5' quadrangle: Gunnison. T49N R1E Section 17 NW4.

Elevation: 8044 feet. **Date Visited:** 31 July 2002

Exclosure recommendation: No. Low priority for restoration. Highly modified.

Dominant Plant Species: Tall mannagrass, Baltic rush.

Johnston Classification: not classified.

General Description: A pit about 10' x 20' in size with open water rimmed with tall mannagrass. According to the 1983 Water Source Inventory, two spring boxes were installed in 1981 and piped to a French Drain that empties into the pit. The location of the actual "spring" was not obvious. Slightly uphill from the pit was a channel with a patch of Baltic rush and wild iris with big sagebrush and green rabbitbrush, possibly the original spring source. There is Baltic rush on the higher banks and bare ground, silverweed, foxtail barley, Canada thistle at the rim. There is some hummocking on what is probably the edge of the pool in a non-drought year. Animal life within the pond included a snake (only snake seen all summer), aquatic beetles, scuds, and damselfly adults. Graminoids in the wetland were about 1 foot high with sparse cover of stubble in the sagebrush about 1 inch high.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however, 2 grouse pellets were found at the pond edge. The spring is within two miles of three known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Shrubs			**Graminoids**		
Artemisia tridentata	big sagebrush	20	*Alopecurus aequalis*	shortawn foxtail	1
Chrysothamnus viscidiflorus	green rabbitbrush	20	*Beckmannia syzigachne*	American sloughgrass	1
Forbs			*Carex utriculata*	beaked sedge	5
Argentina anserina	silverweed cinquefoil	1	*Eleocharis palustris*	common spikerush	10
Iris missouriensis	wild iris	1	*Glyceria grandis*	American mannagrass	20
Lemna minor	common duckweed	30	*Hordeum jubatum*	foxtail barley	1
Myriophyllum sibiricum	water milfoil	10	*Juncus balticus*	Baltic rush	20
Rorripa teres	blunt-leaved yellowcress	1	**Non-native forbs**		
Stuckenia (=Potamogeton) pectinatus	pondweed	10	*Cirsium arvense*	Canada thistle	1

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition although it is highly altered from its natural state.

Restoration and Management Comments: Restoration of this spring to its natural condition would include removal of the French Drain system, filling in the pit, and allowing reestablishment of native vegetation. The pit currently serves as a water source.

Water Chemistry: No surface flow was noted out of the excavation. The water chemistry measured in the pond was as follows:

pH	7.8
Conductivity	200 µS/cm

Temperature 15 C

Photos: Roll 4 # 23-24

C-130 (Taylor Park Spring 19)

Location: Gunnison County. Tomichi Creek drainage. Approximately three miles northeast of Gunnison. UTM Zone 13, 336158E, 4270596N.

Legal Description: USGS 7.5' quadrangle: Gunnison. T50N R1E Section 29 NE4.

Elevation: 8216 feet. **Date Visited:** 26 July 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Sandbar willow and non-native biennial wormwood.

Johnston Classification: not classified.

General Description: A check dam in an ephemeral drainage with no spring apparent. The check dam is just below the confluence of two ephemeral drainages with another check dam upstream in the larger channel. Some of the channel between the berms is incised with some areas supporting Rocky Mountain juniper, skunkbrush sumac, and Baltic rush. Sandbar willow surrounds the dry excavation with biennial wormwood on the excavation floor. There is some downcutting and compaction evident. Some willows are mushroom-shaped and are on two-foot high pedestals. The channel cuts through the west side of the check dam. On the downstream end on the east side there is a small stand of chokecherry, skunkbrush sumac, Woods rose, and serviceberry. The vegetation in the dry impoundment was about 2 feet high.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however, three fecal pellets were found in the area. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Non-native forbs**		
Salix exigua	sandbar willow	20	*Artemisia biennis*	biennial wormwood	60
Forbs			*Chenopodium* sp.	goosefoot	1
Achillea millefolium (=lanulosa)	western yarrow	1	*Kochia scoparia*	kochia	1
Cirsium sp.	thistle	1	*Melilotus officinalis*	yellow sweetclover	1
Lepidium sp.	pepperweed	1	*Polygonum* sp.	knotweed	1
Potentilla sp.	cinquefoil	5	*Rumex* sp.	dock	10
Graminoids			*Thlapsi arvense*	penny cress	1
Hordeum jubatum	foxtail barley	2			

Proper Functioning Condition Rating: This spring system is rated as Functional at Risk with a downward trend. The vegetative cover is sparse and the channel is incised. This is apparently an ephemeral channel with a berm and not a spring location.

Restoration and Management Comments: The channel is incised and the berm breached. Weedy species dominant.

Water Chemistry: The bermed impoundment was dry.

Photos: Roll 3 # 36-37

C-136 (Taylor Park Spring 6)

Location: Gunnison County. Sheep Gulch drainage. Approximately six air miles northeast of Gunnison and five air miles south of Almont. On Road 743. UTM Zone 13, 341055E, 4273912N.

Legal Description: USGS 7.5' quadrangle: Signal Peak. T50N R1E Section 14 NE4.

Elevation: 8654 feet. **Date Visited:** 27 June 2002

Exclosure recommendation: No. Small exclosure already exists around highly modified/ excavated spring.

Dominant Plant Species: Beaked sedge.

Johnston Classification: Not assigned.

General Description: A small spring on the north-facing hill has been dug out, bermed, fenced, and piped to two stock tanks below. The excavation is about 10 feet deep. Growing at the bottom of the dry pond is a patch of beaked sedge and non-native pasture grasses. The overflow from the stock tanks is piped to a small opening with Kentucky bluegrass, American sloughgrass, and spikerush. A two-foot deep headcut is migrating up the ephemeral drainage below and has nearly reached the small meadow-like opening (20 feet by 50 feet). The flow reaching the stock tanks was less than ¼ gpm. The uplands are rolling hills covered with sagebrush shrublands with occasional bitterbrush. The stubble height in the sedges in the bottom of the excavation was about 1 foot. Stubble height in the sagebrush uplands was about 1 inch with about 40% bare ground.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Shrubs			**Non-native grasses**		
Rosa woodsii	Woods rose	2	*Agropyron cristatum*	crested wheatgrass	2
Forbs			*Bromus inermis*	smooth brome	2
Achillea millefolium (=lanulosa)	western yarrow	1	*Dactylis glomerata*	orchard-grass	2
Penstemon cf *strictus*	Rocky Mountain penstemon	<1	*Phleum pratense*	common timothy	2
Veronica americana	American speedwell	1	*Poa pratensis*	Kentucky bluegrass	5
Graminoids			**Non-native forbs**		
Carex utriculata	beaked sedge	80	*Kochia scoparia*	kochia	5
Eleocharis palustris	common spikerush	2			
Glyceria striata	fowl mannagrass	1			
Hordeum jubatum	foxtail barley	2			
Juncus balticus	Baltic rush	2			

Proper Functioning Condition Rating: This spring system is rated as Nonfunctional. The spring functions as a livestock and wildlife water source but the natural functions are altered by the excavation and berming of the spring.

Restoration and Management Comments: This spring currently functions as a livestock water source. Restoration to its natural condition would include removing the berm, filling in the excavation, and reestablishment of native vegetation. The spring would not likely function as a livestock water source under natural conditions.

Water Chemistry: Flow from the springs was visually estimated at less than 1/4 gpm. The water chemistry measured in the water flowing from the pipe into the stock tank was as follows:

pH	7.4
Conductivity	360 µS/cm
Temperature	18 C (in tank)

Photos: Roll 1 # 9-10

C-144 (Gold Basin Spring 3)

Location: Gunnison County. Gold Basin Creek drainage. About eight miles south of Gunnison. UTM Zone 13, 330977E, 4255889N.

Legal Description: USGS 7.5' quadrangle: Iris NW. T48N R1W Section 11 NE4.

Elevation: 8678 feet. **Date Visited:** 28 July 2002

Exclosure recommendation: Not needed. Existing exclosure intact. Dry, bermed excavation.

Dominant Plant Species: Redtop.

Johnston Classification: not classified.

General Description: A dry excavation within an exclosure. The stock tank located about 0.15 mile downstream is also dry (and has no escape plank). The pit is about 20 feet deep with a diameter of 30 feet. There are 1 foot deep mud cracks in the center. There is a lot of bare ground with goosefoot on the excavation floor and redtop at the edge. The wetland vegetation stubble was about 6 inches high and stubble in the sagebrush was about 2 inches high.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however one fecal pellet was found at the site. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Shrubs			**Non-native grasses**		
Chrysothamnus viscidiflorus	green rabbitbrush	2	*Agrostis gigantea*	redtop	10
Ericameria (=Chrysothamnus) nauseosus	rubber rabbitbrush	2	*Poa pratensis*	Kentucky bluegrass	2
Forbs			**Non-native forbs**		
Epilobium ciliatum	hairy willowherb	1	*Chenopodium* sp.	goosefoot	10
Hackelia floribunda	manyflower stickseed	1	*Cirsium arvense*	Canada thistle	5
Lupinus sp.	lupine	2	*Kochia scoparia*	kochia	5
Polygonum (Persicaria) sp.	smartweed	1	*Plantago major*	common plantain	1
Veronica americana	American speedwell	1	*Polygonum* sp.	knotweed	1
Graminoids			*Rumex* sp.	dock	1
Alopecurus aequalis	shortawn foxtail	1			
Carex utriculata	beaked sedge	5			
Eleocharis palustris	common spikerush	5			
Hordeum jubatum	foxtail barley	2			
Juncus balticus	Baltic rush	5			

Proper Functioning Condition Rating: This spring system is rated as Nonfunctional. The excavation affects the natural functioning of this seep/spring.

Restoration and Management Comments: The excavation is within an exclosure. Weedy species are the dominants.

Water Chemistry: The excavation was dry.

Photos: Roll 3 # 18-19

C-193 (Lower Cochetopa Spring 18)

Location: Gunnison County. Long Gulch drainage. About six miles southeast of Gunnison. UTM Zone 13, 338954E, 4261154N.

Legal Description: USGS 7.5' quadrangle: Iris. T49N R1E Section 27 NE4.

Elevation: 8295 feet. **Date Visited:** 30 July 2002

Exclosure recommendation: Yes. Low priority.

Dominant Plant Species: Bulrush, tall mannagrass, and sedge.

Johnston Classification: not classified.

General Description: This seep supports a dense stand of sedge and common spikerush and an excavated bermed pond with bulrush and tall mannagrass. The seep is about five vertical feet above the pond. Aquatic plants including pondweed, duckweed, coon's tail, and mare's tail are abundant in the pond. Animal life in the pond included a salamander, dragonflies, damselflies, backswimmers, diving beetles, and snails (*Gyraulus* sp. and *Physa* sp.). Soils are very dark brown (10 YR 2/2) silty clay with abundant organic matter with pure very fine sand at one spring source. The berm has thick chunks of peat it in it. The wetland vegetation was over 1 foot high.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however, about 10 grouse pellets were found. The spring is within two miles of three known lek sites. Six grouse flushed from Flick Spring located on private land about ¼ mile northwest of C-193.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix geyeriana	Geyer willow	1	*Beckmannia syzigachne*	American sloughgrass	1
Shrubs			*Carex* sp.	sedge	30
Chrysothamnus viscidiflorus	green rabbitbrush	5	*Eleocharis palustris*	common spikerush	10
Forbs			*Equisetum (Hippochaete)* sp.	scouring rush	1
Achillea millefolium (=lanulosa)	western yarrow	1	*Equisetum arvense*	field horsetail	1
Argentina anserina	silverweed cinquefoil	1	*Glyceria grandis*	American mannagrass	10
Ceratophyllum demersum	coon's tail (in pond)	10	*Hordeum jubatum*	foxtail barley	1
Epilobium ciliatum	hairy willowherb	1	*Juncus balticus*	Baltic rush	10
Hippurus vulgaris	mare's tail	1	*Schoenoplectus lacustris acutus*	hardstem bulrush	30
Lemna minor	common duckweed	5	**Non-native grasses**		
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1	*Agropyron cristatum*	crested wheatgrass	5
Stuckenia (=Potamogeton) pectinatus	pondweed	10	*Agrostis gigantea*	redtop	5
	Unidentified aquatic	1	*Dactylis glomerata*	orchard-grass	1
			Poa pratensis	Kentucky bluegrass	10
			Non-native forbs		
			Taraxacum officinale	dandelion	1
			Thlapsi arvense	penny cress	5
			Trifolium repens	white clover	1

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition. It is modified with an excavation and berm but appears to be performing its ecological functions.

Restoration and Management Comments: Restoration of this spring to its natural condition would include removal of the berm and filling in of the excavation and allowing reestablishment of native vegetation.

Water Chemistry: No flow was noted at the spring but the ground was saturated. The water chemistry measured at the spring was as follows:

pH	7.6
Conductivity	240 µS/cm
Temperature	9 C

Photos: Roll 4 # 25-26

C-208 (Lower Cochetopa Spring 3)

Location: Gunnison County. Chance Gulch drainage. About five miles southwest of Gunnison. UTM Zone 13, 336685E, 4260719N.

Legal Description: USGS 7.5' quadrangle: Iris. T49N R1E Section 28 NW4.

Elevation: 8410 feet. **Date Visited:** 31 July 2002

Exclosure recommendation: Yes. Medium priority. Undeveloped spring with diverse vegetation. Channel entrenchment in adjacent allotment threatens spring.

Dominant Plant Species: Geyer willow, beaked sedge.

Johnston Classification: RI1 B. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. B designates the community type as Geyer willow-beaked sedge.

General Description: At the spring source are willows and a small channel with a wide variety of forbs. Downstream of the spring is a meadow of beaked sedge. The spring is not developed and is in good condition. The spring is at the edge of an allotment and hence a fenceline. A channel is entrenched upstream of the spring on the other side of the fence but not near the spring. A group of 11 pronghorn were feeding at the spring.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however, one grouse fecal pellet was found in the adjacent sagebrush shrublands. The spring is within two miles of four known lek sites. The spring is within ¼ mile of a powerline.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix bebbiana	Bebb willow	2	*Carex utriculata*	beaked sedge	50
Salix geyeriana	Geyer willow	10	*Equisetum (Hippochaete)* sp.	scouring rush	1
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	2	*Equisetum arvense*	field horsetail	1
Shrubs			*Glyceria grandis*	American mannagrass	1
Artemisia tridentata	big sagebrush	1	*Glyceria striata*	fowl mannagrass	1
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	1	*Hordeum brachyantherum*	meadow barley	1
Rosa woodsii	Woods rose	5	*Hordeum jubatum*	foxtail barley	1
Forbs			*Juncus balticus*	Baltic rush	10
Achillea millefolium (=lanulosa)	western yarrow	1	*Juncus saximontanus*	Rocky Mountain rush	1
Aster sp. (purple)	aster	1	*Pascopyrum smithii*	western wheatgrass	1
Cirsium tioganum var. *coloradense (=scariosum)*	meadow thistle	1	*Triglochin palustre*	marsh arrowgrass	1
Epilobium ciliatum	hairy willowherb	1	**Non-native grasses**		
Thermopsis divaricarpa	golden banner	1	*Agrostis gigantea*	redtop	5
Urtica dioica ssp. *gracilis*	stinging nettle	1	*Poa pratensis*	Kentucky bluegrass	5
Veronica americana	American speedwell	1	**Non-native forbs**		
			Cirsium arvense	Canada thistle	5
			Thlapsi arvense	penny cress	1
			Trifolium pratense	red clover	1
	moss	x	*Trifolium repens*	white clover	1

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition as ecological processes are apparently intact.

Restoration and Management Comments: Willows are mushroom-shaped indicating a rest from livestock grazing would be beneficial. The spring is not developed and is in good condition.

Water Chemistry: The spring was flowing in a small rivulet with no measurable flow. The water chemistry measured at the spring was as follows:

pH	7.8
Conductivity	340 µS/cm
Temperature	10 C

Photos: Roll 4 # 17

C-209 (Lower Cochetopa Spring 5)

Location: Gunnison County. Chance Gulch drainage. About five miles southwest of Gunnison. UTM Zone 13, 336553E, 4260320N.

Legal Description: USGS 7.5' quadrangle: Iris. T49N R1E Section 28 SW4.

Elevation: 8462 feet. **Date Visited:** 31 July 2002

Exclosure recommendation: No. Dry ephemeral channel. No sign of spring.

Dominant Plant Species: Baltic rush and dried unidentified grass.

Johnston Classification: not classified.

General Description: This is a wide grassy area in an ephemeral channel. I did not see any sign of a spring. I walked upstream to spring C-210 and downstream to spring C-208 searching and did not see sign of a spring.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The site is within two miles of four known lek sites.

Plant Species Observed:

Graminoids		
Juncus balticus	Baltic rush	x
	unidentified grass	x

Proper Functioning Condition Rating: No spring or hydrologic development projects were found at this location. Therefore, no PFC analysis was conducted.

Restoration and Management Comments: No spring was found at this site.

Water Chemistry: Dry channel.

Photos: Roll 4 # 20

C-210 (Lower Cochetopa Spring 7)

Location: Gunnison County. Chance Gulch drainage. About five miles southwest of Gunnison. UTM Zone 13, 336534E, 4259755N.

Legal Description: USGS 7.5' quadrangle: Iris. T49N R1E Section 28 SW4.

Elevation: 8526 feet. **Date Visited:** 31 July 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Beaked sedge and common spikerush.

Johnston Classification: not classified.

General Description: An excavated spring within a bermed pond. The pond is rimmed with beaked sedge and common spikerush and has dense aquatic vegetation including coon's tail, pondweed, and water milfoil. Animal life noted within the pond includes aquatic beetles, backswimmers, damselflies, and dragonflies. The bench above is vegetated with basin wildrye, big sagebrush, Baltic rush, and green rabbitbrush. The banks are hummocked, trampled, and grazed and have some shearing.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Shrubs			**Graminoids**		
Artemisia tridentata	big sagebrush	5	*Carex utriculata*	beaked sedge	30
Chrysothamnus viscidiflorus	green rabbitbrush	5	*Eleocharis palustris*	common spikerush	10
Forbs			*Juncus balticus*	Baltic rush	20
Ceratophyllum demersum	coon's tail	10	*Leymus cinerus*	basin wildrye	5
Lemna minor	common duckweed	1	**Non-native grasses**		
Myriophyllum sibiricum	water milfoil	30	*Agrostis gigantea*	redtop	5
Stuckenia (=Potamogeton) pectinatus	pondweed	5			

Proper Functioning Condition Rating: This spring is rated as Functioning at Risk with no apparent trend. The excavated pond appears relatively stable but the banks are trampled and hummocked.

Restoration and Management Comments: Restoration of this spring to its natural condition would include removal of the berm and filling in of the excavation and allowing reestablishment of native vegetation.

Water Chemistry: No surface flow from the pond was noted. The water chemistry measured at the pond was as follows:

pH	9.6 (see page 16 for discussion of elevated pH)
Conductivity	200 µS/cm
Temperature	22 C

Photos: Roll 4 # 18-19

C-228 (Steers Gulch Spring 25)

Location: Gunnison County. Maggie Gulch drainage. Approximately six miles northwest of Gunnison. UTM Zone 13, 327978E, 4276424N.

Legal Description: USGS 7.5' quadrangle: Gunnison. T50N R1W Section 5 SE4.

Elevation: 8540 feet. **Date Visited:** 26 July 2002

Exclosure recommendation: Yes. Low priority. A small exclosure surrounds the immediate spring source. Vegetation immediately outside of the exclosure shows signs of heavy grazing.

Dominant Plant Species: Narrowleaf cottonwood, Geyer willow, and fowl mannagrass.

Johnston Classification: FR1 E. Cotttonwood/willow-water layered soils-floodplains. E designates the community type as shrubby cinquefoil-sparse cottonwood-Kentucky bluegrass-Baltic rush.

General Description: A small seep supporting a few narrowleaf cottonwood and willows. The surface water is ponded behind a berm – the pond is densely vegetated with fowl mannagrass, common spikerush, duckweed, and pondweed. Aquatic invertebrates noted include water striders and snails (*Gyraulus* sp.). Hummingbirds and Mourning Dove are abundant in the trees and shrubs. Soils at the seep were very dark brown (10YR 2/2) silty clay loam with a gravel layer. A small exclosure was constructed around the seep but not the pond by the YACC in 1980. There are some pasture grasses and weeds but overall the vegetation appears to be in good condition. The stubble height was about 4 inches in the sagebrush.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however two grouse fecal pellets were found. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Populus angustifolia	narrowleaf cottonwood	10	*Beckmannia syzigachne*	American sloughgrass	1
Willows			*Eleocharis palustris*	common spikerush	20
Salix bebbiana	Bebb willow	2	*Glyceria striata*	fowl mannagrass	40
Salix drummondiana	Drummond (blue) willow	1	*Hordeum jubatum*	foxtail barley	1
Salix geyeriana	Geyer willow	5	*Juncus balticus*	Baltic rush	10
Shrubs			*Leymus cinerus*	basin wildrye	1
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	2	**Non-native grasses**		
Ribes lacustre	prickly currant	1	*Agrostis gigantea*	redtop	5
Rosa woodsii	Woods rose	20	*Bromus inermis*	smooth brome	1
Forbs			*Phleum pratense*	common timothy	1
Achillea millefolium (=lanulosa)	western yarrow	1	*Poa pratensis*	Kentucky bluegrass	5
Epilobium ciliatum	hairy willowherb	2	**Non-native forbs**		
Fragaria sp.	strawberry	1	*Cirsium arvense*	Canada thistle	1
Geranium sp.	geranium	1	*Melilotus officinalis*	yellow sweetclover	2
Lemna minor	common duckweed	20			
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1			
Urtica dioica ssp. *gracilis*	stinging nettle	1			

Proper Functioning Condition Rating: This spring system is rated as Proper Functioning Condition as ecological processes are apparently intact. The size of the wetland is likely decreased by the ponding of the water behind the berm.

Restoration and Management Comments: There is a small patch of Canada thistle at this site. Some willows outside of the exclosure are mushroom shaped.

Water Chemistry: The pond was full with no visible surface outflow. The water chemistry measured in the pond was as follows:

pH	7.0
Conductivity	160 µS/cm
Temperature	12 C

Photos: Roll 3 # 31-32

C-229 (Steers Gulch Spring 26)

Location: Gunnison County. Maggie Gulch drainage. Approximately six miles northwest of Gunnison. UTM Zone 13, 336647E, 4263318N.

Legal Description: USGS 7.5' quadrangle: Gunnison. T50N R1W Section 5 NW4.

Elevation: 8729 feet. **Date Visited:** 26 July 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Shrubby cinquefoil and Baltic rush.

Johnston Classification: RI6 C. Shrubby cinquefoil-colluvial or alluvial soils-parks and swales. C designates the community type as shrubby cinquefoil-dry grasses and forbs.

General Description: A depression and berm in an ephemeral channel with no spring evident. There is a series of berms in this non-entrenched channel. Soils just upstream from one of the downstream berms were black (10 YR 2/1) silty clay loam with some gleying. The foxtail barley was about 1 foot high and the stubble in the sagebrush was about 2 inches high.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however, five scattered fecal pellets were found in the area. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Shrubs			**Graminoids**		
Artemisia tridentata	big sagebrush	5	*Carex* sp.	sedge	5
Chrysothamnus viscidiflorus	green rabbitbrush	2	*Hordeum jubatum*	foxtail barley	10
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	5	*Juncus balticus*	Baltic rush	15
Rosa woodsii	Woods rose	1	*Pascopyrum smithii*	western wheatgrass	x
Symphoricarpos rotundifolius	roundleaf snowberry	1		unidentified grass	20
Forbs			**Non-native grasses**		
Achillea millefolium (=lanulosa)	western yarrow	1	*Agropyron cristatum*	crested wheatgrass	x
Argentina anserina	silverweed cinquefoil	1	*Bromus inermis*	smooth brome	20
Gentiana (=Pneumonanthe) cf *affinis*	bottle-gentian	<1	*Poa pratensis*	Kentucky bluegrass	5
Hackelia floribunda	manyflower stickseed	1	**Non-native forbs**		
Iris missouriensis	wild iris	2	*Artemisia biennis*	biennial wormwood	5
Lepidium sp.	pepperweed	1	*Chenopodium* sp.	goosefoot	1
			Rumex sp.	dock	x
			Salsola tragus (australis)	Russian thistle	2
			Thlapsi arvense	penny cress	1

Proper Functioning Condition Rating: This is a series of berms in an ephemeral channel. The berms are rated as Proper Functioning Condition for this altered system.

Restoration and Management Comments: Some weedy species are present. There is some bank sloughing but no major channel entrenchment.

Water Chemistry: The depression was dry.

Photos: Roll 3 # 33-35

C-236 (Lower Cochetopa Spring 17)

Location: Gunnison County. Gold Basin Creek drainage. About 3 ½ miles south southeast of Gunnison. UTM Zone 13, 334044E, 4262365N.

Legal Description: USGS 7.5' quadrangle: Iris NW. T49N R1E Section 19 NW4.

Elevation: 8107 feet. **Date Visited:** 31 July 2002

Exclosure recommendation: No. Existing exclosure intact.

Dominant Plant Species: Basin wildrye, Baltic rush, western wheatgrass.

Johnston Classification: not classified.

General Description: This spring is developed and within a box. The spring, associated stock tank, and bermed ponds are dry. An exclosure surrounds the dry spring and berms. Vegetation includes two willows at the spring box and basin wildrye and other dry grasses scattered throughout the area. A nearby, entrenched channel is sparsely vegetated with Geyer willow and shrubby cinquefoil.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix geyeriana	Geyer willow	2	*Juncus balticus*	Baltic rush	10
Salix monticola	serviceberry (mountain) willow	1	*Leymus cinerus*	basin wildrye	20
Shrubs			*Pascopyrum smithii*	western wheatgrass	5
Artemisia tridentata	big sagebrush	5	**Non-native grasses**		
Chrysothamnus viscidiflorus	green rabbitbrush	2	*Agropyron cristatum*	crested wheatgrass	5
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	2	*Bromus inermis*	smooth brome	1

Proper Functioning Condition Rating: This is a dry spring with primarily upland species except for established willows and Baltic rush. It is rated as Proper Functioning Condition for a dry spring.

Restoration and Management Comments: This spring was dry during the Water Source Inventory of 1983 and dry during this 2002 survey. May be uplands.

Water Chemistry: Dry spring.

Photos: Roll 4 # 21-22

C-275 (South Biebel Spring)

Location: Gunnison County. Chance Gulch drainage. Approximately four miles southeast of Gunnison. UTM Zone 13, 336647E, 4263318N.

Legal Description: USGS 7.5' quadrangle: Signal Peak. T49N R1E Section 16 SW4.

Elevation: 8033 feet. **Date Visited:** 13 July 2002

Exclosure recommendation: Not needed. Existing exclosure intact.

Dominant Plant Species: Beaked sedge.

Johnston Classification: not classified.

General Description: An excavated spring within a bermed impoundment is rimmed with dense cover of beaked sedge, Baltic rush, with American mannagrass. Dragonflies and damselflies, backswimmers, tiger salamanders, and hornwort were abundant at the pond. A large meadow occurs below the pond and supports a mixed stand of beaked sedge and Baltic rush with patches of the non-natives Canada thistle and pennycress. Soils were very dark grayish brown (10YR 3/2) silty clay to silty clay loam. The surrounding uplands are rolling hills of sagebrush shrublands. The spring and meadow are adjacent to a dry ephemeral channel with some downcutting. The wetland vegetation was about 1 foot high.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however, one fecal pellet was found at the pond edge. The spring is within two miles of six known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Forbs			**Graminoids**		
Argentina anserina	silverweed cinquefoil	1	*Carex utriculata*	beaked sedge	60
Ceratophyllum demersum	coon's tail	50 in pond	*Glyceria grandis*	American mannagrass	2
Epilobium ciliatum	hairy willowherb	1	*Hordeum jubatum*	foxtail barley	1
Lemna minor	common duckweed	5 in pond	*Juncus balticus*	Baltic rush	10
Mentha arvensis	wild mint	1	*Pascopyrum smithii*	western wheatgrass	1
Veronica americana	American speedwell	1	**Non-native grasses**		
			Agropyron cristatum	crested wheatgrass	1
			Bromus inermis	smooth brome	1
	Green algal mat	5	*Poa pratensis*	Kentucky bluegrass	5
			Non-native forbs		
			Cirsium arvense	Canada thistle	1
			Thlapsi arvense	penny cress	10

Proper Functioning Condition Rating: This spring system is rated as Proper Functioning Condition as ecological processes are apparently intact although functioning is altered by the berm and pond.

Restoration and Management Comments: The exclosure effectively excludes livestock grazing and vegetative cover is dense. Non-native species at the site include Canada thistle and pennycress. Increased entrenchment of the adjacent ephemeral channel could threaten to dewater the spring. Restoration of the spring to its natural condition would require filling in the excavation, removing the berm, and allowing recovery of native species.

Water Chemistry: The pond was full with no surface outflow. The water chemistry measured in the pond was as follows:

pH	9.4 (see page 16 for discussion of elevated pH)
Conductivity	200 µS/cm
Temperature	18 C

Photos: Roll 2 # 5-6

C-281 (Taylor Park Spring 63)

Location: Gunnison County. Tomichi Creek drainage. Approximately nine miles east of Gunnison. Take Sewell Gulch Road. UTM Zone 13, 346897E, 4265750N.

Legal Description: USGS 7.5' quadrangle: Signal Peak. T49N R2E Section 9 NW4.

Elevation: 8408 feet. **Date Visited:** 28 June 2002

Exclosure recommendation: Yes. Medium priority. The spring is functioning relatively naturally and the vegetation is in decent condition. Impacts due to grazing are evident (hedging of willows, trampling of soils) and could degrade the spring further.

Dominant Plant Species: Beaked sedge with mixed willows.

Johnston Classification: RI1 B. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. B designates the community type as Geyer willow-beaked sedge.

General Description: The spring emerges from beneath a rock ledge and flows into a small bermed pond. The spring is on a sagebrush-covered slope beneath a rock cliff. The spring is marked by a dense patch of willows (Geyer and coyote) with beaked sedge and Baltic rush in the understory. Downhill from the berm is a small opening with sparse Baltic rush. The pond is mostly dry with standing water only in hoofprints. The stubble height in the wetland was about 3 inches.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed:

Willows			**Graminoids**		
Salix drummondiana	Drummond (blue) willow	1	*Carex utriculata*	beaked sedge	30
Salix exigua	sandbar willow	10	*Eleocharis palustris*	common spikerush	2
Salix geyeriana	Geyer willow	10	*Juncus balticus*	Baltic rush	10
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	3	*Leymus cinerus*	basin wildrye	1
Salix monticola	serviceberry (mountain) willow	2	**Non-native grasses**		
Shrubs			*Poa pratensis*	Kentucky bluegrass	10
Amelchier utahensis	Utah serviceberry	1	**Non-native forbs**		
Artemisia tridentata	big sagebrush	2	*Melilotus officinalis*	yellow sweetclover	1
Rosa woodsii	Woods rose	5			
Symphoricarpos rotundifolius	roundleaf snowberry	1			
Forbs					
Achillea millefolium (=lanulosa)	western yarrow	1			
Lemna minor	common duckweed	1			
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1			

Proper Functioning Condition Rating: This spring is rated as Functioning at Risk with no apparent trend. Hummocking of the soils alters flow patterns.

Restoration and Management Comments: An exclosure is recommended for this spring to increase the willow and sedge cover. Removal of the berm would be necessary to restore the

spring to its natural condition. The nearby ephemeral channel is severely entrenched and appears to be migrating upstream.

Water Chemistry: No flowing water was noted at the spring but the soil was saturated and there was standing water in hoof prints. The water chemistry measured in a hoof print was as follows:

pH	7.3
Conductivity	720 µS/cm
Temperature	not measured

Photos: Roll 2 # 36

C-305 (Champa Spring)

Location: Gunnison County. Tomichi Creek drainage. Approximately four air miles east of Gunnison. North of Highway 50. UTM Zone 13, 339201E, 4268657N.

Legal Description: USGS 7.5' quadrangle: Signal Peak. T50N R1E Section 34 NE4.

Elevation: 8153 feet. **Date Visited:** 27 June 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Canada thistle.

Johnston Classification: Not assigned.

General Description: C-305 is a dry bermed pit on a small ephemeral drainage. The pit bottom supports Canada thistle and a few bunches of basin wildrye. The uplands are rolling hills of sagebrush with Utah juniper and a few Rocky Mountain juniper. A nearby ephemeral drainage is entrenched with about 10 feet of downcutting. Vegetation within the entrenched channel includes skunkbrush sumac, basin wildrye, Rocky Mountain juniper, and Woods rose.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The berm is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Juniperus scopulorum	Rocky Mtn. juniper	1		unidentified grass	5
Shrubs			*Leymus cinerus*	basin wildrye	2
Artemisia tridentata	big sagebrush	1	**Non-native forbs**		
Rhus trilobata	skunkbrush sumac	1	*Cirsium arvense*	Canada thistle	50
Rosa woodsii	Woods rose	4			

Proper Functioning Condition Rating: No spring is apparent at this berm in a dry channel. The berm in the dry channel is rated as Functioning at Risk with no apparent trend. The vegetation is primarily upland species and dominated by the non-native Canada thistle.

Restoration and Management Comments: Restoration of the ephemeral channel would require removal of the berm, filling in the excavation, and reestablishment of native vegetation.

Water Chemistry: The bermed impoundment was dry during the site visit and appeared to have been dry for an extended period.

Photos: Roll 1 # 5

C-311 (Taylor Park Spring 32)

Location: Gunnison County. Cabin Creek drainage. About four miles north northeast of Parlin. UTM Zone 13, 344271E, 4271562N.

Legal Description: USGS 7.5' quadrangle: Signal Peak. T50N R1E Section 19 NE4.

Elevation: 8916 feet. **Date Visited:** 12 September 2002

Exclosure recommendation: Yes. Medium priority. Grazing pressure appears moderate (some willows are hedged but vegetation is dense).

Dominant Plant Species: Geyer willow, Woods rose, beaked sedge.

Johnston Classification: RI1 B. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. B designates the community type as Geyer willow-beaked sedge.

General Description: A spring emerges on a hillside and flows in a steep channel to a flat opening. Below the opening is a dry channel leading to Cabin Creek. Shrubs growing along the channel include Geyer willow, Bebb willow, chokecherry, currant, Woods rose, honeysuckle, and serviceberry. According to the 1983 Water Source Inventory, there used to be an excavated pond in the opening. The GPS location of the old pond is 344271E, 4271562N. Remnants of the berm are still visible but the pond is now a wet stand of beaked sedge. Songbirds were abundant in the shrubs. Aquatic invertebrates noted include stonefly nymphs at the spring source. The wetland vegetation was about 1 foot high.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however, one grouse fecal pellet was found. The spring is not within two miles of any known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			*Urtica dioica* ssp. *gracilis*	stinging nettle	1
Juniperus scopulorum	Rocky Mountain juniper	1	*Veronica americana*	American speedwell	1
Populus tremuloides	quaking aspen	1	**Graminoids**		
Willows			*Carex nebrascensis*	Nebraska sedge	1
Salix bebbiana	Bebb willow	5	*Carex utriculata*	beaked sedge	5
Salix geyeriana	Geyer willow	20	*Eleocharis palustris*	common spikerush	2
Salix cf *monticola*	serviceberry (mountain) willow	1	*Glyceria grandis*	American mannagrass	1
Shrubs			*Glyceria striata*	fowl mannagrass	5
Amelchier utahensis	Utah serviceberry	5	*Hordeum brachyantherum*	meadow barley	1
Lonicera (=Distegia) involucrata	bush honeysuckle	1	*Hordeum jubatum*	foxtail barley	1
Prunus (=Padus) virginiana	chokecherry	1	*Juncus balticus*	Baltic rush	5
Rosa woodsii	Woods rose	20	*Juncus tracyi*	Tracy rush	1
Forbs			*Leymus cinerus*	basin wildrye	1
Achillea millefolium (=lanulosa)	western yarrow	1	*Pascopyrum smithii*	western wheatgrass	1
Angelica ampla	giant angelica	3	**Non-native grasses**		
Aster sp. (purple)	aster	1	*Agrostis gigantea*	redtop	1
Epilobium ciliatum	hairy willowherb	1	*Phleum pratense*	common timothy	2
Geum macrophyllum	largeleaved avens	1	*Poa pratensis*	Kentucky bluegrass	1
Hackelia floribunda	manyflower stickseed	1	**Non-native forbs**		
Heracleum maximum (=sphondylium)	common cowparsnip	3	*Plantago major*	common plantain	1
Iris missouriensis	wild iris	1	*Rumex* sp.	dock	1
Lemna minor	common duckweed	2	*Trifolium repens*	white clover	1
Mentha arvensis	wild mint	1			

Mimulus sp.	monkeyflower	1			
Rudbeckia lacinata var. *ampla*	cutleaf coneflower	1		moss	10

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition as ecological processes are apparently intact.

Restoration and Management Comments: The willows and shrubs are severely hedged – especially downstream from the sedge opening. There is some bank cutting but overall the spring and channel appear to be in decent shape.

Water Chemistry: The spring was flowing at an unestimated low flow rate. The water chemistry measured at the spring source was as follows:

pH	6.8
Conductivity	240 µS/cm
Temperature	9 C

Photos: Roll 5 # 7-8

C-591 (Escondida Spring)

Location: Saguache County. Spruce Gulch drainage. About 10 air miles southwest of Doyleville. Spruce Gulch (tributary to Prosser Creek) off 14-PP Road. UTM Zone 13, 351945E, 4245037N.

Legal Description: USGS 7.5' quadrangle: Razor Creek Dome. T47N R2E Section 12 SW4SE4.

Elevation: 9120 feet. **Date Visited:** 30 June 2002

Exclosure recommendation: Yes. Medium priority. The wetland is in relatively good condition but some shrubs (birch and willows) are grazed to the ground and soils are hummocked in some areas.

Dominant Plant Species: Blue spruce at the edges with beaked sedge and water sedge in the wetland.

Johnston Classification: RI9 A. Non-forested riparian - Sedge wetland – deep cold gleyed soils – concave water bowls. A designates the community type as water sedge – wet sedges and forbs. This classification may not be appropriate for this site as the elevation range for the described ecological type is 9530-12,040 feet.

General Description: Hillside seepage supports a wetland of mixed sedges and grasses with blue spruce at the edge. The wetland has dense cover of sedges, common spikerush, and an unidentified grass (probably Kentucky bluegrass). Montane wetland flowers such as shooting star, blue-eyed grass, and bog orchid are also present. There are a few heavily grazed shrubs (apparently river birch and Bebb willow) within the wetland and patches of shrubby cinquefoil and wild iris at the edge. Soil hummocking has occurred in the wettest areas. The upslope side of the wetland is edged with spruce forest and the downhill and sides with sagebrush shrublands. Dried soil within the wetland has a white precipitate coating. Soils are gleyed silty clay loam with a lot of organic material. There are two stock tanks at the base of the hill with one of them full from inflow piped from uphill and the second tank dry. The wetland vegetation was over 1 foot high with the stubble in the sagebrush about 3 inches high.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Picea pungens	blue spruce	10	*Carex aquatilis*	water sedge	30
Willows			*Carex aurea*	golden sedge	2
Salix bebbiana	Bebb willow	1	*Carex utriculata*	beaked sedge	30
Salix monticola	serviceberry (mountain) willow	1	*Deschampsia cespitosa*	tufted hairgrass	2
Shrubs			*Eleocharis palustris*	common spikerush	10
Artemisia tridentata	big sagebrush	1	*Equisetum arvense*	field horsetail	2
Betula occidentalis (=fontinalis)	river birch	1	*Juncus balticus*	Baltic rush	5
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	2	*Juncus saximontanus*	Rocky Mountain rush	1
Ribes inerme	whitestem gooseberry	2	*Triglochin maritimum*	seaside arrowgrass	1
Rosa woodsii	Woods rose	2	**Non-native grasses**		
Sambucus racemosa	elderberry	1	*Phleum pratense*	common timothy	1
Forbs			*Poa pratensis*	Kentucky bluegrass	30
Achillea millefolium (=lanulosa)	western yarrow	1	**Non-native forbs**		

Antennaria sp.	pussytoes	1	*Cirsium arvense*	Canada thistle	1
Argentina anserina	silverweed cinquefoil	2	*Taraxacum officinale*	dandelion	2
Cirsium tioganum var. *coloradense (=scariosum)*	meadow thistle	1	*Trifolium repens*	white clover	1
Dodecatheon pulchellum	darkthroat shooting-star	1			
Galium boreale (=septrionale)	northern bedstraw	1			
Geranium sp.	geranium	1			
Iris missouriensis	wild iris	1			
Platanthera (=Limnorchis) hyperborea	bog orchid	1			
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1			
Sisyrinchium sp.	blue-eyed grass	1			
Viola sp.	violet	1			

Proper Functioning Condition Rating: This spring system is rated as Proper Functioning Condition as the hillside seepage supported meadow appears to be functioning at or near potential. There are no major hydrologic modifications other than piping of some flow to stock tanks at the base of the hill. However, severe grazing of shrubs and some hummocking of soils indicates that this wetland may be altered by livestock. Notes from the WSI visit in 1983 indicate heavy livestock use at that time.

Restoration and Management Comments: The wetland appears to be in relatively good condition but some hummocking of soils, hoof prints, and severely stunted shrubs indicate livestock use is, or has been, heavy. Some increasers such as shrubby cinquefoil and wild iris are around some edges indicating that portions of the wetland may be drying. Non-native grass species are present as well as clover and dandelion.

Water Chemistry: There was no visible or channelized flow within the wetland. The water chemistry of ponded water in a hoofprint was as follows:

pH	7.0
Conductivity	900 µS/cm
Temperature	17 C

Photos: Roll 2 # 22

C-615 (Little Seep Rsv Fnc)

Location: Gunnison County. Tomichi Creek drainage. Approximately two miles northeast of Parlin. 1.1 mile north on road from Pitkin then 2.2 miles west and north on dirt road. UTM Zone 13, 351314E, 4266042N.

Legal Description: USGS 7.5' quadrangle: Parlin. T49N R2E Section 1 SW4.

Elevation: 8600 feet.

Date Visited: 26 June 2002

Exclosure recommendation: No. No spring found – this is apparently a berm in an ephemeral channel.

Dominant Plant Species: Sandbar willow is the dominant shrub on the berm and dry pond edge. Baltic rush and an unidentified grass are the dominant ground cover.

Johnston Classification: RI1 L. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. L designates the community type as Baltic rush-quackgrass-dandelion-yarrow-Kentucky bluegrass-iris.

General Description: There is apparently no spring source but rather a berm in an ephemeral channel. Sandbar willow grows on the berm and sparsely around the dry pond edge. The soil is mostly bare ground with sparse cover of Baltic rush and an unidentified dried grass. Cattle tracks and droppings are abundant in the dried mud of the pond bottom. Songbirds are in the sandbar willow and rabbits and small rodents along with deer and elk scat were noted. An exclosure occurs just north of the bermed pond but no spring was evident within the exclosure. The stubble height around the pond was about 1 inch with about 70% bare ground. The uplands are sagebrush with green rabbitbrush with sparse grass cover (about 50% bare ground).

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of five known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Populus angustifolia	narrowleaf cottonwood	<1 short - grazed	*Juncus balticus*	Baltic rush	1
Willows				unidentified grass	2
Salix exigua	sandbar willow	5	**Non-native grasses**		
Shrubs			*Agropyron cristatum*	crested wheatgrass	2
Artemisia tridentata	big sagebrush	1	**Non-native forbs**		
Rosa woodsii	Woods rose	1	*Kochia scoparia*	kochia	1
Symphoricarpos rotundifolius	roundleaf snowberry	1	*Salsola tragus (australis)*	Russian thistle	1
Forbs			*Thlapsi arvense*	penny cress	1
Achillea millefolium (=lanulosa)	western yarrow	1			
Hackelia floribunda	manyflower stickseed	1			

Proper Functioning Condition Rating: No spring was noted, just a berm in an ephemeral channel. The rating of Functioning at Risk with no apparent trend is based on the sparsity of vegetation and the condition of the cottonwoods (grazed to the ground).

Restoration and Management Comments: There is no spring at the site to restore. The site is a berm within a dry drainage.

Water Chemistry: There was no water in the impoundment or channel.

Photos: Roll 1 # 25-26

C-649 (Taylor Park Spring 75)

Location: Gunnison County. Quartz Creek drainage. Approximately four miles northeast of Parlin. UTM Zone 13, 354563E, 4268080N.

Legal Description: USGS 7.5' quadrangle: Parlin. T50N R3E Section 32 NW4.

Elevation: 8600 feet. **Date Visited:** 26 June 2002

Exclosure recommendation: No. Berms in ephemeral channel. Low restoration priority.

Dominant Plant Species: Baltic rush and an unidentifiable dried grass (Kentucky bluegrass?) are the dominant plant species at the site.

Johnston Classification: RI3 F. Non-forested riparian serviceberry willow-deep alluvial soils-concave bottoms and swales. F designates the community type as dandelion-Kentucky bluegrass-Baltic rush-moist sedges.

General Description: A series of berms are constructed in an ephemeral channel. There is entrenchment of the channel along portions. All the impoundments are dry. A meadow of about 2 acres occurs along the channel. The vegetation is primarily dried unidentifiable grass and Baltic rush with a few (seven) very scattered heavily hedged willows. A small patch of beaked sedge grows at what is apparently the spring source. Cattle, deer, and elk droppings were abundant. Two coyotes were in the meadow. The uplands are rolling hills of sagebrush with green rabbitbrush with scattered small stands of aspen. The stubble height of the sedge and rush was about 1 foot. The uplands are sagebrush with about 2 inches stubble height.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Juniperus scopulorum	Rocky Mountain juniper	1	*Beckmannia syzigachne*	American sloughgrass	1
Willows			*Carex utriculata*	beaked sedge	5
Salix bebbiana	Bebb willow	<1	*Equisetum (Hippochaete)* sp.	scouring rush	2
Salix geyeriana	Geyer willow	1	*Equisetum arvense*	field horsetail	1
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	<1	*Glyceria grandis*	American mannagrass	1
Shrubs			*Juncus balticus*	Baltic rush	20
Artemisia tridentata	big sagebrush	5	*Leymus cinerus*	basin wildrye	5
Ericameria (=Chrysothamnus) nauseosus	rubber rabbitbrush	1	**Non-native grasses**		
Rosa woodsii	Woods rose	5	*Agrostis gigantea*	redtop	5
Forbs			*Phalaris arundinacea*	reed canarygrass	2
Achillea millefolium (=lanulosa)	western yarrow	10	*Poa pratensis*	Kentucky bluegrass	2
Argentina anserina	silverweed cinquefoil	1	**Non-native forbs**		
Cirsium sp.	thistle	1	*Artemisia biennis*	biennial wormwood	5
Hackelia floribunda	manyflower stickseed	1	*Cirsium arvense*	Canada thistle	1
Iris missouriensis	wild iris	1	*Plantago major*	common plantain	1
Lepidium sp.	pepperweed	1	*Rumex* sp.	dock	1
Urtica dioica ssp. *gracilis*	stinging nettle	1	*Polygonum* sp.	knotweed	1

Proper Functioning Condition Rating: This is an ephemeral drainage and functions as such. The location is rated as Functioning at Risk with no apparent trend. Entrenchment and vegetation changes due to grazing are altering the functions at the site. Willows would likely be more abundant with more limited grazing. Channel entrenchment threatens dewatering (may have already occurred).

Restoration and Management Comments: The area is hummocked, the channel is entrenched, and willows are hedged and mushroom shaped indicating heavy use by livestock.

Water Chemistry: There was no water at the site.

Photos: Roll 1 # 17-18

C-786 (Powderhorn Spring Dev 11)

Location: Gunnison County. Gunnison River drainage. About seven miles southwest of Gunnison. UTM Zone 13, 322636E, 4260592N.

Legal Description: USGS 7.5' quadrangle: Big Mesa. T49N R2W Section 25 SW4.

Elevation: 7851 feet. **Date Visited:** 28 July 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Baltic rush and yarrow.

Johnston Classification: not classified.

General Description: A dry bermed pond in an ephemeral drainage. The pond and surrounding area are primarily bare ground with about 10 stalks of cattail, and sparse redtop, beaked sedge, and biennial wormwood. There is one juniper tree on a bank and one Geyer willow on the berm. The berm is partially breached and the channel is entrenched downstream. The wetland vegetation was about 1 foot high.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Juniperus scopulorum	Rocky Mountain juniper	1	*Beckmannia syzigachne*	American sloughgrass	1
Willows			*Carex utriculata*	beaked sedge	5
Salix geyeriana	Geyer willow	1	*Equisetum (Hippochaete)* sp.	scouring rush	2
Shrubs			*Equisetum arvense*	field horsetail	1
Artemisia tridentata	big sagebrush	5	*Glyceria grandis*	American mannagrass	1
Ericameria (=Chrysothamnus) nauseosus	rubber rabbitbrush	1	*Juncus balticus*	Baltic rush	20
Rosa woodsii	Woods rose	5	*Leymus cinerus*	basin wildrye	5
Forbs			**Non-native grasses**		
Achillea millefolium (=lanulosa)	western yarrow	10	*Agrostis gigantea*	redtop	5
Argentina anserina	silverweed cinquefoil	1	*Phalaris arundinacea*	reed canarygrass	2
Cirsium sp.	thistle	1	*Poa pratensis*	Kentucky bluegrass	2
Hackelia floribunda	manyflower stickseed	1	**Non-native forbs**		
Iris missouriensis	wild iris	1	*Artemisia biennis*	biennial wormwood	5
Lepidium sp.	pepperweed	1	*Cirsium arvense*	Canada thistle	1
Urtica dioica ssp. *gracilis*	stinging nettle	1	*Plantago major*	common plantain	1
			Rumex sp.	dock	1

Proper Functioning Condition Rating: This is a berm in ephemeral channel rated Functioning at Risk with no apparent trend due to a breach in the berm and channel entrenchment.

Restoration and Management Comments: It is not clear whether there is a spring here in non-drought years. There are livestock trails leading to the "pond" and the channel is downcutting.

Water Chemistry: Dry impoundment.

Photos: Roll 3 # 16-17

C-805 (Willow Creek Spring 1)

Location: Gunnison County. Willow Creek drainage. Approximately five miles south of Blue Mesa Reservoir east of Highway 149 and west of Willow Creek. UTM Zone 13, 320144E, 4251146N.

Legal Description: USGS 7.5' quadrangle: Big Mesa. T48N R2W Section 23 SE4.

Elevation: 8300 feet. **Date Visited:** 21 June 2002

Exclosure recommendation: No. Spring is excavated and bermed and primarily functions as a livestock water source. Low restoration priority.

Dominant Plant Species: Beaked sedge was the dominant species at the bermed pond and associated wet meadow. Geyer willow was the most prevalent shrub.

Johnston Classification: RI1 B. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. B designates the community type as Geyer willow-beaked sedge.

General Description: The spring source is impounded by a dirt berm creating a small pond about 40 feet in diameter. Cattle use is heavy at the pond and within the adjacent small meadow. Growing within the pond and at the edge are cattail, duckweed, beaked sedge, and Kentucky bluegrass. Aquatic insects noted in the pond include beetles and water striders. The small meadow adjacent to the pond supports scattered willows and closely cropped beaked sedge. The pond is close to a dry tributary to Willow Creek. The uplands are rolling hills of sagebrush with green rabbitbrush with occasional small patches of juniper. The stubble height in the meadow within the sedges was about 1 to 2 inches. The stubble height within the surrounding sagebrush was about 1 to 4 inches with a visual estimate of about 40% bare ground.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted at the spring; however, two fecal pellets were noted. The spring is within two miles of three known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Juniperus scopulorum	Rocky Mountain juniper	<1	*Carex* utriculata.	beaked sedge	50
Willows			*Eleocharis palustris*	common spikerush	pond
Salix geyeriana	Geyer willow	5	*Equisetum (Hippochaete)* sp.	scouring rush	1
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	1	*Juncus balticus*	Baltic rush	10
Shrubs			*Typha* sp.	cattail	pond
Artemisia tridentata	big sagebrush	2	**Non-native grasses**		
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	2	*Poa pratensis*	Kentucky bluegrass	2
Ribes inerme	whitestem gooseberry	1			
Rosa woodsii	Woods rose	1			
Forbs					
Iris missouriensis	wild iris	1			
Lemna minor	common duckweed	pond			

Proper Functioning Condition Rating: This spring is rated as Functional At Risk with no apparent trend. Ecological processes may be intact but are altered by the bermed impoundment as well as heavy use by livestock. The soil around the pond and within the associated meadow is

hummocked due to hoof action – likely altering nutrient cycling and creating higher percentage of bare soil.

Restoration and Management Comments: Livestock use is heavy at this spring. Willows are hedged and sedges are grazed short. Restoration to natural conditions would require removal of the berm, filling in the excavation, and allowing the reestablishment of native vegetation.

Water Chemistry: No surface outflow was noted from the impoundment. The water chemistry of the impounded water was as follows:

pH	7.2
Conductivity	220 µS/cm
Temperature	13 C

Photos: Roll 1 # 32-35

C-806 (Cow Camp Spring)

Location: Gunnison County. Willow Creek drainage. Approximately five miles south of Blue Mesa Reservoir, ½ mile east of Highway 149, and west of Willow Creek. UTM Zone 13, 319564E, 4250343N.

Legal Description: USGS 7.5' quadrangle: Big Mesa. T48N R2W Section 26 center.

Elevation: 8420 feet.

Date Visited: 21 June 2002

Exclosure recommendation: Repair existing exclosure.

Dominant Plant Species: Willow shrubland dominated by Geyer willow.

Johnston Classification: RI1 D. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. D designates the community type as Geyer willow-Kentucky bluegrass-dandelion.

General Description: The spring supports a dense thicket of willows within the dry channel of a tributary to Willow Creek. Beneath the willows is an understory of gooseberry and Woods rose. Songbirds were abundant in the shrubs. The willows are within an exclosure but the fence is down near the dry stock tank. Apparently the fence has been down for a long time – cattle trails are abundant and the willows are hedged. Cattle were present both within and outside of the exclosure. The uplands are sagebrush hills with granite cliffs. Stubble height within the exclosure was about 1 to 2 inches.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of three known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Forbs**		
Juniperus scopulorum	Rocky Mountain juniper	<1	*Iris missouriensis*	wild iris	5
Willows			**Graminoids**		
Salix bebbiana	Bebb willow	1	*Juncus balticus*	Baltic rush	5
Salix geyeriana	Geyer willow	30		unidentified grass	20
Salix ligulifolia (=lutea, eriocephala)	yellow (strapleaf) willow	1	**Non-native grasses**		
Salix monticola	serviceberry (mountain) willow	5	*Bromus inermis*	smooth brome	5
Shrubs					
Artemisia tridentata	big sagebrush	1			
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	2			
Ribes cereum	wax currant	1			
Ribes inerme	whitestem gooseberry	3			
Rosa woodsii	Woods rose	1			
Symphoricarpos rotundifolius	roundleaf snowberry	1			

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition as all ecological processes are apparently intact.

Restoration and Management Comments: The willow thicket is within an exclosure but the fence is down. Fence repairs are needed to exclude the cattle. Cattle trails are prevalent within the exclosure and willows are hedged.

Water Chemistry: The spring was dry at the time of the site visit.

Photos: Roll 1 # 30-31

C-809 (Powderhorn Spring Dev 25)

Location: Gunnison County. Approximately six miles south of Blue Mesa Reservoir east of Highway 149 and west of Willow Creek . On the same tributary as C-806 but 0.7 miles upstream. UTM Zone 13, 319219E, 4249215N.

Legal Description: USGS 7.5' quadrangle: Powderhorn. T48N R2W Section 35 NE4NW4.

Elevation: 8680 feet. **Date Visited:** 21 June 2002

Exclosure recommendation: Yes. Medium priority. The spring is not hydrologically modified and is in relatively natural condition. Livestock grazing is altering the structure and density of vegetation. Soils are hummocked, willows are sparse and mushroom shaped, and the channel downstream from the wetland is severely entrenched.

Dominant Plant Species: Beaked sedge and Geyer willow are the dominant species.

Johnston Classification: RI1 B. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. B designates the community type as Geyer willow-beaked sedge.

General Description: The spring occurs within the dry channel of a tributary to Willow Creek. About 50 feet downstream from the source is a berm within the channel creating a pond that was dry during our site visit. There is a series of check dams downstream in the dry drainage. Small puddles of water were present at the spring source but none within the downstream channel or pond. Willows at the source include Geyer and Bebb. Beaked sedge dominates the understory and forms dense cover at the spring source. Birds noted in the area include a Red-Naped Sapsucker apparently nesting near the spring. No mussels, aquatic snails, or aquatic insects were noted in the shallow (1 inch deep) water at the spring source. Livestock hoof prints were abundant and the ground is hummocked due to hoof action and the willows show evidence of grazing. Not more than a quarter mile downstream from the spring the channel is severely entrenched and the headcut is likely migrating upstream. The uplands are rolling hills of sagebrush shrublands. The stubble height in the wetland was about 2 inches (sedges).

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix bebbiana	Bebb willow	5	*Carex utriculata*	beaked sedge	50
Salix geyeriana	Geyer willow	20	*Juncus balticus*	Baltic rush	10
Shrubs			*Juncus tracyi*	Tracy rush	1
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	5	**Non-native grasses**		
Ribes inerme	whitestem gooseberry	10	*Agrostis gigantea*	redtop	1
Forbs			*Poa pratensis*	Kentucky bluegrass	10
Achillea millefolium (=lanulosa)	western yarrow	1			
Iris missouriensis	wild iris	1		moss	x
Potentilla sp.	cinquefoil	1			

Proper Functioning Condition Rating: This spring is rated as Functioning at Risk with no apparent trend. The functioning of the spring and associated small wetland has been altered by livestock use. The soil is hummocked due to hoof action – likely altering nutrient cycling and creating a higher percentage of bare soil.

Restoration and Management Comments: The spring and channel are used as a livestock watering source. The mushroom-shaped willows and hummocked soils indicate livestock use is altering the system. The headcut downstream in the ephemeral channel could migrate upstream and dewater this spring.

Water Chemistry: No outflow was noted from spring. The water chemistry of the puddled water at the spring source was as follows:

pH	7.3
Conductivity	340 µS/cm
Temperature	21 C

Photos: Roll 1 # 27-28

C-820 (I Powderhorn Dev)

Location: Gunnison County. Gunnison River drainage. About 12 miles southwest of Gunnison. UTM Zone 13, 316642E, 4256455N.

Legal Description: USGS 7.5' quadrangle: Big Mesa. T48N R2W Section 4 SE4.

Elevation: 7958 feet. **Date Visited:** 10 August 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Bare ground.

Johnston Classification: not classified.

General Description: A spring within an excavated pit. The pit is adjacent to an ephemeral drainage with sparse vegetation and about 5 to 10 feet of entrenchment. The pit has apparently been recently reexcavated. The pond has abundant aquatic vegetation, fowl mannagrass and common spikerush at the water's edge, and Canada thistle and foxtail barley on the dry edge. Woods rose is growing on the berm. Animals within the pond include abundant tiger salamanders, water striders, deer flies, aquatic beetles, backswimmers, and water boatmen. There is a series of berms in the channel (see C-818 and C-819 on page 128). The stubble height was about 3 inches in the wetland and 1 inch in the sagebrush (with lots of bare ground).

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of three known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Shrubs			**Graminoids**		
Rosa woodsii	Woods rose	1	*Carex* sp.	sedge	1
Forbs			*Eleocharis palustris*	common spikerush	5
Achillea millefolium (=lanulosa)	western yarrow	1	*Equisetum (Hippochaete)* sp.	scouring rush	1
Argentina anserina	silverweed cinquefoil	1	*Glyceria grandis*	American mannagrass	3
Ceratophyllum demersum	coon's tail (in pond)	10	*Glyceria striata*	fowl mannagrass	5
Epilobium ciliatum	hairy willowherb	1	*Hordeum jubatum*	foxtail barley	2
Lemna minor	common duckweed (in pond)	1	*Juncus balticus*	Baltic rush	1
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1	*Typha* sp.	cattail	1
Veronica americana	American speedwell	1	**Non-native grasses**		
			Agrostis gigantea	redtop	1
			Phleum pratense	common timothy	1
	Unknown aquatic (in pond	20	*Poa pratensis*	Kentucky bluegrass	1
			Non-native forbs		
			Artemisia biennis	biennial wormwood	1
			Chenopodium sp.	goosefoot	1
			Cirsium arvense	Canada thistle	5
			Melilotus officinalis	yellow sweetclover	1

Proper Functioning Condition Rating: This is an excavated spring within a bermed impoundment rated as Functioning at Risk with no apparent trend due to channel entrenchment.

Restoration and Management Comments: Restoration of this spring to its natural condition would include filling in the excavation, removing the berm, and allowing native vegetation to reestablish itself.

Water Chemistry: Full bermed pond. The water chemistry measured at the pond was as follows:

pH	9.6 (see page 16 for discussion of elevated pH)
Conductivity	200 µS/cm
Temperature	15 C

Photos: Roll 4 # 8-9

C-839 (Steers Gulch Spring 1)

Location: Gunnison County. Steers Gulch drainage. About four miles west of Gunnison. UTM Zone 13, 325828E, 4267594N.

Legal Description: USGS 7.5' quadrangle: Gunnison. T49N R1W Section 5 NW4.

Elevation: 7820 feet. **Date Visited:** 5 August 2002

Exclosure recommendation: No.

Dominant Plant Species: Narrowleaf cottonwood and sandbar willow.

Johnston Classification: FR1 C. Cotttonwood/Willow-Water layered soils-floodplains. C designates the community type as cottonwood-rose-Kentucky bluegrass-bedstraw-dandelion.

General Description: Steers Gulch is a dry channel with scattered patches of narrowleaf cottonwood and mixed willows with Woods rose and shrubby cinquefoil in the understory. The channel is somewhat entrenched but vegetation is dense in the vicinity of C-839. According to the 1983 Water Source Inventory, this is a pit spring not actually in the channel. I did a lot of searching but perhaps did not see the actual spring. At what appeared to be the spring source there was moss lining the channel for about 10 to 20 feet with non-native pasture grasses including redtop, meadow foxtail, Kentucky bluegrass, and smooth brome. Elk droppings were abundant and birds seen included chickadee, Mourning Dove, and Northern Flicker. The wetland vegetation was about 1 foot high with 3 inches of stubble in the sagebrush.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of three known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			*Ribes inerme*	whitestem gooseberry	1
Juniperus scopulorum	Rocky Mountain juniper	1	*Rosa woodsii*	Woods rose	5
Populus angustifolia	narrowleaf cottonwood	10	*Symphoricarpos rotundifolius*	roundleaf snowberry	1
Willows			**Graminoids**		
Salix exigua	sandbar willow	5	*Equisetum (Hippochaete)* sp.	scouring rush	1
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	1	**Non-native grasses**		
Shrubs			*Agrostis gigantea*	redtop	10
Artemisia tridentata	big sagebrush	5	*Alopecurus pratensis*	meadow foxtail	1
Chrysothamnus viscidiflorus	green rabbitbrush	1	*Bromus inermis*	smooth brome	1
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	5	*Poa pratensis*	Kentucky bluegrass	5
Purshia tridentata	antelope bitterbrush	1			

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition as ecological processes are apparently intact. There is some channel entrenchment but vegetative cover is dense and no hydrologic modifications were noted.

Restoration and Management Comments: This dry spring seemed to be in relatively good condition. The willows did not appear hedged. Non-native grasses dominate the understory and there is some entrenchment but relative to other sites this was good condition.

Water Chemistry: Dry spring.

Photos: Roll 4 # 14-15

C-866 (Pit Spring 83103)

Location: Gunnison County. Gunnison River drainage. About 14 miles southwest of Gunnison. UTM Zone 13, 314746E, 4253986N.

Legal Description: USGS 7.5' quadrangle: Big Mesa. T48N R2W Section 17 N2.

Elevation: 8288 feet. **Date Visited:** 10 August 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Beaked sedge and common spikerush.

Johnston Classification: RI3 F. Non-forested riparian serviceberry willow-deep alluvial soils-concave bottoms and swales. F designates the community type as dandelion-Kentucky bluegrass-Baltic rush-moist sedges. (poor fit for this site)

General Description: An excavated spring with berm and ponded water. The spring is near the head of a small northeast-facing basin. No outflow from the pond was seen. The pond is rimmed with beaked sedge and common spikerush with duckweed and pondweed in the pond. Damselflies were abundant and snails (*Gyraulus parvus*) were collected. Soils were very dark grayish brown (10 YR 3/2) sand with clay.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Shrubs			**Graminoids**		
Artemisia tridentata	big sagebrush	1	*Beckmannia syzigachne*	American sloughgrass	1
Ericameria (=Chrysothamnus) nauseosus	rubber rabbitbrush	1	*Carex* sp.	sedge	5
Forbs			*Carex utriculata*	beaked sedge	40
Argentina anserina	silverweed cinquefoil	2	*Eleocharis palustris*	common spikerush	20
Epilobium ciliatum	hairy willowherb	1	*Glyceria striata*	fowl mannagrass	5
Hackelia floribunda	manyflower stickseed	1	*Hordeum jubatum*	foxtail barley	5
Lemna minor	common duckweed (in pond)	10	*Juncus balticus*	Baltic rush	10
Lupinus sp.	lupine	1	**Non-native grasses**		
Potamogeton sp.	pondweed (in pond)	60	*Agrostis gigantea*	redtop	5
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1	*Phleum pratense*	common timothy	1
Veronica americana	American speedwell	1	*Poa pratensis*	Kentucky bluegrass	1
			Non-native forbs		
	Green algal mat (in pond)	5	*Plantago major*	common plantain	1

Proper Functioning Condition Rating: This is an excavated spring within bermed impoundment rated as Proper Functioning Condition. It is a highly altered system with a lot of bare ground away from the pond edge.

Restoration and Management Comments: Restoration of this spring to its natural condition would include filling in the excavation, removing the berm, and allowing native vegetation to reestablish itself.

Water Chemistry: Full bermed pond. The water chemistry measured at the pond was as follows:

pH	8.8
Conductivity	180 µS/cm
Temperature	28 C

Photos: Roll 4 # 4

C-884 (Goose Creek Spring 5)

Location: Gunnison County. Lake Gulch drainage. About 20 miles west southwest of Gunnison. UTM Zone 13, 306858E, 4252263N.

Legal Description: USGS 7.5' quadrangle: Carpenter Ridge. T48N R3W Section 21 NE4.

Elevation: 8200 feet. **Date Visited:** 11 August 2002

Exclosure recommendation: No. Low priority for restoration. Exclosure would need to fence entire riparian area.

Dominant Plant Species: Shrubby cinquefoil, Kentucky bluegrass, sparse willows.

Johnston Classification: RI1 D. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. D designates the community type as Geyer willow-Kentucky bluegrass-dandelion.

General Description: A dry ephemeral channel with scattered dry springs. There are patches of beaked sedge in the channel indicating that these areas are generally wetter. The UTM point C-884 is beneath a Geyer willow at a dry hole with sparse beaked sedge and moss. The springs have no hydrologic modifications. The most prevalent plants in the channel are Kentucky bluegrass, Baltic rush, wild iris, redtop, shrubby cinquefoil, and basin wildrye. Willows along the channel include Pacific, Geyer, and Bebb. The willows are severely mushroom-shaped and some are grazed to shorter than 1 foot. Soils are sandy gravel.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of three known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			*Lupinus* sp.	lupine	1
Juniperus scopulorum	Rocky Mountain juniper	1	*Sidalcea neomexicana*	New Mexican checkermallow	1
Populus angustifolia	narrowleaf cottonwood	2	*Urtica dioica* ssp. *gracilis*	stinging nettle	1
Willows			**Graminoids**		
Salix bebbiana	Bebb willow	1	*Carex utriculata*	beaked sedge	2
Salix geyeriana	Geyer willow	10	*Deschampsia cespitosa*	tufted hairgrass	1
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	5	*Equisetum (Hippochaete)* sp.	scouring rush	1
Salix monticola	serviceberry (mountain) willow	1	*Hordeum jubatum*	foxtail barley	1
Shrubs			*Juncus balticus*	Baltic rush	20
Artemisia tridentata	big sagebrush	1	*Leymus cinerus*	basin wildrye	5
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	5	*Poa* sp.	bluegrass	1
Ribes inerme	whitestem gooseberry	2	**Non-native grasses**		
Forbs			*Agrostis gigantea*	redtop	20
Achillea millefolium (=lanulosa)	western yarrow	1	*Phleum pratense*	common timothy	1
Argentina anserina	silverweed cinquefoil	1	*Poa pratensis*	Kentucky bluegrass	20
Aster sp. (purple)	aster	1	**Non-native forbs**		
Cirsium sp.	thistle	1	*Cirsium arvense*	Canada thistle	2
Conioselinum scopulorum	Rocky Mountain hemlock-parsley	3	*Madia glomerata*	tarweed	1
Epilobium ciliatum	hairy willowherb	1	*Taraxacum officinale*	dandelion	1
Iris missouriensis	wild iris	3			

Proper Functioning Condition Rating: This dry spring is rated as Proper Functioning Condition. The spring has no hydrologic modifications. Vegetation is sparse likely influenced by livestock grazing but there is no channel entrenchment.

Restoration and Management Comments: Willows are severely grazed and many are dead. Rest from livestock grazing would likely aid the willows and other vegetation.

Water Chemistry: Dry spring in ephemeral channel.

Photos: Roll 5 # 36-37

D-227 (Steers Gulch Spring 16)

Location: Gunnison County. Blinberry Gulch drainage. About four miles west northwest of Gunnison. UTM Zone 13, 325781E, 4270109N.

Legal Description: USGS 7.5' quadrangle: Gunnison. T50N R1W Section 29 SW4.

Elevation: 8578 feet. **Date Visited:** 11 August 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Cattail, common spikerush, burreed.

Johnston Classification: not classified

General Description: A spring emerges from a hillslope within a northeast facing drainage and flows immediately into a bermed pond. The drainage supports a few aspen and a few grazed willows. The pond is rimmed with cattail, common spikerush, and burreed and is covered with pondweed. There is one Pacific willow and a few sandbar willow at the pond. The berm supports a dense population of Canada thistle. Downstream from the pond is a small dry opening with dry, cracked fiberglass stock tanks and Baltic rush, big sagebrush, basin wildrye, and weedy species. Soils at the pond are black (10YR 2/1) clay loam. The height of the wetland vegetation was over 1 foot.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however two grouse fecal pellets were found near the spring. The spring is within two miles of three known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix exigua	sandbar willow	10	*Eleocharis palustris*	common spikerush	20
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	5	*Glyceria striata*	fowl mannagrass	5
Shrubs			*Hordeum brachyantherum*	meadow barley	1
Artemisia tridentata	big sagebrush	1	*Hordeum jubatum*	foxtail barley	5
Rosa woodsii	Woods rose	5	*Juncus balticus*	Baltic rush	20
Forbs			*Juncus tracyi*	Tracy rush	1
Achillea millefolium (=lanulosa)	western yarrow	1	*Sparganium emersum (in Weber)*	burreed	20
Cirsium sp.	thistle	1	*Typha latifolia*	cattail	20
Epilobium ciliatum	hairy willowherb	5	**Non-native grasses**		
Lemna minor	common duckweed	100 (in pond)	*Agrostis gigantea*	redtop	5
Lupinus sp.	lupine	1	*Phleum pratense*	common timothy	1
Potamogeton sp.	pondweed	50 (in pond)	*Poa pratensis*	Kentucky bluegrass	5
Urtica dioica ssp. *gracilis*	stinging nettle	1	**Non-native forbs**		
Vicia americana	American vetch	1	*Madia glomerata*	tarweed	5
			Rumex sp.	dock	1
			Trifolium repens	white clover	1
			Cirsium arvense	Canada thistle	patch

Proper Functioning Condition Rating: This is an excavated spring within a bermed impoundment rated as Proper Functioning Condition for the altered system.

Restoration and Management Comments: Restoration of this spring to its natural condition would include filling in the excavation, removing the berm, and allowing native vegetation to reestablish itself.

Water Chemistry: Full bermed pond with no surface outflow. The water chemistry measured at the pond was as follows:

pH	7.0
Conductivity	2200 µS/cm
Temperature	12 C

Photos: Roll 4 # 1-3

D-232 (Steers Gulch Spring 3)

Location: Gunnison County. Steers Gulch drainage. About 4 ½ miles west of Gunnison. UTM Zone 13, 324914E, 4268324N.

Legal Description: USGS 7.5' quadrangle: McIntosh Mountain. T50N R1W Section 31 SE4.

Elevation: 8133 feet. **Date Visited:** 5 August 2002

Exclosure recommendation: No. Dry channel.

Dominant Plant Species: Geyer willow, Baltic rush, big sagebrush.

Johnston Classification: not classified.

General Description: This is a dry tributary to Steers Gulch. The channel is vegetated with big sagebrush, shrubby cinquefoil, currant, skunkbrush sumac, snowberry, basin wildrye and Baltic rush. According to the 1983 Water Source Inventory, D-232 is a pond but at that time the pond was overgrown and silting in. No spring location was found. One spot in the channel had two Geyer willow and the same species listed above. The channel is not entrenched and is well vegetated with upland species. Elk and deer droppings were abundant in the channel.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Forbs**		
Salix geyeriana	Geyer willow	2	*Iris missouriensis*	wild iris	1
Shrubs			**Graminoids**		
Artemisia tridentata	big sagebrush	5	*Carex* sp.	sedge	5
Chrysothamnus viscidiflorus	green rabbitbrush	5	*Juncus balticus*	Baltic rush	5
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	5			
Ribes inerme	whitestem gooseberry	5			
Symphoricarpos rotundifolius	roundleaf snowberry	5			

Proper Functioning Condition Rating: This site is rated as Proper Functioning Condition as ecological processes are apparently intact. It is functioning as an ephemeral channel.

Restoration and Management Comments: None. Apparently in good condition.

Water Chemistry: Dry channel.

Photos: Roll 4 # 12-13

D-248 (Sapinero Spring 27)

Location: Gunnison County. Willow Creek drainage. About 11 miles west southwest of Gunnison. North of Blue Mesa Reservoir. UTM Zone 13, 314746E, 4262836N.

Legal Description: USGS 7.5' quadrangle: Big Mesa. T49N R2W Section 19 NW4.

Elevation: 7912 feet. **Date Visited:** 28 July 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Willows and biennial wormwood.

Johnston Classification: not classified.

General Description: A dry bermed pond in an ephemeral drainage. There are a few hedged willows in the channel and on the berm. Weedy species dominate the dry pond bottom and edges. Upstream from the berm the channel is not entrenched and is vegetated with upland species. There is a series of berms in the downstream channel.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of three known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			*Polygonum (Persicaria)* sp.	smartweed	1
Juniperus scopulorum	Rocky Mountain juniper	1	*Rorripa teres*	blunt-leaved yellowcress	5
Willows			*Sidalcea neomexicana*	New Mexican checkermallow	1
Salix exigua	sandbar willow	5	**Graminoids**		
Salix geyeriana	Geyer willow	5	*Carex* sp.	sedge	1
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	5	*Hordeum jubatum*	foxtail barley	1
Shrubs			*Juncus balticus*	Baltic rush	5
Amelchier utahensis	Utah serviceberry	1	**Non-native grasses**		
Artemisia tridentata	big sagebrush	10	*Agrostis gigantea*	redtop	10
Chrysothamnus viscidiflorus	green rabbitbrush	1	**Non-native forbs**		
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	5	*Artemisia biennis*	biennial wormwood	20
Rhus trilobata	skunkbrush sumac	1	*Chenopodium* sp.	goosefoot	1
Rosa woodsii	Woods rose	10	*Cirsium arvense*	Canada thistle	10
Symphoricarpos rotundifolius	roundleaf snowberry	1	*Melilotus officinalis*	yellow sweetclover	1
Forbs			*Plantago major*	common plantain	2
Achillea millefolium (=lanulosa)	western yarrow	5	*Polygonum* sp.	knotweed	1
Epilobium ciliatum	hairy willowherb	1	*Thlapsi arvense*	penny cress	1
Lupinus sp.	lupine	1			

Proper Functioning Condition Rating: This dry bermed pond is rated as Proper Functioning Condition for the altered system.

Restoration and Management Comments: It does not appear that a spring exists at this location.

Water Chemistry: Dry bermed pond.
Photos: Roll 3 # 15

D-525 (Nopit Spring)

Location: Saguache County. Spruce Gulch drainage. About 10 air miles southwest of Doyleville. Spruce Gulch (tributary to Prosser Creek) off 14-PP Road. UTM Zone 13, 350819E, 4245780N.

Legal Description: USGS 7.5' quadrangle: Razor Creek Dome. T47N R2E Section 12 SW4.

Elevation: 9000 feet. **Date Visited:** 30 June 2002

Exclosure recommendation: No. Drying meadow within an existing exclosure.

Dominant Plant Species: Shrubby cinquefoil and wild iris.

Johnston Classification: RI1 or RI6.

General Description: A drying meadow with shrubby cinquefoil around the edge and wild iris abundant in the center. Small patches of sedge and Baltic rush occur at the dry spring source. The drying meadow is within an exclosure and there is no berm or excavation. Soils are black (10YR 2/1) silty clay. The wetland vegetation was about 1 foot high.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Shrubs			**Graminoids**		
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	5	*Carex* sp.	sedge	5 collected
Ribes cereum	wax currant	5	*Carex* sp.	sedge	1
Forbs			*Hordeum jubatum*	foxtail barley	1
Argentina anserina	silverweed cinquefoil	2	*Juncus balticus*	Baltic rush	10
Iris missouriensis	wild iris	5	**Non-native grasses**		
Thermopsis divaricarpa	golden banner	1	*Poa pratensis*	Kentucky bluegrass	10
			Non-native forbs		
			Taraxacum officinale	dandelion	2

Proper Functioning Condition Rating: This spring system is rated as Proper Functioning Condition as ecological processes are apparently intact.

Restoration and Management Comments: The exclosure effectively excludes livestock grazing.

Water Chemistry: The spring was dry.

Photos: Roll 2 # 19-20

F-425 (Biebel Spring 2)

Location: Gunnison County. Sheep Gulch drainage. Approximately six air miles northeast of Gunnison and five air miles south of Almont. On Road 743. UTM Zone 13, 340392E, 4273780N.

Legal Description: USGS 7.5' quadrangle: Signal Peak. T50N R1E Section 14 NE4NW4.

Elevation: 8460 feet. **Date Visited:** 27 June 2002

Exclosure recommendation: Yes. High priority. The wetland and vegetation are altered by grazing. Soils are hummocked, willows are sparse and mushroom shaped, and the channel immediately downstream from the wetland is severely entrenched.

Dominant Plant Species: Beaked sedge with scattered willows.

Johnston Classification: RI1 B. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. B designates the community type as Geyer willow-beaked sedge.

General Description: A large wet meadow supported by a series of springs. The flow rate of the springs is estimated at about 2 gpm. The wet meadow continues along the road for about 0.15 mile and is about half as wide. The meadow is dominated by beaked sedge and has scattered willows. The willows are heavily grazed and the soils very hummocked. With decreased grazing there would likely be more willows at this site. A lot of the meadow was dry during our site visit but still supported beaked sedge. At the downstream end of the meadow there is channel slumping/headcutting in excess of 5 feet deep which appear to be migrating quickly upstream through the meadow. The most upstream spring is on the south side of the road and is fenced (about 20' x 40') and has ponded open water supporting duckweed and fowl mannagrass and some aspen. Elk and deer scat are abundant in the meadow and birds observed include American Robin, Raven, Mourning Dove, Broad tailed Hummingbirds, Black-billed Magpies, Violet-green Swallow, and sparrows. Aquatic insects noted include water striders and damselflies. There are two full cattle troughs in the meadow. The uplands are rolling hills covered with sagebrush with granite outcrops. Soils within the meadow are very dark grayish brown (10YR 3/2) silty clay with oxidized rhizospheres and mottles. The stubble height in the wetland was about 3 inches.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of three known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Graminoids**		
Populus tremuloides	quaking aspen	1	*Beckmannia syzigachne*	American sloughgrass	<1
Willows			*Carex utriculata*	beaked sedge	40
Salix bebbiana	Bebb willow	2	*Eleocharis palustris*	common spikerush	5
Salix exigua	sandbar willow	10	*Equisetum (Hippochaete)* sp.	scouring rush	1
Salix geyeriana	Geyer willow	5	*Glyceria striata*	fowl mannagrass	1
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	2	*Hordeum jubatum*	foxtail barley	<1
Salix monticola	serviceberry (mountain) willow	2	*Juncus balticus*	Baltic rush	2
Shrubs			*Pascopyrum smithii*	western wheatgrass	1
Ribes sp.	currant	3	**Non-native grasses**		
Rosa woodsii	Woods rose	3	*Agrostis gigantea*	redtop	2
Forbs			*Bromus tectorum*	cheatgrass	<1
Achillea millefolium (=lanulosa)	western yarrow	1	*Phleum pratense*	common timothy	2

Iris missouriensis	wild iris	1	*Poa pratensis*	Kentucky bluegrass	20
Lemna minor	common duckweed	<1	**Non-native forbs**		
Potentilla sp.	cinquefoil	1	*Cirsium arvense*	Canada thistle	1
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1	*Plantago major*	common plantain	<1
Veronica americana	American speedwell	1	*Taraxacum officinale*	dandelion	1
			Trifolium pratense	red clover	<1
	moss	x			

Proper Functioning Condition Rating: This spring is rated as Functioning at Risk with a downward trend. Channel entrenchment at the downstream end of the wetland threatens the wetland and the functions it performs. Cattle trailing and hummocking also alter the functioning of the wetland.

Restoration and Management Comments: Hummocking, trailing, and channel entrenchment are extreme at this site. Willows are sparse with some individuals grazed to the ground and taller willows mushroom shaped. The headcuts appear to be migrating quickly upstream threatening the wetland. A small (about 5 ft^2) patch of cheatgrass was noted within the fenced spring on the south side of the road (UTM Zone 13, 340410E, 4273764N) with a little spreading to the north side of the road.

Water Chemistry: Flow from the springs was visually estimated at about 2 gpm. The water chemistry was as follows:

pH	7.0
Conductivity	380 µS/cm
Temperature	8 C

Photos: Roll 1 # 11-15

F-452 (Down the Line Spring)

Location: Gunnison County. Wood Gulch drainage. From Parlin take 76 Road to 44 Road to Wood Gulch. UTM Zone 13, 358415E, 4264278N.

Legal Description: USGS 7.5' quadrangle: Pitkin. T49N R3E Section 10 SE4.

Elevation: 8620 feet. **Date Visited:** 1 July 2002

Exclosure recommendation: Yes. Top priority. Soils at the spring and willow-lined creek are hummocked in some areas and the many of the willows are heavily grazed. The area is heavily used by Gunnison Sage Grouse. Recommend limiting grazing in this allotment or fencing the entire spring/creek system.

Dominant Plant Species: Geyer and Bebb willows with an understory of beaked sedge and Kentucky bluegrass.

Johnston Classification: RI1 B. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. B designates the community type as Geyer willow – beaked sedge.

General Description: An undeveloped spring emerges from an ephemeral tributary to Wood Gulch and supports willows and other wetland vegetation along more than ¼ mile of channel. Geyer and Bebb willows form a near continuous band with occasional Pacific willow. The understory is dominated by species that increase with grazing including Kentucky bluegrass, Baltic rush, wild iris, and shrubby cinquefoil. Ponded areas support stands of beaked sedge and fowl mannagrass. The banks show signs of soil compaction and the grass is grazed very short. Eleven Gunnison Sage Grouse flushed from the creek and adjacent hillside and fecal pellets, secal pellets, and feathers were abundant on the banks. An unusually high density of ants were present along most of the creek. The adjacent slopes are rocky sagebrush shrublands. The stubble height in the wetland was about 1 to 3 inches with about 2 inches of stubble in the sagebrush.

Gunnison Sage Grouse notes: Nine sage grouse flushed from the creek and two from the adjacent sagebrush slope. Sage grouse fecal and secal pellets and feathers were abundant on the banks of the creek. The spring is within two miles of one known lek site.

Plant Species Observed (with rough estimate of percent cover):

Willows			**Graminoids**		
Salix bebbiana	Bebb willow	20	*Alopecurus aequalis*	shortawn foxtail	1
Salix geyeriana	Geyer willow	30	*Carex* sp.	sedge	1
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	5	*Carex utriculata*	beaked sedge	20
Shrubs			*Eleocharis palustris*	common spikerush	2
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	5	*Equisetum arvense*	field horsetail	2
Ribes inerme	whitestem gooseberry	10	*Glyceria striata*	fowl mannagrass	5
Rosa woodsii	Woods rose	10	*Hordeum brachyantherum*	meadow barley	1
Symphoricarpos rotundifolius	roundleaf snowberry	1	*Juncus balticus*	Baltic rush	10
Forbs			**Non-native grasses**		
Achillea millefolium (=lanulosa)	western yarrow	1	*Phleum pratense*	common timothy	1
Argentina anserina	silverweed cinquefoil	1	*Poa pratensis*	Kentucky bluegrass	20
Epilobium ciliatum	hairy willowherb	1	**Non-native forbs**		
Geranium sp.	geranium	<1	*Chorispora tenulla*	purple-mustard	1
Hackelia floribunda	manyflower stickseed	<1	*Plantago major*	common plantain	1
Heracleum maximum (=sphondylium)	common cowparsnip	2	*Rumex* sp.	dock	1

Iris missouriensis	wild iris	1	*Taraxacum officinale*	dandelion	10
Lemna minor	common duckweed	1	*Thlapsi arvense*	penny cress	1
Lupinus sp.	lupine	1	*Trifolium pratense*	red clover	5
Ranunculus (=Halerpestes) cymbalaria	alkali buttercup	1			
Urtica dioica ssp. *gracilis*	stinging nettle	1			
Veronica americana	American speedwell	1			
Vicia americana	American vetch	1			

Proper Functioning Condition Rating: This spring system is rated as Proper Functioning Condition as hydrological and ecological functions at the spring and associated creek appear to be relatively intact. However, livestock use is changing the vegetation and creating trailing, hummocking, and mushrooming of willows and considered a risk for the long-term condition of the spring.

Restoration and Management Comments: Livestock use appears to be changing the creek banks by causing hummocking, bank shearing, and soil compaction. The bank vegetation includes many increasers (including Kentucky bluegrass, Baltic rush, wild iris, and shrubby cinquefoil) and the willows are mushroom shaped indicating heavy grazing. Manage livestock grazing to maintain spring and riparian vegetation in good condition.

Water Chemistry: The flow rate within the creek was visually estimated at about 1 gpm. The water chemistry was as follows:

pH	7.8
Conductivity	200 µS/cm
Temperature	10 C

Photos: Roll 2 # 12-17

Alder Creek Spring – New to WSI

Location: Gunnison County. Alder Creek drainage. About four miles north northeast of Parlin. UTM Zone 13, 352370E, 4268208N.

Legal Description: USGS 7.5' quadrangle: Parlin. T50N R2E Section 36 NE4.

Elevation: 8420 feet. **Date Visited:** 16 September 2002

Exclosure recommendation: No. Low priority for restoration. Immediately adjacent to dirt road and Alder Creek.

Dominant Plant Species: Redtop, clover, timothy.

Johnston Classification: not classified

General Description: A spring emerges in the dirt road along Alder Creek. It is about three vertical feet above Alder Creek and 10 feet from the creek horizontally. The spring flows at about 2 gpm into Alder Creek. A patch of non-native pasture grasses (primarily redtop and timothy) and clover grows at the spring. The spring is adjacent to a beaver pond on Alder Creek. This spring is within the CNHP Alder Creek Potential Conservation Area (Rocchio et al. 2003). Alder Creek supports a good example of common riparian plant communities including Geyer willow/beaked sedge.

Gunnison Sage Grouse notes: Two Gunnison Sage Grouse flushed from this area on June 26, 2002 during a previous site visit. Grouse fecal pellets were found at the spring. The spring is within two miles of four known lek sites.

Plant Species Observed:

Forbs			**Non-native grasses**		
Achillea millefolium (=lanulosa)	western yarrow	x	*Agrostis gigantea*	redtop	x
Epilobium ciliatum	hairy willowherb	x	*Phleum pratense*	timothy	x
Vicia Americana	American vetch	x	**Non-native forbs**		
			Trifolium repens	white clover	x

Proper Functioning Condition Rating: The spring is disrupted by the dirt road and is rated as Functioning at Risk with no apparent trend due to the disruption.

Restoration and Management Comments: The spring is disrupted by the road but the canyon is narrow at this point and the creek wide with beaver ponds so road rerouting does not appear feasible.

Water Chemistry: The spring was visually estimated to be flowing at about 2 gpm. The water chemistry was measured as follows:

pH	7.2
Conductivity	200 µS/cm
Temperature	10 C

Photos: Roll 6 # 18

Birch Spring - new to WSI

Location: Gunnison County. In small dry drainage between Dry Gulch and Red Creek north of Highway 50. Park on Highway 50 about 1 mile east of Red Creek turnoff. Hike up canyon about 0.6 mile to notch with rock towers. UTM Zone 13, 306408E, 4261957N.

Legal Description: USGS 7.5' quadrangle: Carpenter Ridge. T49N R3W Section 20 SW4SW4.

Elevation: 8200 feet. **Date Visited:** 29 August 2002

Exclosure recommendation: No. This area is not grazed by livestock. If the area were grazed by livestock, an exclosure would be recommended.

Dominant Plant Species: River birch, mixed willows, Woods rose, wild hops, and giant angelica. CNHP described the community as river birch/mesic forb (*Betula occidentalis*/mesic forb) riparian shrubland, an apparently globally secure (G4? S2) plant community. This location is documented as a fair (C-ranked) example of this community in the CNHP Biological Conservation Database.

Johnston Classification: RI1. Non-forested riparian yellow willow-deep alluvial soils-concave bottoms and swales. Johnston et al. (2001) conducted plots at this spring but a community type was not assigned. Johnston et al. (2001) describes the community as dominated by river birch with mixed willows (yellow, Bebb) with an understory of sparse beaked sedge, Kentucky bluegrass, and Baltic rush and states that the community is rare in the Upper Gunnison Basin but common elsewhere.

General Description: A spring emerging from a drainage on a steep southeast face of Tenderfoot Hill. The spring was flowing at about 1 gpm and infiltrated into the drainage within about 50 meters. The spring supports a dense stand of river birch – though a small stand – this is probably the largest river birch stand in Gunnison County. Growing with the birch are sparse narrowleaf cottonwood, Rocky Mountain juniper, Gambel oak, Woods rose, willows including Pacific and either mountain or yellow (*S. monticola* or *S. eriocephala*), and other woody vegetation. Dense patches of giant angelica and wild hops occur along the drainage. Birds seen in the shrubs include Wilson's Warbler and Yellow Warbler. The spring is adjacent to tall rock outcrop towers. The adjacent slopes are sagebrush shrublands with occasional Utah juniper. Patches of cheatgrass grow along Highway 50 and continue sporadically up the slope and adjacent to the spring.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is not within two miles of any known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Forbs**		
Juniperus scopulorum	Rocky Mountain juniper	5	*Angelica ampla*	giant angelica	5
Populus angustifolia	narrowleaf cottonwood	5	*Humulus lupulus*	common hops	10
Pseudotsuga menziesii	Douglas-fir	1	*Platanthera (=Limnorchis)* sp.	bog orchid	<1
Willows			*Solidago canadensis*	Canada goldenrod	1
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	5	**Graminoids**		
Salix cf *monticola*	serviceberry (mountain)	2	*Juncus balticus*	Baltic rush	1

	willow				
Shrubs			*Juncus* sp.	rush	<1
Betula occidentalis (=fontinalis)	river birch	70	*Poa* sp.	bluegrass	<1
Holodiscus dumosus (=discolor)	ocean spray	2			
Prunus (=Padus) virginiana	chokecherry	1		moss	x
Quercus gambelii	Gambel oak	10			
Rhus trilobata	skunkbrush sumac	2			
Rosa woodsii	Woods rose	10			

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition. Ecological functions at this spring are intact - no hydrologic modifications or intense livestock grazing have occurred.

Restoration and Management Comments: Cheatgrass is established along Highway 50 and continues in patches up the slope to the spring. A patch of cheatgrass about 200 square feet occurs adjacent to the spring at UTM Zone 13 306408E 4262011N.

Water Chemistry: Flow from the spring was visually estimated at about 1 gpm. The water chemistry was as follows:

pH	7.2
Conductivity	200 µS/cm
Temperature	not measured

Photos: Roll 5 # 27-31

Cabin Creek Spring 1 – New to WSI

Location: Gunnison County. Cabin Creek drainage. About four miles north northeast of Parlin. UTM Zone 13, 344013E, 4271324N.

Legal Description: USGS 7.5' quadrangle: Signal Peak. T50N R1E Section 19 NE4.

Elevation: 8700 feet. **Date Visited:** 16 September 2002

Exclosure recommendation: Yes. Low priority. Does not appear impacted by grazing. The spring is in natural and good condition. Higher priority if grazing intensity increased in this allotment.

Dominant Plant Species: Aspen, giant angelica.

Johnston Classification: FR2. Aspen-cottonwood-deep alluvial soils-floodplains. None of the community descriptions fit this site.

General Description: This spring emerges from a densely vegetated drainage (aspen, rose, serviceberry) and forms a tributary to Cabin Creek. The aspen stand continues down the hill all the way to the confluence with Cabin Creek. There is dense cover of giant angelica and fowl mannagrass at the spring source. The channel is narrow with moss-covered rocks and contains at least 1 gpm flow. The wetland vegetation was over 1 foot high with the stubble height in the sagebrush about 2 inches.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is not within two miles of any known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Forbs**		
Juniperus scopulorum	Rocky Mountain juniper	2	*Achillea millefolium (=lanulosa)*	western yarrow	2
Populus tremuloides	quaking aspen	30	*Angelica ampla*	giant angelica	30
Willows			*Aster* sp. (purple)	aster	1
Salix bebbiana	Bebb willow	2	*Epilobium ciliatum*	hairy willowherb	5
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	1	*Iris missouriensis*	wild iris	5
Salix monticola	serviceberry (mountain) willow	1	*Rudbeckia lacinata* var. *ampla*	cutleaf coneflower	1
Shrubs			*Veronica americana*	American speedwell	5
Rosa woodsii	Woods rose	20	**Graminoids**		
			Glyceria striata	fowl mannagrass	5
			Juncus tracyi	Tracy rush	2
			Non-native grasses		
			Agrostis gigantea	redtop	10
			Poa pratensis	Kentucky bluegrass	5

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition as ecological processes are apparently intact. No hydrologic modifications are evident.

Restoration and Management Comments: This spring and tributary appear to be in relatively good condition. The shrub vegetation is dense and the willows are not hedged. There is some slight hummocking in some of the wetter areas. The channel is not downcut.

Water Chemistry: The spring was flowing at an estimated flow rate of at least 1 gpm. The water chemistry measured at the spring source was as follows:

pH	7.6
Conductivity	500 µS/cm
Temperature	8 C

Photos: Roll 6 # 24-25

Cabin Creek Spring 2 – New to WSI

Location: Gunnison County. Cabin Creek drainage. About four miles north northeast of Parlin. UTM Zone 13, 343738E, 4271085N.

Legal Description: USGS 7.5' quadrangle: Signal Peak. T50N R1E Section 19 SW4.

Elevation: 8742 feet. **Date Visited:** 16 September 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Aspen, alder, redtop.

Johnston Classification: FR2 C. Aspen-cottonwood-deep alluvial soils-floodplains. C designates the community type as aspen-Kentucky bluegrass.

General Description: This is a dry spring with dense overstory cover of alder and aspen.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is not within two miles of any known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Forbs**		
Populus tremuloides	quaking aspen	20	*Angelica ampla*	giant angelica	1
Willows			*Iris missouriensis*	wild iris	1
Salix drummondiana	Drummond (blue) willow	1	**Graminoids**		
Salix sp.	willow	5	*Equisetum arvense*	field horsetail	10
Shrubs			**Non-native grasses**		
Alnus incana ssp. *tenuifolia*	thinleaf alder	30	*Agrostis gigantea*	redtop	10
Ribes inerme	whitestem gooseberry	1	*Phleum pratense*	common timothy	1
Rosa woodsii	Woods rose	10	**Non-native forbs**		
			Cirsium arvense	Canada thistle	5
			Rumex sp.	dock	1
			Taraxacum officinale	dandelion	1

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition as ecological processes are apparently intact. No hydrologic modifications evident.

Restoration and Management Comments: Evidence of grazing and presence of non-native species (Canada thistle) indicates management desirable.

Water Chemistry: Dry spring.

Photos: Roll 6 # 28

Cabin Creek Spring 3 – New to WSI

Location: Gunnison County. Cabin Creek drainage. About four miles north northeast of Parlin. UTM Zone 13, 343610E, 4270787N.

Legal Description: USGS 7.5' quadrangle: Signal Peak. T50N R1E Section 19 SW4.

Elevation: 8463 feet. **Date Visited:** 16 September 2002

Exclosure recommendation: Yes. Low priority. Trail passes by spring source and ground is trampled.

Dominant Plant Species: Aspen, alder, Woods rose.

Johnston Classification: FR2 D. Aspen-cottonwood-deep alluvial soils-floodplains. D designates the community type as aspen-rose-Kentucky bluegrass-dandelion.

General Description: This spring emerges from beneath a large boulder and seeps from the adjacent hillslope. A hiking trail passes immediately below the spring and the spring water forms puddles on the trail. The flow is estimated at less than ¼ gpm. Aspen and alder are the dominant overstory plants with Woods rose and mixed grasses and forbs in the understory.

Gunnison Sage Grouse notes: No Gunnison Sage Grouse were noted; however, one fecal pellet that was apparently from a grouse was found. The spring is not within two miles of any known lek sites.

Plant Species Observed (with rough estimate of percent cover):

Trees			**Forbs**		
Juniperus scopulorum	Rocky Mountain juniper	5	*Conioselinum scopulorum*	Rocky Mountain hemlock-parsley	1
Populus tremuloides	quaking aspen	20	*Geranium* sp.	geranium	1
Willows			*Heracleum maximum (=sphondylium)*	common cowparsnip	1
Salix bebbiana	Bebb willow	1	*Rudbeckia lacinata* var. *ampla*	cutleaf coneflower	1
Salix lucida ssp. *caudata (=lasiandra)*	Pacific (whiplash) willow	1	*Vicia americana*	American vetch	1
Salix cf *monticola*	serviceberry (mountain) willow	5	**Graminoids**		
Shrubs			*Equisetum (Hippochaete)* sp.	scouring rush	1
Alnus incana ssp. *tenuifolia*	thinleaf alder	20	*Equisetum arvense*	field horsetail	1
Amelchier utahensis	Utah serviceberry	5	*Glyceria striata*	fowl mannagrass	1
Juniperus communis	common juniper	5	**Non-native grasses**		
Lonicera (=Distegia) involucrata	bush honeysuckle	1	*Agrostis gigantea*	redtop	1
Rosa woodsii	Woods rose	10	*Phleum pratense*	common timothy	1
Trees			**Non-native forbs**		
Juniperus scopulorum	Rocky Mountain juniper	5	*Plantago major*	common plantain	1
Populus tremuloides	quaking aspen	20			
	moss	5			

Proper Functioning Condition Rating: This spring is rated as Proper Functioning Condition as ecological processes are apparently intact.

Restoration and Management Comments: The trail passing by the spring alters the flow patterns. Vegetative cover is sparse in some areas.

Water Chemistry: The spring was flowing at an unestimated rate of less than ¼ gpm. The water chemistry measured at the spring source was as follows:

pH	7.2
Conductivity	320 µS/cm
Temperature	9 C

Photos: Roll 6 # 26-27

Excavated spring near B-928 – new to WSI

Location: Gunnison County. Tomichi Creek drainage. About three miles north of Doyleville. Near B-928. UTM Zone 13, 359570E, 4262645N.

Legal Description: USGS 7.5' quadrangle: Pitkin. T49N R3E Section 14 SW4.

Elevation: 8977 feet. **Date Visited:** 29 July 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Bare ground, Geyer willow.

Johnston Classification: not classified.

General Description: A recently reexcavated spring with ponded water, a berm, bare ground, and a few mushroom-shaped Geyer willows.

Gunnison Sage Grouse notes: No signs of Gunnison Sage Grouse were noted. The spring is within two miles of two known lek sites.

Plant Species Observed:

Willows		
Salix geyeriana	Geyer willow	x

Proper Functioning Condition Rating: This excavated spring is rated as Nonfunctional due to the excess of bare, compacted ground.

Restoration and Management Comments: Restoration of the spring to its natural condition would require filling in the excavation, removal of the berm, and reestablishment of native vegetation. The spring currently functions as a livestock water source.

Water Chemistry: No outflow from the pond was noted and water chemistry was not measured.

Photos: Roll 3 # 10

Dry spring near C-884 – new to WSI

Location: Gunnison County. Lake Gulch drainage. Between 26 Road south of Blue Mesa Reservoir and the Lake Gulch drainage. About 20 miles west southwest of Gunnison. UTM Zone 13, 306872N, 4253168N.

Legal Description: USGS 7.5' quadrangle: Carpenter Ridge. T48N R3W Section 16.

Elevation: 8400 feet. **Date Visited:** 11 August 2002

Exclosure recommendation: No. Low priority for restoration.

Dominant Plant Species: Geyer willow.

Johnston Classification: not classified.

General Description: A dry spring in a drainage on a west facing hillslope about ½ mile north of C-884. The drainage and spring had many dead willows.

Gunnison Sage Grouse notes: One Gunnison Sage Grouse fecal pellet was found near the dry spring.

Plant Species Observed:

Willows			**Graminoids**		
Salix geyeriana	Geyer willow	x	*Carex* sp.	sedge	x
Salix bebbiana	Bebb willow	x	*Juncus balticus*	Baltic rush	x
Shrubs			*Leymus cinerus*	basin wildrye	x
Dasiphora (=Pentaphylloides) floribunda	shrubby cinquefoil	x	**Non-native grasses**		
Ribes cereum	wax currant	x	*Poa pratensis*	Kentucky bluegrass	x
Ribes inerme	whitestem gooseberry	x			
Rosa woodsii	Woods rose	x			
Forbs					
Argentina anserina	silverweed cinquefoil	x			
Cirsium sp.	thistle	x			
Mainthemum stellatum	false Solomon's seal	x			

Proper Functioning Condition Rating: Rated as Proper Functioning Condition. The spring is dry but not developed and appears to be functioning at potential.

Restoration and Management Comments: There are some signs of heavy grazing.

Water Chemistry: Dry spring.

Photos: None

Notes on Additional Springs Visited.

The following four springs were visited because they were along the road between targeted springs B-868 and B-880. Visited 7/30/02. Houston Gulch Quad.

B-871 (Houston Spring 3) Houston Gulch drainage. UTM 352576E, 4257615N. T48N R3E Section 6. This is an excavated bermed spring. Aquatic insects noted included water striders, water boatmen, backswimmers, and whirligig beetles. The wetland below the berm is dry, hummocked, and torn up. The pond had overflow water.

B-872 (Albuquerque Spring) Houston Gulch drainage. UTM 352716E, 4257072N. T48N R3E Section 6. This spring supplies two full stock tanks. The spring is within an exclosure. There is some hummocking and some old cow droppings within the exclosure as well as a colony of Gunnison prairie dog. There is a patch of beaked sedge and dry bare ground adjacent. Photo Roll 3 # 3.

B-878 (Steer Gulch Spring 29) Razor Creek drainage. UTM 354622E, 4256449N. T48N R3E Section 5. This is a round stock tank with about ½ gpm inflow. The source of the water was not found. The tank overflowed to a small patch of Baltic rush and redtop. (There was no escape ramp from the tank). The tank is at the base of a slope with rocky granite outcrops. Photo Roll 3 # 2.

B-879 (Arroyo Seco Spring) Razor Creek drainage. UTM 354779E, 4256610N. 8350 feet elevation. T48N R3E Section 5. This is a dug out spring/pit. It is wet but with no flow. It is within a small exclosure. Plants at the pit include common spikerush, foxtail barley, silverweed cinquefoil, Canada thistle, redtop, and Kentucky bluegrass. The pond had a muddy center and a small amount of water (less than 1 inch deep over less than $1ft^2$). Photo Roll 3 # 1.

Near B-889 (not a spring) Saguache County. Long Gulch drainage. UTM 352292E, 4251880N. T48N R2E Section 24 SE4. Elevation 8841 feet. Note: B-889 not included in survey – 8 grouse seen at this location. Visited 29 June 2002. A meadow-like opening in the sagebrush with dried grasses and water sedge. Two springs are included within this exclosure (B-889 and B-890). The spring sources were not visited but this site was noted because of eight Gunnison Sage Grouse foraging within and flushing from the north end of the exclosure. The exclosure includes some mushroom-shaped willows and a berm indicating grazing has occurred. Photo Roll 2 # 24.

C-818 (Jim Blain Spring 4) Gunnison County. Gunnison River drainage. About 12 miles southwest of Gunnison. UTM Zone 13, 317035E, 4256137N. USGS 7.5' quadrangle: Big Mesa. T48N R2W Section 4 SE4. Elevation 8038 feet. Visited 10 August 2002.
A dry pit within an ephemeral channel. This is a series of three ponds associated with C-820. Does not appear to be a spring at this location. Canada thistle and foxtail barley are the dominant plants.

C-819 (Hwy 149 Spring 2) Gunnison County. Gunnison River drainage. About 12 miles southwest of Gunnison. UTM Zone 13, 316853E, 4256250N. USGS 7.5' quadrangle: Big Mesa. T48N R2W Section 4 SE4. Elevation 8005 feet. Visited 10 August 2002. Bermed impoundment within an ephemeral channel. The pool is about 30 feet in diameter and contains water. It is not

clear whether the water is from a spring or from recent rains. There is no vegetation in the water and over 70% bare ground. There has been some recent excavation here (less than at C-820). This is part of a series of three ponds associated with C-820. Canada thistle and Baltic rush are the dominant plants.

C-931 (Steers Gulch Spring 4) Steers Gulch drainage. UTM 336685E, 4260719N. 8361 feet elevation. T50N R1W Section 31 Visited 5 August 2002. A bermed pond with dense beaked sedge and common spikerush at the edge. Duckweed and mare's tail grow in the water. No outflow was noted. Other plants noted include narrowleaf cottonwood, Baltic rush, Woods rose, foxtail barley, redtop, American mannagrass, Kentucky bluegrass, willowherb, and sloughgrass. No signs of grouse were noted. Photo Roll 4 # 11.

D-526 (Havaas Spring) Saguache County. Cochetopa Creek drainage. Did not locate spring after ½ hour of searching. Found two dry trenches with sagebrush. Visited 30 June 2002.

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APPENDICES

APPENDIX A: Gunnison Basin Potential Conservation Area

(from Rocchio et al. 2003)

Biodiversity Rank: B1. Irreplaceable biodiversity significance. The Gunnison Basin PCA supports very good (B-ranked) occurrences of the globally- and state- critically imperiled (G1 S1) Gunnison Sage Grouse (*Centrocercus minimus*), designated a species of special concern by the Colorado Division of Wildlife and a candidate for listing under the Federal Endangered Species Act. This site represents the largest and most likely to succeed population of the Gunnison Sage Grouse. (That is, there are no remaining A-ranked occurrences). This site also supports nearly the entire world's population of the Gunnison milkvetch (*Astragalus anisus*) (G2 S2).

Protection Urgency Rank: P2. Very high urgency. Protection actions are urgently needed to secure the long-term survival of the Gunnison Sage Grouse. Although much of the land is federally owned, numerous important brood rearing and lek sites for the grouse are under private ownership with potential for development.

Management Urgency Rank: M1. Very high urgency. Although current management in many parts of this site is good to excellent, there are many areas that require management action. One of the most urgent management actions is to increase canopy cover and height of grasses and forbs under the sagebrush as well as in the riparian areas used for brood rearing.

Location: Gunnison and Saguache counties. The Gunnison Basin PCA encompasses sagebrush shrublands extending over 40 miles from north to south and 30 miles east to west, centered near the town of Gunnison.

U.S.G.S. 7.5-min. quadrangles: Cochetopa Park, Cold Spring Park, Sargents Mesa, West Baldy, Razor Creek Dome, Sawtooth Mountain, Spring Hill Creek, Sargents, Doyleville, Houston Gulch, Iris, Iris NW, Pitkin, Parlin, Signal Peak, Gunnison, Crystal Creek, Almont, Flat Top, Cement Mountain, Crested Butte, Powderhorn, Gateview, Poison Draw, Big Mesa, Carpenter Ridge, Sapinero, McIntosh Mountain, West Elk Peak SW, Little Soap Park, Squirrel Creek.

Legal Description: T15S R84W, T15S R85W, T15S R 86W, T15S R87W, T45N R2E, T46N R1E, T46N R2E, T47N R1E, T47N R1W, T47N R1.5W, T47N R2E, T47N R2W, T47N R3E, T47N R3W, T47N R4E, T47N R4W, T48N R1E, T48N R1W, T48N R1.5W, T48N R2E, T48N R2W, T48N R3E, T48N R3W, T48N R4E, T48N R4W, T48N R5E, T49N R1E, T49N R1W, T49N R2E, T49N R2W, T49N R3E, T49N R3W, T49N R4E, T49N R4W, T50N R1E, T50N R1W, T50N R2E, T50N R2W, T50N R3E, T51N R1E, T51N R1W, T51N R2E, T51N R2W.

Elevation: 7,500-11,465 ft. **Size:** Approximately 552,900 acres

General Description: The Gunnison Basin site is best characterized as rolling hills of sagebrush shrublands with dissecting rivers and creeks. Many of the hilltops are windblown free of snow and represent a more xeric landscape dominated by either dwarf sagebrush shrublands (sagebrush steppe) or montane grasslands. All of these ecological systems are extremely important for the Gunnison Sage Grouse, a sagebrush specialist. The sagebrush shrublands are winter and nesting

habitat, while the xeric hilltops are lek sites, and the rivers and creeks are brood-rearing habitat. This site represents the world's largest remaining habitat and population for the Gunnison Sage Grouse (Gunnison Sage Grouse Working Group 1997), one of Colorado's rarest birds.

Numerous species of sagebrush dominate these shrublands, but Wyoming sagebrush (*Artemisa tridentata* ssp. w*yomingensis*) is usually the dominant below 8,500 feet in elevation, while mountain sagebrush (*A. tridentata* ssp. *vaseyana*) is dominant above 8,500 feet. The dwarf sagebrush shrublands on the windswept slopes and ridges may be black sagebrush (*A. nova*) or low sagebrush (*A. arbuscula*). The dominant grasses in the grasslands vary with elevation as well.

The riparian areas along the creeks and rivers vary significantly depending on elevation, stream gradient, stream volume, and floodplain width. The most significant riparian areas within this site are those dominated by shrubs, including willows (*Salix* spp.), and alders (*Alnus incana*) that also have high grass and forb cover during the summer months when grouse are present.

Biodiversity Rank Justification: This area represents the best remaining site for the Gunnison Sage Grouse (G1). This grouse was recently described as a distinct species and has a high potential for being federally listed as an endangered species due to a declining population. Within the Gunnison Sage Grouse range (i.e., southwest Colorado), only Gunnison County has a secure population (Gunnison Sage Grouse Conservation Plan 1997). In 1995, the spring population of sage grouse in the Gunnison Basin was about 2200 birds (Gunnison Sage Grouse Working Group 1997). Factors clearly implicated in the long-term decline of sage grouse are habitat loss; habitat fragmentation (caused by roads, powerlines, reservoirs, land conversion, land treatments, etc.); and habitat degradation caused by land treatments and other uses which have changed grass, forb, and sagebrush composition, reduced organic material in the soil, and increased the loss/movement of soil resulting in changes in water table levels, and basic soil productivity. Sage grouse are specialists of sagebrush ecosystems and have not adapted to changing land uses.

Table A-1. Natural Heritage element occurrences at Gunnison Basin PCA. Elements in bold are those upon which the PCA's B-rank is based.

Scientific Name	Common Name	Global Rank	State Rank	Federal and State Status	EO* Rank
Animals					
Centrocercus minimus	**Gunnison Sage Grouse**	**G1**	**S1**	**C, SC**	**B**
Centrocercus minimus	**Gunnison Sage Grouse**	**G1**	**S1**	**C, SC**	**B**
Centrocercus minimus	**Gunnison Sage Grouse**	**G1**	**S1**	**C, SC**	**B**
Centrocercus minimus	**Gunnison Sage Grouse**	**G1**	**S1**	**C, SC**	**B**
Centrocercus minimus	**Gunnison Sage Grouse**	**G1**	**S1**	**C, SC**	**B**
Centrocercus minimus	**Gunnison Sage Grouse**	**G1**	**S1**	**C, SC**	**B**
Centrocercus minimus	Gunnison Sage Grouse	G1	S1	C, SC	C
Centrocercus minimus	Gunnison Sage Grouse	G1	S1	C, SC	C
Centrocercus minimus	Gunnison Sage Grouse	G1	S1	C, SC	C
Centrocercus minimus	Gunnison Sage Grouse	G1	S1	C, SC	C
Centrocercus minimus	Gunnison Sage Grouse	G1	S1	C, SC	C
Centrocercus minimus	Gunnison Sage Grouse	G1	S1	C, SC	C
Centrocercus minimus	Gunnison Sage Grouse	G1	S1	C, SC	C
Centrocercus minimus	Gunnison Sage Grouse	G1	S1	C, SC	C
Centrocercus minimus	Gunnison Sage Grouse	G1	S1	C, SC	D
Centrocercus minimus	Gunnison Sage Grouse	G1	S1	C, SC	D

Scientific Name	Common Name	Global Rank	State Rank	Federal and State Status	EO* Rank
Centrocercus minimus	Gunnison Sage Grouse	G1	S1	C, SC	D
Plants					
Astragalus anisus	Gunnison milkvetch	G2	S2		B
Astragalus anisus	Gunnison milkvetch	G2	S2		B
Astragalus anisus	Gunnison milkvetch	G2	S2		C
Astragalus anisus	Gunnison milkvetch	G2	S2		C
Astragalus anisus	Gunnison milkvetch	G2	S2		C
Astragalus anisus	Gunnison milkvetch	G2	S2		C
Astragalus anisus	Gunnison milkvetch	G2	S2		C
Astragalus anisus	Gunnison milkvetch	G2	S2		C
Astragalus anisus	Gunnison milkvetch	G2	S2		C
Astragalus anisus	Gunnison milkvetch	G2	S2		D
Astragalus anisus	Gunnison milkvetch	G2	S2		D
Astragalus anisus	Gunnison milkvetch	G2	S2		D
Astragalus anisus	Gunnison milkvetch	G2	S2		E
Astragalus anisus	Gunnison milkvetch	G2	S2		E
Astragalus anisus	Gunnison milkvetch	G2	S2		E
Astragalus anisus	Gunnison milkvetch	G2	S2		E
Astragalus anisus	Gunnison milkvetch	G2	S2		E
Astragalus anisus	Gunnison milkvetch	G2	S2		E
Astragalus anisus	Gunnison milkvetch	G2	S2		E
Astragalus anisus	Gunnison milkvetch	G2	S2		E

*EO=Element Occurrence. Multiple listings represent separate locations.

Boundary Justification: This boundary represents all known lek sites within the Gunnison Basin, as well as nesting habitat, critical winter habitat, and the rivers and creeks used for brood rearing. There are areas within this site that have concentrations of lek sites and high quality habitat as well as areas that have been developed and no longer serve as sage grouse habitat. This boundary includes nearly all of what the Colorado Division of Wildlife has identified as the Gunnison Sage Grouse overall habitat in Gunnison Basin. In addition, this boundary represents nearly the entire world's population of Gunnison milkvetch.

Protection Comments: Protection actions are needed to secure long-term survival of the Gunnison Sage Grouse. Although much of the land is federally owned, numerous important brood rearing and lek sites for the grouse are under private ownership with potential for development.

Management Comments: The following is excerpted from the Gunnison Sage Grouse Conservation Plan, 1997:

> The major factors that drive sage grouse populations are quality and extent of habitat. No other bird is so habitat specific to one particular plant type (sagebrush) in meeting its annual life requirements. Size of habitat is important because sage grouse move seasonally between suitable habitat types. Sage grouse require several distinct habitat types during different times of the year, which can be divided as following:
>
> 1. Winter
> 2. Nesting and early brood-rearing (uplands)
> 3. Late summer (riparian)
> 4. Escape and hiding habitat (needed yearlong)
> 5. Lek (breeding areas)

The key to sage grouse management is habitat, but in many locations of the Gunnison Basin key components of the sagebrush ecosystem are either insufficient or have been altered. The number and distribution of high quality nesting and early brood-rearing areas appear to be a limiting factor for sage grouse in the Gunnison Basin (Gunnison Sage Grouse Plan, 1997). The quality and quantity of residual herbaceous cover have an important role in sage grouse production and survival. Residual herbaceous vegetation (grasses and forbs) in sagebrush areas which provide adequate cover, both horizontal and vertical, is necessary to hide nests and nesting hens, and broods, as well as provide habitat for insects upon which birds depend. However, recent studies have shown that grasses and forbs are under-represented in a large portion of the Gunnison Basin sagebrush ecosystem.

In addition to the Gunnison Sage Grouse, the Gunnison milkvetch (*Astragalus anisus*) is of high biodiversity significance. The world's distribution of Gunnison milkvetch is tightly associated with the same sagebrush ecosystem that the Gunnison Sage Grouse use. Nearly all of the worlds known populations of Gunnison milkvetch occur within the Gunnison Basin PCA.

APPENDIX B: Natural Heritage Methodology

The Natural Heritage Methodology is used by Natural Heritage Programs throughout North, Central, and South America, forming an international database network. The 85 Natural Heritage Network data centers are located in each of the 50 U.S. states, five provinces of Canada, and 13 countries in South and Central America and the Caribbean. This network enables scientists to monitor the status of species or natural community from a state, national, and global perspective. Information collected by the Natural Heritage Programs can provide a means to protect species before the need for legal endangerment status arises. It can also enable conservationists and natural resource managers to make informed, objective decisions in prioritizing and focusing conservation efforts.

The Natural Heritage Methodology ranks species and communities according to their rarity or degree of imperilment. The ranking system is scientifically based upon the number of known locations of the element as well as its ecology and known threats. By ranking the relative rareness or imperilment of a species or community, the quality of its populations, and the importance of associated conservation sites, the methodology can facilitate the prioritization of conservation efforts so the most rare and imperiled elements may be preserved first. Because plant communities are as important as individual species, this methodology has also been applied to ranking and preserving rare plant communities, as well as the best examples of common communities.

Element imperilment ranks are assigned both in terms of the element's degree of imperilment within Colorado (its State or S-rank) and the element's imperilment over its entire range (its Global or G-rank). Taken together, these two ranks indicate the degree of imperilment of an element. For example, the lynx, which is thought to be secure in northern North America but is known from fewer than 5 current locations in Colorado, is ranked G5S1 (globally secure, but critically imperiled in this state). The Rocky Mountain Columbine (*Aquilegia saximontana*), which is known only in Colorado from about 30 locations, is ranked a G3S3 (vulnerable both in the state and globally, since it only occurs in Colorado and then in small numbers). A narrowleaf cottonwood sand dune forest community that is only known from one location in the world at the Great Sand Dunes National Monument is ranked G1S1 (critically imperiled both in the state and globally, because it exists in a single location).

Definition of Natural Heritage Imperilment Ranks
Global imperilment ranks are based on the range-wide status of a species or community. State imperilment ranks are based on the status of an element in an individual state. State and Global ranks are denoted with an "S" or a "G" respectively, followed by a number or letter. **These ranks should not be interpreted as legal designations.**

Table B-1. Definition of Natural Heritage Imperilment Ranks.

G/S1	Critically imperiled globally/state because of rarity (5 or fewer occurrences in the world/state; or 1,000 or fewer individuals), or because some factor of its biology makes it especially vulnerable to extinction.
G/S2	Imperiled globally/state because of rarity (6 to 20 occurrences, or 1,000 to 3,000 individuals), or because other factors demonstrably make it very vulnerable to extinction throughout its range.
G/S3	Vulnerable through its range or found locally in a restricted range (21 to 100 occurrences, or 3,000 to 10,000 individuals).

G/S4	Apparently secure globally/state, though it may be quite rare in parts of its range, especially at the periphery. Usually more than 100 occurrences and 10,000 individuals.
G/S5	Demonstrably secure globally/state, though it may be quite rare in parts of its range, especially at the periphery.
G/SX	Presumed extinct globally, or extirpated within the state.
G#?	Indicates uncertainty about an assigned global rank.
G/SU	Unable to assign rank due to lack of available information.
GQ	Indicates uncertainty about taxonomic status.
G/SH	Historically known, but usually not verified for an extended period of time.
G#T#	Trinomial rank (T) is used for subspecies or varieties. These taxa are ranked on the same criteria as G1-G5.
S#B	Refers to the breeding season imperilment of elements that are not residents.
S#N	Refers to the non-breeding season imperilment of elements that are not permanent residents. Where no consistent location can be discerned for migrants or non-breeding populations, a rank of SZN is used.
SZ	Migrant whose occurrences are too irregular, transitory, and/or dispersed to be reliably identified, mapped, and protected.
SA	Accidental in the state.
SR	Reported to occur in the state but unverified.
S?	Unranked. Some evidence that species may be imperiled, but awaiting formal rarity ranking.

Note: Where two numbers appear in a state or global rank (for example, S2S3), the actual rank of the element is uncertain, but likely falls within the stated range.

Element Occurrence Ranking

Actual locations of elements, whether they are single organisms, populations, or plant communities, are referred to as **element occurrences**. The element occurrence is considered the most fundamental unit of conservation interest and is at the heart of the Natural Heritage Methodology. To prioritize element occurrences for a given species or community, an element occurrence rank (EO-Rank) is assigned according to the ecological quality of the occurrences whenever sufficient information is available. This ranking system is designed to indicate which occurrences are the healthiest and ecologically the most viable, thus focusing conservation efforts where they will be most successful. The EO-Rank is based on three factors:

> Size – a measure of the area or abundance of the element's occurrence, relative to other known, and/or presumed viable, examples. Takes into account factors such as area of occupancy, population abundance, population density, population fluctuation, and minimum dynamic area (which is the area needed to ensure survival or re-establishment of an element after natural disturbance).

Condition/Quality – an integrated measure of the composition, structure, and biotic interactions that characterize the occurrence. This includes factors such as reproduction, age structure, biological composition (such as the presence of exotic versus native species), structure (for example, canopy, understory, and ground cover in a forest community), and biotic interactions (such as levels of competition, predation, and disease).

Landscape Context – an integrated measure of two factors: the dominant environmental regimes and processes that establish and maintain the element, and connectivity. *Dominant environmental regimes and processes* include herbivory, hydrologic and water chemistry regimes (surface and groundwater), geomorphic processes, climatic regimes (temperature and precipitation), fire regimes, and many kinds of natural disturbances. *Connectivity* includes such factors as a species having access to habitats and resources needed for life cycle completion, fragmentation of ecological communities and systems, and the ability of the species to respond to environmental change through dispersal, migration, or re-colonization.

Each of these factors is rated on a scale of A through D, with A representing an excellent grade and D representing a poor grade. These grades are then averaged to determine an appropriate EO-Rank for the occurrence. If not enough information is available to rank an element occurrence, an EO-Rank of E is assigned. EO-Ranks and their definitions are as follows:

Table B-2. CNHP Element Occurrence Ranks and their Definitions.

A	Excellent viability.
B	Good viability
C	Fair viability.
D	Poor viability.
H	Historic: known from historical record, but not verified for an extended period of time.
X	Extirpated (extinct within the state).
E	Extant: the occurrence does exist but not enough information is available to rank.
F	Failed to find: the occurrence could not be relocated.

Conservation Areas and Their Ranking

In order to successfully protect populations or occurrences, it is helpful to delineate Potential Conservation Areas (PCAs). These PCAs focus on capturing the ecological processes that are necessary to support the continued existence of a particular element occurrence of natural heritage significance. Potential Conservation Areas may include a single occurrence of a rare element, or a suite of rare element occurrences or significant features.

The goal of the PCA process is to identify a land area that can provide the habitat and ecological processes upon which a particular element occurrence, or suite of element occurrences, depends for its continued existence. The best available knowledge about each species' life history is used in conjunction with information about topographic, geomorphic, hydrologic features, vegetative cover; and current and potential land uses. In developing the boundaries of a Potential Conservation Area, CNHP scientists consider a number of factors that include, but are not limited to:

- ecological processes necessary to maintain or improve existing conditions;
- species movement and migration corridors;
- maintenance of surface water quality within the PCA and the surrounding watershed;
- maintenance of the hydrologic integrity of the groundwater;

- land intended to buffer the PCA against future changes in the use of surrounding lands;
- exclusion or control of invasive non-native species;
- land necessary for management or monitoring activities.

The boundaries presented are meant to be used for conservation planning purposes and have no legal status. The proposed boundary does not automatically recommend exclusion of all activity. Rather, the boundaries designate ecologically significant areas in which land managers may wish to consider how specific activities or land use changes within or near the PCA affect the natural heritage resources and sensitive species on which the PCA is based. Please note that these boundaries are based on our best estimate of the primary area supporting the long-term survival of targeted species and plant associations. A thorough analysis of the human context and potential stresses has not been conducted. However, CNHP's conservation planning staff is available to assist with these types of analyses where conservation priority and local interest warrant additional research.

Off-Site Considerations

Frequently, all necessary ecological processes cannot be contained within a PCA of reasonable size. For example, taken to the extreme, the threat of ozone depletion could expand every PCA to include the entire planet. The boundaries described in this report indicate the immediate, and therefore most important, area to be considered for protection. Continued landscape level conservation efforts are necessary as well, which will involve regional efforts in addition to coordination and cooperation with private landowners, neighboring land planners, and state and federal agencies.

Ranking of Potential Conservation Areas

CNHP uses element and element occurrence ranks to assess the overall biological diversity significance of a PCA, which may include one or many element occurrences. Based on these ranks, each PCA is assigned a biological diversity rank (or B-rank). See Table B-3 for a summary of these B-ranks.

Table B-3. Natural Heritage Program Biological Diversity Ranks and their Definitions.

B1	Outstanding Significance (irreplaceable): Only known occurrence of an element A-ranked occurrence of a G1 element (or at least C-ranked if best available occurrence) Concentration of A- or B-ranked occurrences of G1 or G2 elements (four or more)
B2	Very High Significance: B- or C-ranked occurrence of a G1 element A- or B-ranked occurrence of a G2 element One of the most outstanding (for example, among the five best) occurrences rangewide (at least A- or B-ranked) of a G3 element. Concentration of A- or B-ranked G3 elements (four or more) Concentration of C-ranked G2 elements (four or more)
B3	High Significance: A- or B-ranked occurrence of a G3 element Up to five of the best occurrences of a G4 or G5 community (at least A- or B-ranked) in an ecoregion (requires consultation with other experts)

B4	Moderate Significance: Other A- or B-ranked occurrences of a G4 or G5 community C-ranked occurrence of a G3 element A- or B-ranked occurrence of a G4 or G5 S1 species (or at least C-ranked if it is the only state, provincial, national, or ecoregional occurrence) Concentration of A- or B-ranked occurrences of G4 or G5 N1-N2, S1-S2 elements (four or more) D-ranked occurrence of a G2 element At least C-ranked occurrence of a disjunct G4 or G5 element Concentration of excellent or good occurrences (A- or B-ranked) of G4 S1 or G5 S1 elements (four or more)
B5	General or State-wide Biological Diversity Significance: good or marginal occurrence of common community types and globally secure S1 or S2 species.

Protection Urgency Ranks

Protection urgency ranks (P-ranks) refer to the timeframe in which it is recommended that conservation protection occur. In most cases, this rank refers to the need for a major change of protective status (for example agency special area designations or ownership). The urgency for protection rating reflects the need to take legal, political, or other administrative measures to protect the area. Table B-4 summarizes the P-ranks and their definitions.

Table B-4. Natural Heritage Program Protection Urgency Ranks and their Definitions.

P1	Protection actions needed immediately. It is estimated that current stresses may reduce the viability of the elements in the PCA within 1 year.
P2	Protection actions may be needed within 5 years. It is estimated that current stresses may reduce the viability of the elements in the PCA within this approximate timeframe.
P3	Protection actions may be needed, but probably not within the next 5 years. It is estimated that current stresses may reduce the viability of the elements in the PCA if protection action is not taken.
P4	No protection actions are needed in the foreseeable future.
P5	Land protection is complete and no protection actions are needed.

A protection action involves increasing the current level of protection accorded one or more tracts within a potential conservation area. It may also include activities such as educational or public relations campaigns, or collaborative planning efforts with public or private entities, to minimize adverse impacts to element occurrences at a site. It does not include management actions. Situations that may require a protection action are as follows:

- Forces that threaten the existence of one or more element occurrences at a PCA. For example, development that would destroy, degrade or seriously compromise the long-term viability of an element occurrence; or timber, range, recreational, or hydrologic management that is incompatible with an element occurrence's existence;

- The inability to undertake a management action in the absence of a protection action; for example, obtaining a management agreement;

- In extraordinary circumstances, a prospective change in ownership or management that will make future protection actions more difficult.

Management Urgency Ranks

Management urgency ranks (M-ranks) indicate the timeframe in which it is recommended that a change occur in management of the element or PCA. This rank refers to the need for

management in contrast to protection (for example, increased fire frequency, decreased grazing, weed control, etc.). The urgency for management rating focuses on land use management or land stewardship action required to maintain element occurrences at the potential conservation area.

A management action may include biological management (prescribed burning, removal of non-natives, mowing, etc.) or people and site management (building barriers, rerouting trails, patrolling for collectors, hunters, or trespassers, etc.). Management action does not include legal, political, or administrative measures taken to protect a potential conservation area. Table B-5 summarizes M-ranks and their definitions.

Table B-5. Natural Heritage Program Management Urgency Ranks and their Definitions.

M1	Management actions may be required within one year or the element occurrences could be lost or irretrievably degraded.
M2	New management actions may be needed within 5 years to prevent the loss of the element occurrences within the PCA.
M3	New management actions may be needed within 5 years to maintain the current quality of the element occurrences in the PCA.
M4	Current management seems to favor the persistence of the elements in the PCA, but management actions may be needed in the future to maintain the current quality of the element occurrences.
M5	No management needs are known or anticipated in the PCA.