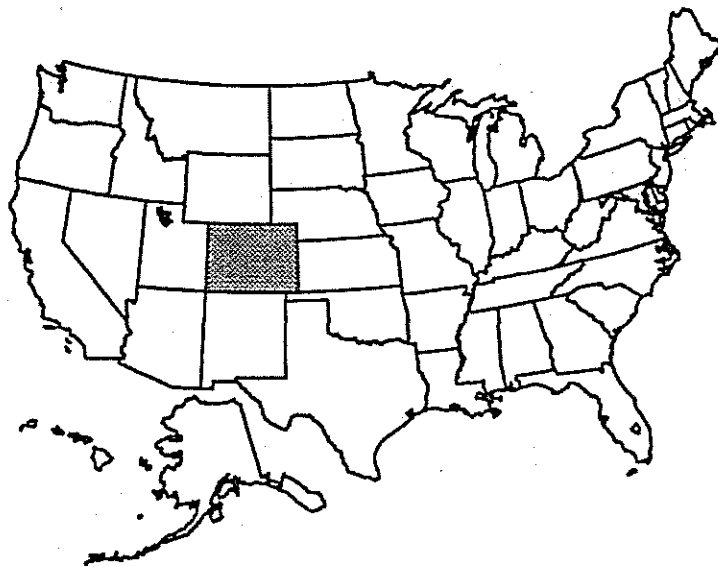


# STATEWIDE CONSERVATION PLAN FOR COLORADO



June 30, 1995

The Nature Conservancy  
of Colorado  
1244 Pine Street  
Boulder, Colorado 80302

*The  
Nature  
Conservancy* 

UNITED STATES DEPARTMENT OF AGRICULTURE

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## ACKNOWLEDGEMENTS

This plan is dedicated to our children, that they may experience and appreciate Colorado's rich natural heritage for years to come.

Many thanks to the Colorado scientists who have dedicated their lives to the better understanding and conservation of the state's biodiversity, especially John Anderson, David Armstrong, Bill Baker, Rick Brune, Janet Coles, David Cooper, Mike Figgs, Tamara Naumann, Steve O'Kane, Chris Pague, Scott Peterson, David Kuntz, Sue Galatowitsch, and Bill Weber, for without these individuals, this plan would not have been possible. Thanks to Chris and Katie Pague (and Savanna) and the staff of the Colorado Natural Heritage Program for bringing the program to a new level and producing the scorecard, the basis for this plan, and responding to our endless requests. Thanks to Janet Coles, who provided critical input in the early phases of this plan, and continues to share her vast knowledge of the state's biodiversity with us. Thanks also to Nancy Auerbach and Margaret Howe for compiling information on threats to biodiversity in Colorado, and to the Adopt-a-Rare Plant volunteers to gathering information on the status of rare plants. Many thanks to the scientists who reviewed the plan and provided substantial comments (see below). And finally, thanks to Will Murray for providing national perspective, inspiring us and asking hard questions throughout the planning process.

Planning team members: Dr. David Armstrong, Dr. Alan Carpenter, Mark Burget, Nancy Fishbein, Todd Kipfer, Will Murray, Betsy Neely, Chris Pague, Heidi Sherk, Terri Schulz

Regional program managers: Carol Beidleman, Tom Light, Jamie Williams, Pat Willits

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Maps: Todd Kipfer

# COLORADO STATEWIDE CONSERVATION PLAN

## Executive Summary

**Introduction:** The Nature Conservancy must determine how it can best contribute to the long-term protection of Colorado's imperiled species and natural plant communities. A statewide conservation plan, developed by an interdisciplinary team, identifies 45 priority conservation planning units with 129 sites in need of protection and management. If protected, this portfolio of conservation sites will capture the best known examples of rare, declining or inadequately protected species and plant communities representing major ecoregions in Colorado.

Based on information from the Colorado Natural Heritage Program (CNHP), the plan will serve as an internal guide to focus the Conservancy's protection efforts in Colorado over the next 5-10 years. It provides a benchmark upon which we can measure our success in years to come, and provides a scientific foundation for future capital campaigns, cooperative projects, and new community-based programs. This plan will be updated periodically to incorporate new information from the CNHP and other scientists, as well as the new conservation agenda of the national organization.

The plan outlines ecologically significant and threatened landscape-level and smaller conservation sites, targeting: 1) examples of threatened, declining, or inadequately protected species and natural communities; 2) concentrations of state-rare species and/or communities; 3) examples of unprotected species and communities representative of ecoregions found in Colorado; and 4) critical habitat and concentration areas for migratory bird species.

**Process:** Conservation Programs staff members developed the plan with major input from Will Murray (Western Regional Office), Chris Pague (CNHP), David Armstrong (Board of Trustees Conservation Programs Committee), and Janet Coles (Colorado Natural Areas Program). The CNHP and Conservancy staff held "scorecard" meetings in the fall of 1994 to review Colorado's top 275 conservation sites of outstanding or very high biodiversity significance. The planning team then drafted vision and goals statements to set broad strategic direction and developed seven scientific criteria to assess all sites. These included: number of global and state rare species and communities, whether the site was the only known protectable site, urgency of threats, manageability, defensibility, viability of ecosystem processes, and existing protection. All sites were scored according to the criteria and ranked by total science score within planning unit, a concentration of sites with highly-ranked elements. Sites meeting minimum science scores were included on the priority list. Priority sites and planning units were grouped by Conservancy region for developing conservation strategies, such as information and inventory needs, site plan needs, protection and management/monitoring actions.

**Results:** The plan summarizes the results of the planning process, and consists of a review of Colorado's current status of biodiversity, vision and goals, methodology, a list of the high-priority conservation sites needing protection with a brief summary of significance,

preliminary conservation strategies, recommended next steps, and maps.

One hundred and twenty-nine conservation sites within 45 planning units were selected as the highest-priority for protection based on their scientific scores. These included landscape-level sites containing multiple elements as well as smaller conservation sites containing populations of single rare species. At least 30 planning units have a significant private land component; 10 will require major capital expenditures to protect. Almost all planning units have mixed landownership, with some public lands component: Bureau of Land Management lands occur within 24 planning units, State Land Board lands occur within 12 units, Forest Service lands occur within nine units, FWS occur within two units, and Tribal lands occur within two units. Eighteen have high potential for cooperative projects with public entities. Almost all units require inventory, site plans, research and monitoring.

1. High-priority landscape-level conservation planning units: The most threatened planning units containing multiple elements in need of protection attention and most appropriate for TNC involvement (by scientific rank with brief significance):

- Parachute Creek (shale barrens shrublands, riparian forests, rare species)
- Dolores River (riparian forests, grassland, rare plants, hanging gardens, native fish)
- San Miguel River (riparian forests and shrublands, rare plants)
- San Luis Valley (wet meadows, cold desert shrublands, playa lakes, rare species)
- Piceance Basin (shale barrens, rare plants, remnant communities)
- Uncompahgre Badlands (shale barrens communities, rare plants)
- Arikaree River (Plains riparian forest, wet prairie, loess prairie, sandsage prairie)
- Colorado River at Grand Junction/Debeque (rare fish, rare plants, riparian forests, grasslands)
- South Park (wet meadows, fens, montane grasslands)
- Arkansas River (shale barrens grasslands and shrublands, rare plant ensemble)
- Yampa River (cottonwood riparian forests, montane willow carrs, rare birds, rare fish)
- Laramie Foothills (foothill prairies, mixed mountain shrublands, ponderosa pine woodland)
- Aiken Canyon (foothills pinyon-juniper woodlands, gambel oak shrublands)
- Mesa de Maya (pinyon-juniper woodlands, foothills shrublands, rare species)
- Western High Plains (shortgrass prairies, sandhill prairie, rare birds)
- Animas River (narrowleaf cottonwood and coniferous riparian forests)

2. Medium-priority landscape-level conservation planning units: Planning units with high ecological significance containing multiple elements, but not immediately threatened, or other entities are leading the protection efforts:

- Mesa Verde (numerous rare plants, state rare mammals, remnant communities)
- Mosquito Peaks (rare plant ensemble, many species disjunct from the arctic)
- Ute Mountain Ute Tribal Lands (shale barrens communities, rare plants)
- Rocky Mountain National Park (numerous state rare plants and animals)
- Raven Ridge (numerous rare plants, pinyon woodland)
- Brown's Park (rare plants, woodlands, grasslands, shrublands)
- Dinosaur National Monument (numerous rare plants, rare fish, remnant plant communities)
- Greenland Ranch (foothills shrublands, grasslands)
- Bar NI (pinyon-juniper woodlands, montane grasslands, montane wetlands)
- North St. Vrain Creek (rare plant, ponderosa pine savanna, foothill shrublands)

- Big Creek Lakes (numerous rare plants, montane wet meadows, birds, rare frogs)
- Lake Fork of the Gunnison River (mixed riparian forest, rare plant)
- Little Snake River (rare plants, saltbush shrublands, cold desert shrublands)
- West Bijou Creek (riparian forests, ponderosa pine woodlands, short grass prairies)

3. High-priority smaller conservation planning units/sites: Smaller conservation planning units harboring primarily single species/communities in need of protection attention:

- Troublesome Creek (2 federally listed plants: Penland penstemon and Osterhout milkvetch)
- North Platte River (all populations of North Park phacelia, a federally listed endangered plant)
- South Beaver Creek (all populations of skiff milkvetch, a federal candidate for listing)
- Kremmling (Osterhout milkvetch, a federally listed endangered plant, sagebrush shrublands)
- Pike's Peak (globally rare moonwort and state rare columbine)
- Uncompahgre Peak and Redcloud Peak (federally listed endangered fritillary butterfly)
- Southern Ute Tribal Lands (federally endangered Knowlton cactus)
- Boulder County (Bell's twinpod, ladies tresses orchid, tallgrass prairie, rare jumping mouse)
- Salida (Brandegge buckwheat, a federal candidate for listing)
- Jefferson County (federally threatened ladies tresses orchid, foothill prairie)

**Conclusions:** The Conservancy faces exciting challenges in addressing the protection of Colorado's priority landscape-level and smaller conservation sites harboring rare, declining, or inadequately protected species and communities. This plan will help us focus conservation activities on the most ecologically significant and threatened elements. A number of creative conservation strategies will be needed to address these critical areas, beginning with inventories and planning, and including developing partnerships, expansion of private land and public land protection, and stewardship activities. We must work at multiple scales and use a combination of coarse and fine-filter conservation strategies to accomplish protection of the targeted species and communities. Much of our conservation work will be accomplished at the local community level, developed around Conservancy preserves. Because we can't acquire many of the smaller isolated sites, we must pursue alternative methods such as management agreements, registries and special designations to protect and manage targeted single species. And finally, we must expand partnerships with a number of public and private entities to adequately protect and manage these high-priority sites.

**Recommended Next Steps:**

1. Initiate rangewide and regional inventories, planning, research and monitoring projects for the priority conservation sites to refine conservation strategies.
2. Identify best conservation sites for species and high-quality communities representative of ecoregions not captured in this plan.
3. Develop consensus on best bioregion system/level for making conservation decisions.
4. Obtain better information on declining species and communities.
5. Expand the planning process to include public and private partners.
6. Revise statewide plan to incorporate new information and concepts from the national Conservancy Conservation Committee's proposed conservation agenda.
7. Work with Trustee Conservation Programs Committee and Scientific Advisory Group on items #1-6 above.

## I. INTRODUCTION

This report summarizes the first comprehensive statewide planning effort by The Nature Conservancy of Colorado to develop a system of priority landscape-level and other conservation sites in need of protection in the state. This plan will effectively guide the Conservancy's protection activities in Colorado over the next 5-10 years. If adequately protected and managed, this portfolio of sites will capture a broad spectrum of biodiversity representing major ecoregions of Colorado. Primarily based on the Colorado Natural Heritage Program's scorecard, the plan will serve as an internal conservation planning document for the Conservancy. The plan provides a scientific foundation for upcoming capital campaigns and will drive future capital funding strategies. The plan should be considered to be a working document under continual revision to incorporate new information from the Colorado Natural Heritage Program and other scientists, as well as the national Conservancy's new conservation agenda. It was developed through an interdisciplinary team effort and consists of the following:

- A. a review of the current known status of Colorado's biodiversity;
- B. vision and goals to guide statewide conservation activities;
- C. a list of the highest-priority conservation sites needing protection with a brief summary of significance;
- D. recommended conservation strategies, conclusions, next steps, and maps.

The plan identifies 45 ecologically-significant and threatened conservation planning units, consisting of multiple sizes, including: standard sites (areas smaller than five square miles), macrosites (5-100 square mile areas), and megasites (large cohesive areas of particular biological significance, generally greater than 100 square miles). These areas contain one or more of the following:

- A. examples of threatened, declining, or inadequately protected species and plant communities and the ecological processes that sustain them;
- B. concentrations of state-rare species and/or communities;
- C. examples of unprotected species and communities representative of Bailey's ecoregions found in Colorado;
- D. critical habitat and concentration areas for migratory bird species.

This document will enable the Conservancy in Colorado to:

- focus our conservation efforts/resources on the highest priority conservation

sites which best further the Conservancy's mission in Colorado;

- be more proactive in protecting threatened species, plant communities, and landscapes;
- more effectively measure our success;
- more strategically coordinate protection efforts with partners; and
- establish annual objectives and long-term goals for inventory, site planning, stewardship and protection.

## II. COLORADO'S BIODIVERSITY

**A. Overview:** Colorado has one of the most varied landscapes in the United States, encompassing 104,247 square miles, with elevations ranging from 3,387 ft. near Holly along the Arkansas River in southeastern Colorado to 14,433 ft. at the top of Mt. Elbert, the second highest mountain in the contiguous United States. Fifty-three peaks are higher than 14,000 ft., and the Continental Divide runs through the center of the state (Rennicke 1990). Colorado is unique among western states because the headwaters of five major rivers originate here, fed mostly by snow meltwater from high elevations in the Southern Rocky Mountains. These include the Colorado, Rio Grande, Republican, Arkansas, and Platte Rivers. Colorado is a geographically complex state, and "possesses a phenomenal array of examples of geological activity" (Huber 1993).

A rich diversity of ecosystems occurs in Colorado, ranging from Southern Plains grasslands in eastern Colorado to riparian forests to alpine tundra. These ecosystems reflect the diversity of the state's landscapes with tremendous variability in elevation, temperature, precipitation and soils (Galatowitsch 1985).

**B. Ecoregions:** Bailey et al. (1994) provides the most recent and comprehensive delineation of ecoregions for Colorado. Colorado lies within three major divisions based on ecological climate zones, which include tropical/subtropical steppe, temperate steppe and temperate desert. These are further divided into seven ecoregion provinces (italics below), delineated primarily by vegetation type. These provinces have been further divided into 17 physiographic sections, as listed below.

- *Colorado Plateau Semi-Desert Province*
  - Grand Canyon Lands Section
  - Navajo Canyon Lands Section
- *Arizona-New Mexico Mountains Semi-Desert-Open Woodland-Coniferous Forest-Alpine Meadow Province*
  - White Mountain-San Francisco Peaks Section

- **Great Plains-Palouse Dry Steppe Province**
  - Central High Plains Section
  - Central High Tablelands Section
  - Arkansas Tablelands Section
  - Southern High Plains Section
  - Northern Rio Grande Basin Section

- **Southern Rocky Mountain Steppe-Open Woodland Coniferous Forest-Alpine Meadow Province**
  - Northern Parks and Ranges Section
  - North Central Highlands Section
  - South Central Highlands Section
  - Southern Parks and Ranges Section
  - Uinta Mountains Section

- **Intermountain Semi-Desert and Desert Province**
  - Uinta Basin Section
  - Northern Canyon Lands Section

- **Nevada-Utah Mountains Semi-Desert-Coniferous Forest-Alpine Meadow Province**
  - Tavaputs Plateau Section

- **Intermountain Semi-Desert Province**
  - Green River Basin Section

Further review of these ecoregion provinces and sections is needed to determine the most meaningful regions for making conservation decisions. Others have proposed regional boundaries for Colorado that correlate roughly with Bailey et al. (1994). Gregg (1963) proposes four physiographic provinces: Colorado Plateau, Great Plains, Southern Rocky Mountains, and Wyoming Basin. Huber (1993) outlines five geologic provinces: the Colorado Plateau, High Plains, Southern Rocky Mountains, Green River Basin (Wyoming Basin), and Uinta Range (Middle Rocky Mountains). Gallant et al. (1989), Fenneman (1931), Dice (1943), Armstrong (1972) and Chronic (1980) also describe the physiography, geology and biotic regions of Colorado.

**C. Status of Species:** Colorado harbors 3,088 vascular and 1,200 nonvascular plant taxa; 144 species are ranked as globally rare by the Colorado Natural Heritage Program (see Table 1). These species are considered to be critically imperilled globally because of extreme rarity (G1), imperilled globally because of rarity (G2), or very rare or local throughout their range (G3); see Appendix C for further explanation of Heritage Program ranking system. Of these, 121 species are endemic to Colorado (Weber and Witmann, 1992). Although not all of these are imperilled, these species can be protected only in Colorado. A few plant species,

including the Wolf Creek evening primrose (*Oenothera kleinii*), Colorado watercress (*Rorippa coloradensis*), small-flower beardtongue (*Penstemon parviflorus*), and Grand Junction cat's eye (*Cryptantha aperta*), apparently have been extirpated. We have a responsibility and opportunity to prevent other species from declining or going extinct, particularly because there is no state statute protecting rare plant species in Colorado.

Colorado is home to 670 vertebrate species, with the majority of these classified as nongame, meaning they are not hunted or fished (Nesler 1995, Rennicke 1990). Seventeen vertebrates are considered to be globally rare by the Colorado Natural Heritage Program (ranked G1-G3, see Appendix C for explanation of ranking system). Twenty-six vertebrate species are listed as threatened or endangered in Colorado by the Colorado Division of Wildlife.

There are approximately 50-100,000 invertebrate species in Colorado. Invertebrates are not legally protected in Colorado; yet Colorado supports unique species, such as the Uncompahgre fritillary (*Boloria acronema*), known from two places in the world, both in Colorado. There are 12 globally rare invertebrates in Colorado tracked by the Colorado Natural Heritage Program. This number would most certainly be larger if sufficient inventories for invertebrates existed.

Colorado has one of the largest state bird lists (444 observed species) of any state, especially for an interior state (Andrews and Righter 1992). A total of 267 (60% of total) bird species are confirmed to have nested in Colorado. The state provides important habitat for a number of globally rare birds. For example, over 60% of the world's mountain plover (*Charadrius montanus*) breeding population occurs in Colorado (Pague, personal communication). Approximately 140 of the 255 species on the official Partners in Flight list of neotropical migratory birds for North America regularly breed in Colorado (Roth 1992).

Approximately 127 mammal species are found in Colorado (Armstrong, personal communication). Several taxa, such as the gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos*), black footed ferret (*Mustela nigripes*), southwestern otter (*Lutra canadensis*) and bison (*Bison*) occurred historically but have been extirpated in Colorado (Murray 1987). There are 46 reptiles and 18 amphibians in Colorado.

There is considerable concern about Colorado's native aquatic fauna, as there are declines in many of the 116 native aquatic wildlife species (known fish, amphibians, mollusks and crustaceans; there are likely many more small crustaceans not included due to lack of information). For example, 61% of the 56 native fish in Colorado are considered to be at risk (Nesler 1995). Of particular concern are warm water fish communities of the Colorado River, four of which are federally endangered, and the decline of the Great Plains native fishes. Four minnow species have disappeared from the Arkansas and South Platte Rivers (Woodling 1985, Fausch 1995). There is a great need for further inventories, research and status assessments of Colorado's aquatic fauna and flora to provide baseline information to guide protection and management activities to prevent further declines.

Globally-rare fishes in Colorado include four subspecies of cutthroat trout (greenback, Colorado River, Rio Grande, and yellowfin (presumed extinct), six native Colorado River fishes (Colorado squawfish, bonytail, humpback chub, razorback sucker, all federally endangered, and flannelmouth sucker and roundtail chub, Category 2). Five globally rare species are native to the eastern plains: Arkansas darter (Category 1), and plains minnow, plains topminnow, flathead chub, and specked chub (all Category 2); all are native to the Arkansas basin, except plains topminnow and plains minnow, which are native to both the Arkansas and South Platte (Fausch 1995).

Table 1. Globally Rare Elements in Colorado Tracked by Colorado Natural Heritage Program.

CNHP Rank	Plants	Animals	Plant Communities	Total
G1	20	8	8	41
G2	42	0	38	80
G3	82	21	54	157
Total G1-G3	144	29	100	273

Note: This information is from the Colorado Natural Heritage Program as of May 1995; element ranks are regularly updated and subject to change. Additionally, results differ depending on how the data base is queried. See Appendix C for explanation of Heritage ranking system.

**D. Status of Plant Communities:** In addition to the fine filter approach to conservation of rare species, the Conservancy uses a coarse filter approach, a community-level conservation strategy. This strategy is based on the assumption that the majority of species can be protected by conserving examples of plant communities without having to inventory and manage each species individually (this concept is untested). It is based on the UNESCO classification system, a physiognomic system at the highest levels and a floristic system at the lowest levels (Bourgeron and Engelking 1994).

The Natural Heritage Program tracks plant associations, or plant communities, defined as plant communities "of definite floristic composition, presenting a uniform physiognomy, and growing in uniform habitat conditions" (Third International Botanical Congress 1910 in CNHP 1995). The plant association concept applies to existing vegetation regardless of successional status. The Natural Heritage Program recognizes over 450 plant associations; at least 100 of these are considered to be globally rare and imperiled (CNHP 1995). These associations form the building blocks of ecosystem or landscape level conservation. The Colorado Natural Areas Program recognizes natural plant communities, a broader classification of vegetation, which includes both biotic and abiotic factors. For the

purposes of this report, plant communities are used broadly to encompass both plant associations of the Natural Heritage Program and natural plant communities of the Colorado Natural Areas Program.

Plant communities with limited habitat and which are threatened in Colorado should take priority for protection (Baker 1984, Galatowitsch 1985, Colorado Natural Heritage Program 1994 and 1995, Colorado Natural Areas Program 1990, Noss et al. 1995). These include, but are not limited to:

- Aspen wetland forests
- Coniferous wetland forests
- Fens
- Great Plains mixed grass prairie
- Loess prairies
- Marshes
- Montane grasslands
- Montane wet meadows
- Montane willow carrs
- Plains escarpment prairie
- Playa lakes
- Riparian shrublands
- Saltbush and cold desert shrublands
- Shale barren shrublands and grasslands
- Tallgrass prairies
- Western Slope ponderosa pine woodlands
- Western Slope grasslands
- Wet prairies
- Wet meadows

Plant communities that were previously widespread but are now limited in distribution and/or have altered structures or composition due to human activities are also of concern. These previously widespread types (Baker 1984, Galatowitsch 1985, Colorado Natural Heritage Program 1994 and 1995, Colorado Natural Areas Program 1990, Noss et al. 1995) include, but are not limited to:

- Foothill prairies
- Fremont cottonwood riparian forests
- Mixed mountain shrublands
- Narrowleaf cottonwood forests
- One-seeded juniper woodlands
- Plains cottonwood riparian forests
- Ponderosa pine scrub woodlands
- Ponderosa pine savannas
- Sandsage prairies
- Saline bottomland shrublands
- Shortgrass prairies

Please note that these lists have not yet undergone peer review outside of the Colorado Natural Heritage Program and the Colorado Natural Areas Program.

**E. Threats to Colorado's biodiversity:** Habitat loss or fragmentation is the primary threat to biodiversity in Colorado and elsewhere in the Western United States. A number of human activities, including mining, logging, water development, livestock grazing, residential development, and urbanization and associated activities, have contributed to the destruction or fragmentation of habitat. These uses have modified the structure and composition of many of the communities and interfered with natural processes. The introduction of alien and adventive species has also played an important part in changing the natural vegetation since European settlement, particularly at low to middle elevations (Galatowitsch 1985).

Approximately 50 square miles of land in Colorado are developed annually for use by humans (Holden 1995). An acre of agricultural land is lost every 4 minutes; and, open space is consumed by development 1.6 times faster than the population is growing (Finley 1992). Colorado is one of the fastest growing states in the nation, with an average annual population growth of 2.9% between 1992 and 1993 (Lamm et al. 1994). Between 1993 and 1994, Colorado was the fourth fastest growing state, with an annual growth of 2.6% (Bureau of Census 1995). Historically, the major source of habitat loss in the Rocky Mountain Region has been harvest or extraction of natural resources (e.g., logging, mining, agriculture). Today, due to changes in economic and demographic trends, more and more people are moving to Colorado, shifting the cause of habitat loss to residential and commercial construction and associated roads, service development, and recreation demand. Colorado's population is expected to grow significantly between now and 2020. The current population is ca. 3.720 million; the estimated population for 2020 is 5.029 million. This growth, driven largely by people moving here from other states, will not only be along the metropolitan Front Range and nearby mountains, but also will affect the ski counties of the central mountains and southwest Colorado (Gottlieb 1994 and Colorado Division of Local Governments 1994).

It is critical that high-quality communities and ecosystems, as well as populations of rare species, be protected within naturally-functioning landscapes as baseline areas. Selected highly threatened ecosystems (all are globally rare with the possible exception of the fens and wet meadows) in need of immediate conservation before further losses of species and communities occur include the following:

**1. Cottonwood Riparian Forests:** Riparian and wetland systems are highly dependent on natural hydrologic and geomorphic regimes. These ecosystems are threatened by agricultural clearing, urban development, gravel mining, highway construction and maintenance, expansions of reservoirs, water diversions, bank channelization and stabilization, and invasion of alien weeds. These activities interfere with natural processes and seriously impact regeneration of riparian species, such as cottonwood, on downstream sites. The rivers where natural processes are largely intact and that support the most outstanding riparian ecosystems in the state are the Yampa, San Miguel and Animas Rivers.

● Low-elevation riparian communities are particularly threatened in Colorado and in the western United States due to numerous pressures (mentioned above), particularly invasion by exotic species including Russian olive and tamarisk.

● On the Plains in eastern Colorado, the drawdown of the Ogallala Aquifer continues to be a major concern, particularly for its potential impact on riparian aquatic systems of streams such as the Arikaree River.

2. **Playa Lakes and Cold Desert Shrublands:** The Bureau of Reclamation's Closed Basin Project in the San Luis Valley has potential to adversely affect the unique shallow wetlands, playa lakes, and cold desert shrublands by lowering the groundwater table in the northern end of the valley.

3. **Warm Water Riverine -- endangered fish/native fish communities:** Dams and diversions on the Colorado River have altered the physical and biological characteristics of the river and tributaries to the point that little warm water habitat remains for four federally endangered fish species (Maddux et al. 1993). Other threats to these fish communities include alien species and alteration of stream channels and sediment regime.

4. **Front Range Foothills Communities:** Front Range communities, such as prairie, shrublands and woodlands, formerly threatened by grazing and logging, are now imminently threatened by urban and residential development that fragments habitat and promotes weed invasions and fire suppression. Additionally, there is much fish biodiversity in the transition zone between the mountains and plains. This encompasses reaches of major rivers from canyon mouths where they emerge from the mountains downstream to the border of the western Great Plains at about 5,000 ft.

5. **Great Plains Mixed Grass and Shortgrass Prairie:** Much of the habitat supporting shortgrass and mixed grass prairie, once widespread and secure, has been converted to cropland and is heavily grazed by cattle, which have significantly altered the vegetation. Keystone species such as prairie dog and bison are no longer significant herbivores in this system. While grasslands are rich in bird species, grassland birds have declined more than birds of other North American vegetative associations; declines in mountain plover, cassin's sparrow and lark bunting are major conservation concerns (Knopf 1994). Once destroyed, restoration requires several centuries (Samson and Knopf 1994).

6. **Green River Shale Barrens:** Oil shale development in the Piceance Basin and Parachute Creek areas on the West Slope will occur if and when the price of oil increases sufficiently. Shale beds near Parachute hold an estimated 600

billion barrels of recoverable oil, rivaling the Persian Gulf's reserves. New technologies to extract the oil and/or rising prices of oil threaten the shale habitats which harbor a rich suite of species and communities highly restricted to the Green River Shale outcrops. There have been recent proposals to open up the Navy Oil Shale Reserve to natural gas development, which would allow the federal Departments of Energy and Interior to establish a leasing program covering billions of cubic feet of natural gas on the Naval Reserve.

The Piceance Basin also holds 30 billion tons of nahcolite, naturally occurring sodium bicarbonate. Plans to extract this resource are now underway, with a new processing plant near Meeker (Colorado Geological Survey 1994).

Extraction could directly impact habitats supporting rare species, several of which are endemic to the Piceance Basin.

7. **Niobrara Shale Barrens:** Niobrara Shale barrens on slopes above the Arkansas River support a rich ensemble of rare plant species and remnant communities endemic to the region between Canon City and Pueblo. This habitat is rapidly being fragmented or destroyed as a result of residential, industrial and recreational development associated with rapid population growth in the region. Many rare plants occur near Portland, an area being actively mined.

8. **Fens and Montane Wet Meadows:** Peat mining poses a real threat to peat deposits that took nearly 10,000 years to create in high-elevation fens in South Park. These wetlands support numerous high-quality communities and plant species disjunct from their relatives in the arctic. Fens are fed by mineral-rich ground and surface water in addition to precipitation. Montane wet meadows in South Park are also threatened by draining and water diversions.

### III. VISION/GOALS: WORKING DRAFT

The following vision and goals are proposed here as a working draft for further discussion and refinement by Colorado staff and Chapter Trustees over the next year. Additionally, we will incorporate the new conservation agenda proposed for the national organization by the Conservancy's Conservation Committee (TNC 1995).

#### A. Vision for The Nature Conservancy of Colorado:

*Over the next decade, the Conservancy will establish a network of preserves and conservation projects in Colorado where we can most effectively conserve, using an ecosystem approach, the best examples of rare, declining or inadequately protected species and plant communities across their range with priority on those that are most threatened or declining, along with the ecological processes that sustain them. These projects will emphasize a community-based approach and development of partnerships with private and public entities.*

**B. Goals: In concert with partners, we will:**

**1. Ensure the long-term viability of threatened, declining or inadequately protected species and plant communities within natural landscapes, and work to prevent other species and communities from becoming rare. Specifically, we will protect:**

- a. Multiple, viable populations of globally rare species;
- b. Multiple, viable examples of each known globally rare plant community;
- c. High-quality examples of common plant communities occurring within one landscape-scale site in each of the major ecoregions;
- d. Critical habitat and concentration areas for migratory species.

**2. Establish monitoring programs to help determine management needs and measure success of protection activities for targeted species and communities which can detect long-term:**

- a. Population trends of at least one to two occurrences of all G1-G3 species;
- b. Trends in plant species composition on at least one to two occurrences of all G1-G3 plant communities;
- c. Degradation of the common plant communities contained within the landscape-scale protected sites;
- d. Trends in population numbers of migratory species (MAPS stations could do this outside of concentration areas).

**3. Initiate research projects to address critical information needs to promote appropriate protection and management of the most threatened, declining or inadequately protected:**

- a. G1-G3 species;
- b. G1-G3 plant communities;
- c. Common plant communities within protected landscape-scale sites;
- d. Migratory species.

#### IV. METHODOLOGY

**A. Process:** An interdisciplinary team consisting of a number of conservation programs staff members developed the plan with assistance from Will Murray, Director of Conservation Programs, Western Regional Office; David Armstrong, Chairman of The Nature Conservancy of Colorado's Board of Trustees Conservation Programs Committee; Janet Coles, Ecologist with the Colorado Natural Areas Program; and Chris Pague, Director of the Colorado Natural Heritage Program. The procedure used by the group is outlined below.

1. **Scorecard** (September-October 1994): Two one-day "scorecard" meetings were held with the Colorado Natural Heritage Program to review and exchange information on Colorado's top 275 conservation sites of outstanding (B1 sites) or very high biodiversity significance (B2 sites). See Appendix C for explanation of ranking system.

2. **Vision/Goals** (May 1994-December 1995): The planning team developed a draft conservation vision statement to set broad strategic direction and goals to help select specific conservation sites. We will continue to refine these goals in the future, to incorporate the new conservation agenda of the national organization.

3. **Scientific/protection phase** (October-December 1994): The team developed scientific criteria to be used to screen and prioritize the list of 275 conservation sites. See Appendix A for definitions. These criteria included:

- number of globally and state rare elements
- whether the site was the only known protectable site
- urgency of threats
- manageability
- defensibility
- viability of ecosystem processes
- existing protection

Sites were given scientific scores using a 1-3 scale (low, medium, high) for manageability, defensibility, viability, and protection. The scale was weighted to give more points to number of highly ranked elements and only known protectable sites. Protection urgency was scaled from 1 to 5 to weight sites which were immediately threatened to emphasize the relative importance of threat. If no information was available, a default of 1 was given. All sites within and including macrosites and megasites were scored separately.

The priority list consisted of all B1 and B2 sites with science scores greater than or equal to 20 or element scores greater than or equal to 12. Element

scores were included to capture sites with high concentrations of elements but for which information may be lacking for other criteria. Thresholds were chosen to capture sites with: highest-ranked elements, concentrations of elements, high threats, intact ecological processes, etc. Conservation sites were grouped into conservation planning units, defined as areas of conservation interest that contain a concentration of sites with highly ranked elements. Planning units were ordered first by biodiversity rank, second by scientific score of the highest-ranked site within the unit, and third by element score.

Sites that did not meet the thresholds were dropped from the priority list, except those sites known to be significant without current data in the Heritage database (e.g., West Bijou, Arikaree River at Willow Creek, Crested Butte, Meadow Springs, Baca Ranch, Unaweep Seep, Yampa River at Yampa, which were added to the priority list). This narrowed the list down from 66 units with 275 sites to 45 units with 129 sites. Note that some new elements emerged from the files for sites during the development of the site summaries: these elements were not added to the scientific scores, but rather are included in site summaries.

Colorado was divided into Bailey's ecoregions (1994) using Atlas GIS to help evaluate sites within a bioregional context and to assess proposed conservation framework. Ecoregion boundaries are based on climate, natural vegetation, and land surface form.

Nomenclature in this report is from the Colorado Natural Heritage Program (1995), which follows Weber and Wittman (1992) and Kartesz (1994).

4. Programmatic phase (November-December 1994): The team developed programmatic criteria to further evaluate sites to determine what we can accomplish and where to focus our efforts. The primary criteria were feasibility, the degree to which protection of site is achievable in terms of relative costs, political feasibility, opportunity, and fund-raising ability, and capacity building (the degree to which protection of site would increase our capacity to advance the Conservancy's mission with politicians, donors, and land managers). See Appendix B for definitions of programmatic criteria.

Programmatic criteria were difficult to apply consistently for all sites largely due to the lack of information and for sites with multiple ownership patterns. Thus programmatic criteria were not used for ranking sites for the purposes of the statewide plan. Programmatic criteria, while useful for considering protection of individual sites, are not practical for comparing or ranking large numbers of sites.

5. Regional conservation analyses (December 1994): Priority planning units and conservation sites were grouped by COFO region (NE, SE, NW, SW) for regional conservation analyses. Conservation strategies, including information and inventory needs, site plan needs, and protection and management actions were developed for priority planning units within the four regions with the help of regional program managers (November, December).

6. Statewide conservation strategies (December 1994-January 1995):

- a. The results of analyses were synthesized into priority lists, regional summaries, public lands sites, sites requiring capital expenditures, potential cooperative projects, sites needing plans and inventory.
- b. Goals and broad strategies were developed for accomplishing conservation of identified conservation sites for inventory, planning, monitoring, protection, and stewardship.
- c. The group addressed capacity and feasibility questions, including:
  1. where we should focus our work/money
  2. how we should organize ourselves to address protection needs
  3. needs for public lands and/or tribal program
  4. staffing needs for other regions
- d. The group developed FY96 priorities and goals from statewide plan results.

7. Final report and review (March-May 1995): We drafted the report and submitted it to planning group members and selected outside experts for review.

**B. Limitations of the process:**

1. The scoring system is an index, not a precise measurement, and is used primarily as a guideline for setting priorities. Interpretation of the results of the index should be done cautiously; we needed to recognize biases in the index rather than continue to change index and weights.
2. Professional/scientific judgement and experience were valued during the scientific analysis and planning process.
3. Element scores are based on field inventory and the best information available in the CNHP database (Biological and Conservation Database or BCD) as of October 15, 1994. Field work is often limited in time and space. Our

knowledge of the state is biased towards public lands largely due to past inventory activities. These inventory efforts have focused largely on plants and communities, not animals; the sites in this plan reflect this bias due to lack of current information. Scores for some sites do not reflect the most recent information, as new data are not yet in the Heritage database (e.g., Western Great Plains, Baca Ranch). Data from recent large inventory projects, such as the Roaring Fork Basin riparian study (Jankovsky-Jones 1994) and Purgatoire River have not yet been entered into the database, and thus, are not included in this report.

4. The statewide planning process is dynamic, requiring periodic revision. Ranks/conservation priorities will change as new information becomes available from Colorado Natural Heritage Program and other sources and/or as threats increase. For example, not all animal information from Colorado Division of Wildlife is in the data base; CNHP is in the process of entering this now with funding from Great Outdoors Colorado (GOCO) Trust Fund. More sites targeting animals should emerge from this process.
5. It was not the purpose of the plan to identify priority conservation sites for all G1-G3 species and communities; highly-ranked elements without high-quality sites are not included in this analysis. Some of these may occur within B3 sites, which will be considered at a later date.
6. Sites are grouped by conservation planning units, concentrations of highly-ranked conservation sites. No specific site boundaries are proposed for these planning units at this time.

## V. RESULTS

**A. Statewide Priority Conservation Planning Units:** Two-hundred and seventy-five sites within 72 planning units were assessed using a scientific analysis with the goal of identifying priorities for protection by the Colorado Nature Conservancy. While all of these sites are deserving of some level of protection, the Conservancy cannot feasibly accomplish protection of all of these sites. One-hundred and twenty-nine conservation sites within 45 planning units (landscapes and smaller conservation sites) were selected as the highest priority for protection based on their scientific scores. Three other planning units emerged as highly significant that were not run through the scientific analysis due to lack of current data in the Heritage database; these were added to the list of priorities based on recommendations by the Colorado Natural Heritage Program (West Bijou, Crested Butte and Meadow Springs).

The list of priority planning units and conservation sites, with the science scores, landownership, and other site information, is in Appendix D. Sites are listed in order by scientific rank (high science scores indicate high priority for conservation). Brief site summaries for the planning units and conservation sites are in Appendix F. Maps depicting

the location of the planning units by ecoregion province and section, by COFO region, and specific locations are in Appendix F.

If protected, these conservation planning units will most effectively capture a broad spectrum of Colorado's rare, threatened, or inadequately protected species and communities representative of Colorado and its ecoregions. One-hundred fifty nine (55 percent) or more of Colorado's estimated 273 globally rare species and communities are proposed for protection. Priority planning units occur within all of Colorado's seven major ecoregions (provinces); only two minor sections are not represented (Southern High Plains and White Mountain-San Francisco Peaks) in the system. See Appendix G for map of priority conservation planning units by ecoregion.

Conservation planning units were grouped by relative size and priority into: 1) landscape-level units (divided into two groups, high and medium-priority, based on scientific rank, relative level of threat, and role for The Nature Conservancy) and 2) small conservation sites. Recommendations are provided on priority planning units/conservation sites with current major capital needs, potential for cooperative projects, inventory needs, and site planning needs.

1. High-priority landscape-level conservation planning units: Landscapes consisting of the most outstanding conservation sites with multiple rare species and high-quality communities are listed below. Conservation sites within these planning units are highly threatened, in need of protection in the very near future, and most appropriate for Conservancy involvement (in order by scientific rank with brief summary of significance):

- Parachute Creek (shale barrens shrublands, rare species)
- Dolores River (riparian forests, grassland, rare plant species, hanging gardens, native fish)
- San Miguel River (riparian forests and shrublands, rare plants, rare animals)
- San Luis Valley (wet meadows, cold desert shrublands, playa lakes, rare species)
- Piceance Basin (shale barrens, rare plants, remnant communities)
- Uncompahgre Badlands (shale barrens communities, rare plants)
- Arikaree River (Plains riparian forest, wet and loess prairie, sandsage prairie)
- Colorado River at Grand Junction and Debeque (rare fish, rare plants, cottonwood forests, grasslands, bald eagle)
- South Park (wet meadows, fens, montane grasslands)
- Arkansas River (rare plant ensemble, shale barrens grasslands, grasslands and shrublands)
- Yampa River (cottonwood riparian forests, montane willow carrs, rare birds, rare fish)
- Laramie Foothills (foothill prairies; mixed mountain shrublands, ponderosa pine woodland)

- Aiken Canyon (foothills pinyon-juniper woodland, gambel oak shrublands)
- Mesa de Maya (pinyon-juniper woodlands, foothills shrublands, rare species)
- Western High Plains (shortgrass prairies, rare birds)
- Animas River (narrowleaf cottonwood and coniferous riparian forests)

2. Medium-priority landscape-level conservation planning units: Landscapes with high ecological significance containing multiple elements, but not immediately threatened, are listed below. In many cases, other entities are leading the protection efforts of these areas. Further inventories are needed to update threats, status, and to further define TNC role. These are in order by scientific rank with brief summary of significance:

- Mesa Verde (numerous rare plants, state rare mammals)
- Mosquito Peaks (rare plant ensemble, many disjunct from the Arctic)
- Ute Mountain Ute Tribal Lands (shale barrens communities, rare plants)
- Rocky Mountain National Park (numerous state rare plants and animals)
- Raven Ridge (numerous rare plants, pinyon woodlands)
- Brown's Park (rare plants, woodlands, grasslands, shrublands)
- Dinosaur National Monument (numerous rare plants, rare fish, remnant plant communities)
- Greenland Ranch (foothills shrublands, grasslands)
- Bar NI (pinyon-juniper woodlands, montane grasslands, montane wetlands)
- North St. Vrain Creek (rare plant, ponderosa pine savanna, foothill shrublands)
- Big Creek Lakes (numerous rare plants, montane wet meadows, birds, rare frogs)
- West Bijou Creek (Plains riparian forest, ponderosa pine woodlands, shortgrass prairie)

3. High-priority smaller conservation planning units/sites: Smaller conservation planning units harboring primarily single species or communities in need of protection attention are (in order by scientific score):

- Troublesome Creek (two federally listed rare plants: Penland penstemon and Osterhout milkvetch)
- North Platte River (all populations of North Park phacelia, a federally listed endangered plant)
- South Beaver Creek (all populations of skiff milkvetch, a federal candidate for listing)
- Kremmling (Osterhout milkvetch, a federally listed endangered plant, sagebrush shrublands)
- Pike's Peak (globally rare moonwort and state rare columbine)
- Uncompahgre Peak and Redcloud Peak (federally listed endangered fritillary butterfly)

- Southern Ute Tribal Lands (federally endangered Knowlton cactus)
- Boulder County (Bell's twinpod, federally listed threatened ladies tresses orchid, tallgrass prairie, rare jumping mouse)
- Lake Fork of the Gunnison River (mixed riparian forest, rare plant)
- Little Snake (rare plants, saltbush shrublands, cold desert shrublands)
- Jefferson County (federally threatened ladies tresses orchid, foothill prairie)
- Salida (Brandege buckwheat, a federal candidate for listing)

4. Targeted planning units with major capital needs: At least 30 planning units have a significant private land component. Priority sites within 10 conservation planning units which require major capital expenditures by the Conservancy to protect include (in alphabetical order with targeted site or tract in parentheses):

- Aiken Canyon (additions to preserve)
- Arikaree River (Bowman Ranch)
- Dolores River (La Sal Creek)
- Laramie Foothills (Roberts Ranch, Rennells)
- Mesa de Maya (Spool Ranch)?
- San Miguel River (South Fork and Tabeguache)
- San Luis Valley (Mishak Lakes and Baca Ranch)
- South Park (High Creek additions)
- Western High Plains (Well's Ranch)
- Yampa River (Morgan Bottoms, Hayden Bottoms)

5. Planning units with public land component: Almost all conservation planning units have a mixed landownership, containing some public land (see Appendix D). BLM lands occur within 24 planning units, State Land Board lands occur within 12 planning units, U.S. Forest Service lands occur within nine units, Fish and Wildlife Service lands occur within two units, and Tribal lands occur within two units. Cooperative statewide strategies are needed with BLM, State Land Board, FS, FWS, and the Tribes to address protection of these critical units and sites.

Eighteen planning units have very high potential for cooperative projects with federal agencies, the state, or local governments. Planning units with current high potential are (in alphabetical order; land manager is in parentheses):

- Animas River (FS)
- Boulder County (County)
- Colorado River at Grand Junction and Debeque (BLM)
- Crested Butte (County, Land Trust)
- Dinosaur National Monument (NPS)
- Dolores River (BLM)
- Greenland Ranch (Douglas County)
- Jefferson County (County)

- Lake Fork of the Gunnison (BLM)
- Mosquito Peaks (FS)
- Piceance Basin (BLM)
- San Luis Valley (NPS)
- San Miguel River (BLM)
- South Beaver Creek (BLM)
- Troublesome Creek (BLM)
- Uncompahgre Badlands (BLM)
- Yampa River (DOW)

6. Planning units needing inventory: While all conservation sites need some level of inventory, 15 priority areas need inventory now. Because the majority of past inventories have focused on either species or plant communities, integrated inventories of plants, animals, and plant communities are needed to fill in the gaps. These areas include (in alphabetical order):

- Arikaree River
- Arkansas River
- Colorado River at Grand Junction and Debeque
- Kremmling
- Laramie Foothills
- Mesa de Maya
- Mosquito Range
- Parachute Creek
- San Luis Valley
- South Park
- Southern Ute
- Uncompahgre Badlands
- Ute Mountain Ute
- Western High Plains

Other inventories should focus on poorly known areas of the state, such as the Comanche National Grasslands and southeastern Colorado, the rest of the Great Plains, and the San Luis Valley. Inventories should be coordinated with adjacent states to help gain a rangewide understanding of the targeted species and communities. Additional targets for inventory include poorly known communities and species, common and unprotected communities, and animals. Specific communities needing inventories include, but not are limited to, wetlands, montane and subalpine grasslands, shortgrass prairie, aquatic systems, southwestern shrublands, and shale barrens.

7. Planning units needing conservation plans: Most priority areas need site conservation plans, or at least preliminary plans, to develop specific ecological, protection and management goals, objectives and actions. Fourteen priority units needing plans in

the very near future are (in alphabetical order):

- Arikaree River
- Arkansas River
- Colorado River at Debeque and Grand Junction
- Crested Butte(?)
- Kremmling
- Mesa de Maya
- Mosquito Peaks
- Parachute Creek
- Piceance Basin
- San Luis Valley
- Uncompahgre Badlands
- West Bijou Creek (Combs Ranch)
- Western High Plains

**B. Priority Planning Units by Conservancy Region:** Much of the conservation work of the Conservancy takes place at the regional or community level. To help the Conservancy further its mission in local communities in Colorado, the state is divided into four Conservancy regions: northwest, southwest, southeast, and northeast each with its own field office in Steamboat Springs, Telluride, Colorado Springs, and Ft. Collins, respectively. Each office is staffed by a full time program manager and seasonal stewardship assistant position (except the southeast). A fifth region, the San Luis Valley is proposed. These regions are delineated first by major watershed and second by county for practical purposes. See Appendix E for summary of recommended conservation actions for planning units by Conservancy regions, and Appendix G for the map of planning units by region. The priority planning units within each of the COFO regions are listed below, in order by scientific score.

Northwest Colorado (12 planning units)

- Parachute Creek
- Troublesome Creek
- North Platte River
- Piceance Basin
- Kremmling
- Raven Ridge
- Browns Park
- Dinosaur National Monument
- Yampa River
- Big Creek Lakes
- Little Snake River
- White River

Southwest Region (14 planning units)

- Mesa Verde

- Dolores River
- San Miguel River
- South Beaver Creek
- Ute Mountain Ute Tribal Lands
- Uncompahgre Badlands
- Colorado River at Grand Junction
- Uncompahgre Peak
- Redcloud Peak
- Southern Ute Tribal Lands
- Colorado River at Debeque
- Lake Fork of the Gunnison
- Animas River
- Crested Butte

**Southeast Colorado (11 planning units)**

- Mosquito Peaks
- Pikes Peak
- South Park
- Arkansas River
- Greenland Ranch
- Bar NI Ranch
- Aiken Canyon
- Mesa de Maya
- Jefferson County
- Salida
- West Bijou Creek

**Northeast Colorado (7 planning units)**

- Arikaree River
- Rocky Mountain National Park
- Boulder County
- Laramie Foothills
- North St. Vrain
- Western High Plains
- Meadow Springs

**San Luis Valley (1 planning unit; included with southeast region in Appendix E; proposed region)**

- San Luis Valley

C. Elements: As proposed, the Colorado statewide plan, if accomplished, would protect at least 159 (55%) or more of Colorado's 273 globally-rare plants, animals, and plant communities tracked by the Colorado Natural Heritage Program (Table 2). Because several sites were added to the list of priorities after conducting the scientific analysis (for sites

known to be significant, but information is not yet in the database), the percentage of elements proposed for protection will be higher. The Natural Heritage Program is constantly updating ranks and element information, and these numbers are subject to change. Additionally, the number of elements differ depending on how database is queried.

Several community types are conspicuously missing or not well represented in the proposed priority site list. While some of these types, such as wetlands, are proposed for protection at a few conservation sites, further inventories are needed for these and other poorly known species and communities before sites can be recommended for these elements.

Table 2 indicates that more globally rare plants and communities are targeted for protection than animals. This is largely due to the lack of inventory information for many animal species in the database. The CNHP is currently in the process of populating the database with animal information from the DOW and beginning to conducting inventories of priority animal species. Clearly, we need to place more emphasis on protection of animals in the future of the program.

**Table 2. Number of globally rare elements proposed for protection in Colorado Statewide Conservation Plan (animals include both vertebrates and invertebrates).**

Element type	Number of elements proposed for protection in statewide plan	Number of elements tracked by CNHP	Percent proposed for protection in statewide plan
G1 Plants	18	20	90%
G2 Plants	21	42	50%
G3 Plants	44	82	53%
Total Plants	83	144	57%
G1 Animals	5	8	62%
G2 Animals	1	0	100%
G3 Animals	5	21	24%
Total Animals	11	29	37%
G1 Communities	7	8	87%
G2 Communities	30	38	79%
G3 Communities	18	54	33%
Total Communities	55	100	55%
Total G1-G3 Elements	159	273	55%

## **VI. RECOMMENDATIONS**

### **A. Strategies for Addressing Conservation Priorities**

1. **Inventory:** Inventory is needed for most priority planning units to provide a basis for moving forward with both planning or protection efforts.
  - a. Seek funding for Colorado Natural Heritage Program inventories
  - b. Partner with federal agencies on public land, particularly BLM
  - c. Promote and seek funding for county wide surveys (EPA and GOCO)
  - d. Coordinate with adjacent states on rangewide and bioregional analyses of species, communities, and ecosystems; start by coordinating with NM and OK on Mesa de Maya and NE and KS on Arikaree River
  - e. Partner with Colorado Natural Areas Program on inventory projects
  - f. Initiate inventories of common but unprotected plant communities; seek external review and systematic inventories of threatened communities
  - g. Further integrate aquatic and other animal information from DOW and other experts into Biological Conservation Database
2. **Site Conservation Planning:** Develop full plans and preliminary plans, as appropriate.
  - a. Continue using interdisciplinary team approach
  - b. Involve Colorado Chapter Trustee Conservation Programs Committee
  - c. Develop better information on ecology of targeted elements and processes
  - d. Secure better funding for necessary research, particularly on ecological processes and modeling, threats analysis
  - e. Complete preliminary plans for large planning units/sites to initiate protection or areas where protection action is urgent; full plans for sites where we are certain to have a large investment of time or money
3. **GAP Analysis:** Continue to learn about the biodiversity of Colorado and conduct an analysis to determine what is and is not protected in Colorado.
  - a. Pursue as graduate student project
  - b. Partner with Division of Wildlife on statewide GAP Analysis
  - c. Initiate bioregional analysis
  - d. Increase understanding of major vegetation types to help determine where to focus at larger scales
4. **Public Land Partnerships:** Secure protection and monitoring projects for targeted species and communities on public lands.

- a. Develop strategy with BLM, Ute Mountain Ute, DOW, mining companies; develop MOU's (top down approach)
- b. Utilize Western Regional Office resources where possible
- c. Consider developing public lands position
- d. Connect with ecologists in agencies, provide technical assistance for management plans, monitoring, etc. (bottom up approach)
- e. Partner with CNAP and other conservation organizations on protection and monitoring
- f. Work cooperatively with agencies to influence policy (State Land Board, DOW, etc.)
- g. Resurrect registry or landowner recognition program

**5. Private Land Protection:** Develop a variety of creative strategies to obtain more protection, including acquiring conservation easements, negotiating management leases, initiating cooperative management projects, and recognizing excellent land managers.

- a. Assess in-house capacity and expertise
- b. Expand real estate expertise to assist with protection projects
- c. Develop strategy with industries, ranchers, and other key landowners/land managers
- d. Acquire key tracts within significant landscapes as preserves, providing foundations for local community-based work
- e. Expand relationships with other NGO's as potential partners, such as land trusts, Colorado Historical Society, Denver Museum, etc.
- f. Resurrect registry program or initiate landowner recognition program
- g. Develop a conservation buyer program

**6. Community Programs:** Develop community-based programs to leverage conservation and to address broader threats within landscapes.

- a. Determine what constitutes a good community program, what we want to accomplish and how to measure our success
- b. Build capacity of community programs
- c. Determine where we need community-based programs
- d. Develop a communications strategy to support community programs

**7. Stewardship:** Promote better understanding, maintenance and restoration of high-quality occurrences and systems, focusing on targeted elements and processes.

- a. Continue to utilize volunteers and interns
- b. Establish preserve managers on large preserves and regional full-time stewardship ecologist positions

- c. Increase monitoring of rare species populations and communities to assess management and protection effectiveness on preserves
- d. Increase cooperative research and monitoring projects with universities and colleges
- e. Develop community-based monitoring projects for weed surveys, such as adopt-a-rare species and adopt-a-site programs

## VII. CONCLUSIONS

The Conservancy faces exciting challenges in addressing the protection of Colorado's rare, declining, or inadequately protected species and communities. This comprehensive statewide plan will help us focus conservation activities on the state's most outstanding and threatened conservation sites. Broad conservation strategies are needed to address the protection and management of these priority areas. These include:

1. **Local Community Conservation:** Successful conservation is dependent on the support of local communities; thus we will likely need to establish more regional field offices, following the successful examples of community-based programs on the Yampa and San Miguel Rivers. New regional programs may be needed in the San Luis Valley, Grand Junction, and on the Great Plains.
2. **Multiple-Scale Conservation:** Conservation must be addressed at multiple scales. A combination of coarse and fine-filter conservation strategies is needed to protect the broad spectrum of species, communities, ecosystems and landscapes in need of protection in Colorado. There are a number of important but small isolated sites harboring single species (i.e., Droney Gulch and South Beaver Creek) not currently near to TNC regional field offices. We cannot overlook these sites; but we cannot feasibly acquire and manage these sites and many occur on public land! We must pursue alternative methods, such as management agreements, monitoring projects, registries and special designations to protect and manage targeted single-species sites.
3. **Partnerships:** Only proactive conservation through partnerships can alter the declining trend of many species and communities in Colorado. We must develop new conservation partnerships and strengthen existing partnerships with major land management entities, particularly BLM, Ute Mountain Ute Tribe, Department of Energy, U.S. Forest Service and the State Land Board. We must also develop conservation strategies and partnerships with mining companies, key landowners, and other NGO partners, with emphasis on the Piceance Basin, Parachute Creek, Arkansas River and Mosquito Range.
4. **Inventory and Research:** Further regional inventories across state boundaries are needed to update the rangewide distribution and status of species,

communities and ecosystems. Further investigation of significance of the priority conservation sites in relation to other conservation sites in adjoining states and in the region is needed. Further inventories are needed for little known parts of Colorado, such as the Great Plains, and for poorly known and unprotected species and communities, such as wetlands, aquatic systems and montane grasslands. Research is needed to help us better understand ecological patterns and processes of targeted species, communities and systems, and to develop appropriate strategies to address key threats.

5. **Monitoring:** We must not underestimate the need to establish monitoring projects on priority species (both plants and animals) and communities to better understand their management and protection needs and to measure the success of our conservation actions.

**A. Vision for the Future of the Conservancy in Colorado:** The following is a proposed vision for the future of the Conservancy's major landscape-level projects in Colorado; it is meant to illustrate the types of projects that, if the Colorado Program were to accomplish over the next 5-10 years, we would really have succeeded at protecting an important part of Colorado's biodiversity. Note that the details of this vision warrant further discussion and refinement by the staff and trustees.

The Conservancy will round out protection of existing six preserves by expanding its holdings at Aiken Canyon, Mishak Lakes, Phantom Canyon, San Miguel River, South Park, and Yampa River, to ensure long-term viability of the targeted species and communities. New projects will emphasize protection of "integral" landscapes, where natural ecological processes are largely intact. We need to actively involve local communities in these efforts. In order to most effectively leverage our protection of these areas, we need to expand our community-based programs from the Yampa River, Phantom Canyon, Aiken Canyon, and San Miguel River to include new regions, such as the San Luis Valley and Grand Junction. We will also launch a community-based program on one major Great Plains site. We will protect smaller isolated sites largely through working with private landowners and other public entities, including the BLM and the State Land Board. We will acquire key tracts with funding from GOCO and possibly through a critical landscapes capital campaign. Selected suggested highlights include, but are not limited to:

#### Expansions of Existing Projects:

- **Aiken Canyon:** Protect over 5,000 acres at Aiken Canyon through acquisition of easements, gifts, and purchase to preserve one of the last large naturally-functioning foothills systems on the southern Front Range; develop cooperative monitoring and protection projects with Ft. Carson, BLM, USFS.
- **Phantom Canyon:** Expand Phantom Canyon preserve by working

cooperatively with landowners to acquire 45,000 acres both in fee and conservation easements to protect the largest remaining high-quality foothills ecosystem consisting of mixed mountain shrublands, ponderosa pine woodlands, mixed grass prairie, shortgrass prairie and rare species.

- **San Luis Valley:** Initiate community-based program to focus conservation efforts on high priority conservation sites. Begin with significantly expanding the Mishak Lakes preserve to encompass the extensive and threatened wetland system containing wet meadows, cold desert shrublands, playa lakes, and rare species, by completing acquisitions, land exchanges, and cooperative agreements with the State Land Board, DOW, BLM, and private landowners.

- **San Miguel River:** Protect remaining tracts on the South Fork through the conservation buyer program and via conservation easements in cooperation with the Forest Service and acquire 10 additional river miles adjacent to the lower preserve at San Miguel at Tabeguache Creek in cooperation with the BLM. Protect an additional 20 river miles on the mainstem and on major tributaries, containing critical riparian forests and shrublands, rare plants, and rare animals.

- **South Park:** Significantly expand Conservancy holdings in South Park by acquiring large tracts adjacent to High Creek Fen to protect wet meadows, fens, montane grasslands, mountain plover and numerous rare plant species. Increase Conservancy involvement in South Park in order to complete other protection projects, such as easements over significant wetlands and rare plant sites.

- **Yampa River:** Acquire conservation easements on core tracts containing regenerating cottonwood stands, willow sloughs and other riparian communities, within a 40 mile stretch of river between the Elk and Elkhead Rivers, to protect one of the last intact riparian systems in the west. Complete conservation easements at Morrison Creek, Yampa at Yampa, East Fork of Williams Fork, and Elk River, to protect riparian forests, montane willow shrublands, rare birds, and rare fish.

#### **New Projects:**

- **Arikaree River:** Acquire the 14,000 acre Bowman Ranch to protect some of the best known plains cottonwood riparian forests, wet and loess prairie, and sand sage prairie. Possibly initiate a community-based program in the Wray area, centered around the ranch, and complete conservation easements and management leases with other key landowners, such as McCoy, in the Arikaree watershed.

- **Arkansas River:** Develop conservation agreement with Holnam, Inc. and other large landowners to monitor and protect an ensemble of imperiled plants and high-quality shale barrens grasslands and shrublands of the Niobrara Shale between Canon City and Pueblo. Develop an innovative cooperative project with counties to incorporate rare plant location information into planning efforts, and possibly acquire key tract.
- **Colorado River at Grand Junction and Debeque:** Protect a high-quality natural area identified through the Colorado Heritage Program's Mesa County Inventory to protect an ensemble of rare plants, cottonwood riparian forests, grasslands, and/or rare fish.
- **Dolores River:** Establish the La Sal Creek Preserve centered around key inholdings via a progressive conservation-buyer program and cooperative projects with BLM to protect riparian forests, grassland, rare plant species, hanging gardens, native fish representative of the Colorado Plateau.
- **Piceance Basin/Parachute Creek:** Seek protection of some of the best known remnant plant communities and rare species ensembles restricted to the Green River Shale Formation through donations and/or land exchanges with Exxon, Mobil, Unical, and BLM, or acquisition of fee title or conservation easement.
- **Mesa de Maya:** Complete regional conservation plan and inventory of Black Mesa/Mesa de Maya in cooperation with Oklahoma and New Mexico; protect over 100,000 acres through conservation buyer program, management leases, and cooperative projects to protect pinyon-juniper woodlands, foothills shrublands, prairie remnants, and rare species.
- **Uncompahgre Badlands:** In a cooperative project with BLM, protect the best remaining Mancos Shale badlands habitat supporting highly threatened shale barrens communities and rare plants.
- **Western High Plains:** In cooperation with the DOW and the Well's family, acquire and reintroduce bison to the 30,000 acre Well's Ranch to protect and manage outstanding sandsage, sandhill and shortgrass prairie system and associated rare bird species.

#### B. Recommended Next Steps:

1. Initiate rangewide and regional inventories and conservation planning for high priority species and communities with adjacent states. Further investigate rangewide significance of priority conservation sites, particularly those that lie near to adjacent states (e.g., Arikaree River, Mesa de Maya, Western High Plains). Initiate research and monitoring projects for targeted species and

communities within the priority conservation sites to increase understanding of ecological processes and to help refine conservation strategies.

2. Determine what's missing: assess and fill gaps in taxa, aquatic systems, and poorly known common but unprotected communities representative of Bailey's ecoregions found in Colorado. Identify best conservation sites for threatened and declining species and communities not captured in this plan.

3. Develop consensus on most meaningful ecoregion or bioregion system useful for making conservation decisions on a regional level with a scientific advisory group, WRO and HO; expand portfolio of threatened ecosystems needing protection attention.

4. Work with Colorado Natural Heritage Program to obtain better information on species and communities in decline due to anthropogenic causes; obtain recent data for fish and other aquatic species to update Heritage database.

5. Seek peer review of list of threatened plant communities by scientific community external to the Conservancy and Heritage Program; seek expertise regarding aquatic systems most in need of conservation attention.

6. Expand the planning process to include scientists, public partners, and private partners. Develop a document to integrate state and federal lands and to serve as a tool for a unified conservation effort in Conservancy.

7. Revise statewide plan regularly and incorporate new information from the Colorado Natural Heritage Program and scientific experts as well as concepts from the national Conservation Committee's proposed conservation goals; refine criteria used for analyzing sites and vision for the future section.

8. Work with Colorado Chapter Trustee Conservation Programs Committee and Scientific Advisory Group on above items.

9. Assess organizational structure of the Conservation Programs Department to determine if we are organized in the best way to accomplish the vision and goals.

## VIII. REFERENCES

Andrews, R. and R. Rieger. 1992. Colorado Birds: A Reference to their Distribution and Habitat. Denver Museum of Natural History. 442 pp.

Armstrong, D. 1972. Distribution of mammals in Colorado. Monograph of the Museum of Natural History, Univ. of KS, Lawrence. 415 pp.

Bailey, R.G., P. Avers, T. King and W. H. McNab. 1994. Ecoregions and Subregions of the United States. U.S.D.A. Forest Service, Ft. Collins, CO.

Baker, W.L. 1986. Preserve Design for Animas River. Unpubl. Report to The Nature Conservancy, Colorado Program, Boulder.

Baker, W.L. 1984. A Preliminary Classification of the Natural Vegetation of Colorado. Great Basin Naturalist. Vol. 44 (4) 647-676.

Bock, J. 1995. Personal Communication. Dept. of EPO Biology, University of Colorado, Boulder, CO.

Bourgeron, P. and L. Engelking. 1994. A Preliminary Vegetation Classification of the Western United States. The Nature Conservancy, Western Heritage Task Force, Boulder, CO.

Brown, G. and R. Evans. 1995. *Oonopsis puebloensis*, a new species of the Canon City area. Systematic Botany (in press).

Bureau of Census. 1995. Colorado Demography Section, Division of Local Governments, Denver, CO.

Chronic, H. 1980. Roadside geology of Colorado. Mtn. Press Publishing Co., Missoula, MT. 322 pp.

Coles, J. 1994. Personal Communication. Colorado Natural Areas Program, Dept. of Natural Resources, Denver, CO.

Colorado Division of Local Governments. 1994. Population Projections for Colorado Regions, 1990-2000. Prepared by Demographic Section. Denver, CO.

Colorado Geological Survey 1993 and 1994. Colorado Mineral and Mineral Fuel Activities: Unpublished Report, Colorado Geological Survey, Denver, CO.

Colorado Natural Areas Program. 1990. Sensitive Plant Communities, USFS Region 2, 1990.

Colorado. Unpubl. manuscript. Dept. of Natural Resources, Denver, CO.

Colorado Natural Heritage Program. 1994. Plant Communities of Special Concern in Colorado. Dept. of Natural Resources, Colorado State University, Ft. Collins.

Colorado Natural Heritage Program. 1994. Colorado Scorecard for B1 and B2 Sites. Dept. of Natural Resources, Colorado State University, Ft. Collins.

Colorado Natural Heritage Program. 1995. Colorado's Natural Heritage: Rare and Imperiled Animals, Plants and Natural Communities: Vol. 1 (1). Colorado State University, Ft. Collins.

Dice, L. R. 1943. The Biotic Provinces of North America. University of Michigan Press, Ann Arbor.

Ellis, S. 1989. Preserve Design for the Nokomis Fritillary butterfly Colonies, Unaweeep Canyon, Mesa County, CO. Unpubl. Report prepared for TNC and BLM; on file at TNC, Colorado Program, Boulder, CO.

Fausch, K. D. 1995. Personal Communication. Dept. of Fishery Biology, Colorado State University, Ft. Collins, CO.

Fenneman, N. M. 1931. Physiography of western United States. McGraw-Hill Book Co., New York. 534 pp.

Finley, B. 1992. Urban Sprawl Devouring Open Spaces. Denver Post, November 15. p.1A.

Galatowitsch, S. 1985. Colorado's Natural Vegetation. Draft unpubl. manuscript. Colorado Natural Areas Program, Denver, CO.

Gallant, A. L., T.R. Whittier, D. P. Larsen, J.M. Omernick, R.M. Hughes. 1989. Regionalization as a Tool for Managing Environmental Resources. EPA/600/3-89/060. 152 pp.

Gottlieb, A. 1994. State Growth Off Charts. Denver Post. (Dec. 7, 1994), Denver, CO.

Gregg, R. E. 1963. The Ants of Colorado with Reference to their Ecology, Taxonomy, and Geographic Distribution. University of Colorado Press, Boulder, CO.

Holden, D. 1995. Personal Communication. Natural Resources Conservation Service. GIS Specialist. Lakewood, CO.

Huber, T. P. 1993. Colorado: The Place of Nature, The Nature of Place. University Press of Colorado, Niwot. 296 pp.

Jankovsky-Jones, M. 1994. Environmental Factors Affecting the Distribution of Riparian Plant Associations in the Roaring Fork Basin, Colorado. M.A. Thesis. Dept. of Geography and Recreation, University of Wyoming, Laramie, WY.

Kartesz, J. T. 1994. A Synonymized Checklist of the Vascular Flora of the United States, Canada and Greenland. Second Edition. Timber Press, Inc., Portland, OR. Vol. 1: 633 pp.; Vol. 2: 816 pp.

Knopf, F. L. 1994. Avian Assemblages on Altered Grasslands. Studies in Avian Biology, No. 15. A Century of Avifaunal Change in Western North America. J. R. Jehl, and N.K. Johnson (eds.). Cooper Ornithological Society.

Lamm, R., D. Lamm, J. Gersh, and W. Eldred. 1994. The West at Risk. Paper presented to Urban Land Institute's policy forum on growth in the Rocky Mountain West.

Maddux, H. R., L. A. Fitzpatrick, W. R. Noonan. 1993. Colorado River Endangered Fishes Critical Habitat: Draft Biological Support Document. USFWS, UT/CO Field Office, Salt Lake City, UT.

Miller, A. S. and W. A. Hubert. 1990. Compendium of existing knowledge for use in making habitat management recommendations for the Upper Colorado River Basin, USFWS, University of Wyoming and USFWS, Region 6, Denver.

Murray, J. A. 1987. Wildlife in Peril: The Endangered Mammals of Colorado. Roberts Rinehart, Inc. Boulder, CO. 226 pp.

Nesler, T. P. 1995. Native Aquatic Wildlife Management in Colorado: The Vision and Need. Nongame and Endangered Aquatic Wildlife Program. Colorado Division of Wildlife, Denver, CO.

Noss, R. F., E. T. LaRoe, and J. M. Scott. 1995. Endangered Ecosystems of the United States: A Preliminary Assessment of Loss and Degradation. Biological Report 28. USDI-National Biological Survey, Washington, D.C.

Pague, C. A. and S. E. Simonson. 1995. Patterns of Rarity in the San Luis Valley of Colorado. Proceedings of the Colorado Riparian Association Annual Meeting, October 7, 1994. Alamosa, CO.

Pague, C. A. 1995. Personal Communication. Colorado Natural Areas Program, Ft. Collins, CO.

Rennicke, J. 1990. Colorado Wildlife. Falcon Press Publishing Co., Inc., Helena, MT. 138 pp.

Romme, W. H. 1995. Personal Communication. Biology Dept., Ft. Lewis College,

Durango, CO.

Roth, D. 1992. Management of Neotropical Migrant Birds in Western Riparian Areas. Colorado Riparian Association Proceedings: Fourth Annual Convention.

Samson, F. and F. Knopf. 1994. Prairie Conservation in North America. *Bioscience* Vol. 44 418-421.

The Nature Conservancy. 1992. Upper Colorado River Basin Bioreserve Strategic Plan. Unpubl. Report on file at Colorado Program, TNC, Boulder, CO.

The Nature Conservancy. 1995. A Framework for our Conservation Agenda: Draft. Unpubl. Conservation Committee, The Nature Conservancy, Arlington, VA.

Tyus, H. M. 1995. Personal Communication.

Tyus, H. M. and C.A. Karp, 1989. Habitat Use and Streamflow Needs of Rare and Endangered Fishes, Yampa River, Colorado. USFWS Biological Report 89 (14), Washington, D.C.

Weber, W. A. 1987. Colorado Flora: Western Slope. University of Colorado Press, Niwot, CO.

Weber, W. A. 1990. Colorado Flora: Eastern Slope. University of Colorado Press, Niwot, CO. 396 pp.

Weber, W. A. and R. C. Wittman. 1992. Catalog of the Colorado Flora: A Biodiversity Baseline. University of Colorado Press, Niwot, CO. 215 pp.

Weber, W. A. 1995. Personal Communication. Herbarium, University of Colorado Museum, University of Colorado, Boulder, CO.

Woodling, J. 1985. Colorado's Little Fish: A Guide to the Minnows and Other Lesser Known Fishes in the State of Colorado. Colorado Division of Wildlife, Dept. of Natural Resources, Denver, CO.

**IX. APPENDICES**

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## APPENDIX A: SCIENTIFIC CRITERIA

### Scientific criteria for evaluating all B1-B2 conservation sites

The following criteria were used to evaluate B1 and B2 sites from the 1994 Scorecard produced by Colorado Natural Heritage Program. The total score for each site is the sum of all criterion scores (low, medium and high).

1. **G1-G3 elements (add scores for each G1, G2 or G3 element present):**

<u>score</u>	<u>definition</u>
3 =	G3 element(s) present
5 =	G2 element(s) present
7 =	G1 element(s) present
10 =	only known protectable site in the world
  
2. **G4G5-S1-S3 elements (add scores for each S1, S2, or S3 element present):**

0.5 =	S3 element(s) present
1.0 =	S2 element(s) present
2.0 =	S1 element(s) present
  
3. **Urgency (of threats and management): degree to which human activity or lack of management will result in loss of targeted communities or species in the near term (protection ranks from CNHP database provide base for score where known; management ranks are also considered).**

0 =	P5: Land protection complete or adequate reason exist not to protect site.
1 = low	P4: No threat known for foreseeable future
2 = medium:	P3: Definable threat, but not within next 5 years.
4 = high:	P2: Threat expected within 5 years (changes in land use/ownership and/or management are likely within 5 years). (oil shale endemics because of markets uncertainties). For sale.
5 = urgent:	P1: Immediately threatened by severely destructive forces (bulldozer, dam, subdivision, etc.).
  
4. **Manageability/Restorability: degree to which condition of primary elements or ecological processes can be maintained and/or restored with reasonable expenditures (i.e., our ability to maintain/or and restore condition of elements, handle human use, recreation use, etc.)**

1 = low:	Probability of maintaining/restoring the condition of the primary elements at the site is constrained by off-site
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- influences and lack of technology.
- 2 = medium: Probability of improving/restoring the condition of the primary elements may currently be constrained by a lack of technology, but we will be able to maintain the elements in their current condition.
- 3 = high: Probability of maintaining and improving/restoring the condition of the primary elements is excellent.
5. **Defensibility: degree to which we or others are able to defend the site's elements or overall health from off-site activities over time (extrinsic factors)**
- 1 = low: Off-site activities will have a serious affect on our ability to defend the site's elements and overall health over time.
- 2 = medium: Off-site activities are currently or may potentially affect elements and/or overall health.
- 3 = high: Off-site activities are not projected to have more than a minor and easily mitigated affect on the site's elements or require on-going maintenance.
6. **Viability of ecosystem processes: degree to which natural ecological processes that support the targeted elements are intact (note: where information is not available for rare plants, population size will be used as a surrogate for processes)**
- 1 = low: The major processes are not intact.
- 2 = medium: Some processes are intact or can be restored.
- 3 = high: All or most processes are intact or can be restored.
7. **Existing protection: Degree to which highest-ranked elements are protected (as defined by element needs), e.g., TNC preserve, ACEC, RNA, etc. If designated as Research Natural Area or Area of Critical Environmental Concern, is management plan or is monitoring in place?**
- 1 = low: Protection of highest ranked elements is adequate (if designated as ACEC or RNA, management plan and monitoring are in place).
- 2 = medium: There is some protection in place for highest ranked elements, but there is more to do (other populations need protection, management plans or monitoring).
- 3 = high: There is no protection for the highest-ranked elements.

These criteria are based on those developed by the Oregon, Minnesota, Wisconsin Field Offices, and have been modified to meet the needs of the Colorado Nature Conservancy.

**Elements:**

For purposes of assigning ranks to sites, elements with:

Ranks spanning 2 levels (G2G3) are given higher rank (G2)  
Ranks spanning 3 levels (G3G5) are given middle rank (G4)  
Ranks with question mark (G3?) are given rank without ? (G3)  
Ranks with U (GU) are treated as G4  
Ranks with Q and subspecific taxa (T1) are treated at next lower rank (G2)

**Sites:**

27 B1 sites or sites with a biodiversity rank of 1, such as the only known occurrence of any element the best or an excellent occurrence of a G1 element or a concentration of high-ranked occurrences of G1 or G2 elements) or very high biodiversity significance

248 B2 sites or sites with a biodiversity rank of 2, B2 sites include sites harboring one of the most outstanding occurrences of any community element, any occurrence of a G1 element, a good occurrence of a G2 element, an excellent occurrence of a G3 element, or a concentration of B-ranked elements.

## APPENDIX B: PROGRAMMATIC CRITERIA

### Criteria for assessing/evaluating the programmatic benefits/opportunities of B1-B2 conservation sites.

Each factor was scored as high, medium or low.

For any site, regardless of ownership:

#### 1. Feasibility: Degree to which protection of the site is achievable in terms of:

- a. Relative total cost in terms of staffing, protection and endowment dollar amount. Consider factors such as partners who could assist, TNC role in site, and potential for income-producing compatible land use on the site, etc.

- 1 = low (costs will be high)
- 2 = medium (costs will be moderate)
- 3 = high (costs will be low)

- b. Political feasibility at local, state and federal levels, local community, industry groups, etc. Also consider factors such as compatible land uses from a public relations standpoint in areas where agricultural interests are strong (i.e., are there opportunities for grazing, etc. on the site which would have positive impacts on our relationship with the community?).

- 1 = low
- 2 = medium
- 3 = high

- c. Cooperative landowner (e.g., willing seller, willing partner)

- 1 = low
- 2 = medium
- 3 = high

- d. Fund-raising ability: ease of mobilizing requisite financial support

- 1 = low
- 2 = medium
- 3 = high

2. **Capacity building: Degree to which protection of the site would increase our capacity to advance the Conservancy's mission in Colorado; will protection of the site help to leverage further conservation action as measured through increased relationships with:**

a. **Policy makers (e.g., state and federal partners, county commissioners, local organizations).**

1 = low

2 = medium

3 = high

b. **Resources (e.g., private landowners, membership, partners, local organizations, volunteers). Degree to which the project will help us raise more money for other projects. Also consider factors such as overhead on cooperative projects, potential for grants, home office internal recognition, etc.**

1 = low

2 = medium

3 = high

c. **Land managers (e.g., public land management agencies, private landowners, partners). To what extent does the project provide an opportunity for us to establish models which are applicable to other land managers or help change people's relationship to the landscape?**

1 = low

2 = medium

3 = high

Table IA Definition of Natural Heritage Global Rarity Ranks  
 These ranks should not be interpreted as legal designations.

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Global Rank (G): Based on the range-wide status of a species.

- G1 Critically imperiled globally because of extreme rarity (5 or fewer occurrences, or very few remaining individuals), or because of some factor of its biology making it especially vulnerable to extinction. (Critically endangered throughout its range).
- G2 - Imperiled globally because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction throughout its range. (Endangered throughout its range).
- G3 Very rare or local throughout its range or found locally in a restricted range (21 to 100 occurrences). (Threatened throughout its range).
- G4 Apparently secure globally, though it might be quite rare in parts of its range, especially at the periphery.
- G5 Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
- GX Presumed extinct.
- G#? Indicates uncertainty about an assigned global rank.
- GU Unable to assign rank due to lack of available information.
- GQ Indicates uncertainty about taxonomic status.

G#T# Trinomial rank (T) is used for subspecies or varieties. These taxa are ranked on the same criteria as G1-G5.

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Table 1B Definition of Natural Heritage State Rarity Ranks  
These ranks should not be interpreted as legal designations.

State rank (S): Based on the status of a species in an individual state. S ranks may differ between states based on the relative abundance of a species in each state.

- S1 Critically imperiled in state because of extreme rarity (5 or fewer occurrences, or very few remaining individuals), or because of some factor of its biology making it especially vulnerable to extirpation from the state. (Critically endangered in state).
- S2 Imperiled in state because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extirpation from the state. (Endangered or threatened in state).
- S3 Rare in state (21 to 100 occurrences).
- S#B Refers to the breeding season imperilment of elements that are not permanent 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.
- SH Historically known from the state, but not verified for an extended period, usually > 15 years; this rank is used primarily when inventory has been attempted recently.
- SX Presumed extirpated from state.
- S#? Indicates uncertainty about an assigned state rank.
- SU Unable to assign rarity rank, often because of low search effort or cryptic nature of the element.
- 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.

Table 2. Federal and State Agency Special Designations

Federal Status:

1. U.S. Fish and Wildlife Service (58 Federal Register 51147, 1993)

- LE Endangered; taxa formally listed as endangered.
- LT Threatened; taxa formally listed as threatened.
- P Proposed E or T; taxa formally proposed for listing as endangered or threatened.
- C1 Notice of Review, Category 1: taxa for which substantial biological information exists on file to support proposing to list as endangered or threatened.
- C2 Notice of Review, Category 2: taxa for which current information indicates that proposing to list as endangered or threatened is possible, but appropriate or substantial biological information is not on file to support an immediate rulemaking.
- C2\* Taxa believed to be possibly extirpated in the wild.
- 3A Taxa for which the USFWS has persuasive evidence of extinction.
- 3B Names that based on current taxonomic knowledge do not represent taxa meeting the Endangered Species Act's definition of a species.
- 3C Notice of Review, Category 3C: taxa that have proven to be more abundant or widespread than was previously believed, and/or those that are not subject to any identifiable threat.

2. U.S. Forest Service (Forest Service Manual 2670.5) (noted by the Forest Service as "S")

- FS: Sensitive: those plant and animal species identified by the Regional Forester for which population viability is a concern as evidenced by:
  - a. Significant current or predicted downward trends in population numbers or density.
  - b. Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

3. Bureau of Land Management (BLM Manual 6840.06D) (noted by BLM as "S")

- BLM: Sensitive: those species found on public lands, designated by a State Director, that could easily become endangered or extinct in a state. The protection provided for sensitive species is the same as that provided for C1 and C2 candidate species.

State Status:

1. Colorado Division of Wildlife

- E Endangered
- T Threatened
- SC Special Concern

APPENDIX D. PRIORITY CONSERVATION PLANNING UNITS:  
RESULTS OF SCIENTIFIC ANALYSIS

(D = default = 1, nr = not ranked)

RUP#	PLANNING UNIT	SITES	SITE INFORMATION				COFO REGION	SCIENTIFIC SCORING										HERITAGE INFORMATION							
			SCI TOTAL	ELEM SCORE	LAND OWNER	COUNTY		ELEM G1	ELEM G2	ELEM G3	RCLG2 S1	RCLG2 S2	RCLG2 S3	STP (C10)	URG	MAN	DEP	VAR	PROT	TYPE	MACROSITE	MEGASITE			
1	AKSA PLAINS	CHAPIN MESA	B1	52.5	39.5	IPS	Morencos	SW	1	4	1	4	1	1	1	1	2	3	3	3	3	3	STD	MESA VERDE	MESA VERDE
1	AKSA PLAINS	MESA VERDE MACROSITE	B2	18.0	5.0	IPS	Morencos	SW	0	0	0	2	1	0	0	0	2	1	3	3	3	2	MAC	MESA VERDE	MESA VERDE
2	PARAJUTE CREEK	MOUNT CALLAHAN AND CALLAHAN RIDGE	B1	51.0	35.0	PR(OCCIDENTAL OL)	Orfield	NW	1	3	1	0	0	0	0	0	0	2	3	3	3	3	MAC		PARAJUTE CR
2	PARAJUTE CREEK	PARAJUTE CREEK MACROSITE	B2	39.5	22.5	BLM(PRLPAHOL)	Orfield	NW	0	2	1	0	1	1	1	1	2	3	3	3	2	2	MAC	PARAJUTE CREEK	PARAJUTE CREEK
2	PARAJUTE CREEK	ANVIL POINTS	B1	29.5	13.5	PR(DIAVAL OL)	Orfield	NW	1	0	2	0	0	1	1	1	4	3	3	3	3	3	STD		PARAJUTE CR
3	DOLORES RIVER	LA SAL CREEK	B1	48.0	34.0	BLM(PR)	Montrose	SW	1	2	1	0	0	0	0	0	10	4	3	3	3	3	MAC	LA SAL CR	
3	DOLORES RIVER	COYDTE WASH	B2	28.0	18.0	BLM	Montrose	SW	1	1	1	0	1	0	0	0	1	3	3	3	3	3	STD		
3	DOLORES RIVER	BEWELUP MESA	B2	21.0	16.0	BLM	Nora	SW	1	1	1	0	1	0	0	0	0	0	0	0	0	0	STD		
3	DOLORES RIVER	EAST PARADOX CREEK	B2	18.0	13.0	OLM	Montrose	SW	0	2	1	0	0	0	0	0	1	0	0	0	0	0	STD		PARADOX VALLEY
3	DOLORES RIVER	SILVEY'S POCKET	B2	18.0	13.0	OLM	Montrose	SW	0	2	1	0	0	0	0	0	0	0	0	0	0	0	STD		
3	DOLORES RIVER	MULL CANYON	B2	17.0	12.0	OLM	Montrose	SW	1	1	0	0	0	0	0	0	0	0	0	0	0	0	STD		TRIPLEX PLM
4	SAN JOUQUEL RIVER	SAN JOUQUEL RIVER AT TAREOULACHE CREEK	B1	43.0	30.0	BLM(PR)	Montrose	SW	1	4	1	0	0	0	0	0	4	2	2	3	3	3	MAC		SAN JOUQUEL RIVER
4	SAN JOUQUEL RIVER	SAN JOUQUEL RIVER CANYON MACROSITE	B2	29.0	18.0	BLM(PR)	Montrose	SW	0	3	0	0	0	0	0	0	2	3	3	3	3	3	MAC	SAN JOUQUEL CANYON	SAN JOUQUEL RIVER
4	SAN JOUQUEL RIVER	SAN JOUQUEL RIVER AT SOUTH FORK	B2	27.5	18.5	PR	San Miguel	SW	0	2	0	0	0	1	1	1	3	3	3	3	3	3	STD		SAN JOUQUEL RIVER
5	TROUBLESONG CREEK	TROUBLESONG CREEK	B1	40.0	24.0	BLM(PR)	Grand	NW	2	0	0	0	0	0	0	0	10	4	3	3	3	3	STD		
6	ARIZONITE PLAINS	HOOSIER RIDGE MACROSITE	B1	38.5	22.5	FS(PR)	Seward	SE	1	0	4	1	1	1	1	1	4	2	2	3	3	3	MAC		MOSQUITO PEAKS
6	ARIZONITE PLAINS	AMERICAN FLATS	B1	31.0	17.0	FS	Park	SE	1	0	3	0	1	0	0	0	4	2	2	3	3	3	MAC		MOSQUITO PEAK
6	ARIZONITE PLAINS	CAMERON AMPHITHEATRE	B2	33.0	18.0	FS(PR)	Park	SE	1	0	2	1	2	0	0	0	4	2	3	3	3	3	STD		MOSQUITO PEAKS
6	ARIZONITE PLAINS	MOSQUITO PEAK PASS	B2	31.0	17.0	BLM(PR)	Park	SE	1	0	1	0	1	0	0	0	4	2	3	3	3	3	STD		MOSQUITO PEAKS
6	ARIZONITE PLAINS	MOUNT SILVERHEELS	B2	32.0	7.0	FS	Park	SE	1	0	0	0	0	0	0	0	4	3	3	3	3	3	STD	HOOSIER RIDGE	MOSQUITO PEAKS
6	ARIZONITE PLAINS	MOUNT DEMOCRAT	B2	21.5	8.5	FS(PR)	Park	SE	0	1	1	0	0	1	1	1	4	2	2	3	3	2	STD		MOSQUITO PEAKS
6	ARIZONITE PLAINS	BLUE LAKE(MOSQUITO)	B2	18.0	13.0	HF	Seward	SE	0	1	1	2	1	0	0	0	0	0	0	0	0	0	STD		MOSQUITO PMS
6	ARIZONITE PLAINS	MOUNT BHERIDAN	B2	12.0	7.0	FR(PR,FLM)	Lake	SE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	STD		MOSQUITO PEAKS
7	NORTH PLATTE RIVER	CALIFORNIA GULCH	B1	33.0	28.0	BLM	Jackson	NW	1	0	1	0	0	0	0	0	10	2	3	3	3	3	STD	NORTH PLATTE	
7	NORTH PLATTE RIVER	NORTH PARK NATURAL AREA	B1	33.0	18.0	BLM(PR)	Jackson	NW	1	0	0	0	1	0	0	0	10	4	3	3	3	3	STD	NORTH PLATTE	
7	NORTH PLATTE RIVER	GREEN RANCH (N PLATTE)	B2	21.0	7.0	ST 904	Jackson	NW	1	0	0	0	0	0	0	0	4	3	3	2	2	2	STD	NORTH PLATTE	
7	NORTH PLATTE RIVER	DIAMOND J RANCH	B2	20.0	7.0	PR	Jackson	NW	1	0	0	0	0	0	0	0	3	3	3	3	3	2	STD	NORTH PLATTE	
8	SAN LUIS VALLEY	GREAT SAND DUNES MACROSITE	B1	32.0	18.0	IPS	Alamosa	SLV	1	0	0	1	0	0	0	0	0	3	3	3	3	3	MAC		GREAT SAND DUNES
8	SAN LUIS VALLEY	MISHAK LAKES	B2	25.5	11.5	PR 37	Logeche	SLV	0	0	2	1	1	1	1	1	4	3	2	2	2	2	STD		
8	SAN LUIS VALLEY	SHEEP CREEK UPLAND (NORTH PASS)	B2	18.0	13.0	BLM(PR)	Logeche	SLV	0	2	1	0	0	0	0	0	0	0	0	0	0	0	STD		NORTH PASS
9	SOUTH REAVER CREEK	SOUTH REAVER CREEK	B1	32.0	17.0	BLM(PR)	Cheriton	SW	1	0	0	0	0	0	0	0	0	4	2	3	3	3	MAC		SOUTH REAVER CREEK
10	PICEANCE CREEK	RYAN GULCH	B1	28.0	17.0	BLM(PR)	Rio Grande	NW	1	2	0	0	0	0	0	0	2	2	3	3	3	3	STD		PICEANCE BASH
10	PICEANCE CREEK	YELLOW CREEK AT PHTO GULCH	B1	18.0	12.0	BLM(PR)	Rio Grande	NW	1	1	0	0	0	0	0	0	2	0	0	0	0	0	MED	YELLOW CREEK	PICEANCE BASH
10	PICEANCE CREEK	DUDLEY BLUFFS	B2	37.0	22.0	BLM(PR)	Rio Grande	NW	1	2	1	1	0	0	0	0	4	3	3	3	3	3	STD		PICEANCE BASH
10	PICEANCE CREEK	SOUTH CATHEDRAL BLUFFS	B2	31.5	18.5	BLM(PR)	Rio Grande	NW	0	2	2	0	0	1	1	1	4	3	3	3	3	3	MAC	CATHEDRAL BLUFFS	PICEANCE BASH
10	PICEANCE CREEK	PICEANCE CREEK	B2	30.0	22.0	BLM	Rio Grande	NW	0	2	4	0	0	0	0	0	4	0	0	0	0	0	STD		PICEANCE BASH
10	PICEANCE CREEK	CALAMITY RIDGE MEGASITE	B2	18.5	13.5	OLM	Rio Grande	NW	0	2	1	0	0	1	1	1	2	0	0	0	0	0	MEG		CALAMITY RIDGE PICEANCE CR
10	PICEANCE CREEK	LOWER HAY GULCH	B2	18.0	11.0	BLM	Rio Grande	NW	0	1	2	0	0	0	0	0	0	0	0	0	0	0	STD		PICEANCE BASH
11	UTE MOUNTAIN UTE	TANNER MESA	B1	23.0	12.0	UTE	Montezuma	SW	1	1	0	0	0	0	0	0	2	2	3	3	3	3	STD		NAVAJO WASH
11	UTE MOUNTAIN UTE	CHIMNEY ROCK MESA	B1	22.0	8.0	UTE	Montezuma	SW	1	0	0	0	1	0	0	0	2	1	3	3	3	3	STD		MESA VERDE
11	UTE MOUNTAIN UTE	EAST TOE EAST	B1	17.0	12.0	UTE	Montezuma	SW	1	1	0	0	0	0	0	0	0	0	0	0	0	0	STD		

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**APPENDIX E. SUMMARY OF RECOMMENDED CONSERVATION ACTIONS FOR PLANNING UNITS BY COFO REGION**

**NORTHWEST REGION PRIORITY CONSERVATION PLANNING UNITS**

#/TNC PRIORITY	PLANNING UNIT/SITE	PROTECTION URGENCY/ THREATS	INFORMATION NEEDS	SITE PLAN STATUS/ NEEDS	TNC ROLE/PROTECTION ACTION	MONITORING ACTION
2./High	<b>PARACHUTE CREEK</b> Mt. Callahan Parachute Creek Anvil Points	Medium/ Oil shale development Disposal of lands	Inventory (proposal to DOE) Threats Population status of G1-G2 species Obtain Graystone report Determine need for ecosystem approach	CNHP site profile done; Preliminary SCP	Develop relationships: Cultivate and develop strategy w/oil companies & DOE	Monitor rare plants and communities: Initiate monitoring of G1-G2 elements
5./High	<b>TROUBLESOME CREEK</b> Troublesome Creek Waste Creek	High/ ORV Road maintenance Uncontrolled grazing	Population status of 2 G1 plants Extent of habitat for pollinators	Old design on file, Update SCP	Develop relationships/ acquisition/easement: Cultivate Wall & Palmer; potential conservation easement Special designation: Seek ACEC; potential coop. with BLM	Monitor rare plants: Provide technical assistance & seek funds to continue monitoring plants Coordinate with CNAP
7./High	<b>NORTH PLATTE RIVER</b> California Gulch North Park Natural Area Green Ranch Diamond J Ranch	Medium/ ORV Uncontrolled grazing Little landowner sympathy	Research livestock effects on G1 plant species Population status of G1 plant species	Old site designs for 2 sites on file; SCP to be completed by 6/95	Develop relationships: with private landowners Special designation: Nominate ACEC for Cal. Gulch; addition for North Park Natural Area	Monitor G1 plants on 1-2 private ranches: Meet with CNAP re ACEC and initiate monitoring

#/TNC PRIORITY	PLANNING UNIT/SITE	PROTECTION URGENCY/ THREATS	INFORMATION NEEDS	SITE PLAN STATUS/ NEEDS	TNC ROLE/PROTECTION ACTION	MONITORING ACTION
10./High	PICEANCE BASIN Ryan Gulch Dudley Bluffs Yellow Creek Cathedral Bluffs Piceance Creek Calamity Ridge Lower Hay Gulch	Medium/ oil shale development and nahcolite mining; uncontrolled grazing	Population status of rare plants (CNAP?) Update EORs and threats Status of ACEC proposals Landownership	Old site designs on file for Dudley & Cathedral Bluffs;  Preliminary regional SCP	Special designation: Support BLM designations Develop relationships: cultivate & dev. strategy w/mining companies; Acquisition/easement; Donation of fee or land swap between oil companies & BLM Coordinate with CNAP Schedule field trip w/CNHP, CNAP, BLM	
14./High	KREMMLING	High/Muddy Creek dam	Update EOR's, threats, landownership Population status of G1 plant species	Preliminary SCP	Catalyze BLM: Review recreation facility plan Possible coop. or land swap w/private owner & BLM Develop relationships: with private landowners	Research and monitor rare plants: Continue to monitor/research to determine management strategy; cultivate private landowners; provide technical assistance to BLM & confirm occurrences of rare plants; seek funding from BLM
23. /Medium	RAVEN RIDGE	Low/oil shale?	CNAP lead	CNAP lead	Minor role: Contact CNAP to confirm role	
24. /Medium	BROWNS PARK Irish Canyon Sterling Place Spitzie Draw Bassett Spring Bull Canyon	Medium/ unknown threats	Determine inventory needs Population status of rare plants	CNAP site summaries on file; Preliminary SCP pending inventory	Develop relationships: Meet with BLM and SLB to develop strategy Special designation	Monitor rare plants: Provide technical assistance and seek funding from BLM for initiating new monitoring

#/TNC PRIORITY	PLANNING UNIT/SITE	PROTECTION URGENCY/ THREATS	INFORMATION NEEDS	SITE PLAN STATUS/ NEEDS	TNC ROLE/PROTECTION ACTION	MONITORING ACTION
25. /Medium	DINOSAUR NATIONAL MONUMENT Yampa River Pool Creek Harding Hole Johnson Canyon Cross Mtn. Canyon Sand Canyon	Medium/Low uncontrolled grazing alien species increased recreation	Special designation process Update fish info. into BCD	CNAP report for DNM & site summary for Cross Mtn.; regional SCP?	Special designation: Support NPS designation Government acquisition: Investigate potential coop. project with NPS on Mantle Ranch	
29./High	YAMPA RIVER Morrison Ck. East Fork Elk River Hayden Bottoms Morgan Bottoms Yampa at Yampa Juniper Hot Springs	High/ altered flows bank stabilization residential development	Trends of G1-G2 plant communities; classify patch types Inventory Steamboat to Craig Continue and initiate new research on ecological processes, grazing, cottonwood genetics, hydrology, willow carr biohydrology, birds	SCPs completed for Elk, Morrison, Yampa at Yampa and E. Fork; Expanded Morgan Bottoms SCP - 4rd qtr. FY95; regional SCP?	Acquisition/conservation easements: at Morgan Bottoms, Elk, E. Fork, Morrison, Yampa Government acquisition: Pursue coop. with CDOW (Hayden Bottoms) Water rights protection Develop relationships	Restoration: develop plan for Morgan Bottoms Monitoring: initiate bird and grazing monitoring studies at Carpenter Ranch
33. /Medium	BIG CREEK LAKES MACROSITE	Low/ increased recreation	Research ecological processes Describe/classify plant communities	RNA establishment record completed	Special designation: Support RNA designation	Research: Pursue funding for research on plant communities
36. /Medium	LITTLE SNAKE Horse Draw	Medium/ unknown threats	Determine inventory needs Population status of rare plants	CNAP site summaries on file; Preliminary SCP pending inventory	Develop relationships: Meet with BLM and SLB to develop strategy Special designation	Monitor rare plants: Provide technical assistance and seek funding from BLM for initiating new monitoring
38. /Medium?	WHITE RIVER	Low/altered flows	Update status and enter into BCD	?	Participate in fish program, update EOR info.	

**SOUTHWEST REGION PRIORITY CONSERVATION PLANNING UNITS**  
**Summary of Recommended Conservation Actions**

#/TNC PRIORITY	PLANNING UNIT/SITE	PROTECTION URGENCY/ THREATS	INFORMATION NEEDS	SITE PLAN STATUS/NEEDS	TNC ROLE/PROTECTION ACTION	MONITORING ACTION
1./Medium	MESA VERDE Chapin Mesa Chimney Rock	Low/ Trampling by tourists Park development	Inventory of rare plants NPS designation process Population status of G1-G2 plant species Compile existing info.	Preliminary SCP	Special designation: Contact and dev. strategy with NPS Nominate sites for designation	Initiate monitoring: provide technical assistance; Recruit researcher to seek NPS funds for inventory and monitoring
3./High	DOLORES RIVER La Sal Ck. Coyote Ck. Sewemup Mesa E. Paradox Creek Silveys Pocket Bull Canyon	High/ Copper mining Subdivision Road maintenance Overgrazing Recreation	Status of wilderness designation & mining company plans Inventory Population status of rare plants and communities Ecological processes/model Hazards	Old reports on file for Sewemup Mesa and E. Paradox Creek; SCP done for La Sal Creek; other sites need SCP pending inventory.	Acquisition/easement: Finalize protection strategy for La Sal Creek: fee & conservation easement Develop relationships: Cultivate mining company. Special designation: Nominate ACEC	Initiate monitoring: Pursue BLM funding for inventory and monitoring of rare plants
4./High	SAN MIGUEL RIVER South Fork San Miguel Canyon Tabeguache Creek	High/ Gravel mining Water development Residential dev. Uncontrolled recreation Tamarisk	Threats Hydrologic assessment Inventory animals Complete biohydrology research	SCPs done; need regional SCP?; update SCPs in FY97	Acquisition/easement: additions to 3 preserves Water strategy: Organize water planning strategy session	Continue monitoring: riparian communities; provide technical support to BLM; complete biohydrology research

#/TNC PRIORITY	PLANNING UNIT/SITE	PROTECTION URGENCY/ THREATS	INFORMATION NEEDS	SITE PLAN STATUS/NEEDS	TNC ROLE/PROTECTION ACTION	MONITORING ACTION
9./Medium	SOUTH BEAVER CREEK	Medium/ Mountain biking Uncontrolled grazing Alien species	Ecological processes Population status of G1 rare plant Grazing impacts on rare plant	Old site design on file; SCP to be completed in FY95	Conservation easement: Cultivate private owner for conservation easement or coop.	Initiate monitoring of rare plant: Provide technical assistance to BLM on management plan for ACEC and seek funding for monitoring rare plants
11./Medium	UTE MOUNTAIN UTE Tanner Mesa Chimney Rock East Toe East Toe East Aztec Wash	High/ Oil & gas development Uncontrolled horse grazing Agricultural development	Update threats Population status of G1-G2 plant species, update inventory	Preliminary SCP? pending further inventory?	Develop relationships: Cultivate and dev. strategy with Utes  Coordinate with Navajo Heritage Program (M. Tremble) Meet with NM; CNAP to exchange info.	Technical assistance: Provide technical assistance and training to Utes
12./High	UNCOMPAHGRE BADLANDS Uncompahgre Badlands Selig Canal	High/ Subdivision dev. Residential dev. ORV	Update EORs & inventory Population status of rare plants/communities Locate best site for TNC action Call Ferguson for info.	Old site design on file for Wacker Ranch; Preliminary SCP pending inventory	Develop relationships: Cultivate private owners Government acquisition: Possible BLM land exchange or coop.	Monitor rare plants: Continue monitoring buckwheat and seek funding to initiate monitoring of other rare plants
16./High	COLORADO RIVER AT GRAND JUNCTION Badger Wash Ruby Canyon Devil's Kitchen	High/ altered flows proposed dam residential dev. alien species oil and gas ORVs grazing	Inventory Update fish information (R. Wigington)	Report on file for Badger Wash & Pyramid Rock; Preliminary regional SCP pending inventory	Catalyze BLM & BOR: Meet with BLM, counties, BOR to develop strategy and initiate inventory	Research: seek funding from BOR to research effects of large upstream dams on riparian areas along Colorado River Initiate monitoring of rare plants Technical assistance

#/TNC PRIORITY	PLANNING UNIT/SITE	PROTECTION URGENCY/ THREATS	INFORMATION NEEDS	SITE PLAN STATUS/NEEDS	TNC ROLE/PROTECTION ACTION	MONITORING ACTION
17. /Medium	UNCOMPAHGRE PEAK	Medium/ Recreation Overcollecting Sheep grazing	Threats Inventory	CNAP? BLM?	Special designation: Support SIA designation	Influence management
18. /Medium	REDCLOUD PEAK	Medium/ Recreation Overcollecting Sheep grazing	Threats	CNAP? BLM?	Support BLM: Support existing protection Call BLM to update status Check RMP management actions and provide input Invite Amy Seidle to office	
20. /?	SOUTHERN UTE	Medium/ unknown	Inventory to determine if plant exists in CO (TNC preserve in NM over border)	Preliminary SCP pending inventory	Develop relationships: Cultivate So. Utes Contact Alden Naracio (CNAP council member) re access/status	
30. /High	COLORADO RIVER AT DEBEQUE Debeque Rifle Stretch of Co. River Roan Creek Deer Park Gulch Pyramid Ridge Coon Hollow	High/ altered flows proposed dam residential dev. alien species oil and gas ORVs grazing	Inventory Update fish information (R. Wigington)	Preliminary regional SCP pending inventory	Catalyze BLM & BOR: Meet with BLM, counties, BOR to develop strategy and initiate inventory	Research: seek funding from BOR to research effects of large upstream dams on riparian areas along Colorado River Initiate monitoring: of rare plants Technical assistance

#/TNC PRIORITY	PLANNING UNIT/SITE	PROTECTION URGENCY/ THREATS	INFORMATION NEEDS	SITE PLAN STATUS/NEEDS	TNC ROLE/PROTECTION ACTION	MONITORING ACTION
35./Medium	LAKE FORK OF GUNNISON	Medium/ Residential dev.		Old site design on file; Preliminary SCP to identify areas for acquisition	Develop relationships: Partner with TPL, BLM & BOR (determine TNC role) Direct BOR mitigation funds to acquire private inholdings Call Chuck Finch, BLM to check status	Continue monitoring of riparian community and seek funds
42./High	ANIMAS RIVER	Medium/ Recreation Train Residential dev. Upstream mining	Update landownership & maps	Old design on file, update SCP	Develop relationships: Cultivate private owners & mobilize protection Special designation: Support FS designation Cooperative project, LWCF? Land exchange	

**SOUTHEAST REGION PRIORITY CONSERVATION PLANNING UNITS**  
**Summary of Recommended Conservation Actions**

#/TNC PRIORITY	PLANNING UNIT/SITE	PROTECTION URGENCY/ THREATS	INFORMATION NEEDS	SITE PLAN STATUS/NEEDS	TNC ROLE/PROTECTION ACTION	MONITORING ACTION
6./Medium	<b>MOSQUITO PEAKS</b> Hoosier Ridge American Flats Mt. Sheridan Cameron Amphitheatre Mt. Silverheels Mt. Democrat Blue Lakes	High/ Mining Uncontrolled grazing	Inventory Ecological processes Population status of G1-G2 plant species Update threats	Preliminary regional SCP (further inventory needed for full SCP)	Develop relationships: Cultivate mining companies and develop strategy Special designation: Support RNA designation Government acquisition: LWCF purchase of inholdings/mining claims in Pike San Isabel NF	Initiate monitoring: Seek funding to initiate monitoring of rare plants
8./High	<b>SAN LUIS VALLEY</b> Great Sand Dunes Mishak Lakes Baca Ranch Sheep Creek Upland	High/ Water development Closed Basin Project Agriculture	Inventory Ecological processes/model Population status and ecology of G2-G3 plant species Update threats Biohydrology	SCP for Mishak Lakes done in 1993, update pending ongoing research; SCP ongoing for Baca; regional SCP pending inventory	Develop relationships: Cultivate community; establish presence and community-based project LWCF with NPS Develop new field office: Proposal to EPA for position Acquisition/easement: Additional TNC acquisition at Mishak Lakes	Research and monitoring: seek funding to establish research biohydrology and monitoring of rare plant and communities Install fencing at Mishak
15./Low	<b>PIKES PEAK</b>	Low	Population status of G1 rare plant species	Tom Andrews prepare SIA proposal	Special designation: Notify FS of occurrence and support SIA designation to FS	Monitor rare plant: Seek funding to establish monitoring of G1 plant; provide technical assistance to Broadmore Garden Club

#/TNC PRIORITY	PLANNING UNIT/SITE	PROTECTION URGENCY/ THREATS	INFORMATION NEEDS	SITE PLAN STATUS/NEEDS	TNC ROLE/PROTECTION ACTION	MONITORING ACTION
21./High	SOUTH PARK High Creek Fen	High/ Water development Peat mining Residential development Potential regional airport	Inventory Ecological processes Hydrology Seed bank study Plant species richness	Site design done in 1993, update pending ongoing research & inventory; regional SCP pending inventory (consider expanding boundaries)	Acquisition/easement: Cultivate landowners Continue fec/easement; see SCP Water strategy	Continue & initiate new monitoring: rare plants and communities
22./High	ARKANSAS RIVER Portland Beaver Creek Fourmile Creek Brush Hollow Creek Boggs Creek	High/ Limestone mining Uncontrolled recreation Water development	Inventory Population status of G1-G2 rare plants	Old designs on file for Portland and Fourmile; Preliminary regional SCP pending inventory	Develop relationships: Cultivate landowners/mining company	Monitor rare plants: Seek funding for inventory and continue to monitor plants and communities Establish new population of rare plants at Portland Potential acquisition
27./Medium	GREENLAND RANCH	High/population growth Residential development	Inventory Condition of rare plant communities	Plan being done by Conservation Fund	Minor role: Cultivate landowners Promote biodiversity values	Technical assistance: provide technical assistance and monitor communities
28./Medium	BAR NI MACROSITE	Medium/ Residential development	Inventory expedition	Report on file; SCP pending further inventory	Develop relationships: Cultivate adjacent landowners to Cabots; Lead regional inventory expedition Expand conservation easement	Monitor communities: continue monitoring project

#/TNC PRIORITY	PLANNING UNIT/SITE	PROTECTION URGENCY/ THREATS	INFORMATION NEEDS	SITE PLAN STATUS/NEEDS	TNC ROLE/PROTECTION ACTION	MONITORING ACTION
34./High	AIKEN CANYON	High/ Residential and subdivision development	Inventory region Assess quality and condition of communities Ecological processes/model Plant species richness Woodland encroachment Prescribed burning	SCP done in 1993, update in FY 1997	Develop relationships/special designation: Cultivate Ft. Carson Acquisition/easements: Continue fee and easements See SCP for actions	Initiate monitoring of rare plant communities and expand inventory of preserve
37./High	MESA DE MAYA Jesus Mesa Cobert Mesa	Medium-High/ For Sale Uncontrolled grazing	Inventory	Old designs on file for 2 small sites; Preliminary SCP	Participate in TNC regional inventory and SCP with NM and OK Develop protection strategy based on SCP	pending protection
40. /Medium	JEFFERSON COUNTY Indian Gulch	?/Dam Mining Urban development	Visit site, update EORs Determine if Jeffco needs assistance	Site profile on file; Preliminary SCP	Acquisition/easement: Facilitate Jeffco acquisition as potential coop. Develop relationships: with landowners	pending protection
41. /Medium	SALIDA Dronney Gulch Harrington Gulch Cleora	Medium	Inventory/expand boundaries Population status of G2 species	Old design on file for 1 of 3 sites; update SCP	Develop relationships: with landowners; meet with CNAP and SLB to determine roles	Initiate monitoring of plant: Seek funding from BLM to monitor rare plant
43. /Medium	WEST BIJOU CREEK Combs Ranch	Medium/ residential development	Ecological processes Community classification	Outdated Savonen, thesis and site designs on file; Preliminary SCP needed	Develop relationship/seek donation: cultivate landowner	pending protection

**NORTHEAST REGION PRIORITY CONSERVATION PLANNING UNITS  
Summary of Recommended Conservation Actions**

#/TNC PRIORITY	PLANNING UNIT/SITE	PROTECTION URGENCY/ THREATS	INFORMATION NEEDS	SITE PLAN STATUS/NEEDS	TNC ROLE/PROTECTION ACTION	MONITORING ACTION
13./High	ARIKAREE RIVER Bowman Ranch Black Wolf Creek Hillside Ranch Eckley Sandhills Bonney Prairie	High/ Drawdown of Ogallala aquifer Pig farming	Inventory uplands/animals Ecological processes/model Threats Hydrology	Outdated designs on file; need regional SCP; complete in FY95	Develop relationship: Cultivate landowners SLB conservation lease? Acquisition/easements: Fee or management agreements? Potential TNC acquisition (gift or bargain sale)	Initiate monitoring rare plant community; Recruit researcher: Study center pivot and groundwater
21./Low	ROCKY MOUNTAIN NATIONAL PARK Glacier Basin	Low/ Increased recreation	Threats	Necessary?	Special designation: Support special designation to NPS; notify of value	
26./Medium	BOULDER COUNTY Colorado Tallgrass Fourmile Mesa Beechcraft	High-Medium/Urban development Recreation Horse & cattle grazing Alien species Fire suppression Ponderosa pine encroachment	Threats (impacts of weeds on rare plants, etc.)	Necessary?	Support county: Facilitate cooperation among conflicting factions Grant award for conservation innovation Letter of support	Monitor rare plants and plant communities; Provide technical assistance and continue monitoring G2 plant Research: Research effects of weeds on G2 plant

#/TNC PRIORITY	PLANNING UNIT/SITE	PROTECTION URGENCY/ THREATS	INFORMATION NEEDS	SITE PLAN STATUS/NEEDS	TNC ROLE/PROTECTION ACTION	MONITORING ACTION
31./High	LARAMIE FOOTHILLS N. Fk. Cache la Poudre Campbell Mtn. Cap Rock	High/Residential development Mining	Inventory region Update condition of communities and further classification Ecological processes/model grasslands Grazing, fire Fish/water research	SCP done in FY95; future update pending inventory/research	Acquisition/easement: Cultivate landowners Conservation easement Fee; see SCP Develop water strategy: for Phantom	Monitor rare plants and communities: Continue and establish new monitoring of rare plants and communities
32./Medium	NORTH ST. VRAIN	Low	Ecological processes Population status of rare plants; condition of communities	Establishment record to be completed in FY95	Special designation: Support RNA designation to FS	Initiate monitoring: Seek funding to monitor G2 plant species and communities Research: Promote research/provide technical support to FS
39./High	WESTERN HIGH PLAINS Well's Ranch	Medium	Inventory, update EORs Ecological processes	Outdated design on file, need to update SCP for Wells and need regional SCP pending inventory	Special designation: Support RNA designation to FS Acquisition/easement: cultivate landowners SCP and Fee? (Wells)	Initiate monitoring: of plant communities

**APPENDIX F: PRIORITY CONSERVATION PLANNING UNITS AND SITE SUMMARIES** (in order by science rank with map number)

1. MESA VERDE (Map 1)
2. PARACHUTE CREEK (Map 2)
3. DOLORES RIVER (Map 3)
4. SAN MIGUEL RIVER (Map 4)
5. TROUBLESOME CREEK (Map 5)
6. MOSQUITO PEAKS (Map 6)
7. NORTH PLATTE RIVER (Map 7)
8. SAN LUIS VALLEY (Map 8)
9. SOUTH BEAVER CREEK (Map 9)
10. PICEANCE BASIN (Map 10)
11. UTE MOUNTAIN UTE (Map 1)
12. UNCOMPAHGRE BADLANDS (Map 11)
13. ARIKAREE RIVER (Map 12)
14. KREMMLING (Map 5)
15. PIKES PEAK (Map 13)
16. COLORADO RIVER AT GRAND JUNCTION (Map 14)
17. UNCOMPAHGRE PEAK (Map 15)
18. REDCLOUD PEAK (Map 15)
19. SOUTHERN UTE (Map 16)
20. ROCKY MOUNTAIN NATIONAL PARK (Map 5)
21. SOUTH PARK (Map 6)
22. ARKANSAS RIVER (Map 13)
23. RAVEN RIDGE (Map 17)
24. BROWNS PARK (Map 17)
25. DINOSAUR NATIONAL MONUMENT (Map 17)
26. BOULDER COUNTY (Map 18)
27. GREENLAND RANCH (Map 19)
28. BAR NI RANCH (Map 20)
29. YAMPA RIVER (Map 21)
30. COLORADO RIVER AT DEBEQUE (Map 2)
31. LARAMIE FOOTHILLS (Map 22)
32. NORTH ST. VRAIN (Map 18)
33. BIG CREEK LAKES (Map 7)
34. AIKEN CANYON (Map 13)
35. LAKE FORK OF GUNNISON (Map 15)
36. LITTLE SNAKE (Map 17)
37. MESA DE MAYA (Map 23)
38. WHITE RIVER (Map 10)
39. WESTERN HIGH PLAINS (Map 24)
40. JEFFERSON COUNTY (Map 18)
41. SALIDA (Map 25)
42. ANIMAS RIVER (Map 15)
43. WEST BLOU CREEK (Map 19)
44. CRESTED BUTTE (Map 9)
45. MEADOW SPRINGS (Map 22)

# 1. MESA VERDE PLANNING UNIT (Map 1)

County: Montezuma

Ecoregion: Grand Canyon Lands

Ecological Significance: Mesa Verde lies in southwestern Colorado, and harbors a rich ensemble of endemic species and a number of high-quality remnant plant communities representative of the Colorado Plateau. The area consists of extensive sandstone mesas and bluffs of the Mesa Verde Group supporting pinyon pine-juniper woodlands and shrublands. Escarpment tops support diverse shrubland communities dominated by gambel oak, serviceberry, fendlera and other species. Mesa Verde is rich in species and communities having southern biogeographic affinities and is largely intact in terms of ecological structure and function (Romme 1995). Most of the targeted elements lie within the Mesa Verde National Park, and are inaccessible to the public due to the presence of ruins. Several of the rare plant species occur within the heavily visited areas near the ruins. A portion of the planning unit lies on Ute Mountain Ute Tribal Lands, which is also generally inaccessible to the public, but is subjected to uncontrolled horse grazing. Mesa Verde and Ute Mountain Ute planning units are adjacent to one another, and should likely be lumped into one unit for planning purposes.

Landownership: National Park Service, Ute Mountain Ute Tribe

Threats: Increased visitor use, wild horses

Conservation Strategies:

1. Promote inventory to update information and status of elements; compile all existing information; need inventory and classification of communities
2. Provide technical support to NPS on monitoring and updating the population status of globally rare plant species
3. Contact and develop protection strategy with NPS
4. Support NPS special designations
5. Seek partnership with University of Colorado Museum satellite office

## Mesa Verde Conservation Site (Macrosite)

Ecological Significance:

Element	Common Name	CNHP Rank	Federal/State Status
<i>Epipactis gigantea</i>	Helleborine	G4S2	
<i>Microtus mexicanus</i>	Mexican vole	G5S1	
<i>Strix occidentalis lucida</i>	Mexican spotted owl	G3T3S1	T/T

Landownership: NPS, Mesa Verde National Park

Threats: Increased visitor use, wild horses, park development



## 2. PARACHUTE CREEK PLANNING UNIT (Map 2)

County: Garfield

Ecoregion: Tavaputs Plateau

Ecological Significance: Cliffs and steep sparsely vegetated slopes of Green River Shale consist of shale fragments and clay. Barrens of white talus support a rich assemblage of rare plant species and high-quality examples of Western Slope plant communities.

Landownership: Occidental Oil, Department of Energy (Naval Oil Shale Reserve), Union Oil, private, BLM Grand Junction District, Glenwood Springs Resource Area

Threats: Oil shale development, threat of extraction not imminent, but likely to be extracted when economically feasible

Conservation Strategies:

1. Obtain results of inventory by Graystone; conduct further inventories in region
2. Lead private protection, pursue partnership with oil companies, BLM, and DOE (seek funding from companies to manage site); begin by developing relationships (seek assistance from John Sawhill)
3. Initiate monitoring of G1-G2 plants and communities
4. Develop inventory proposal to DOE
5. Need to update rank on arapien stickleaf with world authority Barry Prigge (may be rarer than rank reflects)
6. Develop preliminary site conservation plan and update threats to site

### Mount Callahan and Callahan Ridge Conservation Site

Ecological Significance: Mt. Callahan, a striking geologic feature, rises 3,600 ft. above the Colorado River near Grand Valley. It consists largely of the Green River Shale Formation, but is capped by resistant basalt flows. The shale slopes support populations of at least five rare plant species (the type locality and one of only two known occurrences of the penstemon) and two excellent condition examples of Western Slope plant communities.

Element	Common Name	CNHP Rank	Federal/State Status
<i>Penstemon debilis</i>	Parachute penstemon	G1S1	2
<i>Mentzelia argillosa</i>	Arapien stickleaf	G2S1	2
<i>Thalictrum heliophilum</i>	Sun-loving meadowrue	G3S3	
<i>Festuca dasyclada</i>	Utah fescue	G3S3	
<i>Astragalus lutosus</i>	Dragon milkvetch	G5S3S 4	
<i>Pseudotsuga menziesii/Symphoricarpos oreophilus</i>	Western Slope Douglas fir/snowberry forest	G5S4	
<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass Western Slope grassland	G2S2	

**Landownership:** Occidental Oil, BLM Grand Junction District, Glenwood Springs Resource Area  
**Threats:** Oil shale development, possible disposal by Occidental Oil Company  
**Protection:** Site is a designated State Natural Area; however, this provides no legal protection

**Anvil Points Conservation Site**

**Ecological Significance:** Green River Shale Formation outcrops above Rifle north of the Colorado River support the second known occurrence (smaller population) of the Parachute penstemon and high-quality examples of a Western Slope woodland and shrubland.

Element Name	Common Name	CNHP rank	Federal/ State Status
<i>Penstemon debilis</i>	Parachute penstemon	G1S1	2
<i>Festuca dasyclada</i>	Utah fescue	G3S3	
<i>Quercus gambellii-Cercocarpus montanus</i>	Gambel oak-mountain mahogany/Geyer's sedge mixed mountain shrubland	G3S3	
<i>Pinus edulis/Cercocarpus montanus</i>	Pinyon pine/mountain mahogany mesic Western Slope woodland	G5S4	

**Landownership:** Naval Oil Shale Reserve

**Parachute Creek Conservation Site (Macrosite)**

**Ecological Significance:** Parachute Creek drains the southeast corner of the Roan Plateau and joins the Colorado River at Parachute. The watershed has a great diversity of habitats ranging from quaking aspen-spruce forests at upper elevations to xeric sagebrush communities on the slopes to lush riparian forests in the box canyons and hanging gardens associated with numerous waterfalls. The primary geologic formation is the Green River Shale, which contains some of the largest oil reserves in the United States. The shale provides habitat for at least 5 globally rare plants, 4 animals, and 6 high-quality plant communities.

Element Name	Common Name	CNHP rank	Federal/ State Status
<i>Mentzelia argillosa</i>	Arapien stickleaf	G2S1	2
<i>Thalictrum heliophilum</i>	Sun-loving meadowrue	G3S3	
<i>Sullivantia hapemanii var. purpusii</i>	Hanging garden sullivantia	G3T3S3	
<i>Festuca dasyclada</i>	Utah fescue	G3S3	
<i>Penstemon debilis</i>	Parachute penstemon	G1S1	2

<i>Scaphiopus intermontanus</i>	Great Basin spadefoot	G5S1	
<i>Oncorhynchus clarki pleuriticus</i>	Colorado River cutthroat trout	G5T2S2	2/SC
<i>Coluber constrictor mormon</i>	Western yellowbelly racer	G5T5S2 S3	
<i>Progne subis</i>	Purple martin	G5S3	
<i>Artemisia tridentata wyomingensis</i> - <i>Oryzopsis hymenoides</i>	Wyoming sagebrush-Indiangrass xeric sagebrush shrublands	G2S2	
<i>Pinus edulis/Cercocarpus montanus</i>	Pinyon pine/mountain mahogany mesic Western Slope woodland	G5S4	
<i>Populus tremuloides-Acer negundo</i>	Quaking aspen-box elder forest	G1S1	
<i>Acer negundo-Populus angustifolia/Cornus stolonifera</i>	Box elder-narrowleaf cottonwood/red osier dogwood riparian forest	G2S2	
<i>Quercus gambellii-Cercocarpus montanus</i>	Gambel oak-mountain mahogany mixed mountain shrublands	G3S3	
<i>Pseudotsuga menziesii/Symphoricarpos oreophilus</i>	Douglas fir/snowberry Western Slope forest	G5S4	

**Landownership:** BLM Grand Junction District, Naval Oil Shale (administered by the BLM), private oil companies (UNOCAL, Exxon)

**Threats:** oil shale development

**Size:** 92,000 acres


### 3. DOLORES RIVER PLANNING UNIT (Map 3)

**Counties:** Montrose, Mesa

**Ecoregion:** Northern Canyon Lands

**Ecological Significance:** The Dolores River is a major tributary of the Colorado River, and harbors species and communities representative of the Colorado Plateau, found nowhere else in Colorado.

**Landownership:** BLM Montrose District

**Threats:** desalinization plant in Paradox Valley, uncontrolled grazing by large landowners, mining of copper, subdivision development, increased recreation, alteration of hydrologic and geomorphic regime.

**Conservation Strategies:**

1. Participate in resource management planning process (Montrose District Durango Resource Area-Mesa Creek RMP)
2. Lead protection of La Sal Creek (finalize strategy)
3. Promote inventory of Dolores River planning unit to update status of elements; obtain information from University of Wyoming graduate student (Lynn Moore) on floristic survey results; update existing field information
4. Develop strategy with BLM to protect area; nominate La Sal Creek for ACEC designation
5. Provide technical assistance to BLM regarding management and monitoring of elements

#### La Sal Creek

**Ecological Significance:** La Sal Creek is a perennial tributary of the lower Dolores River and supports the only known occurrence of the globally rare box elder-river birch deciduous riparian forest. This occurrence is one of the longest known examples of an unfragmented box-canyon riparian forest. Also present are a remnant Western Slope grassland, two regional endemic plant species, and a native warm water fish community. The rare southwestern willow flycatcher (federally listed by USFWS), a species that is seriously declining, has been also reported from the area and needs verification.

Element	Common Name	CNHP Rank	Federal/State Status
<i>Lupinus crassus</i>	Payson lupine	G2S2	2
<i>Pedimelum aromaticum</i>	Paradox breadroot	G3S?	
<i>Acer negundo-Betula occidentalis</i>	Box elder-river birch riparian forest	G1S1	
<i>Stipa comata</i>	Needle-and-thread-grass Western Slope grassland	G2S2	
<i>Empidonax traillii eximius</i>	Southwestern willow flycatcher	Unranked	E

**Landownership:** BLM Montrose District, Uncompahgre Basin Resource Area, private

**Threats:** mining and associated activities including road maintenance, uncontrolled livestock grazing, increased recreation, possible subdivision, highway construction/maintenance, and potential dam construction

**Conservation Strategies:**

1. Nominate site as ACEC to BLM; work with BLM on compatible grazing strategy
2. Promote and pursue BLM funding for further inventories of elements and hanging gardens
3. Develop relationship with mining company; develop joint conservation strategy
4. Develop ecological model of riparian community
5. Finalize land acquisition strategy: acquire inholdings and pursue conservation as identified in site conservation plan
6. Establish monitoring of rare plants; seek funds from BLM to initiate

**Coyote Wash Conservation Site**

**Ecological Significance:** A remote tributary of the Dolores River carved a deep canyon into sandstone rock; protected alcoves harbor hanging gardens, containing the largest known population of the globally rare Kachina daisy in Colorado (this species is more common in Utah). Uplands support a remnant grassland.

Element	Common Name	CNHP Rank	Federal/State Status
<i>Erigeron kachinensis</i>	Kachina daisy	G1S1	2
<i>Mimulus eastwoodiae</i>	Eastwood monkey-flower	G3S1	
<i>Epipactis gigantea</i>	Helleborine	G4S2	
<i>Stipa comata</i>	Needle-and-thread-grass Western Slope grassland	G2S2	

**Landownership:** BLM Montrose District, San Juan and Uncompahgre Resource Areas

**Threats:** increased recreational use

**Conservation Strategies:**

1. Pursue contract with BLM for inventory
2. Pursue ACEC designation, CNAP to pursue SNA

**Sewemup Mesa**

**Ecological Significance:** Sewemup Mesa is a gently sloping 17,000 acre mesa which is almost totally surrounded by deep canyons of the Dolores River. The mesa has experienced little or no grazing by livestock because of difficulty of access and limited water. Lack of disturbance make this mesa a unique untouched natural area representative of the Great Basin, supporting excellent occurrences of rare species and communities.

Element	Common Name	CNHP Rank	Federal/State Status
<i>Erigeron kachinensis</i>	Kachina daisy	G1S1	2
<i>Mimulus eastwoodiae</i>	Eastwood monkey-flower	G3S1	
<i>Adiantum capillus-veneris</i>	Southern maiden-hair fern	G5S2	
<i>Pinus edulis/Stipa comata</i>	Pinyon pine/needle-and-thread grass xeric Western Slope pinyon-juniper woodland	G2S2	
<i>Aquilegia micrantha-Mimulus eastwoodiae</i>	Columbine-Eastwood monkey flower hanging garden	G2S2	

**Landownership:** BLM Montrose Resource Area, Uncompahgre Resource Area

**Threats:** possible overgrazing if access is obtained

**Conservation Strategies:**

1. Need to update field information, and pending site visit
2. Pursue special designation with BLM

#### East Paradox Creek Conservation Site

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal/State Status
<i>Lupinus crassus</i>	Payson lupine	G2S2	2
<i>Pediomelum aromaticum</i>	Paradox breadroot	G3S?	
<i>Stipa comata</i>	Needle-and-thread-grass Western Slope grassland	G2S2	

**Landownership:** BLM Montrose District, San Juan Resource Area, private

**Threats:** desalinization project nearby, increased recreational use of nearby Dolores River

**Conservation Strategy:**

1. Update field records and threats
2. Propose as Area of Critical Environmental Concern

## Silveys Pocket Conservation Site

### Ecological Significance:

Element	Common Name	CNHP Rank	Federal/State Status
<i>Astragalus naturitensis</i>	Naturita milkvetch	G2S2	
<i>Pediomelum aromaticum</i>	Paradox breadroot	G3S?	
<i>Stipa comata</i>	Needle-and-thread-grass Western Slope grassland	G2S2	

Landownership: BLM Montrose District, San Juan Resource Area

## Bull Canyon Conservation Site

### Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Erigeron kachinensis</i>	Kachina daisy	G1S1	2
<i>Astragalus naturitensis</i>	Naturita milkvetch	G2S2	

Landownership: BLM Montrose District, San Juan Resource Area

Threats: unknown, not visited since 1978

## Unawep Seep

Another conservation site not included in the analysis (maybe data is not yet in Heritage database?) but which is worth mentioning here is Unawep Seep in Mesa County. Unawep Seep is a spring-fed hillside and riparian wetland adjacent to West Creek, a perennial stream that flows into the Dolores River near Gateway. These wetlands are uncommon in this arid region, supporting a diverse assemblage of both plant and animal species, several of which are extremely localized and disjunct. The wetlands support large populations of the Nokomis fritillary butterfly (*Speyeria nokomis*), a federal candidate for listing. 37 acres are a BLM Research Natural Area. See Ellis (1989) preserve design for more details.

#### 4. SAN MIGUEL RIVER PLANNING UNIT (Map 4)

**Counties:** San Miguel, Montrose

**Ecoregion:** Northern Canyon Lands and South-Central Highlands

**Ecological Significance:** The San Miguel River flows from its headwaters in the San Juan Mountains near Telluride to its confluence with the Dolores River near the Colorado/Utah border, a total of 90 river miles. Except for a few small dams in the headwaters and a small water diversion on a tributary, the San Miguel is hydrologically intact. Other valleys in southwestern Colorado are rapidly being developed; the San Miguel is our last best chance to preserve an intact river system in the region. The San Miguel harbors one of the longest stretches of high-quality deciduous and evergreen riparian forests in Colorado -- about 40 miles including tributary streams. Most of the high-quality areas are largely contiguous with intervening stretches with high potential for restoration. The Conservancy has identified three core sites for protection (each containing a Conservancy preserve) within the upper, middle and lower watershed. The riparian areas provide important habitat for a number of animal species, including the southwestern willow flycatcher and bald eagle (winter habitat)

**Landownership:** BLM Montrose District, USFS San Juan National Forest

**Protection:** Three Conservancy preserves and a 20,965 acre BLM Area of Critical Environmental Concern

**County:** Mesa, Montrose, San Miguel

**Threats:** uncontrolled recreation, residential development, water development, water quality, road construction, mining/resource development, uncontrolled grazing, alien plants

**Conservation Strategies:**

1. Develop water strategy for San Miguel to 1) maintain natural hydrologic and geomorphic regime (promote unregulated flows, natural channel migration, etc.)
2. Seek fee acquisition and conservation easements to complete protection actions identified in site plans for the 3 core sites
3. Continue monitoring of plant communities
4. Complete biohydrology research; refine ecological models based on new information
5. Actively restore degraded riparian vegetation
6. Develop a regional watershed conservation plan
7. Work with federal agencies to develop a plan to manage recreation of riparian corridor

#### San Miguel River at Tabeguache Creek

**Ecological Significance:** This site consists of 12 mainstem river miles and 13.6 tributary miles in the lower watershed of the San Miguel River supports some of the highest-quality low-elevation riparian vegetation known in the Upper Colorado River Basin and several upland communities. A variety of age classes of cottonwood are present, indicating good cottonwood regeneration; there is little tamarisk, an invasive shrub species introduced from Eurasia.

Element	Common Name	CNHP Rank	Federal Rank
<i>Lupinus crassus</i>	Payson lupine	G2S2	2

<i>Astragalus linifolius</i>	Grand Junction milkvetch	G2S2	
<i>Empidonax traillii eximius</i>	Southwestern willow flycatcher	unranked	T?
<i>Populus angustifolius/Rhus trilobata</i>	Narrowleaf cottonwood/skunkbush riparian forest	G?S?	
<i>Populus deltoides ssp. wislizenii/Rhus trilobata</i>	Rio Grande cottonwood/skunkbush riparian forest	G2S2	
<i>Rhus trilobata</i>	Skunkbush shrubland	G?S?	
<i>Hilaria jamesii</i>	Galleta grass Western Slope grassland	G3S1	
<i>Sporobolus airoides</i>	Alkali sacaton Great Plains salt meadows	G2SU	
<i>Pinus edulis/Cercocarpus montanus</i>	Pinyon pine/mountain mahogany mesic Western Slope woodland	G5S4	
<i>Juniperus osteosperma/Leymus salinus</i>	Juniper/Great Basin wildrye mesic Western Slope woodland	GUSU	
<i>Juniperus osteosperma/Amelanchier utahensis-Philadelphus microphyllus</i>	Juniper/serviceberry-mock-orange mesic Western Slope woodland	GUSU	

Landownership: private and BLM, Montrose District

Protection: TNC preserve (259 acres); 15,400 acres proposed for protection

Threats: Water development, uncontrolled livestock grazing, channelization/streambed alteration, invasion of alien plant species including knapweed and tamarisk, agricultural conversion, uncontrolled recreation, residential development, water quality, highway expansion, etc. Recently a truck had an accident on the highway, and gasoline spills

Conservation Strategies:

1. See above and promote designation of high-quality ecosystems within the watershed, including Tabeguache Creek

### San Miguel River Canyon Conservation Site (Macrosite)

Ecological Significance: The canyon, encompassing approximately 26 miles of the mainstem of the San Miguel with 71 tributary stream miles, supports one of the most extensive stretches of high-quality mixed deciduous-evergreen riparian forest known in the Upper Colorado River Basin.

Element	Common Name	CNHP Rank	Federal Status
<i>Picea pungens/Alnus incana</i>	Colorado blue spruce/thinleaf alder montane riparian forest	G2S2	

<i>Picea pungens/Cornus stolonifera</i>	Colorado blue spruce/red-osier dogwood montane riparian forest	G2S2	
<i>Populus angustifolia-Picea pungens/Alnus incana</i>	Narrowleaf cottonwood-Colorado blue spruce/thinleaf alder montane riparian forest	G2S2	

**Landownership:** BLM Montrose District, NFS Uncompahgre National Forest, Ouray Ranger District, private

**Protection:** San Miguel Canyon TNC preserve (279 acres, 2 river miles); BLM ACEC (20,964 acres); proposed for protection 43,500 acres

**Threats:** Uncontrolled recreation, residential development, water development (altered flow regime), road construction, right-of-way manipulation, mining/resource development, grazing, alien species

**Conservation Strategies:**

1. See above
2. Seek protection of remaining inholdings within ACEC
3. Continue to work with BLM on ACEC management and on surrounding watershed

**San Miguel River at South Fork Conservation Site**

**Ecological Significance:** This site lies within the upper watershed of the San Miguel River and consists of approximately 6.2 miles of the South Fork and 14 miles of the mainstem. This site supports some of the highest-quality examples known of mixed coniferous-deciduous riparian forests in Colorado and the Rocky Mountain West.

Element	Common Name	CNHP Rank	Federal Status
<i>Picea pungens/Lonicera involucrata</i>	Colorado blue spruce/twinberry montane riparian forest	G2S2	
<i>Populus angustifolia-Picea pungens/Alnus incana</i>	Narrowleaf cottonwood-Colorado blue spruce/thinleaf alder montane riparian forest	G2S2	
<i>Salix monticola-Salix geyeriana</i>	Rocky Mountain willow-Geyer's willow/mesic forb shrubland	GUSU	
<i>Carex rostrata</i>	Beaked sedge wetland montane wet meadow	G5S3	

**Landownership:** private, NFS Uncompahgre National Forest, Norwood Ranger District

**Protection:** TNC preserve (67 acres and 1.5 river miles); 11,200 proposed for protection

**Threats:** subdivision and residential development, uncontrolled recreation, water development, degradation of water quality, utility right of way, road maintenance or expansion

**Conservation Strategies:**

1. Pursue acquisition and/or conservation easements of unprotected private tracts

## 5. TROUBLESOME CREEK PLANNING UNIT (Map 5)

Troublesome Creek Conservation Site  
Waste Creek (combined here with Troublesome)  
Sulphur Springs (combined here with Troublesome)

County: Grand

Ecoregion: Northern Parks and Ranges

Ecological Significance: Badlands of the Miocene Troublesome Formation support two federally endangered plant species: the only known population (consisting of several occurrences) of Penland penstemon in the world and one of the best known occurrences of Osterhout's milkvetch. A regional endemic parsley, a Wyoming species known from only two populations in Colorado, is also present. Sulphur Springs, a large alkaline spring complex near the headwaters of Sulphur Gulch, supports good examples of two Western Slope wet meadow communities.

Element Name	Common Name	CNHP rank	Federal Status
<i>Astragalus osterhoutii</i>	Osterhout's milkvetch	G1S1	E
<i>Penstemon penlandii</i>	Penland's penstemon	G1S1	E
<i>Lomatium nuttallii</i>	Dog parsley	G3S1	
<i>Distichlis spicata</i> ssp. <i>stricta</i>	Western Slope saltgrass meadow	G3G4S3	
<i>Scirpus pallidus</i>	American bullrush meadow	G2G4SU	

Landownership: private, BLM Craig District, Kremmling Resource Area

Size: 1,400 acres (does not include Waste Creek)

Threats: ORVs, road grading and maintenance, herbicide spraying, potential uranium mine development, powerline maintenance, uncontrolled grazing and trampling

Conservation Strategies:

1. Update Troublesome Creek site plan and expand boundaries to include communities and Waste Creek
2. Provide technical assistance to BLM and continue monitoring/research project of Osterhout milkvetch in conjunction with Denver Botanical Garden; seek funding from BLM to support monitoring project
3. Develop relationship with private landowners (Wall and Palmer), pursue cooperative project or conservation easements
4. Nominate and support ACEC designation (revive nomination) and provide technical assistance for management/monitoring
5. Update site design; develop site conservation plan

## 6. MOSQUITO PEAKS PLANNING UNIT (Map 6)

**County:** Park, Summit

**Ecoregion:** Northern Parks and Ranges

**Ecological Significance:** The Mosquito Range borders the west side of South Park and is likely the richest alpine botanical area in Colorado (Weber 1990). The range is largely calcareous (with some igneous, for example on East Hoosier Ridge), and provides habitat for numerous state rare and disjunct plant species from the arctic, all of the known occurrences of the alpine fen mustard (G1S1), recently listed as threatened by the USFWS.

**Landownership:** Pike San Isabel National Forest, BLM (Canon City District) and private

**Protection:** Hoosier Ridge is proposed Research Natural Area and 925 acres are registered State Natural Area; TNC owns a small 4 acre preserve (West Hoosier Ridge); Mosquito Pass is a designated BLM Area of Critical Environmental Concern (5,440 acres)

**Threats:** hard-rock mining exploration and extraction, particularly if the price of gold rises, increasing recreational use of area, ORVs, reseeding activities need review

### Conservation Strategies:

1. Facilitate inventory to update existing info. and search for new populations
2. Develop preliminary site conservation plan; overlay ownership map with elements and threats (mining activities); check current status of mining activities
3. Develop strategy to work with mining companies
4. Support Research Natural Area designation for Hoosier Ridge
5. Develop relationship with mining companies: explore partnership with mining companies
6. Assist with acquisition of mining claims, possibly via LWCF
7. Provide technical support to FS and BLM
8. Stay abreast of DOW's proposals to introduce non-native mountain goat

### Hoosier Ridge Conservation Site

**Ecological Significance:** East Hoosier Ridge, a 11,600 to 13,200 ft. high crest straddling the Continental Divide, supports tundra vegetation and a number of rare plant species including the federally threatened Penland alpine fen mustard.

Element	Common Name	CNHP Rank	Federal Status
<i>Eutrema penlandii</i>	Penland alpine fen mustard	G1S1	T
<i>Saussurea weberi</i>	Weber saussurea	G3S2	
<i>Draba borealis</i>	Northern rockcress	G4S2	
<i>Draba porsildii</i>	Porsild draba	G3S1	
<i>Draba streptobrachia</i>	Colorado Divide whitlow-grass	G?S3	
<i>Armeria maritima</i> ssp. <i>sibirica</i>	Sea pink	G5T5S1	
<i>Ipomopsis spicata</i> ssp. <i>capitata</i>	Globe gilia	G4?T2S2	

Landownership: Pike National Forest, White River National Forest, South Park Ranger District, private

**American Flats Conservation Site**

Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Saussurea weberi</i>	Weber's saussurea	G3S2	
<i>Eutrema penlandii</i>	Penland alpine fen mustard	G1S1	T

Landownership: BLM Canon City District, Royal Gorge Resource Area, Pike National Forest, South Park Ranger District

Protection: 925 acres are a designated State Natural Area; proposed for USFS Research Natural Area

Conservation Strategy:

1. Provide technical support to BLM and USFS

**Mount Sheridan Conservation Site**

Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Phippsia algida</i>	Snow grass alpine wetlands	GUSU	
<i>Braya humilis</i>	Alpine braya	G4S2	
<i>Draba oligosperma</i>	Woods draba	G3S1	
<i>Draba porsildii</i>	Porsild draba	G3S1	
<i>Eutrema penlandii</i>	Penland alpine fen mustard	G1S1	T
<i>Astragalus molybdenus</i>	Leadville milkvetch	G3S2	2
<i>Ranunculus karelinii</i>	Tundra buttercup	G4S2	
<i>Salix lanata</i> ssp. <i>callicola</i>	Lime-loving willow	G4T4S1	
<i>Eriophorum altaicum</i> var. <i>neogaeum</i>	Altai cottongrass	G4T?S1	
<i>Phippsia algida</i>	Snow grass	G5S2	
<i>Botrychium echo</i>	Reflected moonwort	G2S2	

Landownership: San Isabel National Forest, Leadville Ranger District; Pike National Forest, South Park Ranger District

### Cameron Amphitheatre Conservation Site

#### Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Crepis nana</i>	Dwarf hawkbeard	G5S2	
<i>Saussurea weberi</i>	Weber saussurea	G3S2	
<i>Braya humilis</i>	Alpine braya	G4S2	
<i>Papaver lapponicum</i> ssp. <i>occidentale</i>	Alpine poppy	G4QS1	
<i>Ipomopsis spicata</i> ssp. <i>capitata</i>	Globe gilia	G?T2S2	
<i>Eutrema penlandii</i>	Penland alpine fen mustard	G1S1	T
<i>Ranunculus karelinii</i>	Tundra buttercup	G4S2	

### Mosquito Peaks Pass Conservation Site

#### Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Phippsia algida</i>	Snow grass alpine wetlands	GUSU	
<i>Saussurea weberi</i>	Weber saussurea	G3S2	
<i>Draba crassa</i>	Thickleaf whitlow-grass	G3S?	
<i>Eutrema penlandii</i>	Penland alpine fen mustard	G1S1	T
<i>Astragalus molybdenus</i>	Leadville milkvetch	G3S2	2
<i>Phippsia algida</i>	Snow grass	G5S2	

Landownership: BLM Canon City District, Royal Gorge Resource Area, private, increased recreation

Threats: ORV activity, road surveyed through site

### Mount Silverheels and Mount Democrat Conservation Site

#### Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Eutrema penlandii</i>	Penland alpine fen mustard	G1S1	T

Landownership: Pike National Forest, South Park Ranger District, private

**Blue Lakes Conservation Site**

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal Status
<i>Saussurea weberi</i>	Weber saussurea	G3S2	
<i>Draba borealis</i>	Northern rockcress	G4S2	
<i>Parnassia kotzebuei</i>	Kotzebue grass-of-Parnassus	G4S1	
<i>Ptilagrostis mongholica ssp. porteri</i>	Porter feathergrass	G2T?S2	2
<i>Cystopteris montana</i>	Mountain bladder fern	G5S1	

**Landownership:** USFS Arapaho Roosevelt National Forest, Dillon Ranger District, White River National Forest, private

**Threats:** private parcel staked for development

**7. NORTH PLATTE RIVER PLANNING UNIT (Map 7)**

**County:** Jackson

**Ecoregion:** Northern Parks and Ranges

**Ecological Significance:** Sandstone bluffs of Coalmont Formation above the North Platte River and its tributaries in North Park support the only known site in the world to protect the federally endangered North Park phacelia. This species, endemic to Jackson County, is restricted to a 10 square mile area and is listed as endangered by USFWS. Several high-quality plant communities of special concern also occur: a montane grassland and Western Slope sagebrush shrubland.

**Landownership:** mixed private and BLM Craig District Kremmling Resource Area

**County:** Jackson

**Protection:** 300 acres are designated as a State Natural Area and a BLM Area of Critical Environmental Concern

**Threats:** fragile habitat susceptible to erosion, ORVs, uncontrolled cattle and horse grazing and trampling, potential coal mining, oil and gas development

**Conservation Strategies:**

1. Pursue protection actions identified in conservation plan
2. Develop relationship with private landowners, including A.D. Davis, a large landowner in north end of North Park
3. Pursue conservation easements, management agreements with private landowners-Swift, Barber
4. Partner with county to develop interpretive display on phacelia
5. Nominate ACEC to BLM for California Gulch and addition for North Park Research Natural Area, work closely with CNAP re ACEC nominations and monitoring
6. Provide technical assistance to BLM and establish monitoring on 1-2 private tracts to determine next steps and management needs

**California Gulch Conservation Site**

**Ecological Significance:** California Gulch supports an outstanding population of the North Park phacelia and well as a high-quality example of a Western Slope shrubland.

Element Name	Common Name	CNHP rank	Federal Status
<i>Phacelia formosula</i>	North Park phacelia	G1S1	E
<i>Artemisia tridentata vaseyana/Leucopoa kingii</i>	Mountain sagebrush/King fescue Western Slope Shrubland	G3S1	

**Landownership:** BLM Craig District, Kremmling Resource Area

**Threats:** Livestock grazing in area, need to investigate oil and gas potential

**Conservation Strategies:**

1. Nominate area as ACEC; work closely with CNAP on ACEC nominations and monitoring

## North Park Natural Area Conservation Site

**Ecological Significance:** North Park Natural Area contains an outstanding population of North Park phacelia and high-quality examples of a montane grassland and sagebrush shrubland communities:

Element Name	Common Name	CNHP rank	Federal Status
<i>Phacelia formosula</i>	North Park phacelia	G1S1	E
<i>Stipa comata</i>	Needle-and-threadgrass montane grassland	G5S2S3	
<i>Artemisia nova/Stipa comata</i> (may be <i>A. arbuscula</i> ; needs further verification)	Black sagebrush/needle-and-threadgrass Western Slope sagebrush shrubland	G4S2?	

**Landownership:** mixed BLM Craig District, Kremmling Resource Area, private

**Threats:** Uncontrolled livestock grazing

**Protection:** Designated State Natural Area and Research Natural Area (310 acres)

**Conservation Strategies:**

1. Expand RNA and State Natural Area to include other occurrences of phacelia
2. Develop relationships with private landowners, seek management agreements, conservation easements, or landowner recognition
3. Develop cooperative fencing project with BLM?

## Green Ranch Conservation Site

**Ecological Significance:** One of best known occurrences of the North Park phacelia

**Landownership:** Private, Verner State Wildlife Area, BLM Craig District, Kremmling Resource Area

**Threats:** Uncontrolled livestock grazing; road improvements

## Diamond J Ranch Conservation Site

**Ecological Significance:** One of best known occurrences of the North Park phacelia

**Landownership:** private

**Threats:** Uncontrolled or season-long grazing

**Conservation Strategies:**

1. Develop relationship with private landowner, seek management agreement, conservation easement or landowner recognition
2. Establish monitoring project

## 8. SAN LUIS VALLEY PLANNING UNIT (Map 8)

**County:** Saguache, Alamosa, Rio Grande

**Ecoregion:** Upper Rio Grande Basin, Southern Parks and Ranges

**Ecological Significance:** The San Luis Valley is one of the most distinctive topographic features in Colorado. Part of the Rio Grande Rift Zone, extending from southern New Mexico to north-central Colorado, this intermountain valley is almost 150 miles long and 50 miles wide in Colorado. The valley lies in the rain shadow of the volcanic San Juan Mountains; the Sangre de Cristos, formed by extensive block faulting of sedimentary rocks, lie to the east. The valley floor is filled with gravel, sand, clay, lava and volcanic ash deposits to depths of 10-19,000 feet. The north half of the valley forms a closed basin with no outlet. The trough-shaped valley, combined with alternating layers of porous gravel and impervious clay, ash and lava filling the valley, creates groundwater flows under artesian conditions.

Springs, artesian wells, and surface water ponds and lakes have created significant wetland complexes that support large populations of breeding shorebirds, migrating waterfowl, whooping cranes, sandhill cranes, and raptors (including bald eagles). These wetlands of the valley are among the most extensive and most threatened in the Southern Rocky Mountains.

The San Luis Valley has long been recognized for its biodiversity significance, and has been proposed as a Conservancy bioreserve and ecosystem initiative site. The complex geology and variety of geologic substrates results in the San Luis Valley having a spectrum of plant communities ranging from eastern plains grasslands to montane forests and woodlands and west slope shrublands and woodlands - a vegetation mosaic unequalled anywhere else in Colorado (CNAP 1990).

Additionally, the valley is high in endemism and globally significant species. Seventy rare species are known to occur in the Rio Grande watershed (14 plants, 22 invertebrates and 34 vertebrates). Of these, 10 plants, 8 invertebrates and 17 vertebrates are considered to be globally rare. 17 species are endemic or near-endemic to the valley (3 plants and 14 animals). At least four communities are globally rare (Pague and Simonson 1995). Because only 9 of the 34 globally rare species (26%) are associated with wetlands, protection of upland ecosystems must be a part of a conservation strategy for the San Luis Valley (Pague and Simonson 1995).

**Threats:** The wetlands of the valley are among the most extensive and most threatened in the southern Rocky Mountains. Specific threats include groundwater withdrawal of shallow aquifer, such as the Bureau of Reclamation's Closed Basin Project, which is moving water from the northern part of the valley into the Rio Grand River drainage for augmentation of flows on the Rio Grande River to meet New Mexico's Rio Grande River Compact requirements. Groundwater withdrawal of the deep aquifer has been proposed by American Water Development Inc. (AWDI) to develop water for urban consumption on the Front Range. Other threats include surface water diversions and agricultural conversion for center-pivot irrigation.

**Conservation Strategies:**

1. Pursue comprehensive inventory of valley

2. Develop TNC presence in SLV: seek outside funding for regional watershed manager.
3. Pursue protection for other wetland and upland elements/systems

**Great Sand Dunes Conservation Site (Macrosite)**

**Ecological Significance:** Only known location of the San Luis Dunes tiger beetle in the world. Ponderosa pine/Indian ricegrass, a poorly known community, is documented from a very localized area on stabilized sand dunes.

Element	Common Name	CNHP Rank	Federal Status
<i>Cicindela theatina</i>	San Luis Dunes tiger beetle	G1S1	
<i>Pinus ponderosa/Oryzopsis hymenoides</i>	Ponderosa pine/Indian ricegrass	G1S1	

**Landownership:** Great Sand Dunes National Park, private

**Threats:** groundwater depletion of San Luis Valley (off-site) and increased recreational pressure

**Conservation Strategies:**

1. Promote integrated inventory of NPS and San Luis Valley
2. Pursuing LWCF for additions (Baca Ranch) to Pike San Isabel National Forest and Great Sand Dunes

**Mishak Lakes Conservation Site**

**Ecological Significance:** Mishak Lakes is the largest and best known example of a natural ephemeral (playa) wetland system in the San Luis Valley and in Colorado. Six wetland and upland plant communities have been documented, including three of special concern. This site also supports the highest-quality natural occurrence known slender spiderflower, and provides habitat for numerous endemic (state-rare) animal subspecies. White-faced ibis (G5S2) nest at nearby Russell Lakes and use Mishak for feeding.

Element	Common Name	CNHP Rank	Federal Status
<i>Cleome multicaulis</i>	Slender spiderflower	G3S2	2
<i>Polites sabuleti ssp. ministigma</i>	San Luis Valley sand hills skipper	G5T3S3	
<i>Dipodomys ordii montanus</i>	Ord's kangaroo rat	G5T3S3	
<i>Eutamias minimus caryi</i>	Least chipmunk	G5T3S3	
	San Luis Valley playa	G3Q3S	
<i>Sarcobatus vermiculatus/Distichlis spicata ssp. stricta</i>	Greasewood/saltgrass community	G3S1	
<i>Distichlis spicata ssp. stricta</i>	Saltgrass	G4S3	

Landownership: TNC, private, State Land Board, BLM Canon City District  
Protection: TNC preserve (1080 acres); proposed for protection (4,755 acres within core area and 7,955 acres within proposed project boundary)

Threats: Closed Basin Project depletion of shallow aquifer, and possible depletion of deep aquifer in future (while AWDI's proposal to mine the groundwater was defeated in court, it may return)

Conservation Strategies:

1. Pursue protection efforts identified in the site conservation plan, including acquisition of core tracts within SEB
2. Develop partnership with DOW, BLM to protect site
3. Develop a broader inventory of Mishak and SLV
4. Seek funding TNC staff person through EPA and GOCO
5. Study ecological processes and develop ecological model for wetland system
6. Develop water strategy
7. Establish monitoring projects to follow population trends of rare species and communities

Sheep Creek Upland Conservation Site

Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Neoparrya lithophila</i>	Rock-loving neoparrya	G2S2	
<i>Pinus ponderosa/Festuca arizonica</i>	Ponderosa pine/Arizona fescue lower montane forest	G5S4	
<i>Festuca arizonica-Muhlenbergia filiculmis</i>	Arizona fescue-thin-stem muhly montane grassland	G3S2	
<i>Festuca arizonica-Muhlenbergia montana</i>	Arizona fescue-mountain muhly montane grassland	GUSU	

Landownership: BLM Canon City District San Luis Resource Area, private

Threats: Unknown

Conservation Strategies:

1. Update element occurrence information
1. Pending results of field visit, consider pursuing special designation with BLM

Baca Ranch Conservation Site

Another site worth mentioning but not yet in the CNHP database (and therefore not included in the statewide plan analysis) is the Baca Ranch, an 85,000 acre ranch on the west flank of the Sangre de Cristo Range in the northern San Luis Valley (within the closed basin). This ranch spans an elevation range from ca. 14,000 to 7,500 ft., and encompasses several nearly complete intact watersheds of streams that flow west out of the Sangres to the salt desert shrubland and

playa lakes area. The site borders the Pike San Isabel National Forest on the east, Great Sand Dunes National Monument to the south, and state lands to the west. Known elements include the San Luis tiger beetle (G1S1), greasewood/saltgrass shrubland (G3S1), saltgrass (G3G5S3), ponderosa pine/Indian ricegrass (G1S1), and rabbitbrush/graminoid (unranked, likely S1). There is high potential for a number of other elements, including slender spiderflower (G3S2), least chipmunk (G5T3S3), San Luis Valley sand hills skipper (G5T3S3), San Luis kangaroo rat (G5T3S3), a pinyon pine-juniper woodland, white-faced ibis, etc. Further inventories are recommended.

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Element	Rank	Notes
G1S1	High	San Luis tiger beetle
G3S1	High	greasewood/saltgrass shrubland
G3G5S3	High	saltgrass
G1S1	High	ponderosa pine/Indian ricegrass
S1	High	rabbitbrush/graminoid
G3S2	Potential	slender spiderflower
G5T3S3	Potential	least chipmunk
G5T3S3	Potential	San Luis Valley sand hills skipper
G5T3S3	Potential	San Luis kangaroo rat
	Potential	pinyon pine-juniper woodland
	Potential	white-faced ibis

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**9. SOUTH BEAVER CREEK PLANNING UNIT (Map 9)**

**Counties:** Gunnison and Saguache

**Ecoregion:** Northern-Central Highlands

**Ecological Significance:** Rolling hills of sagebrush, juniper, and grassland communities on uplands within South Beaver Creek drainage support the majority of the known occurrences of the Gunnison Basin endemic, the skiff milkvetch. This is the only known protectable site for skiff milkvetch in the world, as it is restricted to approximately a 4 x 5 mile area southwest of Gunnison. The regional endemic Gunnison milkvetch also occurs; there is potential for the state-rare Brandegee milkvetch (*Astragalus brandegei*; G5S1S2, Category 2).

Element	Common Name	CNHP Rank	Federal Status
<i>Astragalus microcymbus</i>	Skiff milkvetch	G1S1	2
<i>Astragalus anisus</i>	Gunnison milkvetch	G3S2	2

**Landownership:** BLM Gunnison District, Gunnison Resource Area, private (Montcrief)

**Protection:** Part of the site is a designated ACEC and State Natural Area (4,565 acres)

**Threats:** Possible BLM/private land exchange, uncontrolled livestock grazing and recreation, mining, possible ORV and unregulated mountain biking, alien plant species (which may come in with hay bales for annual mountain bike races), rabbit grazing (further research is needed)

**Conservation Strategies:**

1. Provide technical support to BLM on management plan for ACEC and monitoring; seek funds from BLM to establish monitoring project and research on grazing impacts
2. Develop relationship with private landowner; pursue conservation easement
3. Propose ACEC expansion to BLM to include additional known occurrences

Date	Author	Organization	Project
1987			
1987			
1987			

## 10. PICEANCE BASIN PLANNING UNIT (Map 10)

**Counties:** Rio Blanco, Garfield

**Ecoregion:** Tavaputs Plateau

**Ecological Significance:** The Piceance Basin is a 1100 square mile drainage basin bordered by the Roan Cliffs to the south, the White River to the north, the Grand Hogback to the east, and East Douglas Creek to the west. The basin support a number of both regional and narrow endemic plant species and plant associations restricted to Green River Shale Formation, including two federally threatened plant species. A number of high-quality examples of Western Slope plant communities of special concern also occur.

**Landownership:** BLM, Craig District, White River Resource Area, CDOW, Piceance State Wildlife Area, private; Marathon Oil, Exxon, Puckett Energy Corp., Oil Shale Corp. and Shell Oil, Equity Oil, Exxon, Mobil Oil

**Protection:** Designated Areas of Critical Environmental Concern (BLM lands): Deer Gulch - 1,809 acres, Dudley Bluffs - 1,620, L. Greasewood Creek - 203 acres, S. Cathedral Bluffs - 316 acres, Yanks Gulch/upper Greasewood Creek - 2,687 acres; proposed additions include S. Cathedral Bluffs - 1,10 acres, N. Cathedral Bluffs - 5,730 acres, Ryan Gulch - 1,440 acres.

**Threats:** Oil shale development, nahgolite mining, uncontrolled grazing, seismic work, possible road construction could impact roadside populations

**Conservation Strategies:**

1. Support BLM ACEC designations and ACEC additions; provide input to the Resource Management Plan for White River Resource Area (to be completed by 1996)
2. Develop relationship with and develop conservation strategies with oil companies for a number of ecologically significant tracts; pursue cooperative agreements, conservation easements
3. Coordinate with CNAP and BLM on monitoring, designations, and other management and protection efforts; provide technical assistance
4. Consider potential land exchanges with BLM and private owners
5. Update field information (many areas not visited since 1986); conduct further inventories of animals
6. Develop regional conservation plan

### Ryan Gulch Conservation Site

**Ecological Significance:** Green River Shale Formation outcrops along Ryan Gulch, a tributary of Piceance Creek harboring one of best known occurrences of two federally listed threatened plant species and a high-quality cold desert shrubland.

Element Name	Common Name	CNHP rank	Federal Status
<i>Lesquerella congesta</i>	Dudley Bluffs bladderpod	G1S1	T
<i>Physaria obovata</i>	Piceance twinpod	G2S2	T

<i>Atriplex confertifolia</i> / <i>Pseudoroegneria spicata</i>	Shadscale/Indian ricegrass cold desert shrubland	G2S2	
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**Yellow Creek at Pinto Gulch Conservation Site**

**Ecological Significance:** Green River Shale outcrops supporting populations of two federally listed threatened plant species.

Element Name	Common Name	CNHP Rank	Federal Status
<i>Lesquerella congesta</i>	Dudley Bluffs bladderpod	G1S1	T
<i>Physaria obcordata</i>	Piceance twinpod	G2S2	T

**Protection:** Nominated but dropped from ACEC consideration

**Dudley Bluffs Conservation Site (combine with Ryan Gulch?)**

**Ecological Significance:** Dudley Bluffs, an outcrop of the Thirteenmile Tongue of the Green River Formation, supports excellent occurrences of two federally listed threatened plant species (the type locality for the Dudley Bluffs bladderpod) as well as high-quality examples of two cold desert shrublands and pinyon pine woodland.

Element Name	Common Name	CNHP rank	Federal Status
<i>Lesquerella congesta</i>	Dudley Bluffs bladderpod	G1S1	T
<i>Physaria obcordata</i>	Piceance twinpod	G2S2	T
<i>Astragalus lutosus</i>	Dragon milkvetch	G4S3S 4	
<i>Atriplex confertifolia</i> / <i>Pseudoroegneria spicata</i>	Shadscale/bluebunch wheatgrass cold desert shrubland	G3S2	
<i>Atriplex confertifolia</i> / <i>Oryzopsis hymenoides</i>	Shadscale/Indian ricegrass cold desert shrubland	G2S2	
<i>Pinus edulis</i> / <i>Pseudoroegneria spicata</i>	Pinyon pine/bluebunch wheatgrass Western Slope woodland	G4S4	
<i>Typha domingensis</i>	Western Slope cattail marsh	GUS1	

**Protection:** portion of site is designated Area of Critical Environmental Concern and State Natural Area (1620 acres)

**Landownership:** Marathon Oil, Exxon, partnership of Pucket Energy Corp., Oil Shale Corp., Shell Oil.

## Cathedral Bluffs Macrosite (includes South and North Cathedral Bluffs)

### North Cathedral Bluffs Conservation Site

**Ecological Significance:** Spectacular Green River shale bluffs provide habitat for at least two rare plant species and high-quality examples of four Western Slope plant communities of special concern.

Element Name	Common Name	CNHP rank	Federal Status
<i>Lesquerella parviflora</i>	Piceance bladderpod	G3S3	
<i>Aquilegia barnebyi</i>	Shale columbine	G4S4	3C
<i>Pinus edulis/Cercocarpus montanus</i>	Pinyon pine/mountain mahogany mesic woodland	G5S4	
<i>Pseudotsuga menziesii/Symphoricarpos oreophilus</i>	Douglas fir/snowberry Western Slope forest	G5S4	
<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass Western Slope grassland	G2S2	
<i>Artemisia tridentata/Elymus cinereus</i>	Big sagebrush/Great Basin wildrye bottomland shrubland	GUS?	

### South Cathedral Bluffs Conservation Site

**Ecological Significance:** Spectacular Green River shale bluffs provide habitat for five rare plant species, and the type locality for the Piceance bladderpod. Two high-quality remnant Western Slope plant communities of special concern also occur.

Element Name	Common Name	CNHP rank	Federal Status
<i>Lesquerella parviflora</i>	Piceance bladderpod	G3S3	
<i>Gentianella tortuosa</i>	Utah gentian	G3S1	
<i>Aquilegia barnebyi</i>	Shale columbine	G4S4	3C
<i>Thalictrum heliophilum</i>	Sun-loving meadowrue	G3S3	
<i>Sullivantia hapemanii</i> var. <i>purpusii</i>	Hanging garden sullivantia	G3T3S3	
<i>Pseudotsuga menziesii/Symphoricarpos oreophilus</i>	Douglas fir/snowberry Western Slope forest	G5S4	
<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass Western slope grassland	G2S2	

Protection: portion of area is designated ACEC and State Natural Area (316 acres)

Landownership: BLM Craig District; partnership with Equity Oil and Exxon; a partnership with Pucket Energy Corp., Equity Oil and Mobil

**Piceance Creek Conservation Site**

Ecological Significance: Piceance Creek, a tributary of the White River, cuts through the Green River Shale Formation, providing habitat for a rare grass and several communities of special concern, including two Western Slope grasslands, two cold desert shrublands, and a bottomland shrubland.

Element Name	Common Name	CNHP rank	Federal Status
<i>Festuca dasyclada</i>	Utah fesue	G3S3	
<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass Western Slope grassland	G2S2	
<i>Pseudoroegneria spicata-Oryzopsis hymenoides</i>	Bluebunch wheatgrass-Indian ricegrass Western Slope grassland	G1S1	
<i>Atriplex confertifolia/Oryzopsis hymenoides</i>	Shadscale/Indian ricegrass cold desert shrubland	G2S2	
<i>Atriplex confertifolia/Pseudoroegneria spicata</i>	Shadscale/bluebunch wheatgrass cold desert shrubland	G3S1	
<i>Sarcobatus vermiculatus/Distichlis spicata var. stricta</i>	Greasewood/saltgrass saline bottomland shrubland	G3S1	

Landownership: BLM Craig District White River Resource Area

Protection: King Gulch proposed ACEC dropped, Alkali Flat nominated ACEC

**Calamity Ridge Conservation Site (Megasite)**

Ecological Significance: Calamity Ridge supports significant populations of three rare plants and high-quality examples of three Great Basin plant communities of special concern.

Element Name	Common Name	CNHP rank	Federal Status
<i>Physaria obcordata</i>	Piceance bladderpod	G2S2	T
<i>Lesquerella parviflora</i>	Piceance twinpod	G2S2	
<i>Aquilegia barnebyi</i>	Shale columbine	G3S3	3C
<i>Atriplex confertifolia/Leymus salinus</i>	Saltbush/salina wildrye cold desert shrubland	G3G5S3	

<i>Artemisia tridentata/Elymus cinereus</i>	Big sagebrush/Great Basin wildrye bottomland shrubland	G2G3S1S2	
<i>Pinus edulis/Cercocarpus montanus</i>	Pinyon pine/mountain mahogany mesic Western Slope woodland	G5S4	

Landownership: BLM Craig District, White River Resource Area

Protection: Upper Greasewood Creek/Yanks Gulch ACEC, portions are State Natural Area (2,687 acres).

Threats: Wild horse population

Conservation Strategies:

1. Seek designation for rest of site as ACEC

### Lower Hay Gulch Conservation Site

Ecological Significance: Lower Hay Gulch supports good occurrences of two globally rare plant species and three Western Slope plant communities of special concern to Colorado.

Element Name	Common Name	CNHP rank	Federal Status
<i>Lesquerella parviflora</i>	Piceance bladderpod	G3S3	
<i>Aquilegia barnebyi</i>	Shale columbine	G3S3	3C
<i>Pseudotsuga menziesii/Symphoricarpos oreophilus</i>	Douglas fir/snowberry Western Slope Forest	G5S4	
<i>Pseudotsuga menziesii/Symphoricarpos oreophilus</i>	Bluebunch wheatgrass Western Slope grassland	G2S2	
<i>Quercus gambellii-Cercocarpus montanus/Carex geyeri</i>	Gambel oak-mountain mahogany/sedge mixed mountain shrubland	G3S3	

Landownership: CDOW Piceance State Wildlife Area, private (minor), BLM White River Resource Area, ACEC proposal dropped

**11. UTE MOUNTAIN UTE PLANNING UNIT (Map 1)**

**County:** Montezuma

**Ecoregion:** Navajo Canyonlands, Grand Canyon Lands

**Ecological Significance:** The Ute Mountain Ute Tribal Lands have long been recognized for their rich geology and flora. The bottomlands consist of gray Mancos Shale badlands surrounded by striking mesa tops of the Point Lookout Sandstone (Mesa Verde series) harbor a rich assemblage of rare plant species and plant communities. This planning unit is close to the Mesa Verde unit; these may warrant lumping into one for conservation planning purposes.

**Landownership:** Ute Mountain Ute Tribe

**Threats:** The major threat to the area is surface disturbance associated with mineral, oil, gas and energy development. Other threats include uncontrolled grazing (feral horses and wild cattle), new canal (southwest of Towaoc) and increased agriculture associated with irrigation, invasion of weedy species, overcollecting, and ORV use.

**Conservation Strategies:**

1. Develop relationship with Ute Mountain Ute Tribe and energy companies
2. Promote comprehensive inventory of region; update field information
3. Coordinate with Navajo Heritage and CNAP to update status of elements and determine what is already being done
4. SW Region will serve as clearinghouse for working with Ute tribe
5. Provide technical assistance and training to Ute tribe; monitor and research population status of globally rare plants
6. Update information on threats (e.g., assessment of mineral, oil, gas and other energy development, document existing leases, etc.)

**Tanner Mesa Conservation Site**

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal Status
<i>Astragalus humillimus</i>	Mancos milkvetch	G1S1	E
<i>Sclerocactus mesae-verde</i>	Mesa Verde Cactus	G2S2	T
<i>Atriplex corrugata</i>	Saltbush shale barren	G5S2	

**Chimney Rock Mesa Conservation Site**

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal Status
<i>Astragalus humillimus</i>	Mancos milkvetch	G1S1	E
<i>Adiantum capillus-veneris</i>	Southern maiden-hair fern	G5S2	

<i>Atriplex corrugatus/Frankenia jamesii</i>	Saltbush/frankenia shale alkali mat saltbush shrubland	GUS?	
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**East Toe (includes East Toe East) Conservation Site**

**Ecological Significance:** Mancos Shale badlands at the southern end of Sleeping Ute Mountain support populations of two globally rare species. The tortipes milkvetch is only known from these two occurrences (East Toe and East Toe East, four miles apart) and no where else in the world (East Toe East is the type locality).

Element	Common Name	CNHP Rank	Federal Status
<i>Astragalus cronquistii</i>	Cronquist milkvetch	G2S2	2
<i>Astragalus tortipes</i>	Tortipes milkvetch	G1S1	2

**Threats:** surface disturbance from canal construction

**Aztec Wash Conservation Site**

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal Status
<i>Sclerocactus mesae-verde</i>	Mesa Verde cactus	G2S2	T
<i>Proatriplex pleiantha</i>	Mancos saltbush	G3S1	3C
<i>Eriogonum clavellatum</i>	Comb wash buckwheat	G3S1	
<i>Calochortus flexuosa</i>	Weak-stemmed mariposa lily	G4S1	
<i>Sceloporus magister</i>	Desert spiny lizard	G5S2	
<i>Atriplex cuneata/Frankenia jamesii</i>	Alkali mat saltbush/frankenia shale barrens	GUS?	

**12. UNCOMPAHGRE BADLANDS PLANNING UNIT (Map 11)**

**County:** Montrose, Delta

**Ecoregion:** Northern Canyon Lands

**Ecological Significance:** The Uncompahgre Badlands are composed of the Mancos Shale Formation which support several rare plant species restricted to the gray shale (adobe) badlands, including the federally endangered clay-loving wild buckwheat, two federal candidate species: adobe penstemon and adobe desert-parsley, and the Wetherill milkvetch (3C). Several salt desert shrub communities dominated by shadscale and mat saltbush also occur, but further work is needed.

**Landownership:** BLM Montrose District, Uncompahgre Resource Area, private

**Protection:** Wacker Ranch is a registered natural area with TNC; Fairview is a BLM Area of Critical Environmental Concern (377 acres)

**Threats:** Residential and subdivision development and associated road networks, off-road and all-terrain vehicle use in the Montrose vicinity, agriculture with irrigated hay meadows and pastures (and canals), water pipeline, season-long grazing, year-long grazing, high-density stocking and use of sheep bed grounds and other activities that would cause fragmentation of the shale habitat.

**Conservation Strategies:**

1. Conduct comprehensive inventory of area and update field information; locate best site for conservation action
2. Continue to monitor buckwheat; initiate monitoring of other rare plants and communities; seek funding from BLM for monitoring and research population status of rare plants
3. Develop conservation plan
4. Work with USFWS and BLM on rejuvenating recovery plan activity for the endangered clay-loving wild buckwheat
5. Promote protection and management of entire adobe ecosystem.

**Uncompahgre Badlands Macrosite and Uncompahgre Badlands Conservation Site**

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal Status
<i>Eriogonum pelinophilum</i>	Clay-loving wild buckwheat	G2S2	E
<i>Penstemon retrorsus</i>	Adobe beardtongue	G3S3	2
<i>Astragalus wetherillii</i>	Wetherill milkvetch	G3S2	3C
<i>Atriplex confertifolia/Leymus salinus</i>	Shadscale/Great Basin wildrye cold desert shrublands	G3G5S3	

**Selig Canal Conservation Site (Macrosite may be broken into several smaller sites)**

**Ecological Significance:** Supports significant populations of clay-loving wild buckwheat and adobe beardtongue.

**13. ARIKAREE RIVER PLANNING UNIT (Map 12)**

**County:** Yuma

**Ecoregion:** Central High Tablelands

**Ecological Significance:** The Arikaree River, a major tributary of the Republican River in the High Plains section of the Great Plains in northeastern Colorado, has been proposed as a Conservancy Bioreserve and a Great Plains Initiative site. The river is ephemeral and influent except in the lower reaches and for a short distance below springs. Five riparian core sites along the river have been identified which contain exemplary examples of a globally rare eastern Plains deciduous riparian forest and tallgrass wet prairie; at least four rare fish occur in the river. Two upland sites support high-quality prairie sandhill and grassland communities, including sandsage prairie and little bluestem loess prairie. The sandsage grasslands and adjacent cornfields support the greater prairie chicken, threatened in Colorado.

**Landownership:** Private, State Land Board

**Protection:** One registry at Hillside Ranch; 320 acre TNC preserve at Conrad prairie (near Eckley Sandhills)

**Threats:** Drawdown of the Ogallala Aquifer, resulting from heavy pumping for irrigation, proposed pig farming complex near Wray in prairie may contaminate water table, development of surface water, season-long (summer) or uncontrolled grazing, agricultural conversion, chemical control of sagebrush, prairie dog removal, invasion by alien weed species.

**Conservation Strategies:**

1. Lead private land protection; develop relationship with landowners
2. Acquire or seek donation of Bowman Ranch or via GOCO funding
3. Catalyze State Land Board; pursue conservation lease with State Land Board and Division of Wildlife; pursue fee or management agreement/lease
4. Recruit researcher to develop ecological model for riparian community; establish monitoring project for G1 plant community;
5. Promote winter grazing of riparian areas and grasslands; burning of grasslands
6. Conduct further inventory of region, focusing on grasslands and sandsage prairie
7. Recruit researcher to study center pivots impact on groundwater and cottonwood survival
8. Develop site conservation plan for region; develop water strategy; determine need for presence in area

Site	Acres	Ownership	Management	Notes
Hillside Ranch	320	Private	Conservation Lease	Registry
Conrad Prairie	320	TNC	Preserve	
...	...	...	...	...

### Arikaree River at Bowman Ranch Conservation Site

**Ecological Significance:** This reach of the Arikaree River supports the best known example of a globally rare Plains cottonwood riparian forest and a remnant wet prairie.

Element	Common Name	CNHP Rank	Federal Status
<i>Populus deltoides/Panicum virgatum</i>	Plains cottonwood/switchgrass riparian forest	G1S1	
<i>Andropogon hallii-Calamovilfa longifolia-Panicum virgatum-Sorghastrum nutans</i>	Sand bluestem-sandreed grass-switchgrass-Indian grass wet prairie	GUSU	

### Arikaree River at Copperkettle Creek Conservation Site

**Ecological Significance:** One of the highest-quality known stands of a Plains cottonwood riparian forest and a very large remnant (unplowed) of a wet prairie.

Element	Common Name	CNHP Rank	Federal Status
<i>Populus deltoides/Panicum virgatum</i>	Plains cottonwood/switchgrass riparian forest	G1S1	
<i>Andropogon gerardii-Sorghastrum nutans</i>	Big bluestem-Indian grass wet prairie	G1S1?	

**Landownership:** State Land Board, private

### Arikaree River at Black Wolf Creek Conservation Site

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal/State Status
<i>Etheostoma spectabile</i>	Orangethroat darter	G4?S1	
<i>Hybognathus placitus</i>	Plains minnow	G5S1	
<i>Phenacobius mirabilis</i>	Suckermouth minnow	G5S3	
<i>Notropis blennioides</i>	River shiner	G5S1	
<i>Populus deltoides/Panicum virgatum</i>	Plains cottonwood/switchgrass riparian forest	G1S1	

### Arikaree River at Hillside Ranch Conservation Site

**Ecological Significance:** Supports a good-condition example of the Plains

cottonwood/switchgrass riparian forest.

**Protection:** Registered State Natural Area (3 acres)

### **Eckley Sandhills Conservation Site**

**Ecological Significance:** Eckley Sandhills consists of a series of rolling sand plains in eastern Colorado of the Western High Plains. The sandhills, derived from Holocene and Pleistocene eolian sands, are oriented along a prevailing northwest to southeast wind line. The sandhills support high-quality examples of two northern sandhill prairies as well as a complex of sandhill communities (currently unranked). The area also provides excellent spring breeding ground (leks) and habitat for the state threatened greater prairie chicken.

Element	Common Name	CNHP Rank	Federal/State Status
<i>Andropogon hallii</i> phase <i>Schizachyrium scoparium</i>	Sand bluestem (phase little bluestem) northern sandhill prairie	G2S2	
<i>Artemisia filifolia/Andropogon hallii</i>	Sand sagebrush/sand bluestem northern sandhill prairie	G2S2	
<i>Tympanuchus cupido pinnatus</i>	Greater prairie chicken	G4TUS3	-/T

### **Bonny Prairie Conservation Site**

**Ecological Significance:** Bonny Prairie, adjacent to Bonny Reservoir on the South Fork of the Republican River, consists of four fragments of little bluestem loess prairie. Loess prairie is wind-deposited glacial silt. Fewer than 30 fragments persist in North America of this grassland type that once covered tens of thousands of acres in the central Great Plains.

Element	Common Name	CNHP Rank	Federal Status
<i>Schizachyrium scoparium</i>	Little bluestem loess prairie	G3QS3	

**Landownership:** Bonny Reservoir State Recreation Area

**Protection:** designated State Natural Area (80 acres)

### **Arikaree River at Willow Creek Conservation Site**

**Ecological Significance:** One of the highest-quality stands of Plains cottonwood riparian forest known on the Arikaree River (this occurrence may not yet exist in the CNHP database).

#### 14. KREMMLING PLANNING UNIT (Map 5)

##### Kremmling Conservation Site

County: Grand

Ecoregion: Northern Parks and Ranges

Ecological Significance: Kremmling lies within Middle Park, one of Colorado's four high intermountain parks. Rolling sagebrush hills of highly seleniferous soils derived from Niobrara Shale support one of the largest known occurrences of the federally listed Osterhout's milkvetch, known only from only four populations in the Kremmling area. Also present is a shrubland community of special concern to Colorado.

Element Name	Common Name	CNHP rank	Federal Status
<i>Astragalus osterhoutii</i>	Osterhout's milkvetch	G1S1	E
<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> / <i>Pascopyrum smithii</i>	Wyoming sagebrush/Western wheatgrass bottomland shrublands	GUSU	

Landownership: BLM Craig District, Kremmling Resource Area, State Land Board

Threats: Muddy Creek Dam construction and associated recreation and development; possible trampling by livestock or disturbance to ground nesting bumble bee, the primary pollinator of the milkvetch

Conservation Strategies:

1. Continue monitoring/research project with Denver Botanical Garden
2. Provide technical assistance to BLM
3. Review recreation facility plan for dam
4. Develop relationship with private landowners
5. Work with BLM on management of area
6. Develop site conservation plan

15. PIKES PEAK PLANNING UNIT (Map 13)

Pikes Peak Conservation Site

County: El Paso

Ecoregion: Northern Parks and Ranges

Ecological Significance: Pikes Peak forms the southern anchor of the Front Range, and differs from the northern portion by having a bedrock of very coarse friable granite that does not hold moisture very well (Weber 1990). The peak supports the best known occurrence of the extremely rare moonwort, also known from Idaho, Oregon, California, Montana, New Brunswick and Quebec.

Element	Common Name	CNHP Rank	Federal Status
<i>Botrychium lineare</i>	Moonwort	G1S1	2
<i>Aquilegia saximontana</i>	Rocky Mountain columbine	G2G3S2S3	3C

Landownership: Pike San Isabel National Forest

Threats: Possible maintenance of nearby powerline

Conservation Strategies:

1. Assure that FS is aware of population and written into management plan
2. Provide technical support to FS
3. Promote Special Interest Area Status

## 16. COLORADO RIVER AT GRAND JUNCTION PLANNING UNIT (Map 14)

**County:** Mesa

**Ecoregion:** Tavaputs Plateau, Northern Canyon Lands, South Central Highlands

**Ecological Significance:** The headwaters of the Colorado River are on the Continental Divide in Rocky Mountain National Park; the river flows west through Glenwood Springs to Grand Junction and west to Utah. The lower-elevation reaches near Grand Junction support a diverse assemblage of aquatic species, including the Colorado River squawfish, federally listed as endangered. The best remaining reach containing high concentrations or spawning habitat for this endangered fish lie on the Yampa River below Craig; the other important reach is on the mainstem of the Colorado River at Black Rocks and Westwater Canyon up to confluence with Gunnison River (also important habitat for humpback chub; Tyus 1995). Razorback sucker, another federally endangered fish, also utilize this reach; bonytail chub may still exist, but only one was captured in recent years in the Black Rocks reach (Miller and Hubert 1990, Tyus 1995). Upland sites in the area contain rare species, remnant saltbush and saline bottomland shrublands, and pinyon pine-Utah juniper woodlands, etc.

**Landownership:** BLM Grand Junction District, private

**Threats:** alteration of hydrologic (dam construction and reservoir operations) and geomorphic regime (bank stabilization/channelization), introduction of exotic fish species, fragmentation (hydrological impoundments, highway construction, etc.)

**Conservation Strategies:**

1. Conduct comprehensive inventory of region, in coordination with Utah TNC
2. Update aquatic species information for entry into BCD
3. Develop regional conservation plan

### Colorado River at Grand Junction Conservation Site (Macrosite)

**Ecological Significance:** Key remaining warm water riverine system providing habitat for two endangered fish species endemic to the Colorado River. The Westwater and Black Rocks reaches support some of the highest known concentrations (and spawning areas) for the humpback chub, and the Colorado River near the confluence with the Gunnison River is an important nursery area for the Colorado squawfish (Miller and Hubert 1990, Tyus 1995).

Element	Common Name	CNHP Rank	Federal Status
<i>Ptychocheilus lucius</i>	Colorado squawfish	G1S1	E/E
<i>Xyrauchen texanus</i>	Razorback sucker	G1S1	E/E
<i>Coluber constrictor mormon</i>	Western yellowbelly racer	G5T5S2	

**Landownership:** Colorado Division of Wildlife, Walker State Wildlife Area, BLM Grand Junction District and Resource Area

### Badger Wash Conservation Site (Macrosite)

**Ecological Significance:** Badger Wash consists of an entire small watershed that has been used for hydrologic research for more than 30 years.

Element	Common Name	CNHP Rank	Federal Status
<i>Cryptantha elata</i>	Tall cryptanth	G3S3	
<i>Eriogonum contortum</i>	Grand buckwheat	G3S3	
<i>Astragalus musiniensis</i>	Ferron milkvetch	G3S1	
<i>Gambelia wislizenii</i>	Longnose leopard lizard	G5S2	
<i>Neotoma lepida</i>	Desert woodrat	G5S1	
<i>Atriplex gardneri/Leymus salinus</i>	Gardner's mat saltbush shrubland	G2?S2?	
<i>Atriplex corrugata</i>	Alkali mat saltbush shrubland	G5S2?	
<i>Atriplex confertifolia/Leymus salinus</i>	Shadscale/Salina wildrye cold desert shrubland	G3G5S3	
<i>Sarcobatus vermiculatus/Sueda torreyana</i>	Greasewood/suaeda saline bottomland shrubland	GUS?	

**Landownership:** BLM Grand Junction District and Resource Area  
**Protection:** Designated ACEC and State Natural Area (1520 acres)

**Ruby Canyon of Colorado River Conservation Site (this should be combined with Colorado River at Grand Junction Macrosite)**

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal Status
<i>Gila cypha</i>	Humpback chub	G1S1	E/E
<i>Ptychocheilus lucius</i>	Colorado squawfish	G1S1	E/E
<i>Xyrauchen texanus</i>	Razorback sucker	G1S1	E/E
<i>Hybognathus hankinsoni</i>	Brassy minnow	G5S3	

**Landownership:** BLM Grand Junction District and Resource Area

**Devil's Kitchen Conservation Site**

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal Status
<i>Lomatium eastwoodiae</i>	Eastwood desert-parsley	G3S2	
<i>Lomatium latilobum</i>	Canyonlands lomatium	G1S1	2
<i>Hyla arenicolor</i>	Canyon treefrog	G5S2	
<i>Scaphiopus intermontanus</i>	Great Basin spadefoot	G5S2	
<i>Gambelia wislizenii</i>	Longnose leopard lizard	G5S2	

**Landownership:** NPS Colorado National Monument

**Threats:** possible impact from recreationists

**Conservation Strategies:**

1. update occurrence information (not updated since 1983)

17. UNCOMPAHGRE PEAK PLANNING UNIT (Map 15)

Uncompahgre Peak Conservation Site

County: Hinsdale

Ecoregion: South-Central Highlands

Ecological Significance: This mountain top contains one of only two known populations of the federally endangered Uncompahgre fritillary butterfly (G1S1). The larval, pupal and egg-laying stages of this species depend on the snow willow for food and cover. Adult butterflies feed on common alpine plant species.

Element	Common Name	CNHP Rank	Federal Status
<i>Boloria acronema</i>	Uncompahgre fritillary	G1S1	E

Landownership: Uncompahgre National Forest, Cebolla Ranger District, Big Blue Wilderness Area

Protection: Registered State Natural Area (15 acres)

Threats: recreation (trail within popular climbing area runs through habitat), overcollecting, sheep grazing (trespass)

Conservation Strategies:

1. Support SIA designation; influence management
2. Promote further inventory of species
3. Seek advice of scientific experts to assess threats and recommend Conservancy role

18. REDCLOUD PEAK PLANNING UNIT (Map 15)

Redcloud Peak Conservation Site

County: Hinsdale

Ecoregion: South-Central Highlands

Size: 5947 acres

Ecological Significance: Redcloud Peak provides habitat for the largest known population of the federally endangered Uncompahgre fritillary butterfly, currently known from only two locations in the world

Element	Common Name	CNHP Rank	Federal Status
<i>Boloria acronema</i>	Uncompahgre fritillary	G1S1	E

Landownership: BLM Gunnison District, Gunnison Resource Area

Protection: Designated ACEC and State Natural Area (5,947 acres)

Threats: Small population, recreation, overcollecting, trespass sheep grazing

Conservation Strategies:

1. Promote further inventory of species
2. Provide input to BLM management plan for ACEC
3. Seek advice of scientific experts to assess threats and recommend Conservancy role

19. SOUTHERN UTE PLANNING UNIT (Map 16)

Cemetery Canyon Conservation Site

County: La Plata

Ecoregion: Navajo Canyonlands

**Ecological Significance:** Gravelly hills consisting of alluvial deposits harbor the globally rare Knowlton's cactus, a federally endangered species; this site is thought to be type locality for species; however it has not been re-located in recent years. This species is only known from populations along the New Mexico-Colorado border, and is protected in NM on a Conservancy preserve.

Element	Common Name	CNHP Rank	Federal Status
<i>Pediocactus knowltonii</i>	Knowlton's cactus	G1S1	E

**Landownership:** Southern Ute Tribe, private (site lies just north of New Mexico border and NM TNC preserve)

**Threats:** Unknown, but possible poaching by cactus collectors, development and ORVs are threats to the NM site

**Conservation Strategies:**

1. Develop relationship with Southern Ute (contact Alden Naracio, CNAP council member) re access to site; seek voluntary protection
2. Update field information and conduct further inventories in region

## 20. ROCKY MOUNTAIN NATIONAL PARK PLANNING UNIT (Map 5)

### Glacier Basin Conservation Site

County: Larimer

Ecoregion: Northern Parks and Ranges

Ecological Significance: Glacier Basin supports an unusually rich assemblage of globally and state-rare species (18 taxa), including 5 species of moonwort.

Element	Common Name	CNHP Rank	Federal Status
<i>Bufo boreas</i>	Boreal toad	G5T5S1	2/E
<i>Cypseloides niger</i>	Black swift	G4S2	2
<i>Oncorhynchus clarki stomias</i>	Greenback cutthroat trout	G5TUS2	T/T
<i>Aeshna eremita</i>	Lake darner	G5S1	
<i>Aquilegia saximontana</i>	Rocky Mountain columbine	G3S3	3C
<i>Potentilla effusa</i> var. <i>rupincola</i>	Rocky Mountain cinquefoil	G?T1S1	2
<i>Parnassia kotzebuei</i>	Kotzebue grass-of-parnassus	G4S1	
<i>Juncus vaseyi</i>	Vasey bulrush	G3G5S1	
<i>Cypripedium fasciculatum</i>	Purple lady's slipper	G3S3	2
<i>Listera convallarioides</i>	Broad-leaved twayblade	G5S2	
<i>Isoetes echinospora</i>	Isoetes	G5?S?	
<i>Dryopteris expansa</i>	Spreading wood fern	G5S1	
<i>Botrychium lunaria</i>	Moonwort	G5S2	
<i>Botrychium lanceolatum</i> var. <i>lanceolatum</i>	Lance-leaved moonwort	G5T4S2	
<i>Botrychium multifidum</i>	Leathery grape fern	G5S1	
<i>Botrychium echo</i>	Reflected moonwort	G2S2	
<i>Botrychium hesperium</i>	Western moonwort	G3S2	
<i>Botrychium minganense</i>	Mingan moonwort	G4S2	

Landownership: National Park Service

Threats: Site not currently highly threatened; possibly increased pressure by recreationists

Conservation Strategies:

1. Support special designation status for Glacier Basin
2. Notify NPS staff of ecological significance of site
3. Update threats

21. SOUTH PARK PLANNING UNIT (Map 6)

**High Creek Fen Conservation Site**

**County:** Park

**Ecoregion:** Northern Parks and Ranges

**Ecological Significance:** South Park is a large grassland and wetland park bounded by probably the richest alpine botanical area in Colorado, the Mosquito Range (Weber 1990). High Creek Fen, situated on the west side of the park, and is one of the best-known examples of a rich fen (calcareous spring-fed wetland) in the Southern Rocky Mountains. 16 wetland communities have been described by Dr. David Cooper (not yet incorporated into CNHP database). The fen supports the endemic pale blue-eyed grass, a candidate for listing by USFWS, and at least 10 state-rare species disjunct from their relatives in the Arctic. Other rare species include the prairie goldenrod, mountain plover, a candidate for listing by USFWS, and a moss (only known Colorado occurrence).

Element	Common Name	CNHP Rank	Federal Status
<i>Sisyrinchium pallidum</i>	Pale blue-eyed grass	G3S2	2
<i>Senecio pauciflorus</i>	few-flowered ragwort	G4G5S1S2	
<i>Primula egaliksensis</i>	Greenland primrose	G4S2	
<i>Salix candida</i>	Hoary willow	G5S1	
<i>Salix myrtilifolia</i>	Myrtleleaf willow	G5S1	
<i>Salix serissima</i>	Autumn willow	G4S1	
<i>Carex livida</i>	Livid sedge	G5S1	
<i>Carex scirpoidea</i>	Canadian single-spike sedge	G5S1	
<i>Carex viridula</i>	Green sedge	G5?S1	
<i>Scirpus pumilus</i>	Little bulrush	G5S1	
<i>Lilium philadelphicum</i>	Wood lily	G5S3	
<i>Solidago ptarmicoides</i>	Prairie goldenrod	G5S2S3	
<i>Scorpidium scorpioides</i>	Moss	S1	
<i>Physa skinneri</i>	Glass physa snail	S1	
<i>Charadrius montanus</i>	Mountain plover	G3S2B	2/SC

**Landownership:** Private, State, Denver Water Board

**Protection:** Nature Conservancy preserve, State Natural Area (1,145 acres in fee)

**Threats:** Diversion of water, residential development, proposed airport nearby, pressure from increased growth in Summit County, peat mining, cowbird parasitism

**Conservation Strategies:**

1. Support M.S. research of John Appel (UNM) on hydrology of fen
2. Pending results of hydrologic research, pursue water rights
3. Become involved in larger South Park planning effort
4. Support wetland mapping effort by USFWS and COE, provide CNHP technical expertise on characterizing wetlands
5. Expand our project boundary to include larger watershed and upland habitat for mountain plover.
6. Continue monitoring of wetland and rare plants

Year	Area	Wetland Type	Notes
1980	1000	Wetland	
1981	1000	Wetland	
1982	1000	Wetland	
1983	1000	Wetland	
1984	1000	Wetland	
1985	1000	Wetland	
1986	1000	Wetland	
1987	1000	Wetland	
1988	1000	Wetland	
1989	1000	Wetland	
1990	1000	Wetland	
1991	1000	Wetland	
1992	1000	Wetland	
1993	1000	Wetland	
1994	1000	Wetland	
1995	1000	Wetland	
1996	1000	Wetland	
1997	1000	Wetland	
1998	1000	Wetland	
1999	1000	Wetland	
2000	1000	Wetland	

## 22. ARKANSAS RIVER PLANNING UNIT (Map 13)

County: Fremont, Pueblo

Ecoregion: Arkansas Tablelands

Ecological Significance: The Arkansas River Valley supports a number of globally rare plants, four of which are restricted to the Niobrara Shale barrens: Arkansas River feverfew, roundleaf four o'clock, golden blazing star, and Pueblo goldenweed, all candidates for listing by the USEFS. The goldenweed is a new species of *Haplopappus* recently discovered in this area (Brown and Evans 1995). Other rare species of the area include the Arkansas Canyon stickleaf, dwarf milkweed and the showy prairie gentian, Brandege buckwheat, and the Southern redbelly dace. Additionally, the Niobrara Shale outcrops support several high-quality remnants of prairie shrubland and grassland communities. Shale barren communities in the Arkansas River valley are considered unique in Colorado and have affinities with southern floras, primarily Chihuahuan. Frankenia, a southwestern shrub, is disjunct in the Arkansas River valley from Montezuma County, CO, TX and NM. Several rare grasses have been documented by Weber (1995) for the area; these include: *Sporobolus nealleyi*, *Muhlenbergia arenacea*, and *Scleropogon brevifolius*.

Landownership: Private, Holnam Inc., State, Colorado Dept. of Transportation

Protection: Management agreement with Holnam, Inc. for monitoring rare plants at Portland

Threats: mining of Ft. Hayes limestone, development associated with the new prison, increased recreational use of region, residential and subdivision development, proposed golf course, overgrazing by horses and cattle, invasion by alien weeds

Conservation Strategies:

1. Pursue further inventories of region to update historical occurrences and search for new populations; support CNHP status survey and integrated inventory of Ft. Carson
2. Develop preliminary regional conservation plan
3. Continue monitoring agreement with Holnam at Portland, pursue grazing lease and/or protection pending results of 1995 inventories
4. Stay abreast of golf course and associated development at Fourmile Creek; pursue protection
5. Provide technical support to Holnam and others; develop cooperative fencing project
6. Revisit Arkansas River conservation site (as recommended by Coles 1994), who suggested that this may be the best site to protect four regional endemic species
7. Develop a strategy for conserving the shale habitat with county officials and planners.

Portland Conservation Site (includes Portland Plant)

Ecological Significance: Niobrara Shale badlands support good occurrences of three prairie plant communities and three globally rare plants (federal candidates for listing by USFWS) and one state-rare species.

Element	Common Name	CNHP Rank	Federal Status
<i>Parthenium tetraeuris</i>	Arkansas River feverfew	G2S2	2
<i>Oxybaphus rotundifolius</i>	Round-leaf four-o'clock	G2S2	2

<i>Mentzelia chrysantha</i>	Golden blazing star	G1S1	2
<i>Eustoma grandiflorum</i>	Showy prairie gentian	G5S3	
<i>Artemisia bigelovii/Oryzopsis hymenoides</i>	Bigelow sage/Indian ricegrass Plains escarpment prairie	G3QS3	
<i>Stipa comata</i>	Needle-and-thread grass Great Plains mixed grass prairie	G2S2	
<i>Stipa neomexicana</i>	New Mexico feathergrass mixed grass prairie	G2S2	

**Landownership:** Holnam Inc., private

**Threats:** site lies within primary area to be mined for limestone

**Beaver Creek Conservation Site (Macrosite)**

**Ecological Significance:** One of largest and best known occurrences of Arkansas River feverfew and round-leaf four o'clock.

Element	Common Name	CNHP Rank	Federal Status
<i>Parthenium tetraeuris</i>	Arkansas feverfew	G2S2	2
<i>Oxybaphus rotundifolius</i>	Round-leaf four-o'clock	G2S2	2
<i>Stipa neomexicana</i>	New Mexico feathergrass Great Plains mixed grass prairie	G2S2	

**Landownership:** State Land Board, private

**Threats:** limestone site on reserve for future mining, some exploratory mining, overgrazing by horse and cattle

**Fourmile Creek Conservation Site**

**Ecological Significance:** Fourmile Creek consists of rolling low white shale knolls of the Smoky Hill member of the Niobrara Shale Formation. This site supports one of best known occurrences of round-leaf four o'clock.

Element	Common Name	CNHP Rank	Federal Status
<i>Parthenium tetraeuris</i>	Arkansas feverfew	G2S2	2
<i>Oxybaphus rotundifolius</i>	Round-leaf four-o'clock	G2S2	2
<i>Oonopsis puebloensis</i>	Pueblo	G1S1	2

**Landownership:** private

**Threats:** proposed golf course and associated development

**Conservation Strategies:**

1. Update status of golf course and development
2. Investigate opportunities to obtain fee title or conservation easement
3. Support further inventory in region by CNHP

### Brush Hollow Creek Conservation Site

#### Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Parthenium tetraeuris</i>	Arkansas feverfew	G2S2	2
<i>Oxybaphus rotundifolius</i>	Round-leaf four-o'clock	G2S2	2
<i>Eustoma grandiflora</i>	Showy prairie gentian	G5S3	
<i>Artemisia bigelovii/Oryzopsis hymenoides</i>	Bigelow sage/Indian ricegrass plains escarpment prairie	G3QS3?	

Landownership: BLM Canon City District, Royal Gorge Resource Area, private, Co Dept. of Transportation

Threats: road maintenance or widening, mining, grazing

**Boggs Creek Conservation Site (plants scattered and may not be a distinct population)**

#### Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Mentzelia chrysantha</i>	Golden blazing star	G1S1	2
<i>Asclepias uncialis</i>	Dwarf milkweed	G3S2	2
<i>Artemisia bigelovii/Oryzopsis hymenoides</i>	Bigelow sage/Indian ricegrass escarpment prairie	G3QS3?	

Landownership: private, DPOR, Pueblo State Recreation Area

Threats: some weed invasion, possible recreation

### Arkansas River Conservation Site

Ecological Significance: Although this site did not score high (current data were lacking), it may be the best site to protect all four endemic plant species (Coles 1994). It supports a large A ranked occurrence of Arkansas River feverfew and Southern redbelly dace (G5S1) occur in the river here.

Landownership: Pueblo State Recreation Area, Colorado Div. of Parks and Recreation, private

Threats: recreational activity, overgrazing

**23. RAVEN RIDGE PLANNING UNIT (Map 17)**

**Raven Ridge Conservation Site**

**County:** Rio Blanco

**Ecoregion:** Uinta Basin

**Ecological Significance:** Raven Ridge is an exposure of the Evacuation Creek member of the Green River Formation. This site provides habitat for 8 endemic plant species and a high-quality remnant plant community of special concern.

Element	Common Name	CNHP Rank	Federal Status
<i>Cymopterus duchesnensis</i>	Uinta Basin spring parsley	G3S2	
<i>Parthenium ligulatum</i>	Ligulate feverfew	G3S2	
<i>Cryptantha rollinsii</i>	Rollins cryptanth	G4S1	2
<i>Astragalus detritalis</i>	Debris milkvetch	G3S2	
<i>Eriogonum ephedroides</i>	Ephedra buckwheat	G3S1	
<i>Penstemon grahamii</i>	Graham beardtongue	G2S1	1
<i>Penstemon scariosus</i> var. <i>albifluvis</i>	White river penstemon	G4T2S1	1
<i>Astragalus lutosus</i>	Dragon milkvetch	G4S3S4	
<i>Pinus edulis/Cercocarpus ledifolius</i>	Pinyon pine/mountain mahogany mesic Western Slope woodland	G3S3	

**Landownership:** BLM Craig District White River Resource Area, designated ACEC and State Natural Area

**Protection:** Designated Area of Critical Environmental Concern and State Natural Area (1,049 acres); proposed addition of 2,890 acres to ACEC

**Threats:** Development of oil shale

**Conservation Strategies:**

1. Support CNAP monitoring of site
2. Determine TNC role, if any

## 24. BROWNS PARK PLANNING UNIT (Map 17)

County: Moffat

Ecoregion: Greater Green River Basin, Uinta Mountains

Landownership: BLM Craig District, Little Snake Resource Area

Protection: Irish Canyon is a BLM Area of Critical Environmental Concern (11,680 acres)

Threats: unknown

Conservation Strategies:

1. Catalyze BLM and State Land Board to protect the core areas
2. Provide technical assistance to BLM on management of rare plants; initiate monitoring of rare plants; seek funding from BLM for inventories to update field information and status of elements and monitoring of rare plants to determine population status
3. Pursue inventory of USFWS Wildlife Refuge
4. Pending results of inventory, seek special designations

Irish Canyon Conservation Site (Macrosite)

Ecological Significance: Irish Canyon is an excellent example of a beheaded stream valley; the stream in the canyon was pirated by Vermillion Creek in early Pleistocene time, leaving a 1000 ft. deep dry gorge. The canyon floor and walls support five globally rare plant species and seven high-quality examples of plant communities of special concern. Additionally, Irish Lakes represent one of the few natural playa lakes in this part of the state (there have been undocumented reports of fairy shrimp).

Element	Common Name	CNHP Rank	Federal Status
<i>Parthenium ligulatum</i>	Ligulate feverfew	G3S2	
<i>Cryptantha caespitosa</i>	Tufted cryptanth	G3S2	
<i>Draba oligosperma</i>	Woods draba	G3S1	
<i>Eriogonum tumulosum</i>	Woodside buckwheat	G3S2	
<i>Penstemon yampaensis</i>	Yampa beardtongue	G3S3	3C
<i>Pinus edulis/Cercocarpus ledifolius</i>	Pinyon pine/mountain mahogany mesic Western Slope woodland	G3S3	
<i>Pinus edulis/Pseudoroegneria spicata</i>	Pinyon pine/bluebunch wheatgrass xeric Western Slope pinyon-juniper woodland	G4S4	
<i>Pascopyrum smithii</i>	Western wheatgrass Western Slope grassland	G4S1	
<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass Western Slope grassland	GU/S?	
<i>Artemisia nova/Pseudoroegneria spicata</i>	Black sage/bluebunch wheatgrass Western Slope shrubland	G5S2	

<i>Artemisia nova/Stipa comata</i>	Black sage/needle-and-thread grass Western Slope shrubland	G4S2	
<i>Cercocarpus ledifolius/Pseudoroegneria spicata</i>	Mountain mahogany/bluebunch wheatgrass Western Slope mixed mountain shrubland	G5S2	

**Landownership:** BLM Craig District, Little Snake Resource Area,

**Protection:** BLM ACEC (11,680 acres) and designated State Natural Area (12,960 acres)

**Threats:** cattle grazing, vehicle trail through site

**Conservation Strategies:**

1. Update field information (last visited 1983)
2. Contact Dan Roth (Craig) regarding possible shrimp in Irish Lake

### Sterling Place Conservation Site

**Ecological Significance:** Exposed white shale outcrops of the Brown's Park Formation support part of the largest known population of the Gibben's penstemon, endemic to southcentral Wyoming and northwestern Colorado (only 4 populations are currently known) as well as a regional endemic, ligulate feverfew.

Element	Common Name	CNHP Rank	Federal Status
<i>Penstemon gibbensii</i>	Gibben's beardtongue	G1S1	2
<i>Parthenium ligulatum</i>	Ligulate feverfew	G3S2	

**Landownership:** BLM Craig District, Little Snake Resource Area

**Threats:** Uncontrolled livestock and antelope grazing, oil and gas development

### Bassett Spring Conservation Site

**County:** Moffat

**Ecological Significance:** Bassett Spring harbors the globally rare yellow-flowered narrowleaf evening-primrose, found in seasonally moist, sandy or gravelly soils in northwest Colorado and northeast Utah.

Element	Common Name	CNHP Rank	Federal Status
<i>Oenothera acutissima</i>	Narrowleaf evening-primrose	G2S2	

**Landownership:** BLM Craig District

**Threats:** unknown

**Spitzie Draw Conservation Site**

**Ecological Significance:** Exposed white shale outcrops of the Brown's Park Formation support part of the largest known population of Gibben's beardtongue (G1S1), a federal candidate for listing by the USFWS, endemic to southcentral Wyoming and northwestern Colorado (only 4 populations are known). Spitzie Draw is the largest known occurrence in Colorado.

Element	Common Name	CNHP Rank	Federal Status
<i>Penstemon gibbensii</i>	Gibben's penstemon	G1S1	2

**Landownership:** BLM Craig District, Little Snake Resource Area

**Threats:** possible uncontrolled livestock and antelope grazing, oil and gas development

**Conservation Strategies:**

1. Pursue ACEC designation on BLM lands
2. Provide technical assistance to BLM and lessee
3. Establish monitoring program to determine management needs

**Bull Canyon at Big Joe Basin Conservation Site**

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal Status
<i>Parthenium ligulatum</i>	Ligulate feverfew	G3S2	
<i>Cryptantha caespitosa</i>	Tufted cryptanth	G3S2	
<i>Eriogonum tumulosum</i>	Woodside buckwheat	G3S2	
<i>Penstemon yampaensis</i>	Yampa beardtongue	G3S3	3C
<i>Artemisia nova/Pseudoreogneria spicata</i>	Black sage/bluebunch wheatgrass	G5S2	

**Landownership:** BLM Craig District, Little Snake Resource Area

**Threats:** unknown

25. DINOSAUR NATIONAL MONUMENT PLANNING UNIT (Map 17)

County: Moffat

Ecoregion: Uinta Mountains

**Yampa River in Dinosaur Conservation Site (Megasite)**

Ecological Significance: The Yampa and the Green Rivers in Dinosaur National Monument provide the most important remaining habitat for maintenance and recovery of the rare Colorado River fishes (Tyus and Karp 1989). The flows of the Yampa River are singularly important for providing a natural shape to the hydrograph of the mainstem of the Green River. This area supports the highest concentration and spawning area for the federally endangered Colorado squawfish (Tyus 1995), the "white salmon of the Colorado." Migratory members of the minnow family and top native carnivores in the Colorado system, squawfish once reached weights exceeding 80 pounds and lengths over 6 feet. The fish primarily occupy the reach from the confluence with the Green River up to Craig. Adult squawfish overwinter from Lily Park to above Juniper Canyon (1/2 way between Juniper Canyon and Craig); the fish spawn in the lower 15-20 miles upstream of the confluence with the Green River (Warm Springs Rapid to Harding Hole to Big Joe). The area from the upper Green River to the mouth of the Yampa River near Echo Park is likely the most important habitat for the razorback sucker, as the species is reproducing well and is apparently not hybridizing (Tyus 1995). Humpback chub are concentrated in Dinosaur from Teepee Rapid (river mile 37) to Big Joe (river mile 24). The Yampa River, with its flow regime and sediment supply to the Green River, is key to the maintenance of the system for these endangered fish (Tyus 1995).

Dinosaur also supports one of the richest assemblages of rare plant species in Colorado, several associated with hanging gardens, several rare animal species, and a number of high-quality plant communities, including a Fremont's cottonwood riparian forest.

Element	Common Name	CNHP Rank	Federal Status
<i>Scaphiopus intermontanus</i>	Great Basin spadefoot	G5S2	
<i>Gila cypha</i>	Humpback chub	G1S1	E
<i>Xyrauchen texana</i>	Razorback sucker	G1S1	E
<i>Ptychocheilus lucius</i>	Colorado squawfish	G1S1	E
<i>Populus deltoides</i> ssp. <i>wislizenii</i> / <i>Rhus trilobata</i>	Fremont's cottonwood/squawbush riparian forest	G2S2	

Landownership: NPS, Dinosaur National Monument

Threats: Uncontrolled grazing, alien species (both exotic plants such as tamarisk and exotic fish species such as tiger muskie, introduced into Elkhead Reservoir, increased recreation (although several sites are inaccessible without helicopter)

Conservation Strategies:

1. Support special designations (protected natural areas) for core sites
2. Investigate/pursue potential cooperative acquisition project with NPS on Mantle Ranch
3. Update rare fish information for entry into BCD

**Pool Creek Conservation Site**

Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Euderma maculatum</i>	Spotted bat	G4S2	2
<i>Cirsium ownbeyi</i>	Ownbey thistle	G3S3	2
<i>Erigeron wilkenii</i>	Wilken fleabane	G1G2S1	2
<i>Pellaea glabella</i> ssp. <i>simplex</i>	Smooth cliff-brake	G5T1S?	
<i>Arabis fernaldiana</i> var. <i>feraldiana</i>	Park rockcress	G3G4T3S1	2

**Harding Hole Conservation Site**

Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Cirsium ownbeyi</i>	Ownbey thistle	G3S3	2
<i>Arabis fernaldiana</i> var. <i>feraldiana</i>	Park rockcress	G2G4T3S1	2
<i>Astragalus duchesnensis</i>	Duchesne milkvetch	G3S1	
<i>Platanthera zothecina</i>	Alcove bog orchid	G2S1	2
<i>Adiantum capillus-veneris</i>	Southern maiden-hair fern	G5S2	
<i>Pellaea glabella</i> ssp. <i>simplex</i>	Smooth cliff-brake	G5T1S?	
<i>Zigadenus vaginatus</i>	Alcove death camas	G2S2	

**Johnson Canyon Conservation Site**

Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Cirsium ownbeyi</i>	Ownbey thistle	G3S3	2
<i>Arabis fernaldiana</i> var. <i>feraldiana</i>	Park rockcress	G3G4T3S1	2

<i>Penstemon scarious</i> var. <i>cyanomontanus</i>	Plateau penstemon	G4T?S2S3	
<i>Pellaea glabella</i> ssp. <i>simplex</i>	Smooth cliff-brake	G5T1S?	
<i>Zigadenus vaginatus</i>	Alcove death camas	G2S2	

### Cross Mountain Canyon Conservation Site (part of Dinosaur macrosite)

**Ecological Significance:** Cross Mountain Canyon is a spectacular and rugged superimposed river gorge carved by Yampa River. The canyon contains two globally rare plants and a state rare woodrat. Additionally, three federally endangered fish species utilize this reach of the Yampa River; the area is (close to Lily Park) a concentration area (winter habitat) for the Colorado squawfish (Tyus 1995). Peregrine falcon may nest in the canyon.

Element	Common Name	CNHP Rank	Federal Status
<i>Cirsium ownbeyi</i>	Ownbey thistle	G3S3	2
<i>Penstemon yampaensis</i>	Yampa penstemon	G3S3	3C
<i>Gila cypha</i>	Humpback chub	G1S1	E/E
<i>Ptychocheilus lucius</i>	Colorado squawfish	G1S1	E/E
<i>Xyrauchen texanus</i>	Razorback sucker	G1S1	E/E
<i>Neotoma lepida</i>	Desert wood-rat	G5S1	

**Landownership:** BLM Craig District, Little Snake Resource Area

**Protection:** CNAP considering for State Natural Area

**Threats:** introduction of exotic fish tiger muskie into Elkhead Reservoir, Juniper-Cross Mountain water and power-development (dam proposal) project no longer a threat to the site

### Sand Canyon Conservation Site

**Ecological Significance:** Also, a there is a possible occurrence of the federally threatened Mexican spotted owl (G3T3S1).

Element	Common Name	CNHP Status	Federal Status
<i>Arabis fernaldiana</i> var. <i>feraldiana</i>	Park rockcress	G3G4T3S1	2
<i>Eriogonum lonchophyllum</i> var. <i>saurinum</i>	Dinosaur buckwheat	G4T3S1	
<i>Pellaea glabella</i> ssp. <i>simplex</i>	Smooth cliff-brake	G5T1?S?	
<i>Woodsia neomexicana</i>	New Mexico woodsia	G?S2	

**Threats:** portion of site is roadside, watch road construction

**Yampa River at Lily Park Conservation Site (combine with Yampa River at Dinosaur Macrosite)**

**Ecological Significance:** A suspected spawning area for the federally endangered Colorado squawfish.

Element	Common Name	CNHP Status	Federal Status
<i>Ptychocheilus lucius</i>	Colorado squawfish	GIS1	E/E
<i>Xyrauchen texanus</i>	Razorback sucker	GIS1	E/E

26. BOULDER COUNTY PLANNING UNIT (Map 18)

County: Boulder

Ecoregion: Northern Parks and Ranges

Ecological Significance: Boulder County lies on the eastern flank of the Front Range, where the plains meet the mountains. The county supports a highly diverse assemblage of rare species and remnant-plant communities. According to Weber (1990), over 1,500 flowering plant species have been documented, and this is the richest area of Colorado for all groups of plants (including lichens and mosses). There are some important cryptogam (lichens and mosses) localities on the north-facing-canyonsides of Boulder Creek and South St. Vrain Creek (Weber 1995).

Landownership: City and County of Boulder, private, Arapaho-Roosevelt National Forest

Threats: Increased recreation use, uncontrolled horse and cattle grazing, fire suppression, invasion by alien species such as knapweed and thistle, road widening/maintenance, urban development, ponderosa pine encroachment

Conservation Strategies:

1. Provide technical assistance with monitoring and management; continue monitoring G2 plant species and research project on effects of weeds on G2 plant species
2. Facilitate cooperation between city and county resource managers; grant conservation award
3. Control recreational use of sensitive areas
4. Advocate preservation and good management of prairie.

**Colorado Tallgrass Prairie Conservation Site**

Ecological Significance: The Colorado Tallgrass Prairie Natural Area lies along the bottomland of South Boulder Creek, and supports a high-quality wet prairie, a remnant of a once-extensive area of tall prairie occupying the entire South Boulder Creek floodplain and much of the ponderosa pine ecotone of the Front Range. Tallgrass prairie remnants in Colorado are statistically not different from tallgrass prairies of Nebraska (10 remnant prairies), Kansas (Konza), Oklahoma (Osage), Missouri (Tucker), and Iowa (Bock 1995). Also present are the federally threatened Ute ladies' tresses and the Preble's meadow jumping mouse, a candidate for listing by USFWS (USFWS recently determined listing warrants further review).

Element	Common Name	CNHP Rank	Federal Status
<i>Andropogon gerardii-Sorghastrum nutans</i>	Big bluestem-Indian grass wet prairie	G1S1?	
<i>Spiranthes diluvialis</i>	Ute ladies' tresses	G2S1	T
<i>Rotala ramosior</i>		G5S?	
<i>Zapus hudsonius preblei</i>	Preble's meadow jumping mouse	G5T2S2	2/SC

Landownership: City of Boulder Open Space

Protection: Designated State Natural Area (269 acres)

### Fourmile Mesa Conservation Site

**Ecological Significance:** Fourmile Mesa between Boulder and Lyons supports numerous high-quality occurrences of Bell's twinpod, a Front Range endemic restricted to the Niobrara Shale Formation. Also present is the birdsfoot violet. There is an historical record of Colorado butterfly weed (G5T1S1, Category 1) from this area, but it has not relocated in recent years.

Element	Common Name	CNHP Rank	Federal Status
<i>Physaria bellii</i>	Bell's twinpod	G2S2	2
<i>Viola pedatifida</i>	Birdsfoot violet	G5S2	

**Landownership:** City of Boulder

**Threats:** Increased recreation (hikers and hang gliders)

### Beechcraft Conservation Site

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal Status
<i>Physaria bellii</i>	Bell's twinpod	G2S2	2
<i>Stipa neomexicana</i>	New Mexico feathergrass mixed grass prairie	G2S2	

**Landownership:** Boulder County Open Space

**Threats:** Recreation, horse grazing, roadside plants vulnerable to road construction, invasion by weeds (thistle and knapweed), pollution from past activities by Beechcraft Aircraft.

**Conservation Strategies:**

1. Continue monitoring Bell's twinpod in cooperation with city
2. Research impact of weeds on rare plant
3. Facilitate cooperation among conflicting factions
4. Present award to county for conservation work

27. GREENLAND RANCH PLANNING UNIT (Map 19)

**Greenland Ranch Conservation Site**

**County:** Douglas

**Ecoregion:** Arkansas Tablelands

**Ecological Significance:** Greenland Ranch supports at least four high-quality remnant plant communities and is historical habitat for state-rare plains sharp-tailed grouse (G5TUS1)

Element	Common Name	CNHP Rank	Federal Status
<i>Andropogon gerardii-Sporobolus heterolepis</i>	Big bluestem-prairie dropseed xeric-tallgrass prairie	G2S2?	
<i>Danthonia parryi</i>	Parry oatgrass montane grassland	G2?S2?	
<i>Muhlenbergia montana-Danthonia parryi</i>	Mountain muhly-parry oatgrass montane grassland	G2S2	
<i>Quercus gambelii-Cercocarpus montanus/Muhlenbergia montana</i>	Gambel oak-mountain mahogany/mountain muhly mesic oak thickets	GUS?	

**Landownership:** Private

**Threats:** Residential development: Douglas County is the fastest growing county in Colorado, with a growth rate of 45.8 percent (from 1990 to 1994), and is one of the fastest growing counties in the country.

**Conservation Strategies:** Conservation Fund is developing plan for 100,000 acre area funded by GOCO

1. Promote biodiversity values to GOCO
2. Recommend reintroduction of Plains sharp-tailed grouse back to native habitat
3. Conduct inventory to update scientific information
4. Provide technical assistance; initiate monitoring of G2 plant communities

28. BAR NI PLANNING UNIT (Map 20)

Bar NI Ranch Conservation Site (Macrosite)

**County:** Las Animas

**Ecoregion:** Southern Parks and Ranges

**Ecological Significance:** Bar NI Ranch lies on the eastern flank of the Culebra Range in the southernmost portion of the Sangre de Cristo Mountain in Colorado. The ranch encompasses several entire upper watersheds of tributaries of the Purgatoire River; elevation ranges from approximately 8,400 to 13,368 ft. Bar NI supports excellent condition occurrences of three globally rare woodland and grassland communities and at least two state rare plant species (others are likely to be found). Excellent examples of montane wetlands, old growth Engelmann spruce forests, and alpine tundra are also represented.

Element	Common Name	CNHP Rank	Federal Status
<i>Cypripedium pubescens</i>	Yellow lady's slipper	G5S2	
<i>Goodyera repens</i>	Dwarf rattlesnake plantain	G5S2	
<i>Pinus edulis/Quercus X pauciloba</i>	Pinyon pine/oak foothills woodland	G2?S2	
<i>Danthonia parryi</i>	Parry oatgrass montane grassland	G2?S2?	
<i>Muhlenbergia montana-Danthonia parryi</i>	Mountain muhly-parry oatgrass montane grassland	G2S2	

**Landownership:** private, Cabot family

**Protection:** 27,246 acres are protected by TNC through a conservation easement with Cabot family

**Threats:** subdivision development, conversion of large tracts into smaller tracts

**Conservation Strategies:**

1. Promote inventory/expedition of Bar NI and adjacent ranches' search for acorn woodpecker
2. Pending results of expedition, determine next action steps such as pursuing further inventories and conservation easements
3. Consider expanding conservation strategy from Bar NI to larger region
4. Begin developing relationships with large landowners with help from Cabots
5. Finalize easement addition to Bar NI Ranch

29. YAMPA RIVER PLANNING UNIT (Map 21)

County: Routt

Ecoregion: North Central Highlands, Greater Green River Basin, Uinta Mountains

Ecological Significance: The Yampa River originates in the Gore and Park Ranges and flows over 240 miles to its confluence with the Green in Dinosaur National Monument. While the Yampa has several small reservoirs near its headwaters, the river is hydrologically intact: the natural processes of flooding and sediment transport operate largely unimpaired. The Yampa River represents a great opportunity to protect and restore native aquatic and riparian communities within the Colorado River system to their previous ecological condition by protecting natural hydrologic and geomorphic regimes. Three endangered fish species occupy the lower reaches and depend on its natural flow regime.

Landownership: private, BLM Craig District, Routt National Forest

Threats: alteration of the hydrologic regime, geomorphic regime, altered water quality regime, uncontrolled grazing, alien species, particularly leafy spurge (also exotic fish), gravel mining, and fragmentation of habitat due to dams, highways, residential development, agricultural conversion, and ski area development.

Conservation Strategies:

1. Lead private land protection (acquisition and conservation easements) of Yampa River at Morgan Bottoms, catalyze protection at other core sites within the basin
2. Recruit researcher to study hydroecology of willow shrublands
3. Develop restoration plan for Morgan Bottoms and initiate restoration of riparian vegetation in Morgan Bottoms, Elk, Morrison Creek and Yampa River at Yampa sites
4. Conduct integrated inventories, focusing on animals (birds)
5. Continue research on ecological processes of cottonwood forest system; initiate research on other systems, such as shrublands and develop ecological model
6. Continue work on protecting water rights

**Morrison Creek Conservation Site**

Ecological Significance: Morrison Creek, flows from Lynx Pass in the Gore Range to the Yampa River near Service Creek State Wildlife Area. The upper reaches support a long continuous unfragmented montane riparian system containing high-quality examples of deciduous riparian shrublands and herbaceous wet meadow, important yet unprotected components of the Upper Colorado River Basin.

Element	Common Name	CNHP Status	Federal Status
<i>Platanthera sparsiflora</i> var. <i>ensifolia</i>	Canyon bog orchid	G?T?S2	
<i>Pyrola picta</i>	Pictureleaf wintergreen	G4G5S2	
<i>Grus canadensis tabida</i>	Greater sandhill crane	G5TUS1	-/T
<i>Carex rostrata</i>	Beaked sedge montane wet meadow	G5S3	

<i>Salix boothii</i>	Booth's willow/mesic forb willow shrubland	G3S3	
<i>Salix geyeriana/Carex rostrata</i>	Geyer's willow/beaked sedge willow shrubland	GUS1	
<i>Alnus incana/Salix geyeriana</i>	Thinleaf alder/Geyer's willow shrubland	G?S?	

**Landownership:** Routt National Forest, private

**Protection:** no current protection; 1,100 acres are proposed for protection in site conservation plan

**Threats:** Floodplain and adjacent slopes are rapidly being developed for homes, portions of the site are being subdivided; other threats include clearing of willow shrublands for agriculture, overgrazing by cattle and horses, beaver removal, possible alteration of hydrologic regime (expansion of small dam upstream), and alien species.

**Conservation Strategies:**

1. Pursue conservation actions identified in site conservation plan
2. Develop relationship with landowners; pursue conservation easements
3. Pursue cooperative fencing project with State Land Board, Division of Wildlife and landowner

#### East Fork of Williams Fork Conservation Site

**Ecological Significance:** The East Fork of the Williams Fork flows north out of the Flat Tops Wilderness Area and ultimately into the Williams Fork River, a major tributary of the Yampa. This 11 mile reach supports the largest known occurrence of a narrowleaf cottonwood-blue spruce riparian forest. The East Fork is also winter habitat for bald eagle.

Element	Common Name	CNHP Rank	Federal Status
<i>Grus canadensis tabida</i>	Greater sandhill crane	G5TUS1	A/T
<i>Haliaeetus leucocephalus</i>	Bald eagle	G4S3	E/T
<i>Populus angustifolia-Picea pungens/Alnus incana</i>	Narrowleaf cottonwood-Colorado blue spruce/thinleaf alder-red osier dogwood	G2S2	
<i>Salix lasiandra</i>	Pacific willow/mesic graminoid	G2S2	
<i>Catostomus latipinnis</i>	Flannelmouth sucker	G3G4S3 S4	2

**Landownership:** private, Routt National Forest

**Threats:** residential development, season-long grazing and associated increase of weedy species, alteration of natural hydrologic and geomorphic regimes

**Protection:** Approximately 477 core acres and 2,400 secondary acres (11 river miles) proposed as a natural area

Conservation Strategies:

1. Pursue protection actions identified in site conservation plan, i.e., conservation easements
2. Work with Routt National Forest on watershed protection in upcoming Forest Plan revision

Elk River Conservation Site (Macrosite)

Ecological Significance: The Elk River, a major tributary of the Yampa River, flows from its headwaters along the Continental Divide in the Mt. Zirkel Wilderness Area on the west flank of the Park Range to its confluence with the Yampa 7 miles west of Steamboat Springs. The middle reach of approximately 13 river miles supports a complex mosaic of well-developed riparian communities with abundant regeneration of species such as narrowleaf cottonwood and willow. While human activities have altered much of the floodplain, the Elk River's intact hydrologic and geomorphic regimes provide excellent opportunities for restoration of the riparian vegetation to presettlement conditions. A number of high-quality remnant patches of communities occur. The uplands provide breeding habitat for the Columbian sharp-tailed grouse, a federal candidate for listing by USFWS.

Element	Common Name	CNHP Rank	Federal/State Status
<i>Populus angustifolia/Cornus stolonifera</i>	Narrowleaf cottonwood/red-osier dogwood	G4S2	
<i>Acer negundo-Populus angustifolia/Cornus stolonifera</i>	Box elder-narrowleaf cottonwood/dogwood forest	G2S2	
<i>Salix boothii</i>	Booth's willow/mesic graminoid willow shrubland	G3S2	
<i>Salix bebbiana</i>	Bebb's willow shrubland	G3S3	
<i>Populus angustifolia/Salix boothii-Salix lasiandra</i>	Narrowleaf cottonwood/Booth's willow-Pacific willow forest	G3S3	
<i>Populus angustifolia/Alnus incana</i>	Narrowleaf cottonwood/thinleaf alder shrubland	G4S3	
<i>Alnus incana-Cornus stolonifera</i>	Thinleaf alder-red-osier dogwood shrubland	G?S?	
<i>Grus canadensis tabida</i>	Greater sandhill crane	G5TU S1S2	-/T
<i>Tympanuchus phasianellus columbianus</i>	Columbian sharp-tailed grouse	G4T2 S2	2

Landownership: private

Threats: residential and subdivision development, bank stabilization/channelization, agricultural clearing, alien species, increased recreation, dam construction/reservoir operations

Conservation Strategies:

1. Pursue protection actions identified in site conservation plan, particularly conservation

easements

2. Partner with other land trusts and influence easement language to include biodiversity values
3. Pursue easements with Kurtz, Milligan, Harrington
4. Pursue conservation buyer for Studder tract

**Yampa River at Hayden Bottoms Conservation Site (combined with Morgan Bottoms for planning purposes)**

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal/State Status
<i>Acer negundo</i> - <i>Populus angustifolia</i> / <i>Cornus stolonifera</i>	Box elder-narrowleaf cottonwood/red osier dogwood riparian forest	G2S2	
<i>Grus canadensis tabida</i>	Greater sandhill crane	G4TUS 2	-/T

**Landownership:** DOW State Wildlife Area, private

**Threats:** uncontrolled grazing, invasive leafy spurge and other aliens, improper horse and cattle grazing, uncontrolled recreational use, water diversions, development of ponds in riparian area, bank stabilization, alteration of flood regime

**Conservation Strategies:**

1. Expand SWA; develop partnership with DOW for GOCO funding for acquisition of additions to DOW State Wildlife Area
2. Seek conservation easements

**Yampa River at Morgan Bottoms Conservation Site (combined with Yampa River at Coal Bank Gulch)**

**Ecological Significance:** Riparian bottomlands along the Yampa River encompass ca. 12 river miles from the upstream end within a narrow canyon to near the town of Hayden. Below the canyon, the river meanders over a wide floodplain of Quaternary alluvium. This reach harbors one of best known occurrences of a low-elevation deciduous riparian system in Colorado and the Rocky Mountain West, characterized by the globally rare box elder-narrowleaf cottonwood/red osier dogwood forest and at least 10 community types, as well as nesting and roosting sandhill cranes and bald eagles. Surrounding uplands support habitat for the Columbian sharp-tailed grouse, a candidate for listing by the USFWS. The site conservation plan is being revised at this time, with input from Holly Richter (PhD candidate at CSU who is developing an ecological model for the system) and the ecological boundaries of the site are being expanded to include approximately 40 miles of river from the confluence of the Elk River to the town of Craig.

Element	Common Name	CNHP Rank	Federal/State Status
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<i>Acer negundo</i> - <i>Populus angustifolia</i> / <i>Cornus stolonifera</i>	Box elder-narrowleaf cottonwood/red osier dogwood riparian forest	G2S2	
<i>Salix lasiandra</i>	Pacific willow	G3S3	
<i>Haliaeetus leucocephalus</i>	Bald eagle	G4S1	E/T
<i>Tympanuchus phasianellus columbianus</i>	Columbian sharp-tailed grouse	G4T2S2	2
<i>Grus canadensis tabida</i>	Greater sandhill crane	G4TUS2	E/T

Landownership: private, TNC, DOW

Protection: Conservancy Yampa River preserve (1034 acres protected to date in fee and leases); 3,565 acres proposed for protection in Morgan Bottoms

Threats: Bank stabilization/channelization, conversion of bottomlands to agriculture, dam construction/reservoir operations, gravel mining, residential development, livestock grazing, alien species invasions, oil and gas development, road construction and maintenance, beaver trapping

Conservation Strategies:

1. Pursue protection and management actions identified in site conservation plan; pursue cooperative fencing projects
2. Pursue acquisition and conservation easements to connect Powers tract with existing TNC preserve
3. Continue monitoring of riparian community; initiate riparian grazing monitoring study
4. Complete research on ecological processes/model (Holly Richter); initiate research on genetic variation between cottonwood stands
5. Initiate restoration of riparian vegetation

Yampa River at Juniper Hot Springs Conservation Site (part of a larger area which is important winter habitat for Colorado squawfish from Lily Park to 1/2 way between Juniper Canyon and Craig)

Ecological Significance: According to Miller and Hubert (1990) and Tyus (1995), this reach is a high concentration area and is important winter habitat for the Colorado squawfish. Information on the endangered fish species needs to be updated and entered into the CNHP database.

Element	Common Name	CNHP Rank	Federal Status	State Status
<i>Gila cypha</i>	Humpback chub	G1S1	E	E/E
<i>Ptychocheilus lucius</i>	Colorado squawfish	G1S1	E	E/E

Landownership: BLM Craig District, Little Snake Resource Area

**Yampa River at Yampa Conservation Site (data not yet entered into BCD, thus not included in scientific analysis)**

**Ecological Significance:** This site lies within the upper Yampa River watershed where the Bear River joins Wheeler and Phillips Creek to form the Yampa River. This stretch of the Yampa supports the best known example of the Booth's willow/beaked sedge willow shrubland; a number of other riparian communities of special concern occur in fair to good condition. The riparian vegetation has good potential for restoration. The site also supports a great blue heron rookery and the only known occurrence of the state rare autumn willow west of the Continental Divide.

Element	Common Name	CNHP Rank	Federal Status
<i>Salix geyeriana/Carex rostrata</i>	Booth's willow/beaked sedge willow shrubland	GUS1	
<i>Salix boothii-Salix geyeriana-Salix lasiandra</i>	Booth's willow-Geyer's willow-Pacific willow montane shrubland	G3?SU	
<i>Populus angustifolia/Salix boothii-Salix lasiandra</i>	narrowleaf cottonwood/Booth's willow-Pacific willow deciduous riparian forest	G3S3	
<i>Alnus incana/Salix geyeriana</i>	Thinleaf alder/Geyer's willow shrubland	G?S?	
<i>Carex nebraskensis</i>	Nebraska sedge wet meadow	G4S?	
<i>Carex rostrata</i>	Beaked sedge montane wet meadow	G3S3	
<i>Ardea herodias</i>	Great blue heron rookery	G5S3B	
<i>Salix serissima</i>	Autumn willow	G4S1	

**Landownership:** Private

**Threats:** alteration of the hydrologic regime, improperly managed livestock grazing, alien plant species, agricultural clearing of riparian shrublands, residential development, increased recreational use of area (trampling)

**Conservation Strategies:**

1. Pursue protection actions identified in the site conservation plan; revise plan as needed
2. Develop relationships with private landowners and pursue conservation easements, landowner recognition, or management leases

### 30. COLORADO RIVER AT DEBEQUE PLANNING UNIT (Map 2)

**Counties:** Garfield, Mesa

**Ecoregion:** Tavaputs Plateau

**Ecological Significance:** The Colorado River originates in on the Continental Divide in Rocky Mountain National Park and flows west through Glenwood Springs to Debeque and Grand Junction before flowing on to Utah. The river below Debeque drops from the Wasatch formation through stairstep cliffs of the Cretaceous Mesaverde Group to form Debeque Canyon. This low-elevation reach of the river provides habitat for one of the federally endangered razorback sucker, one of the last remaining warm water fish endemic to the Colorado River Basin. The humpback chub, another endangered fish of the Colorado River (but possibly a hybrid), may inhabit this reach as well (Miller and Hubert 1990, Tyus 1995). Upland sites in the region contain a rich assemblage of rare plant species, remnant plant communities including cold desert shrublands, salt meadow grasslands, Western Slope grasslands, deciduous riparian forests, nesting bald eagles and great blue heron rookeries, and the cold-water native Colorado River cutthroat trout.

**Landownership:** BLM Grand Junction District and Resource Area

**Threats:** Alteration of the hydrologic regime, invasion by Russian olive and tamarisk, invasion by alien fish species, residential development, gravel mining, etc. Proposed Roan Creek Reservoir by Getty/Cities Corp./Chevron could inundate Roan Creek site. In addition, the area supports high quality oil and gas reserves, and oil and gas activity is likely to increase in the future.

**Conservation Strategies:**

1. Update field information, contact experts and conduct further inventory of region; update aquatic information
2. Develop partnership with BLM to develop conservation strategy for area; management plan for ACEC
3. Develop conservation plan; update threats and investigate viability of site with Brian Richter, national hydrologist

#### Debeque Conservation Site

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal Status
<i>Phacelia scopulina</i> var. <i>submutica</i>	Debeque phacelia	G3S2	I
<i>Cirsium perplexans</i>	Rocky Mountain thistle	G3S1	
<i>Sclerocactus glaucus</i>	Uinta Basin hookless cactus	G3S3	T
<i>Xyrauchen texanus</i>	Razorback sucker	G1S1	E/E
<i>Populus deltoides</i> ssp. <i>wislizenii</i>	Fremont's cottonwood/squawbush	G2S2	

**Landownership:** BLM Grand Junction District and Resource Area, private

**Debeque Canyon Conservation Site**

**Ecological Significance:**

Element	Common Name	CNHP Rank	Federal/State Status
<i>Gilia stenothyrsa</i>	Narrowstem gilia	G3S1	
<i>Xyrauchen texanus</i>	Razorback sucker	G1S1	E/E
<i>Ardea herodias</i>	Great blue heron	G5S3B	
<i>Populus deltoides</i> ssp. <i>wislizenii</i> / <i>Rhus trilobata</i>	Fremont's cottonwood/squawbush riparian forest	G2S2	

**Landownership:** BLM Grand Junction District and Resource Area, private

**Rifle Stretch of Colorado River Conservation Site**

**Ecological Significance:** Note that razorback sucker in this reach are rare and incidental (Miller and Hubert 1990, Tyus 1990). An update of the fish information is strongly recommended.

Element	Common Name	CNHP Rank	Federal Status
<i>Haliaeetus leucocephalus</i>	Bald eagle	G4S1B	E/T
<i>Xyrauchen texanus?</i>	Razorback sucker?	G1S1	E/E
<i>Ardea herodias</i>	Great blue heron	G5S3B	
<i>Distichlis spicata</i> var. <i>stricta</i>	Saltgrass Western Slope salt meadow	G4S3	
<i>Populus deltoides</i> ssp. <i>wislizenii</i> / <i>Rhus trilobata</i>	Fremont's cottonwood/squawbush riparian forest	G2S2	

**Landownership:** private, BLM Grand Junction District, Glenwood Springs Resource Area

**Protection:** site is designated Area of Critical Environmental Concern

## Roan Creek Conservation Site

### Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Sclerocactus glaucus</i>	Uinta Basin hookless cactus	G3S3	T
<i>Phacelia scopulina</i> var. <i>submutica</i>	Debeque phacelia	G4T2S2	1
<i>Oncorhynchus clarki pleuriticus</i>	Colorado River cutthroat trout	G5T2T3S2	2/SC

Landownership: BLM Grand Junction District and Resource Area, Getty or Cities Services, private

## Deer Park Gulch Conservation Site

### Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Thalictrum heliophilum</i>	Sun-loving meadow-rue	G3S3	
<i>Atriplex confertifolia</i> / <i>Oryzopsis hymenoides</i>	Shadscale/Indian ricegrass Cold Desert shrubland	G2S2	
<i>Pseudotsuga menziesii</i> / <i>Symphoricarpos oreophilus</i>	Douglas fir/snowberry forest	G5S4	
<i>Pseudoroegneria spicata</i> - <i>Oryzopsis hymenoides</i>	Bluebunch wheatgrass-Indiangrass Western Slope grassland	G3SP?	

## Pyramid Ridge Conservation Site

**Ecological Significance:** Pyramid Rock, a geologic landmark, lies 500 ft. above shallow valleys which drain into the nearby Colorado River. The rock and ridge are composed of colorful claystone, sandstone and siltstone of the Atwood Gulch member of the Wasatch Formation. The site supports substantial populations of 4 globally rare plant species:

Element	Common Name	CNHP Rank	Federal Status
<i>Lomatium eastwoodiae</i>	Eastwood desert-parsley	G3S2	
<i>Sclerocactus glaucus</i>	Uinta Basin hookless cactus	G3S3	T
<i>Astragalus debequaeus</i>	Debeque milkvetch	G2S2	2
<i>Phacelia scopulina</i> var. <i>submutica</i>	Debeque phacelia	G4T2S2	1

Landownership: BLM Grand Junction District and Resource Area, private

**Protection:** RNA and Registered State Natural Area (160 acres)

**Threats:** trampling by livestock, oil and gas development, mining, overcollection by cactus collectors, and ORV use

### Coon Hollow Conservation Site

**Ecological Significance:** Barren grey soils of the Atwell Gulch Member of the Wasatch Formation support outstanding populations of three globally rare species, including the largest known population of the Debeque phacelia.

Element	Common Name	CNHP Rank	Federal Status
<i>Sclerocactus glaucus</i>	Uinta Basin hookless cactus	G3S3	T
<i>Astragalus debequaeus</i>	Debeque milkvetch	G2S2	2
<i>Phacelia scopulina</i> var. <i>submutica</i>	Debeque phacelia	G4T2S2	1

**Landownership:** BLM Grand Junction District and Resource Area

**Protection:** Recommended as critical habitat

**Threats:** unknown, possible uncontrolled grazing, oil and gas development

31. LARAMIE FOOTHILLS PLANNING UNIT (Map 22)

County: Larimer

Ecoregion: Northern Parks and Ranges

Ecological Significance: Laramie Foothills encompasses one of the last large foothills-plains transition zones of the Colorado Front Range. The site harbors a diverse assemblage of globally and state-rare plants, high-quality natural plant communities, and state-rare fish, mammals, and birds. Three globally rare plants, the Larimer aletes, the Bell's twinpod, and the Rocky Mountain cinquefoil, all endemic to north-central Colorado, are candidate species for listing (Category 2) by the U.S. Fish and Wildlife Service. The Bell's twinpod population is the largest known in the world.

Laramie Foothills contains one of the most extensive shrubland-grassland complexes in good condition known along the Front Range. The extensive, high-quality mountain mahogany/New Mexico feathergrass shrubland plant association is newly discovered and currently undescribed. There is one excellent example of the globally-rare bitterbrush-fringed sage/needle-and-thread sparse shrubland. Scattered ponderosa pine/granite woodlands support a diverse understory of native grasses. Also present is an extensive mixed-grass prairie; good condition prairie is uncommon along the Front Range; foothills grasslands are one of Colorado's most threatened and unprotected ecosystems. Front Range foothills grasslands and woodlands have been severely impacted by agriculture and urban and residential development. These and other impacts will only accelerate with the rapid population growth of the region. Protection of this landscape provides both fine- and coarse-filter biodiversity preservation along one of the most threatened habitats in Colorado, the foothills-plains ecotone.

Threats: residential and subdivision development, uncontrolled grazing, mining, increased recreational use

Landownership: private, The Nature Conservancy, State Land Board, Division of Wildlife, Arapaho Roosevelt National Forest

Protection: 1600 acres protected at TNC Phantom Canyon Preserve; 140 acres protected at Cap Rock; site conservation plan currently being completed for Laramie Foothills

Conservation Strategies:

1. Continue inventory of county and region
2. Lead private protection (fee title or conservation easement) of large tracts; cultivate private landowners
3. Continue monitoring of Larimer aletes; initiate monitoring of other rare species and communities, particularly grasslands and shrublands; monitor conservation easement
4. Initiate research on ecological processes and model
5. Pursue conservation strategies outlined in site conservation plan
6. Initiate/continue weed control and restoration

North Fork of Cache La Poudre River Conservation Site (Phantom Canyon)

Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Aletes humilis</i>	Larimer aletes	G3S3	2
<i>Potentilla effusa</i> ssp. <i>rupicola</i>	Rocky Mountain cinquefoil	G7T1S1	2
<i>Plecotus pallescens townsendii</i>	Townsend's big-eared bat	G4T4S3	
<i>Pinus ponderosa</i>	Ponderosa pine/granite woodland	GUSU	
<i>Stipa comata-Bouteloua gracilis</i>	Needle-and-thread grass-blue grama grassland	G5S2	

Landownership: The Nature Conservancy and other private

Protection: The Conservancy's Phantom Canyon Preserve protects all of above mentioned elements except the grassland in approximately 1600 acres (fee and conservation easement).

### Campbell Mountain Conservation Site

#### Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Physaria bellii</i>	Bell's twinpod	G2S2	2
<i>Etheostoma nigrum</i>	Johnny darter	G5S3	-/SC
<i>Etheostoma exile</i>	Iowa darter	G5S2	-/SC
<i>Cercocarpus montanus/Stipa neomexicana</i>	Mountain mahogany/New Mexico feathergrass shrubland	G2S2	
<i>Cercocarpus montanus/Stipa comata</i>	Mountain mahogany/needle-and-thread grass shrubland	G2S2	

### Cap Rock Conservation Site

#### Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Aletes humilis</i>	Larimer aletes	G3S3	2
<i>Besseyia wyomingensis</i>	Kitten-tail	G?S1?	
<i>Purshia tridentata-Artemisia frigida-Stipa comata</i>	Bitterbrush-fringed sage/needle-and-thread shrubland	G1G2S1	

Landownership: Nature Conservancy Preserve

32. NORTH ST. VRAIN PLANNING UNIT (Map 18)

North St. Vrain Conservation Site

County: Boulder

Ecoregion: Northern Parks and Ranges

Ecological Significance: The North St. Vrain, one of the last roadless canyons on the Front Range, represents a unique opportunity to preserve an intact aquatic system and watershed for natural and research values. The river cuts through a steep unglaciated canyon which ranges in elevation from 6,800 to 9,100 ft. The headwaters lie in Rocky Mountain National Park; the river flows into the St. Vrain River, a tributary of the South Platte River. A number of high-quality foothills plant communities occur, including an old growth ponderosa pine savanna, bitterbrush shrubland, and Parry oatgrass grassland, and both coniferous and deciduous riparian forests (not yet in the CNHP database). The area provides excellent habitat for a number of animal species, including bighorn sheep, elk, mule deer, and mountain lion.

Element	Common Name	CNHP Rank	Federal Status
<i>Aletes humilis</i>	Larimer aletes	G3S3	2
<i>Pinus ponderosa/Leucopoa kingii</i>	Foothills ponderosa pine/king fescue savanna	G2S2	
<i>Purshia iridentata/Muhlenbergia montana</i>	Bitterbrush/mountain muhly mixed foothill shrublands	G2S2	

Landownership: Arapaho-Roosevelt National Forest, Boulder Ranger District

Protection: Candidate Research Natural Area, TNC cooperative project with USFS; TNC acquired and transferred 320 acres to USFS

Conservation Strategies:

1. Support RNA designation
2. Promote research such as development of ecological model and population status of rare elements
3. Provide technical support such as monitoring
4. Seek funds from USFS to monitor rare species and communities
5. Stay abreast of Skaggs proposals regarding Wild and Scenic River Status which may increase recreational use of area

33. BIG CREEK LAKES PLANNING UNIT (Map 7)

Big Creek Lakes Conservation Site (Macrosite)

County: Jackson

Ecoregion: Northern Parks and Ranges

Ecological Significance: Big Creek Lakes lies within the North Fork of the North Platte watershed on the east flank of the Park Range just south of the Wyoming border. This area contains one of the largest and densest undisturbed known concentrations of glacially derived lakes in Colorado: the ecosystem complex consists of several thousand acres including approximately 300 wetlands. These wetland types include shallow open water communities (rooted submergent, rooted floating, and rooted emergent) and high water table communities (fens, floating mats, montane shrublands). The targeted elements tracked by CNHP include: 2 globally rare and 5 state rare plants, one state rare frog, and the only known breeding population of the state-rare bufflehead. A number of other ducks and waterbirds inhabit the wetlands as well. Due to its unusual climatic setting, the Park Range, which is part of the Southern Rocky Mountains, is well known for its Central Rocky Mountain and Pacific Northwest floristic elements.

Element	Common Name	CNHP Rank	Federal/State Status
<i>Sisyrinchium pallidum</i>	Pale blue-eyed grass	G3S3	2
<i>Cypripedium fasciculatum</i>	Purple lady's slipper	G3S3	2
<i>Drosera rotundifolia</i>	Roundleaf sundew	G5S1	
<i>Eriophorum gracile</i>	Slender cottongrass	G5S2	
<i>Comarum palustre</i>	Marsh cinquefoil	G5S1	
<i>Carex lasiocarpa</i>	Slender sedge	G5S?	
<i>Carex limosa</i>	Mud sedge	G5S?	
<i>Rana sylvatica</i>	Wood frog	G5S1	-/T
<i>Carex aquatilis-Carex rostrata</i>	Sedge/beaked sedge montane wet meadow	G?S2	
<i>Bucephala albeola</i>	Bufflehead	G5S1B	

Landownership: USFS, Routt National Forest, North Park District

Protection: proposed Research Natural Area (6512 acres)

Threats: Increased recreational use of wilderness area and along Continental Divide National Scenic Trail, uncontrolled grazing, alien species such as Canada thistle, introduction of non-native fish species into the area.

Conservation Strategies:

1. Support RNA designation
2. Promote research on rare elements and ecological processes

34. AIKEN CANYON PLANNING UNIT (Map 13)

**Aiken Canyon Conservation Site**

County: El Paso

Ecoregion: Northern Parks and Ranges

Ecological Significance: One of largest high-quality foothills ecosystems remaining on the Front Range. The site supports excellent occurrences of two foothills communities of special concern which are as yet unprotected elsewhere. Also present are undisturbed examples of ponderosa pine, white fir and Douglas fir communities. Aiken also contains an unusual diversity and concentration of animal species, including numerous neotropical migratory bird species. The canyons provide excellent habitat for the Mexican spotted owl, a federally endangered species (G3T3S1), known to nest in nearby canyons.

Element	Common Name	CNHP Rank	Federal Status
<i>Pinus edulis-Juniperus monosperma/Stipa scribneri</i>	Pinyon pine- one seeded juniper/Scribner needlegrass woodland	G2G3S1 ?	
<i>Quercus gambelii/Carex inops</i>	Gambel oak/sun-loving sedge mesic oak thicket	GUS?	

Landownership: State Land Board, TNC, private

Protection: A portion of the site is protected in fee and conservation lease (Aiken Canyon Conservancy Preserve, 1361 acres) and is a State Natural Area (1600 acres); 3,650 acres are proposed for protection in site plan

Threats: Residential development, fire suppression, highway construction, gravel mining, uncontrolled livestock grazing

Conservation Strategies:

1. Pursue protection strategies as outlined in site conservation plan (e.g., pursue Morley, Allemendinger, Ingersol, etc. tracts)
2. Develop partnership with BLM and Ft. Carson to manage/protect large holdings for natural values
3. Facilitate inventory of Ft. Carson by CNHP
4. Continue involvement with counties in Front Range Backdrop and GOCO
5. Update site conservation plan in FY 1997
6. Further understand ecological processes driving system; refine ecological models for communities
7. Continue monitoring/research of rare communities

35. LAKE FORK OF GUNNISON PLANNING UNIT (Map 15)

Lake Fork of Gunnison River Conservation Site

County: Hinsdale

Ecoregion: South-Central Highlands

Ecological Significance: The Lake Fork of the Gunnison is one of the major streams draining the north slope of the San Juan Mountains. The Lake Fork valley in this area is broad, but the river has cut a narrow steep-sided canyon about 150 feet deep in the center of the valley. This river has formed a very beautiful narrow canyon that supports one of the largest and highest-quality occurrences known of the Colorado blue spruce/thinleaf alder montane riparian forest and two rare plant species.

Element	Common Name	CNHP Rank	Federal Status
<i>Gilia penstemonoides</i>	Black Canyon gilia	G3S3	3C
<i>Listera borealis</i>	Northern twayblade	G5?S2	
<i>Picea pungens/Alnus incana</i>	Colorado blue spruce/thinleaf alder montane riparian forest	G2S2	

Landownership: BLM, Gunnison Resource Area

Protection: TNC protected 1,007 acres through cooperative project with BLM

Threats: residential development and associated impacts such as road building, possible water diversion or upstream water development, small-scale problem with invasive weedy species, increasing recreational use

Conservation Strategies:

1. Possible mitigation project with funding from Blue Lake Reservoir
2. Continue monitoring of rare riparian community; seek funding from BLM
3. Partner with other conservation groups to acquire lands and resell with conservation easements; direct Bureau of Reclamation funds towards acquisition
4. Develop relationship with private landowners in the area
5. Update site design, determine TNC role.

36. LITTLE SNAKE RIVER PLANNING UNIT (Map 17)

Horse Draw Conservation Site

County: Moffat

Ecoregion: Greater Green River Basin

Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Cryptantha caespitosa</i>	Tufted cryptanth	G3S2	
<i>Atriplex gardneri/Leymus salinus</i>	Gardner's mat saltbush/salina wildrye shrublands	G2S2	
<i>Atriplex gardneri/Oryzopsis hymenoides</i>	Gardner's saltbush/Indian ricegrass shrublands	G3S2	
<i>Atriplex confertifolia/Stipa comata</i>	Shadscale/needle-and-thread grass cold desert shrubland	G1G2S 1S2	

Landownership: BLM Craig District Little Snake Resource Area

Threats: unknown

Conservation Strategies:

1. Catalyze BLM and State Land Board to protect the area; meet to develop joint strategy
2. Provide technical assistance to BLM on management of rare plants; initiate monitoring of rare plants; seek funding from BLM to monitor rare plans to determine population status
3. Promote inventories to update field information and status of elements

37. MESA DE MAYA PLANNING UNIT (Map 23)

Mesa de Maya Conservation Site (Macrosite)

County: Las Animas

Ecoregion: Arkansas Tablelands

Ecological Significance: Mesa de Maya is a unique basalt-capped, east-west trending mesa at the juncture of the Rocky Mountain foothills and the shortgrass prairie. The mesa straddles three states and has been identified as a Great Plains initiative site due to the diversity of highly-ranked, high-quality elements representative of the shortgrass prairie ecosystem. A number of plant communities of concern occur (Muldavin 1989). The mesa tops support shortgrass prairie dominated by bluegrama grass, pinyon-juniper woodlands, and patches of ponderosa pine. The unique combination of geography, landscape factors, and climate has fostered an unusual juxtaposition of Rocky Mountain woodlands and forest, with plains grasslands. In addition to the high-quality communities, the mesa supports a large number of state rare species, such as snails, butterflies, birds, reptiles, and possibly some endemic plants. The mesa marks the northern distribution of a number of species representative of the Chihuahuan Desert, such as Texas beargrass (G5S1) and mesquite (*Prosopis glandulosa* (G5?S?)). Several other rare plants have been very recently been documented from the area (listed below but not considered in this analysis). The CNHP recently completed inventory work for COFO on the Whittenburg Ranch, but survey results are not yet available.

Element	Common Name	CNHP Rank	Federal Status
<i>Andropogon gerardii-Schizachyrium scoparium</i>	Big bluestem-little bluestem xeric tallgrass prairie	G3S2	
<i>Juniperus scopulorum/Cercocarpus montanus</i>	Rocky Mountain juniper/mountain mahogany woodland	G2S2	
<i>Juniperus scopulorum/Quercus undulata</i>	Rocky Mountain juniper/wavyleaf oak woodland	G2?S2?	
<i>Cercocarpus montanus/Quercus montanus</i>	Mountain mahogany/wavy leaf oak scrubland	Unkn wn	
<i>Juniperus monosperma-Pinus edulis/Quercus undulata</i>	One-seeded juniper-pinyon pine/wavyleaf oak	G4S2	
<i>Pinus edulis/Quercus X paucilobus</i>	Pinyon pine/oak woodlands	G5S2	
<i>Nolina texana</i>	Texas beargrass	G5S1	
<i>Prosopis glandulosa</i>	Mesquite	G5?S?	
<i>Frasera coloradensis</i>	Colorado green gentian	G2S2	C2
<i>Cheilanthes wootonii</i>	Wooton's lip fern	G5S?	

<i>Cheilanthes eatonii</i>	Eaton's lip fern	G5?S?	
<i>Asclepias oenotheroides</i>	Milkweed	G4G5S 1	
<i>Chenopodium cycloides</i>	Sandhill goosefoot	G3?S1?	C2

Landownership: Whittenburg, Lowden, private, state

Threats: Fire suppression, habitat fragmentation through fencing and construction of water pumping systems, and overgrazing by livestock; the Whittenburg Ranch is currently for sale, and there is uncertainty of how a new manager would manage the site.

Conservation Strategies:

1. Participate in KOSE funded partnership with OKFO and NMFO and heritage programs to initiate a landscape level site conservation plan for Mesa de Maya region
2. Develop conservation strategy for Whittenburg Ranch and larger area pending results of #1.
3. Determine protection strategy for key parcels such as Whittenburg (Spool) Ranch and pursue funding by GOCO
4. Continue to pursue long-term protection of ranch owned by Lowden
5. Pursue further inventory of region
6. Develop relationship with other NGO's, such as the Archaeological Conservancy Society, to investigate potential partnerships

**Jesus Mesa Conservation Site**

Ecological Significance:

Element	Common Name	CNHP Rank	Federal Status
<i>Andropogon gerardii-Schizachyrium scoparium</i>	Big bluestem-little bluestem xeric tallgrass prairie	G2S2	
<i>Nolina texana/Bouteloua eriopoda</i>	Texas beargrass/black grama grass	GUSU	
<i>Notholaena standleyi</i>	Standley's cloak fern	G4S?	
<i>Asclepias macrotis</i>	Milkweed	G4S?	

Landownership: Whittenburg, Spool Ranch

Threats: Ranch for sale, possible overgrazing if sold and managed by another party.

**Cobert Mesa Conservation Site**

Ecological Significance:

Element	Common Name	CNHP Rank

<i>Andropogon gerardii-Schizachyrium scoparium</i>	Big bluestem-little bluestem xeric tallgrass prairie	G2S2
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Landownership: private and state, Whittenburg Ranch

Threats: Ranch for sale, uncertainty of buyer; owner developing water and increasing grazing on previously ungrazed mesa tops

Conservation Strategies: see above

Other significant sites at the northwest end of the mesa identified for protection include Gotera Rincon and Mesa de Maya (Louden and Anderson tracts) (Muldavin 1989 and Galatowitsch 1985).

<p>1982-1983</p>	<p>1984-1985</p>
<p>1986-1987</p>	<p>1988-1989</p>
<p>1990-1991</p>	<p>1992-1993</p>

38. WHITE RIVER PLANNING UNIT (Map 10)

Lower White River Conservation Site (Macrosite)

County: Rio Blanco

Ecoregion: Uinta Basin

Ecological Significance: The White River, a major tributary of the Green River, flows west from its headwaters in the Flat Tops Range. The White River contributes critical sediment and flows to the Green River. The lower reach near the Utah state line was important (wintering) habitat for the Colorado squawfish prior the construction of the White River dam in the early eighties (below Meeker); the current status needs to be confirmed.

Element	Common Name	CNHP Rank	Federal/State Status
<i>Haliaeetus leucocephalus</i>	Bald eagle	G4S1S3	E/T
<i>Ptychocheilus lucius</i>	Colorado squawfish	G1S1	E/E

Landownership: BLM Craig District, White River Resource Area

Threats: altered hydrologic regime, alien species

Conservation Strategies:

1. Support fish recovery program
2. Confirm information and status of fish and eagle nest; enter into BCD

39. WESTERN HIGH PLAINS PLANNING UNIT (Map 24)

County: Weld

Ecoregion: Central High Plains

**Ecological Significance:** The Western High Plains has long been recognized for its high biodiversity significance; it was proposed as a Conservancy Bioreserve and a Great Plains Initiative site. The area encompasses much of the Pawnee National Grasslands, and is predominantly bluegrama shortgrass and needle-and-thread grass-bluegrama mixed prairie. Grasslands and all endemic grassland bird species of this region evolved under a grazing regime dominated by bison. Much of the grassland has been subjected to agricultural conversion and livestock grazing. Other communities of interest include the scarp woodlands, clay barrens, break-shrub, and shrub-steppe. At least 3 rare plant species are known to occur; more are expected. The grasslands provide some of the last remaining habitat for declining prairie species, such as mountain plover, and other rare species, including swift fox and ferruginous hawks, all of which are dependent on the black-tailed prairie dog. The prairie dog was recently petitioned to be classified as a Category 2 candidate species under the ESA. Several rare fish also occur. There is high potential for restoration of a functioning prairie ecosystem, if managed appropriately. Extensive sandhills along the South Platte River support one of the best known sandhill ecosystems in Colorado. Further surveys are needed.

Element	Common Name	CNHP Rank	Federal Status
<i>Cryptantha cana</i>	Mountain cat's eye	G5S2	
<i>Parthenium alpinum</i>	Alpine feverfew	G2S1	
<i>Lomatium nuttallii</i>	Dog parsley	G3S1	
<i>Charadrius montanus</i>	Mountain plover	G3S2B	1/SC
<i>Vulpes velox</i>	Swift fox	G4T4S3?	2
<i>Buteo regalis</i>	Ferruginous hawk	G4S3	2
<i>Juniperus scopulorum/Schizachyrium scoparium</i>	Rocky Mountain juniper/little bluestem scarp woodlands	G3S2S3	
<i>Bouteloua gracilis-Buchloe dactyloides</i>	Bluegrama grass-buffalo grass shortgrass prairie	G3S2?	
<i>Stipa comata-Bouteloua gracilis</i>	Needle-and-thread grass-bluegrama mixed prairie	G5S2S3	

**Landownership:** USFS Pawnee National Grasslands, private

**Threats:** conversion of prairie for agriculture, planting of cool season grasses that displace shortgrass prairie plants, uncontrolled livestock grazing, prairie dog removal, alien plant species

**Conservation Strategies:**

1. Facilitate/promote further field inventories by CNHP; define specific area of interest
2. Support Research Natural Area designations

3. Develop relationship with landowners and lead private land protection
4. Establish monitoring of rare plant communities; partner with other organizations to monitor animals
5. Promote research on rare plant communities
6. Develop contact with and pursue cooperative projects with the Pawnee Natural History Society in Grover.
7. Investigate role of TNC in addressing Conservation Reserve Program (CRP) activities in Weld County.
8. Encourage native seed planting, larger block sizes, and priority areas adjacent to existing rangeland.

**Well's Ranch Conservation Site (Platte River Sandhills)**

**Ecological Significance:** This approximately 30,000 acre ranch lies on a sandy terrace above the South Platte River supports one of the highest-quality known northern sandhill prairies. Sandhill prairie is thought to have been found along most of the South Platte River terraces and over much of the northeast portion of the state, and extending into Nebraska, prior to settlement. The site lies within historic range of the greater prairie chicken and is potential habitat for a globally rare sphinx moth, known to occur in nearby Rogan Dunes.

Element	Common Name	CNHP Rank	Federal Status
<i>Artemisia filifolia/Andropogon hallii</i>	Sandsage/Hall's bluestem	G2S2	
<i>Andropogon hallii-Calamovilfa longifolia</i>	Hall's bluestem-sandreed grass	G2S2	

**Landownership:** private (Wells)

**Protection:** none at present, formerly ca. 5,100 acres proposed for protection

**Threats:** Large ranch may be broken up when current owner dies; uncontrolled grazing and agricultural conversion to center-pivot irrigation.

Other significant sites within this region (but not limited to) include: Pawnee Woodlands harbor Rocky Mountain juniper/little bluestem scarp woodlands, restricted to a 20 mile escarpment composed of sandstones and gravels of the Ogallala Formation (private and Pawnee National Grassland), and Dave's Draw, a proposed Research Natural Area on the Pawnee National Grassland, which also supports high-quality scarp woodlands, as well as Great Plains woody draws, mixed and short grass prairie. Several sites on the National Grassland were recently identified by the Heritage Program as potential research natural areas: Willow Creek, Two Mile Creek, Indian Creek, Keota, Little Owl Creek, Main and Porter Pasture.

40. JEFFERSON COUNTY PLANNING UNIT (Map 18)

**Indian Gulch Conservation Site**

County: Jefferson

Ecoregion: Northern Parks and Ranges

Ecological Significance: Indian Gulch is a tributary of Clear Creek just above Golden and provides an excellent example of the lower timberline transition zone. The site harbors two globally rare foothills plant communities, the federally threatened Ute ladies' tresses, and has potential for the rare Ottoe skipper butterfly (*Hesperia ottoe*, G3?S2).

Element	Common Name	CNHP Rank	Federal Status
<i>Spiranthes diluvialis</i>	Ute ladies' tresses	G2S1	T.
<i>Pinus ponderosa/Cercocarpus montanus/Andropogon gerardii</i>	Ponderosa pine/mountain mahogany/big bluestem foothills scrub woodland	G2S2	
<i>Cercocarpus montanus/Stipa comata</i>	Mountain mahogany/needle-and-thread grass mixed foothill shrubland	G2S2	

Landownership: private, R. Goltra

Size: ca. 1,200 acres

Threats: invasion of alien species, sand and gravel mining, fire suppression

Conservation Strategies:

1. Pursue potential cooperate project with Jefferson County Open Space Department
2. Develop relationship with landowner

41. SALIDA PLANNING UNIT (Map 25)

**Droney Gulch Conservation Site**

County: Chaffee

Ecoregion: North-Central Highlands

Ecological Significance: Droney Gulch consists of sparsely vegetated hills of lucustrine alluvium of the Dry Union Formation. These stark barren slopes support one of most outstanding (largest and least disturbed) occurrences of Brandegee wild buckwheat, a Category 1 species for listing by the U.S. Fish and Wildlife Service.

Element	Common Name	CNHP Rank	Federal Status
<i>Eriogonum brandegei</i>	Brandegee wild buckwheat	G2S2	1

Landownership: SLB, BLM, private

Protection: A portion of the population is protected in the BLM Droney Gulch designated ACEC (828 acres)

Threats: uncertainty of private land management, increasing residential development in area, developing water for hydroplanting, highly erodable soils vulnerable to ORV and livestock use,

Conservation Strategies:

1. Pursue further inventories in region; expand design boundaries of ACEC to include state lands to the north; inventory national forest lands
2. Schedule site visit to state lands and determine nature of water development on state land (hydroplanting)
3. Update site design
4. Seek low cost protection of site; develop capacity to address protection or locate another party, such as CNAP to take the lead on protection

**Harrington Gulch Conservation Site**

County: Chaffee

Ecological Significance: Harrington Gulch, sitting just west of the town of Salida adjacent to agricultural lands, supports one of largest known occurrences of Brandegee wild buckwheat and disjunct occurrence of Arkansas River feverfew.

Element	Common Name	CNHP Rank	Federal Status
<i>Parthenium terraneuris</i>	Arkansas River feverfew	G2S2	2
<i>Eriogonum brandegei</i>	Brandegee wild buckwheat	G2S2	1

Landownership: private, Preston Kaess

Threats: possible ORV, uncontrolled grazing

Conservation Strategies:

1. Develop relationship with owner

2. Need to either develop capacity to address protection or to locate another party, such as CNAP to take the lead on protection

**Cleora Conservation Site**

**County:** Chaffee

**Ecological Significance:** One of largest known occurrences of Brandegee wild buckwheat.

Element	Common Name	CNHP Rank	Federal Status
<i>Eriogonum brandegei</i>	Brandegee wild buckwheat	G2S2	1

**Landownership:** BLM, private

**Threats:** ORV use

**Conservation Strategies:**

1. Work with BLM on management of area
2. Provide technical assistance
3. Nominate site for ACEC designation (determine if CNAP can take lead)

42. ANIMAS RIVER PLANNING UNIT (Map 15)

**Animas River Conservation Site (Macrosite)**

County: La Plata, San Juan

Ecoregion: South-Central Highlands

Ecological Significance: The site consists of a 13.5 mile reach of the Animas River, between 7700 and 8800 ft. in elevation. The site occupies the alluvial bottomlands in the deeply glaciated Animas River Canyon, and is surrounded by 14,000 foot peaks of the needle Mountains, which consist of Precambrian gneisses, schists, and granites. The Animas River proposed preserve is the longest undisturbed river reach in Colorado, if not in the Upper Colorado River Basin. The site contains the best known occurrence of the white fir-Colorado blue spruce-narrowleaf cottonwood montane riparian forest, restricted to the San Juan Mountains and the mountains in northeastern New Mexico. Also present is the subalpine fir-Engelmann spruce montane riparian forest, known only from west-central to southwestern Colorado (Baker 1986).

Element	Common Name	CNHP Rank	Federal Status
<i>Abies concolor-Picea pungens-Populus angustifolia</i>	White fir-Colorado blue spruce-narrowleaf cottonwood montane riparian forest	G1S1	
<i>Abies lasiocarpa-Picea engelmannii</i>	Subalpine fir-Engelmann spruce montane riparian forest	GUSU	

County: La Plata

Landownership: NFS, San Juan National Forest, Animas Ranger District, private, Durango and Silverton Narrow Gauge Railroad (easement for railroad tracks) (3 unpatented mining claims)

Protection: no current protection (13.5 river miles proposed preserve)

Threats: potential upstream water development, upstream mining activity and sediment from old mines, alteration due to increased recreational use, effects of railroad (possible fire, track repair), potential mineral development (mining claims and associated cabins, residential development)

Conservation Strategies:

1. Develop relationship with private owners and mobilize protection; acquire unpatented mining claims; pursue mineral withdrawal
2. Limit further second home construction
3. Support RNA or SIA special designation in upcoming Forest Plan revision
4. Possible land exchange or coop with FS
5. Update site conservation plan

## OTHER PLANNING UNITS/CONSERVATION SITES

Sites recently identified as having high ecological significance but which recent data were not incorporated into the BCD at the time of the scientific analysis for the statewide plan include the following (with tentative element information):

### 43. WEST BIJOU CREEK: Combs Ranch (Map 19)

County: El Paso, Elbert

Ecoregion: Arkansas Tablelands

Ecological Significance: The Bijou Basin, headwaters of the West Bijou Creek, is rimmed by escarpments which are capped by the Castle Rock Conglomerate. Bijou Springs Ranch lies at the northeast edge of Palmer Divide and the Black Forest, a low forested divide separating the Platte and Arkansas drainages. This ranch is the highest-quality site known within the W. Bijou watershed. At least 9 major vegetation types have been described for this transition zone between the Black Forest and the prairie: pinyon-juniper woodland, ponderosa pine forest, Douglas fir forest, mountain mahogany shrubland, prairie dropseed relict prairie, mixed shrublands, northern mixed grass prairie, and short grass prairie). Tentative surveys by CNHP have identified excellent condition grasslands (tallgrass prairie with sandhill components) and ponderosa pine/mountain mahogany woodlands (with little and big bluestem in the understory). Further definition of the communities is ongoing. Five core sites have been identified downstream on the W. Bijou which support the globally rare Plains cottonwood-peachleaf willow/coyote willow (*Populus deltoides-Salix amygdaloides/Salix exigua*) deciduous riparian forest.

Landownership: private, H. Combs

Protection: no protection to date; good potential for conservation easement or donation (19,000 acres)

Threats: Subdivision development of the Black Forest, overgrazing, alien species (introduced animals and invasive weeds)

Conservation Strategies:

1. Develop relationship with private landowner
2. Assist with estate planning; pursue donation

**44. CRESTED BUTTE (Map 9)**

**County:** Gunnison

**Ecoregion:** North-Central Highlands

**East River**

**Ecological Significance:** Booth's willow-Wolf's willow/mesic forb (*Salix boothii-Salix wolfii*) and Wolf's willow-Western river birch riparian shrublands (*Salix wolfii-Betula occidentalis*); very large valley bottom wetland/riparian/beaver complex.

**Threats:** De-watering of river and development associated with Mt. Crested Butte ski area

**Slate River**

**Ecological Significance:** Largest known occurrence of Geyer's willow-Wolf's willow/Canadian reedgrass (*Salix geyeriana-Salix wolfii/Calamagrostis canadensis*; G3S1), large valley bottom wetland/riparian/beaver complex

**Threats:** Residential development

45. MEADOW SPRINGS RANCH (Map 22)

County: Weld

Ecoregion: Central High Plains

Ecological Significance: Spring Creek floodplain is fed by groundwater, and supports a large 420 acre wetland. Also present is a large population (2,000-3,000 individuals) and the only known extant (natural) population of Colorado butterfly weed in Colorado (*Gaura neomexicana* ssp. *coloradensis*) (G5T1S1 and Category 1 species). Historically found along the Front Range from Wyoming to Douglas County; all other populations occur in Wyoming. Other Colorado populations apparently extirpated. Several large populations protected in Research Natural Area at Warren Air Force Base in Wyoming. Rocky Mountain blazing star (*Liatris ligulistylis*), an uncommon species in Colorado, is also known from the site (G?S?).

Threats: Land currently for sale by the City of Ft. Collins; possible alteration of flood regime, uncontrolled grazing; site lies within 26,000 acre ranch acquired for sludge treatment

Conservation Strategies:

1. Provide technical assistance to the City of Ft. Collins; develop management plan and initiate monitoring project
2. Encourage City of Ft. Collins to maintain and manage wetland as a natural area

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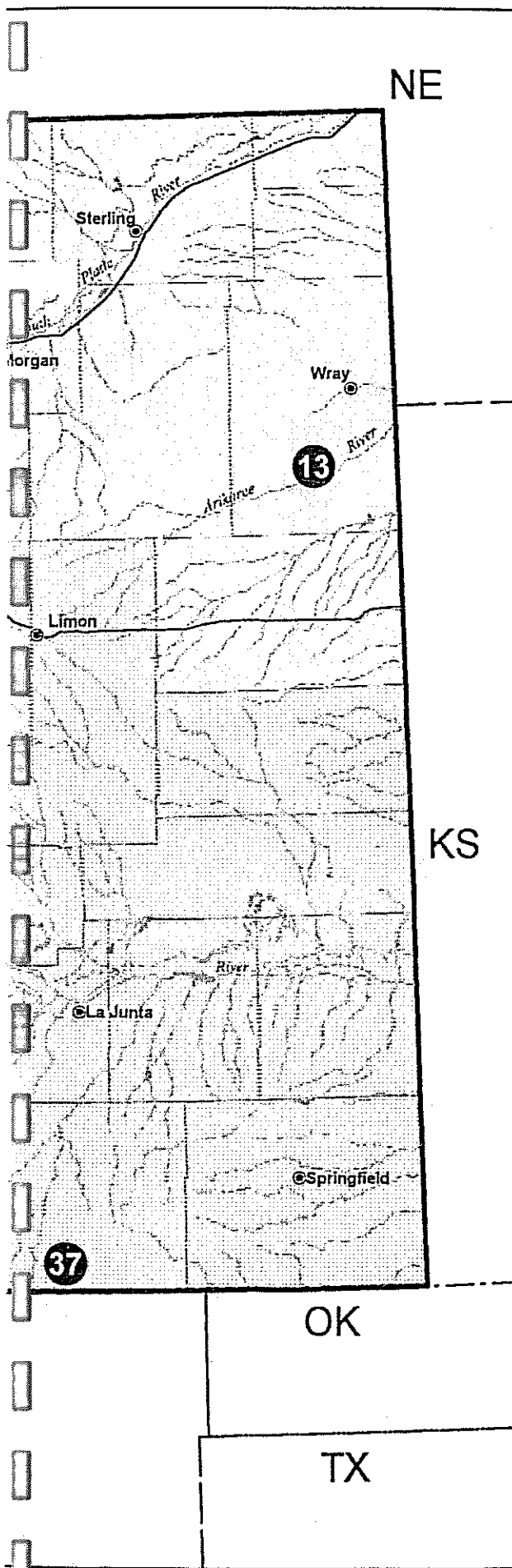
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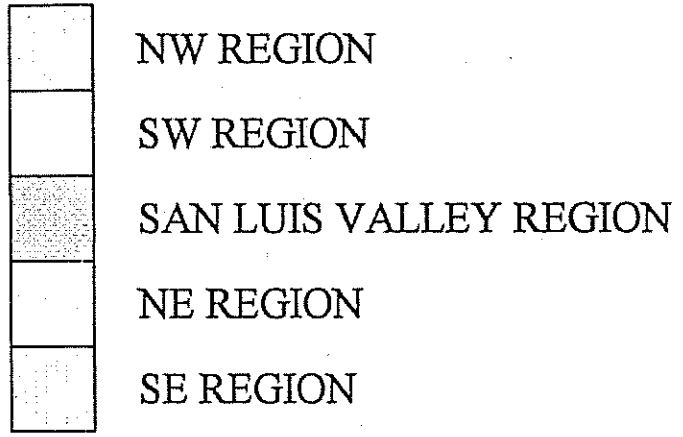
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# Colorado Planning Units by Project Region



## PROJECT REGIONS



- COFO State Office
- Regional Project Office

### PLANNING UNITS (priority order)

- |                             |                          |
|-----------------------------|--------------------------|
| 1 MESA VERDE                | 24 BROWNS PARK           |
| 2 PARACHUTE CREEK           | 25 DINOSAUR NM           |
| 3 DOLORES RIVER             | 26 BOULDER COUNTY        |
| 4 SAN MIGUEL RIVER          | 27 GREENLAND RANCH       |
| 5 TROUBLESOME CREEK         | 28 BAR NI                |
| 6 MOSQUITO PEAKS            | 29 YAMPA RIVER           |
| 7 NORTH PLATTE RIVER        | 30 COLORADO R. - DEBEQUE |
| 8 SAN LUIS VALLEY           | 31 LARAMIE FOOTHILLS     |
| 9 SOUTH BEAVER CREEK        | 32 NORTH ST. VRAIN       |
| 10 PICEANCE BASIN           | 33 BIG CREEK LAKES       |
| 11 UTE MOUNTAIN UTE         | 34 AIKEN CANYON          |
| 12 UNCOMPAGRE BADLANDS      | 35 LAKE FORK GUNNISON    |
| 13 ARIKAREE RIVER           | 36 LITTLE SNAKE          |
| 14 KREMMLING                | 37 MESA DE MAYA          |
| 15 PIKES PEAK               | 38 WHITE RIVER           |
| 16 COLORADO R. - GRAND JUNC | 39 WESTERN HIGH PLAINS   |
| 17 UNCOMPAGRE PEAK          | 40 JEFFERSON COUNTY      |
| 18 REDCLOUD PEAK            | 41 SALIDA                |
| 19 SOUTHERN UTE             | 42 ANIMAS RIVER          |
| 20 ROCKY MOUNTAIN NP        | 43 WEST BIJOU CREEK      |
| 21 SOUTH PARK               | 44 CRESTED BUTTE         |
| 22 ARKANSAS RIVER           | 45 MEADOW SPRINGS        |
| 23 RAVEN RIDGE              |                          |



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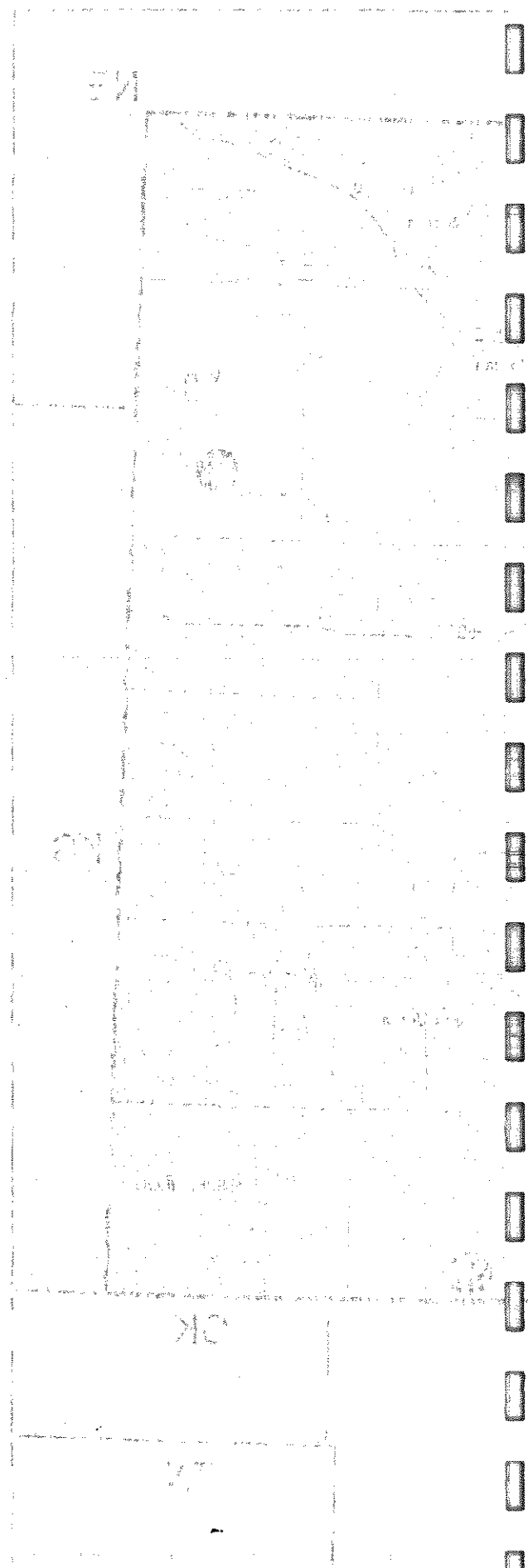
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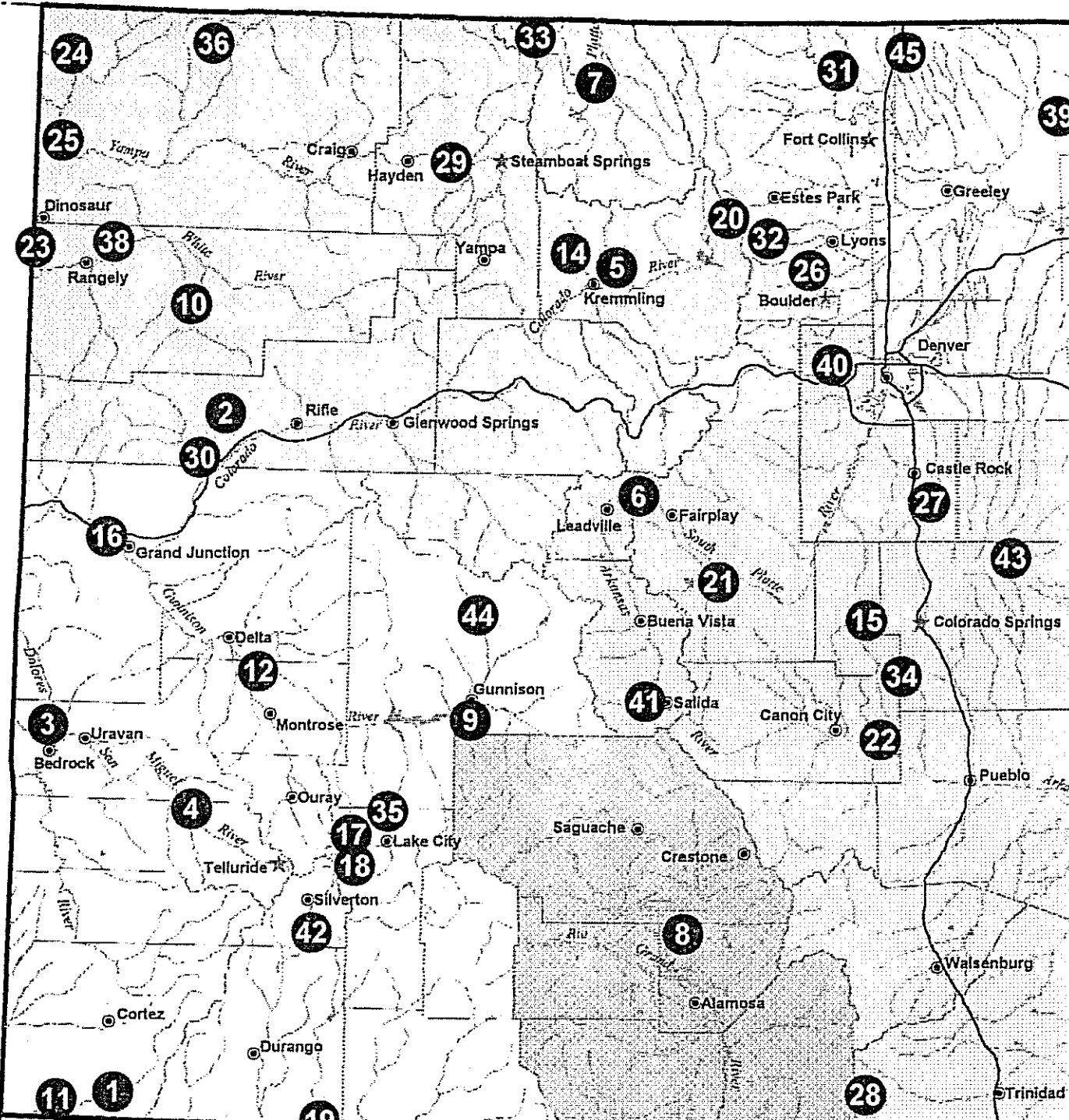
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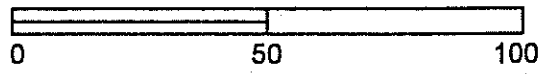
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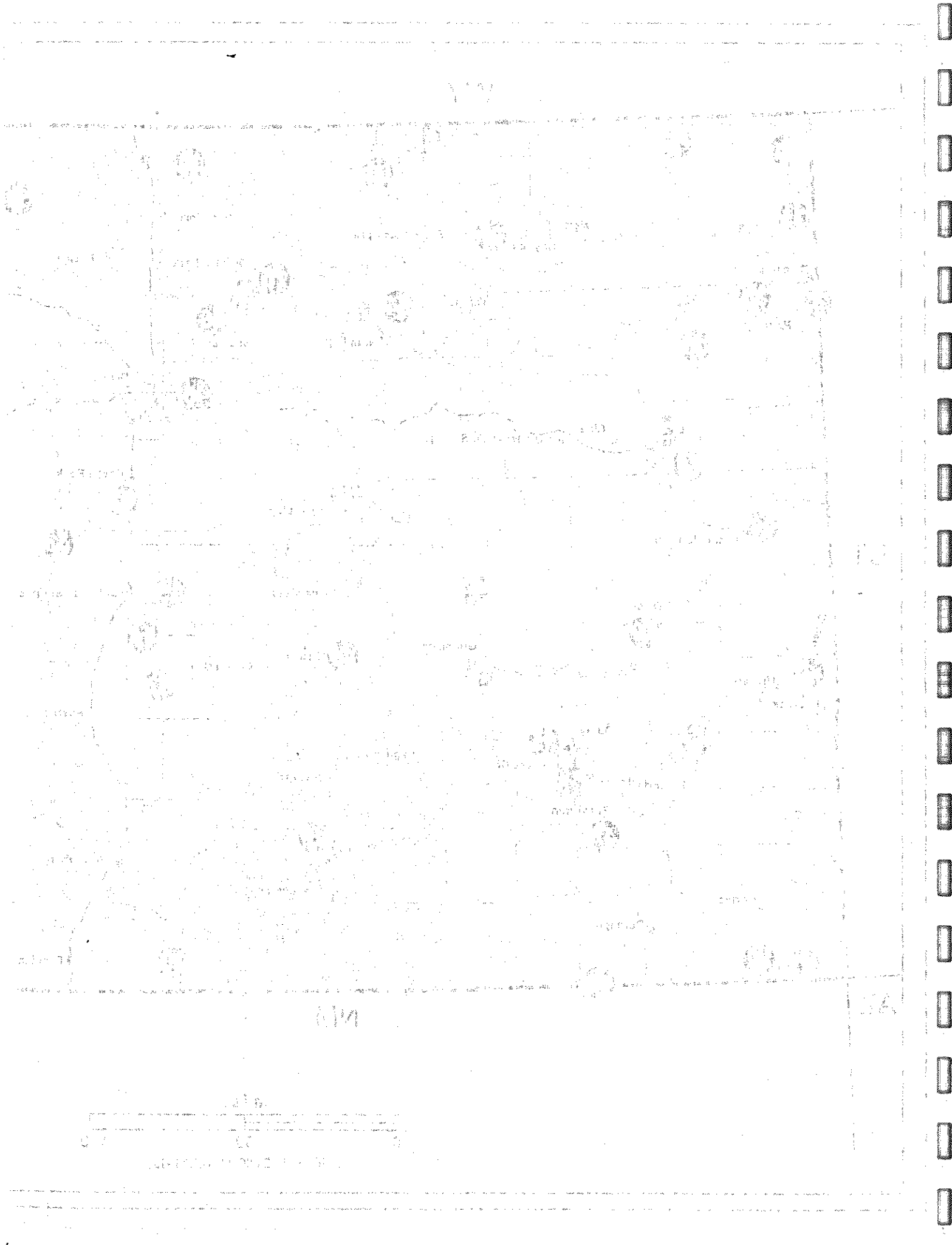
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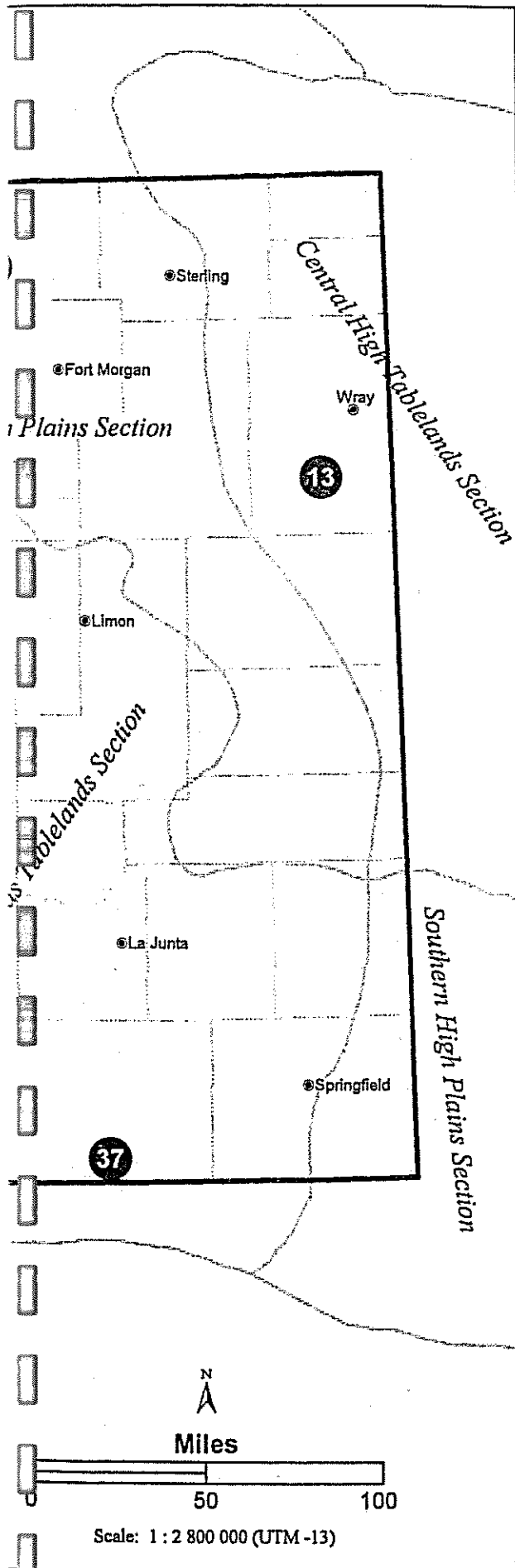


Scale: 1 : 2 800 000 (UTM -13)



# Colorado Planning Units by Ecoregion

ECOREGIONS from 1:7.5 mil base map (Bailey et al. 1994)



## Ecoregion Province



- Colorado Plateau Semi-Desert*
- Arizona-New Mexico Mountains*
- Great Plains Palouse-Dry Steppe*
- Southern Rocky Mountains*
- Intermountain Semi-Desert and Desert*
- Nevada-Utah Mountains*
- Intermountain Semi-Desert*



Ecoregion Section Boundary

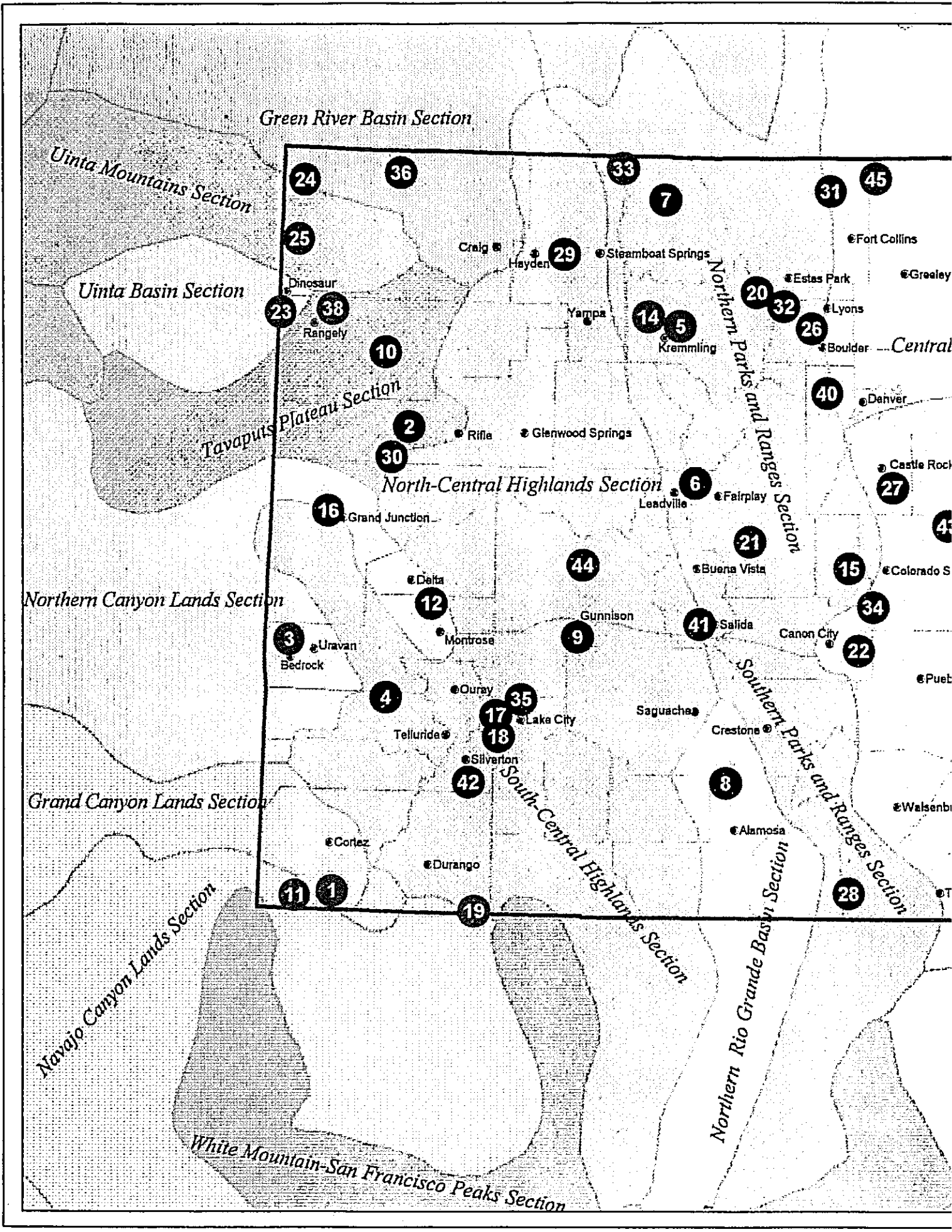


PLANNING UNITS (priority order)

- |                             |                          |
|-----------------------------|--------------------------|
| 1 MESA VERDE                | 24 BROWNS PARK           |
| 2 PARACHUTE CREEK           | 25 DINOSAUR NM           |
| 3 DOLORES RIVER             | 26 BOULDER COUNTY        |
| 4 SAN MIGUEL RIVER          | 27 GREENLAND RANCH       |
| 5 TROUBLESOME CREEK         | 28 BAR NI                |
| 6 MOSQUITO PEAKS            | 29 YAMPA RIVER           |
| 7 NORTH PLATTE RIVER        | 30 COLORADO R. - DEBEQUE |
| 8 SAN LUIS VALLEY           | 31 LARAMIE FOOTHILLS     |
| 9 SOUTH BEAVER CREEK        | 32 NORTH ST. VRAIN       |
| 10 PICEANCE BASIN           | 33 BIG CREEK LAKES       |
| 11 UTE MOUNTAIN UTE         | 34 AIKEN CANYON          |
| 12 UNCOMPAHGRE BADLANDS     | 35 LAKE FORK GUNNISON    |
| 13 ARIKAREE RIVER           | 36 LITTLE SNAKE          |
| 14 KREMMLING                | 37 MESA DE MAYA          |
| 15 PIKES PEAK               | 38 WHITE RIVER           |
| 16 COLORADO R. - GRAND JUNC | 39 WESTERN HIGH PLAINS   |
| 17 UNCOMPAHGRE PEAK         | 40 JEFFERSON COUNTY      |
| 18 REDCLOUD PEAK            | 41 SALIDA                |
| 19 SOUTHERN UTE             | 42 ANIMAS RIVER          |
| 20 ROCKY MOUNTAIN NP        | 43 WEST BIJOU CREEK      |
| 21 SOUTH PARK               | 44 CRESTED BUTTE         |
| 22 ARKANSAS RIVER           | 45 MEADOW SPRINGS        |
| 23 RAVEN RIDGE              |                          |







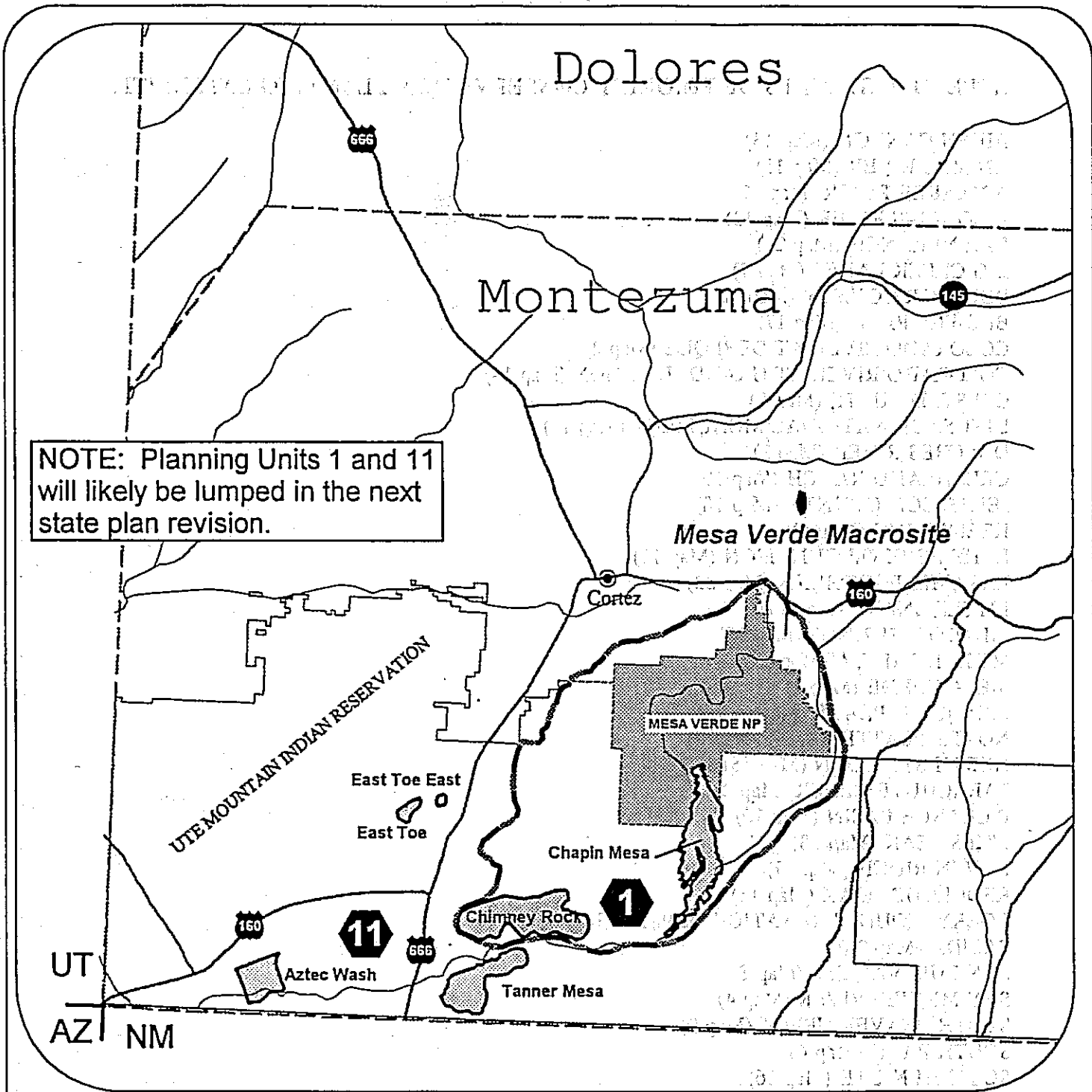
UNITED STATES OF AMERICA

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OF THE UNITED STATES  
IN SENATE  
JANUARY 10 1892  
COMMISSIONER OF THE GENERAL LAND OFFICE  
WASHINGTON







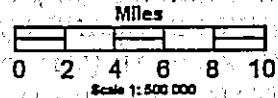
## APPENDIX G. MAPS OF PRIORITY CONSERVATION PLANNING UNITS/SITES

AIKEN CANYON (Map 13)  
ANIMAS RIVER (Map 15)  
ARIKAREE RIVER (Map 12)  
ARKANSAS RIVER (Map 13)  
BAR NI RANCH (Map 20)  
BIG CREEK LAKES (Map 7)  
BOULDER COUNTY (Map 18)  
BROWNS PARK (Map 17)  
COLORADO RIVER AT DEBEQUE (Map 2)  
COLORADO RIVER AT GRAND JUNCTION (Map 14)  
CRESTED BUTTE (Map 9)  
DINOSAUR NATIONAL MONUMENT (Map 17)  
DOLORES RIVER (Map 3)  
GREENLAND RANCH (Map 19)  
JEFFERSON COUNTY (Map 18)  
KREMMLING (Map 5)  
LAKE FORK OF GUNNISON (Map 15)  
LARAMIE FOOTHILLS (Map 22)  
LITTLE SNAKE (Map 17)  
MEADOW SPRINGS (Map 22)  
MESA DE MAYA (Map 23)  
MESA VERDE (Map 1)  
MOSQUITO PEAKS (Map 6)  
NORTH PLATTE RIVER (Map 7)  
NORTH ST. VRAIN (Map 18)  
PARACHUTE CREEK (Map 2)  
PICEANCE BASIN (Map 10)  
PIKES PEAK (Map 13)  
RAVEN RIDGE (Map 17)  
REDCLOUD PEAK (Map 15)  
ROCKY MOUNTAIN NATIONAL PARK (Map 5)  
SALIDA (Map 25)  
SAN LUIS VALLEY (Map 8)  
SAN MIGUEL RIVER (Map 4)  
SOUTH BEAVER CREEK (Map 9)  
SOUTH PARK (Map 6)  
SOUTHERN UTE (Map 16)  
TROUBLESOME CREEK (Map 5)  
UNCOMPAHGRE BADLANDS (Map 11)  
UNCOMPAHGRE PEAK (Map 15)  
UTE MOUNTAIN UTE (Map 1)  
WEST BIJOU CREEK (Map 19)  
WESTERN HIGH PLAINS (Map 24)  
WHITE RIVER (Map 10)  
YAMPA RIVER (Map 21)



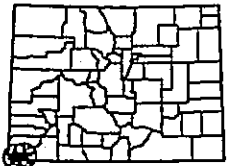
NOTE: Planning Units 1 and 11 will likely be lumped in the next state plan revision.

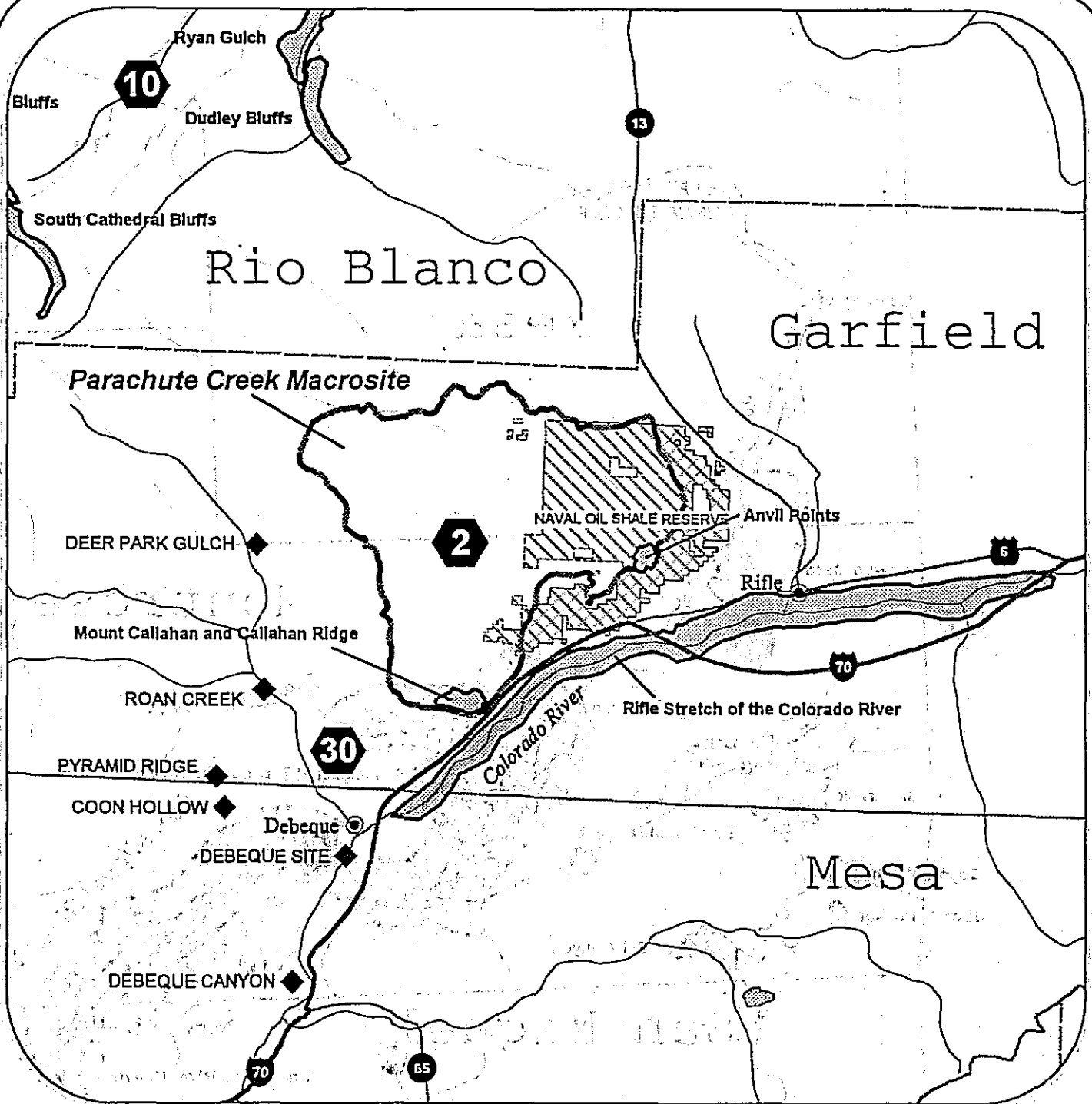
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-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







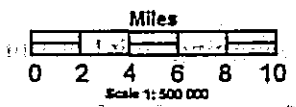
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.

## Mesa Verde (1) and Ute Mountain Ute (11) Planning Units



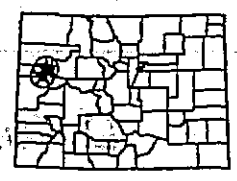


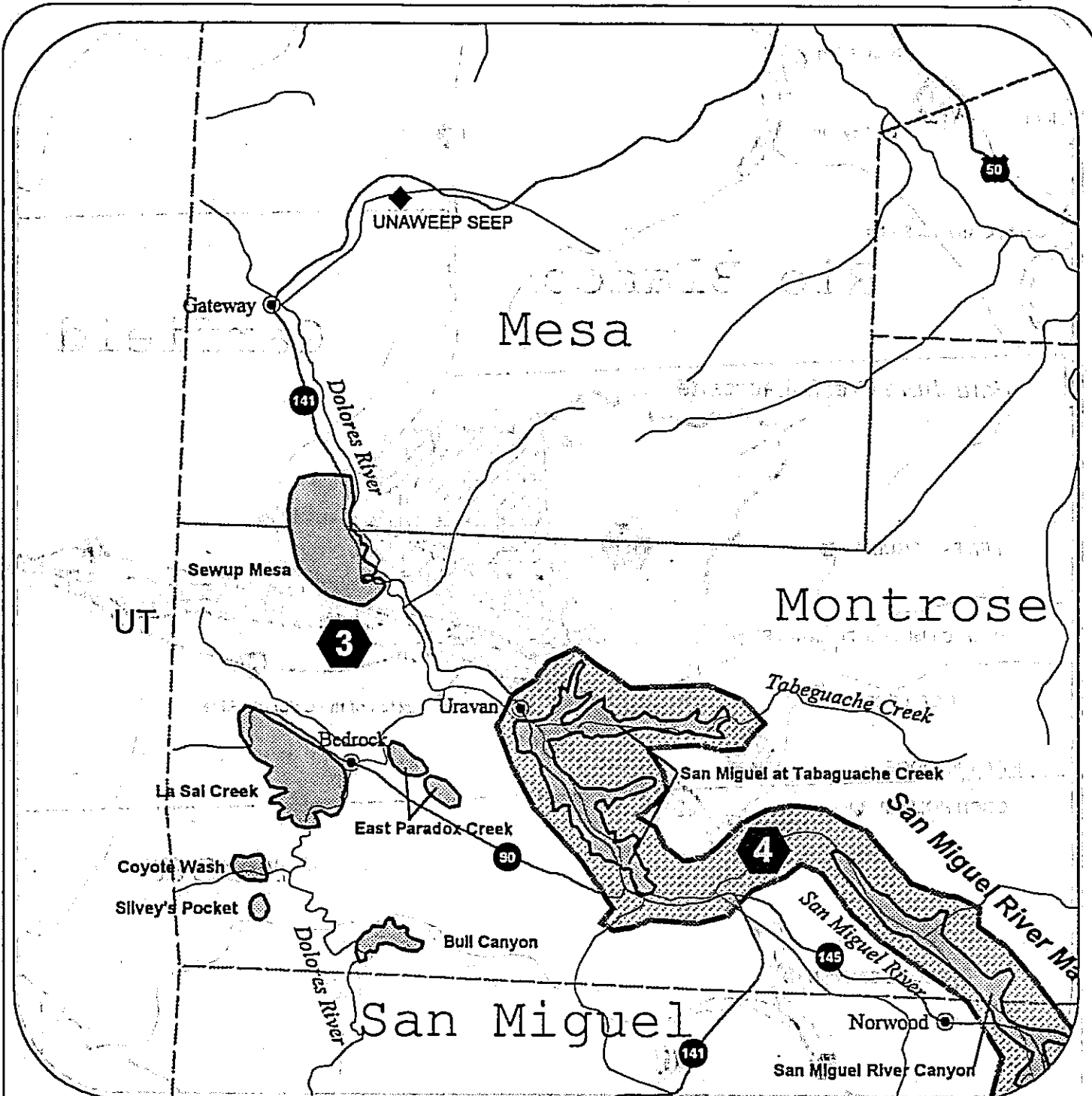
-  Planning Unit Locator
-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







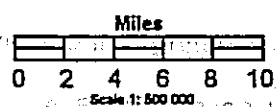
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.

**Parachute Creek (2) and Colorado River at Debeque (30) Planning Units**



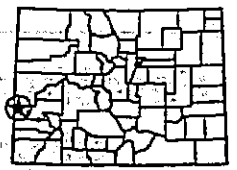


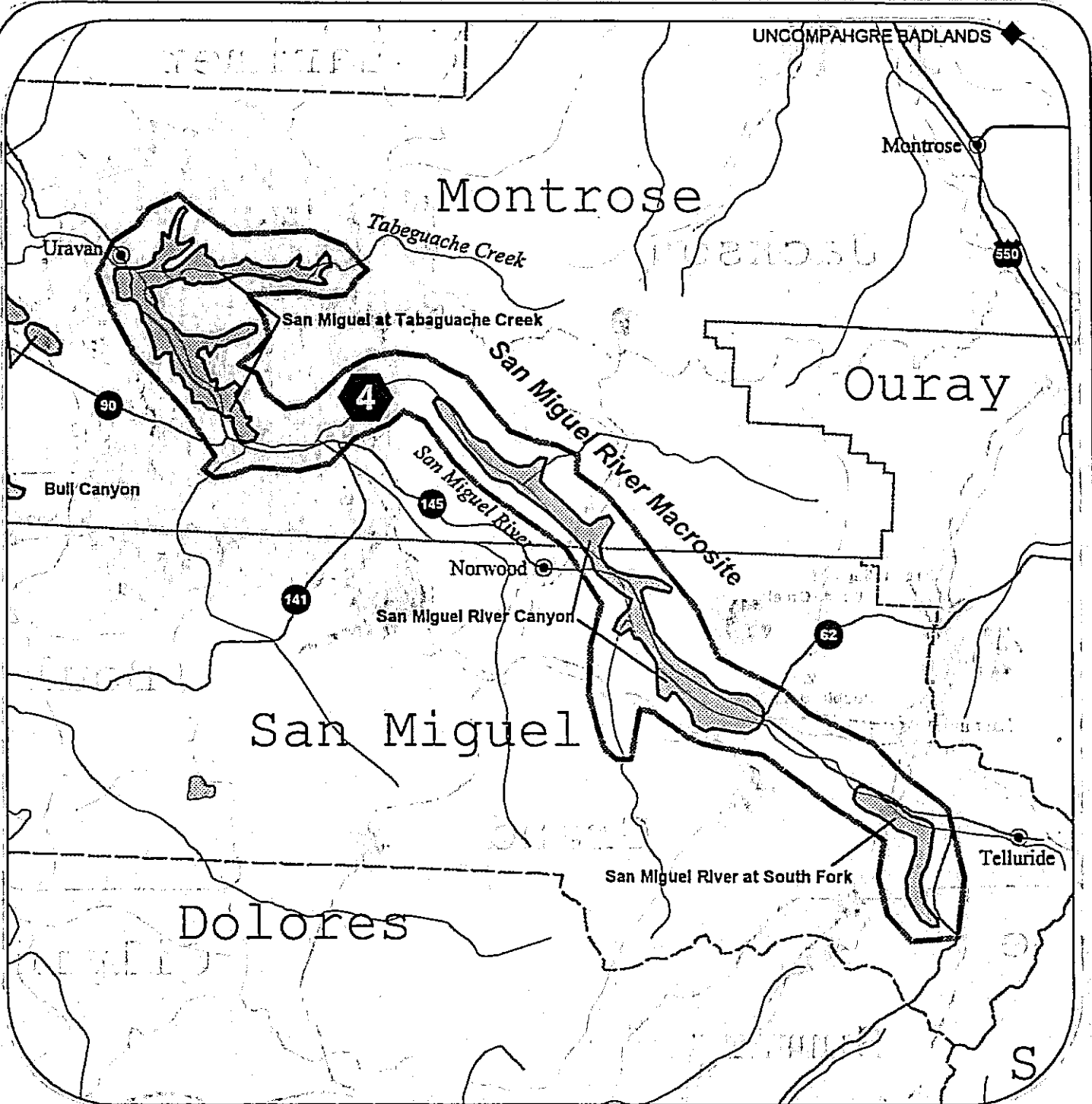
-  Planning Unit Locator
-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







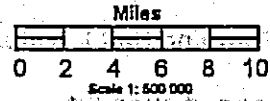
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.

## Dolores River (3) Planning Unit



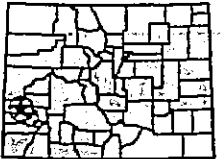


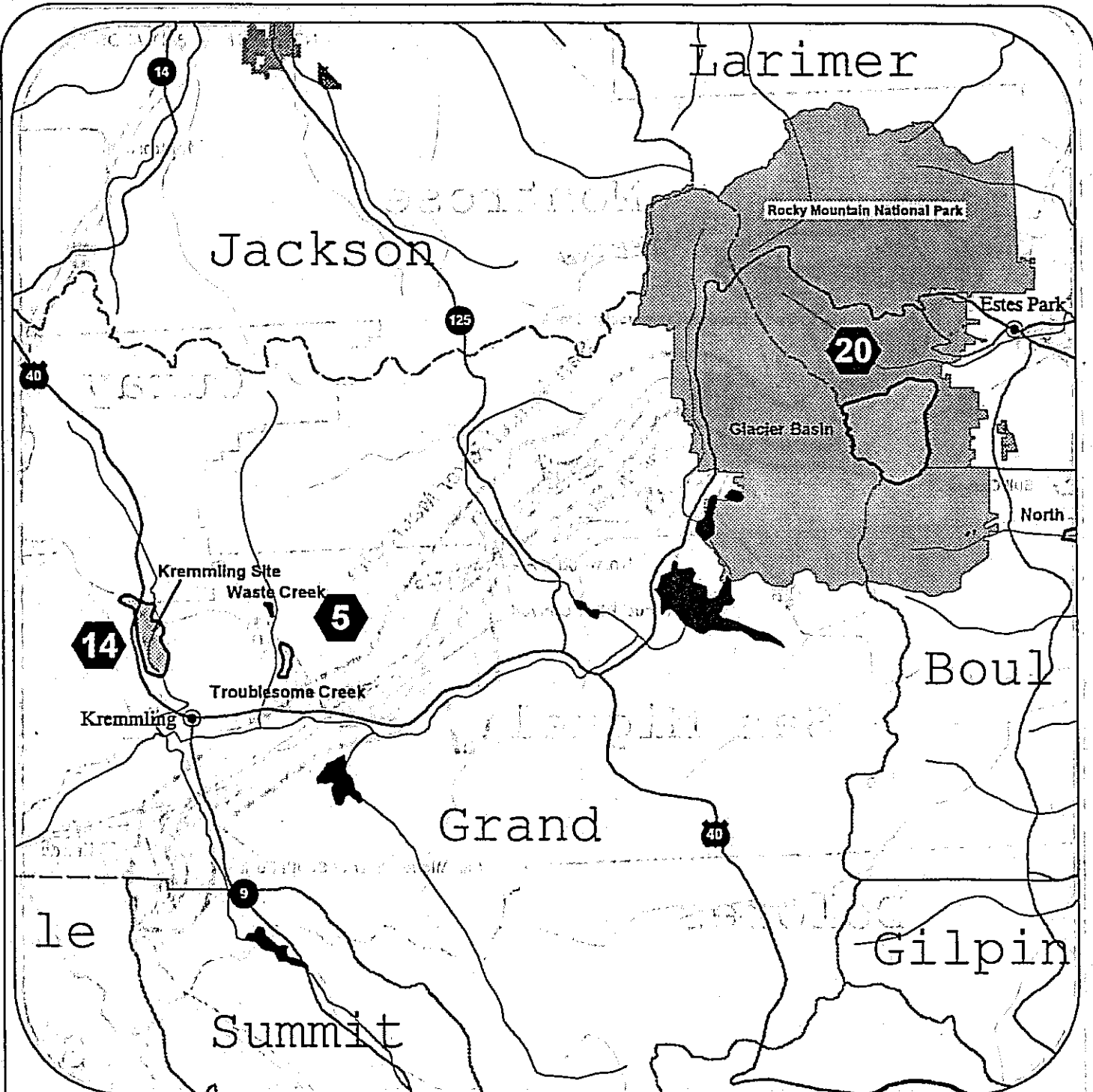
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-  **Conservation Site**
-  **Macro- or Mega- Conservation Site**
-  **SITES WITHOUT DELINEATED BOUNDARY**







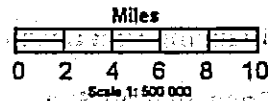
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.

## San Miguel River (4) Planning Unit



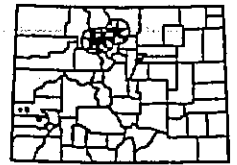


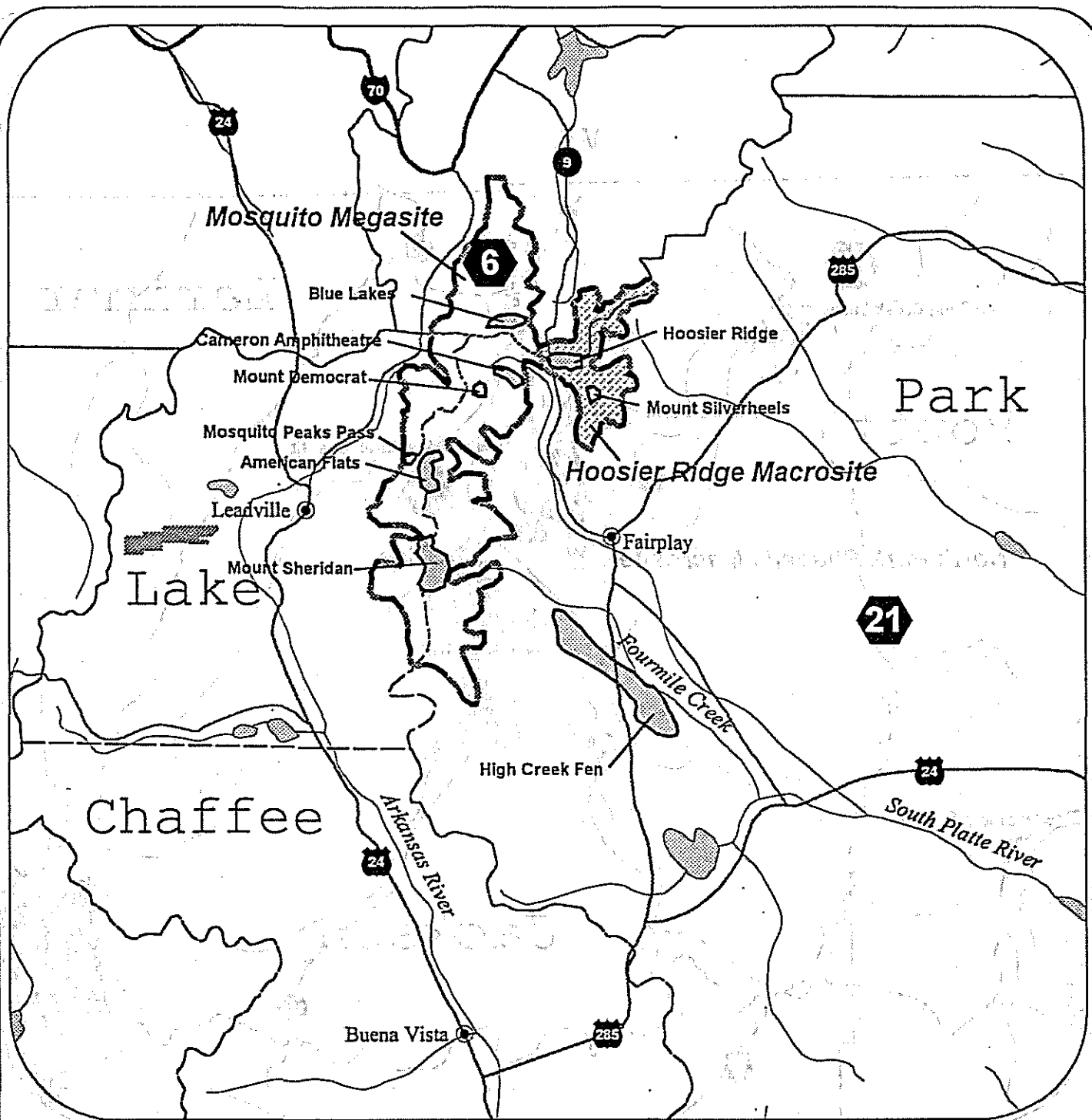
-  Planning Unit Locator
-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







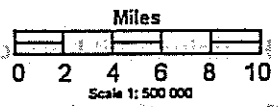
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.

**Troublesome Creek (5), Kremmling (14), and RMNP (20) Planning Units**



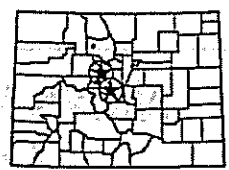


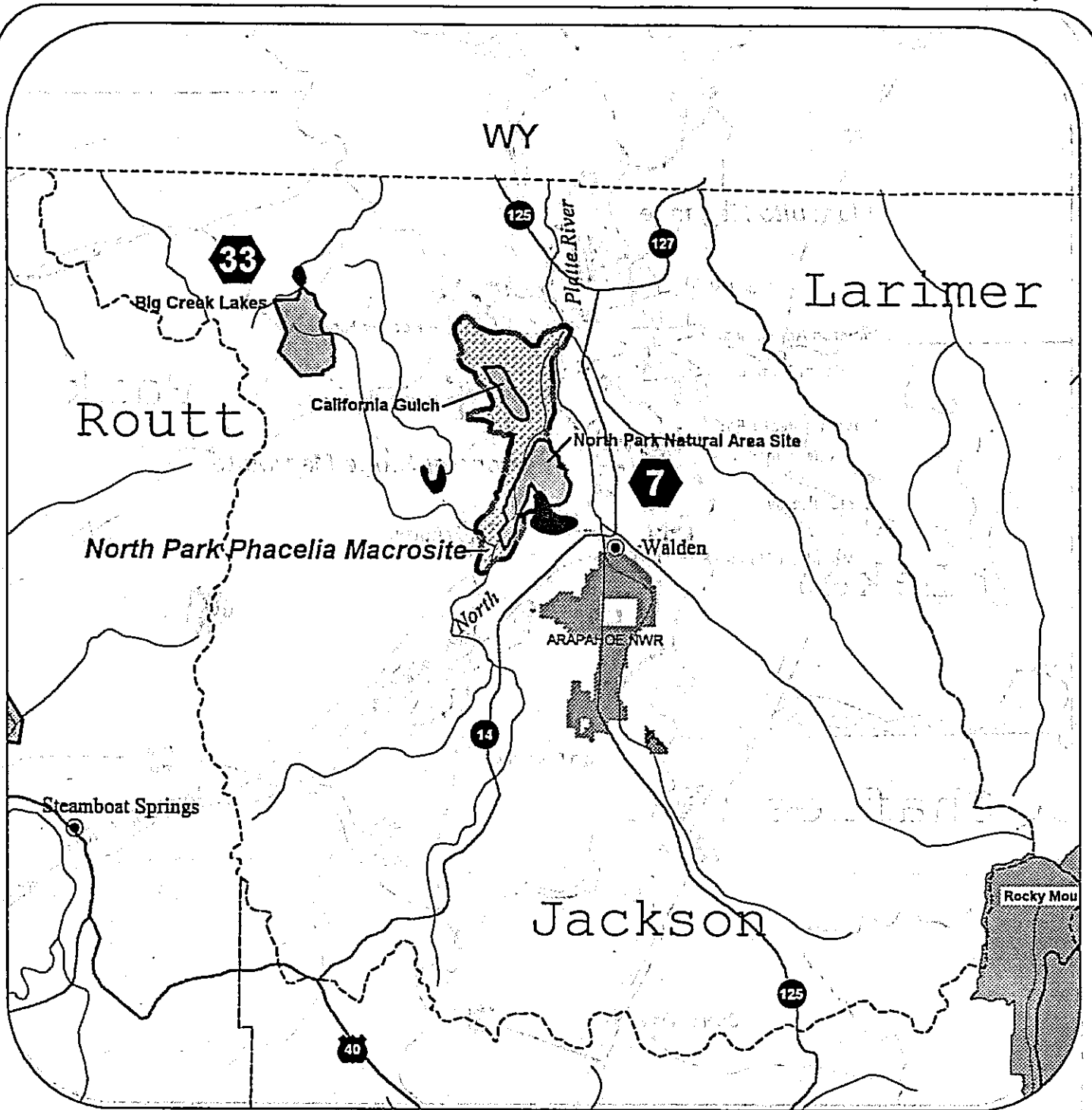
-  Planning Unit Locator
-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







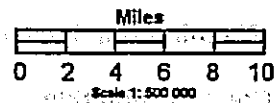
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.

## Mosquito Peaks (6) and South Park (21) Planning Units

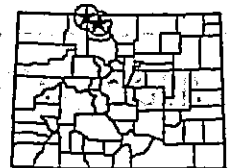




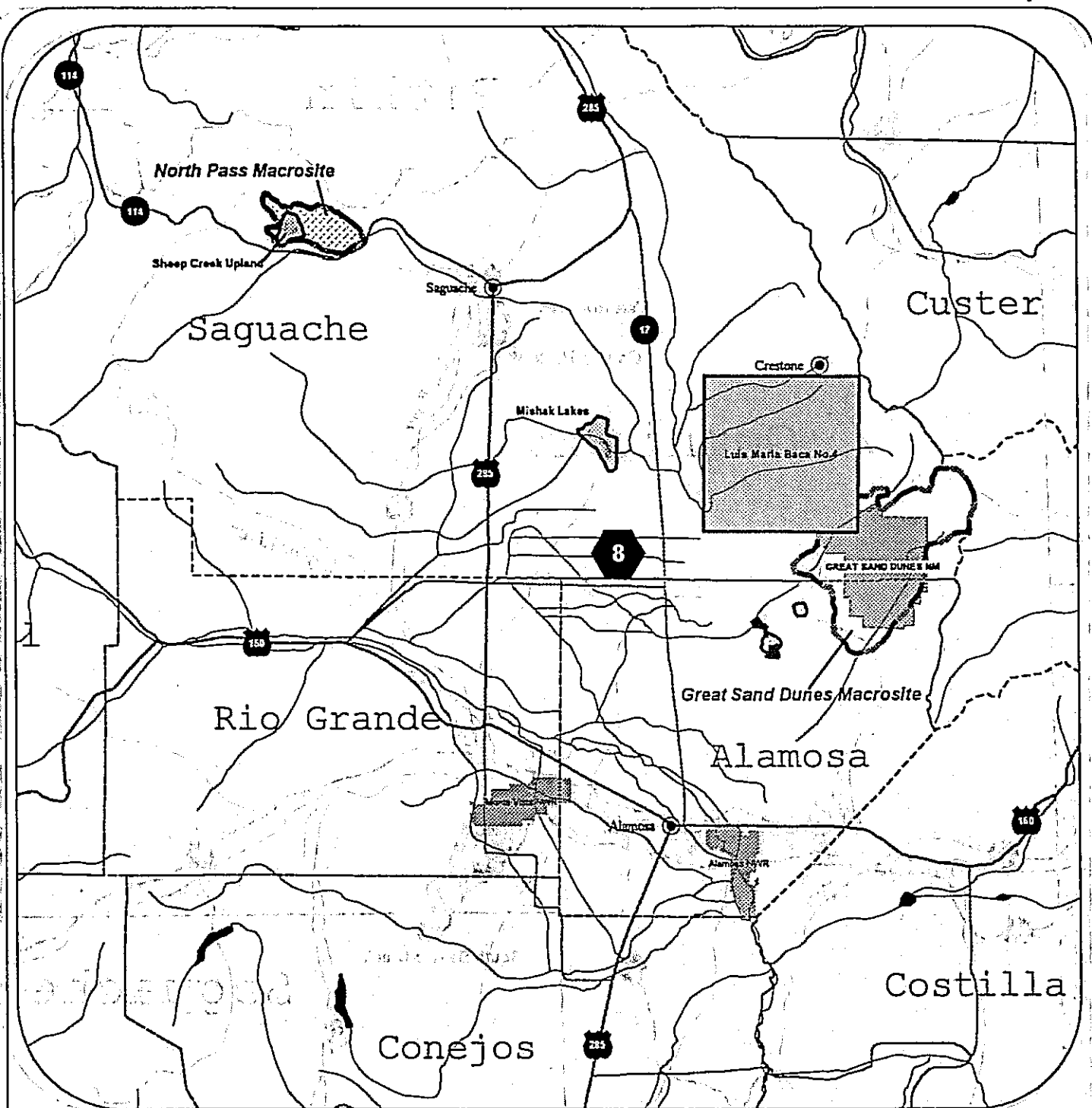
-  Planning Unit Locator
-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







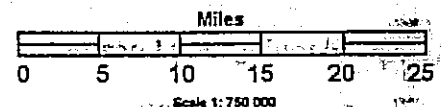
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.



## North Platte River (7) and Big Creek Lakes (33) Planning Units

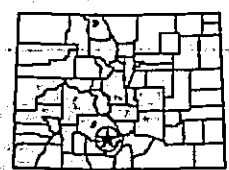


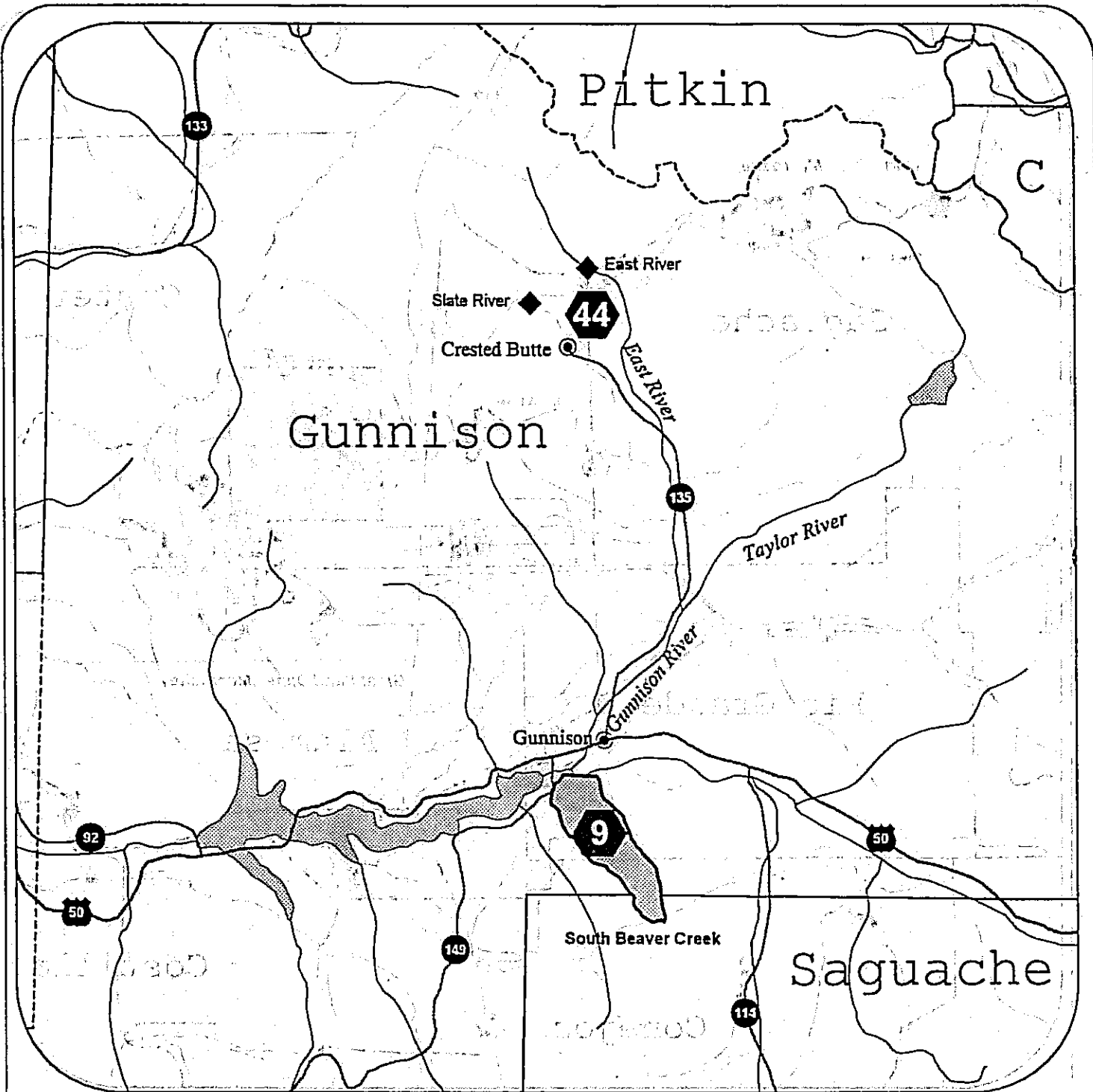
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-  Macro- or Mega-Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







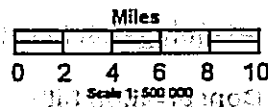
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## San Luis Valley (8) Planning Unit



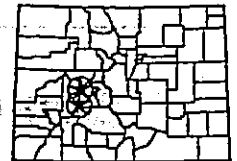


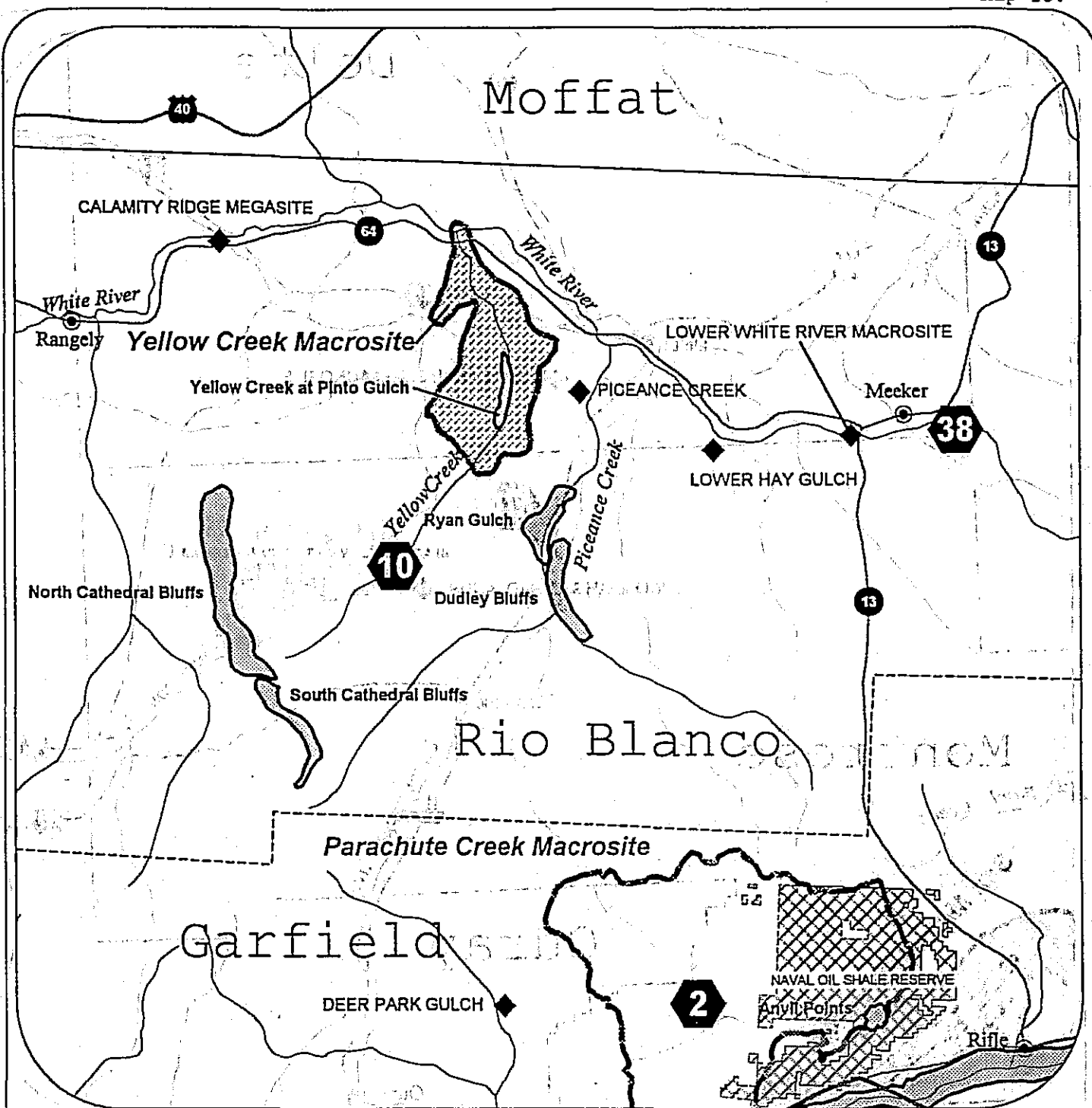
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-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







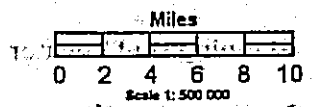
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.

## South Beaver Creek (9) and Crested Butte (44) Planning Units



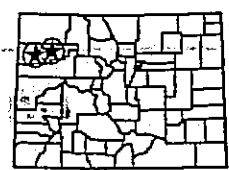


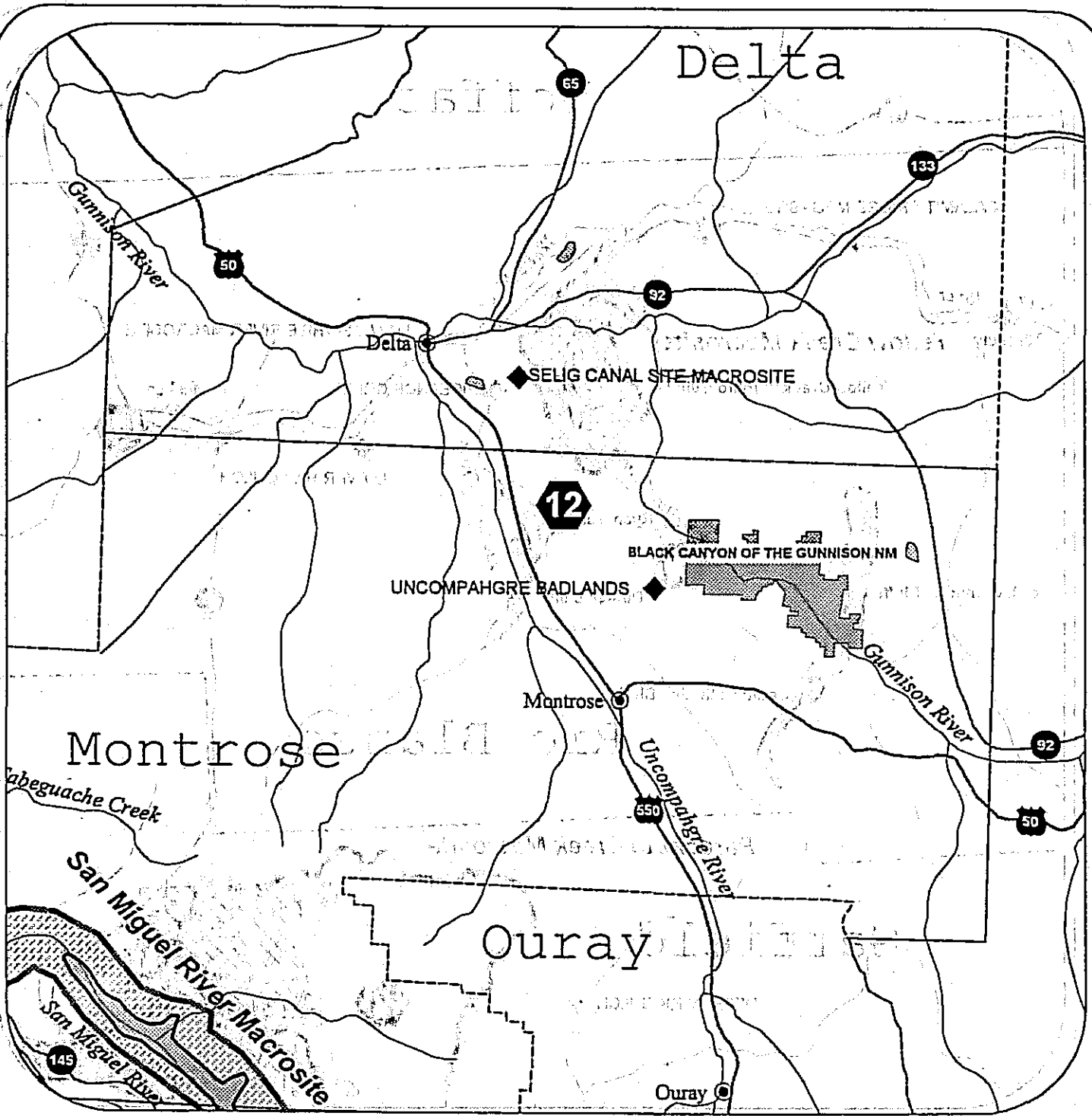
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-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







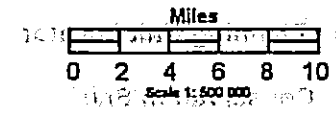
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or for Site Conservation Plans; Planning Unit boundaries not delineated.

## Piceance Creek (10) and White River (38) Planning Units

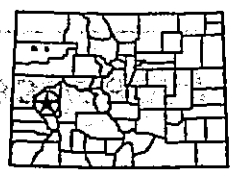




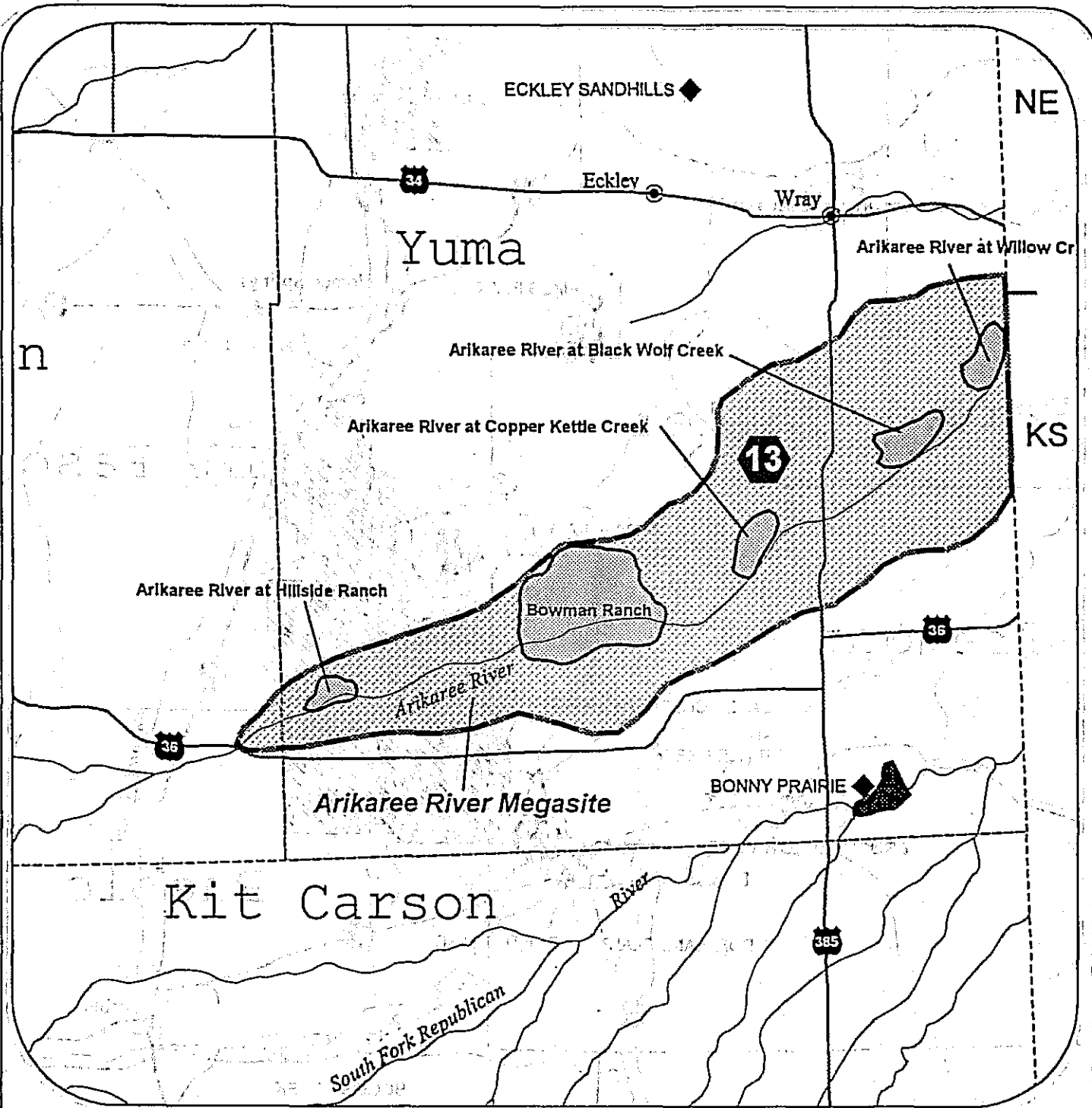
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-  **Conservation Site**
-  **Macro- or Mega- Conservation Site**
-  **SITES WITHOUT DELINEATED BOUNDARY**







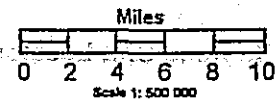
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.



## Uncompahgre Badlands (12) Planning Unit

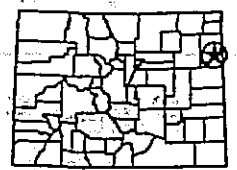


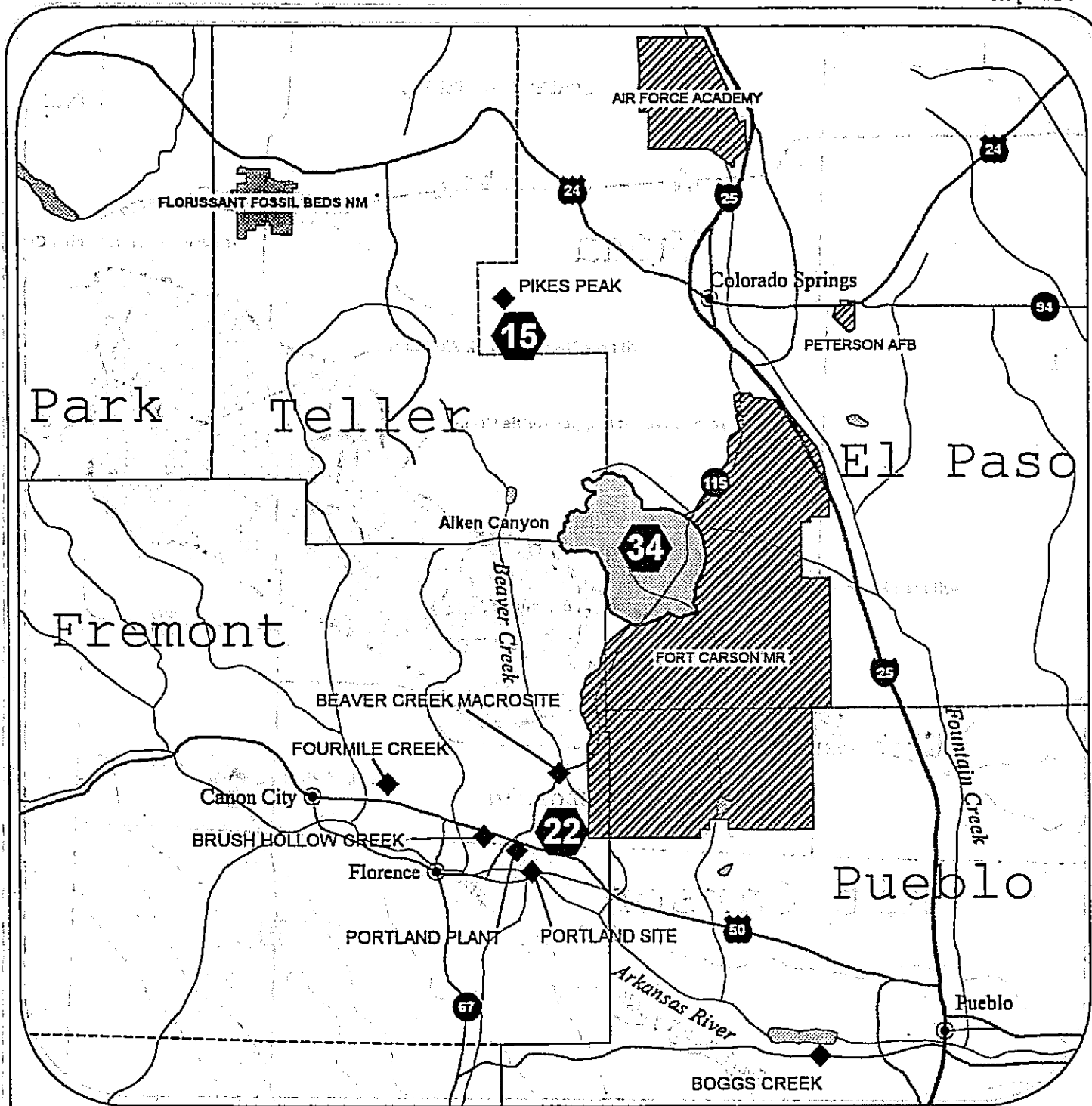
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-  Macro- or Mega- Conservation Site
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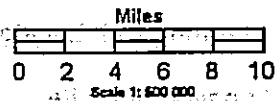
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.

## Arikaree River (13) Planning Unit

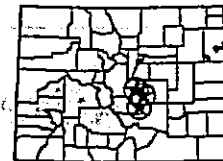




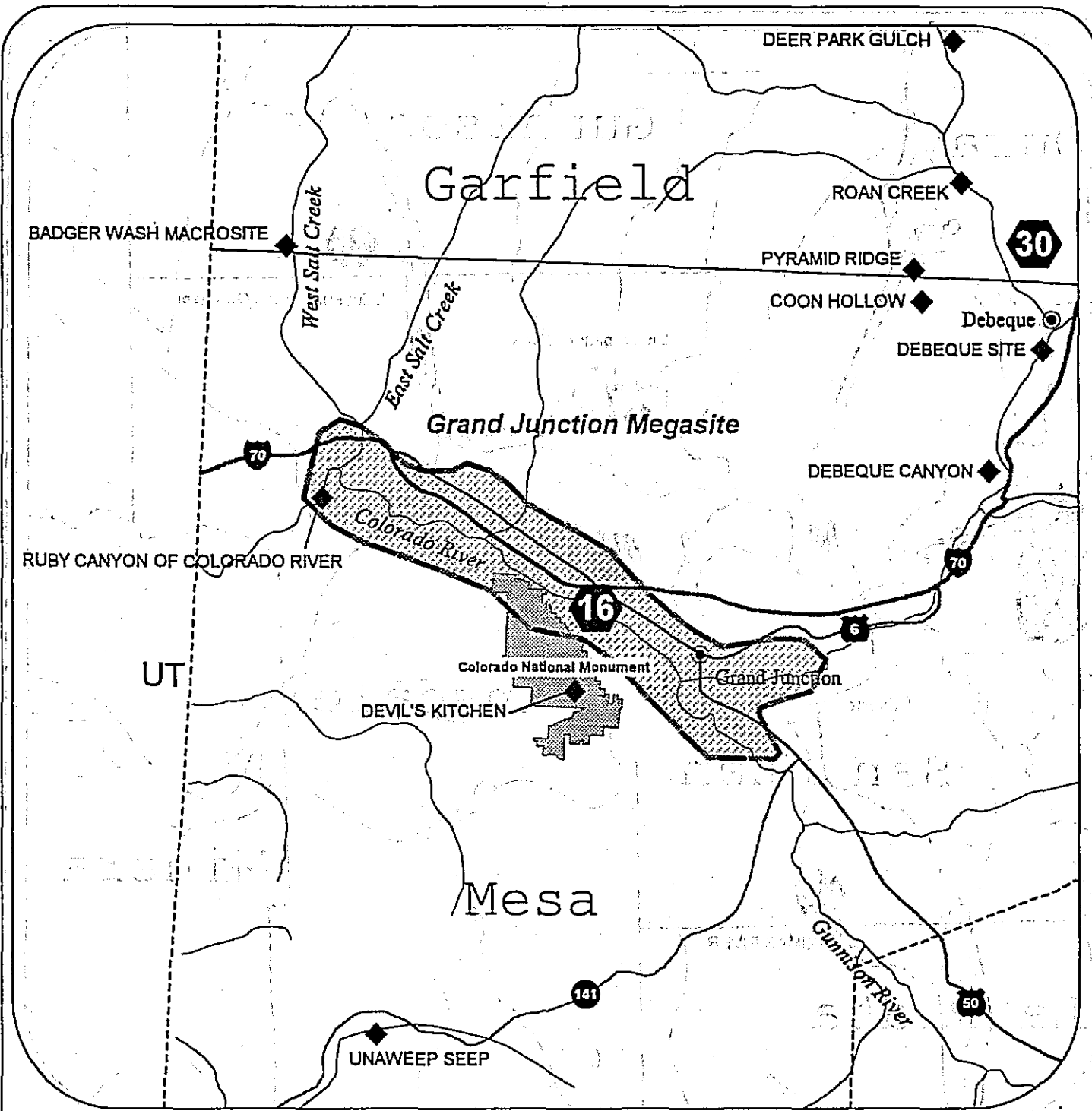
-  Planning Unit Locator
-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.



***Pikes Peak (15), Arkansas River (22), and Aiken Canyon (34) Planning Units***

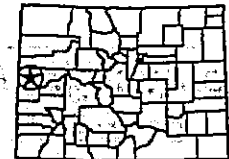


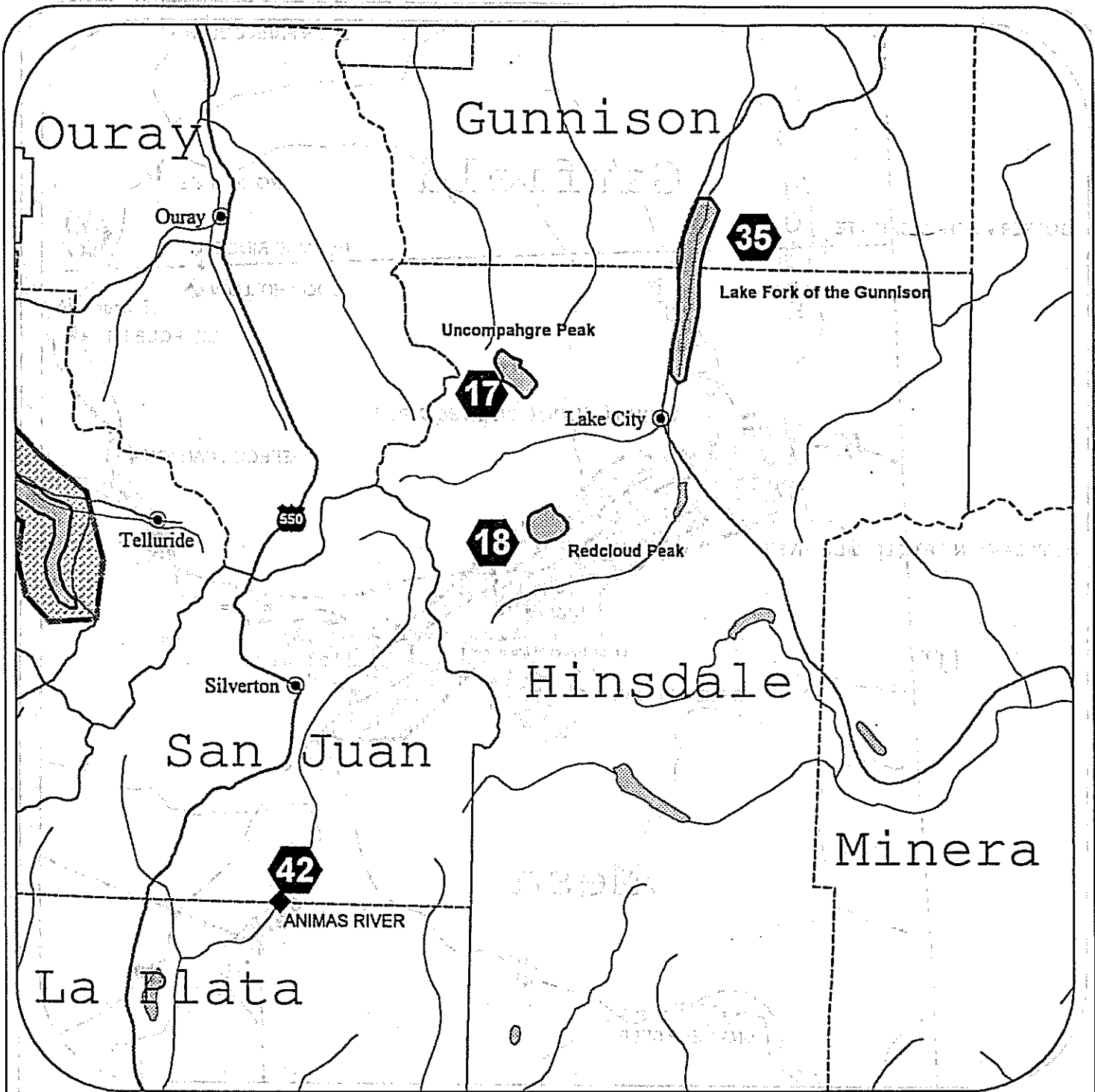
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-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







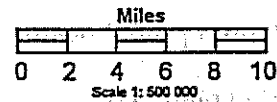
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) Macro- or Site Conservation Plans; Planning Unit boundaries not delineated.

## Colorado River - Grand Junction (16) Planning Unit

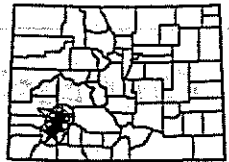




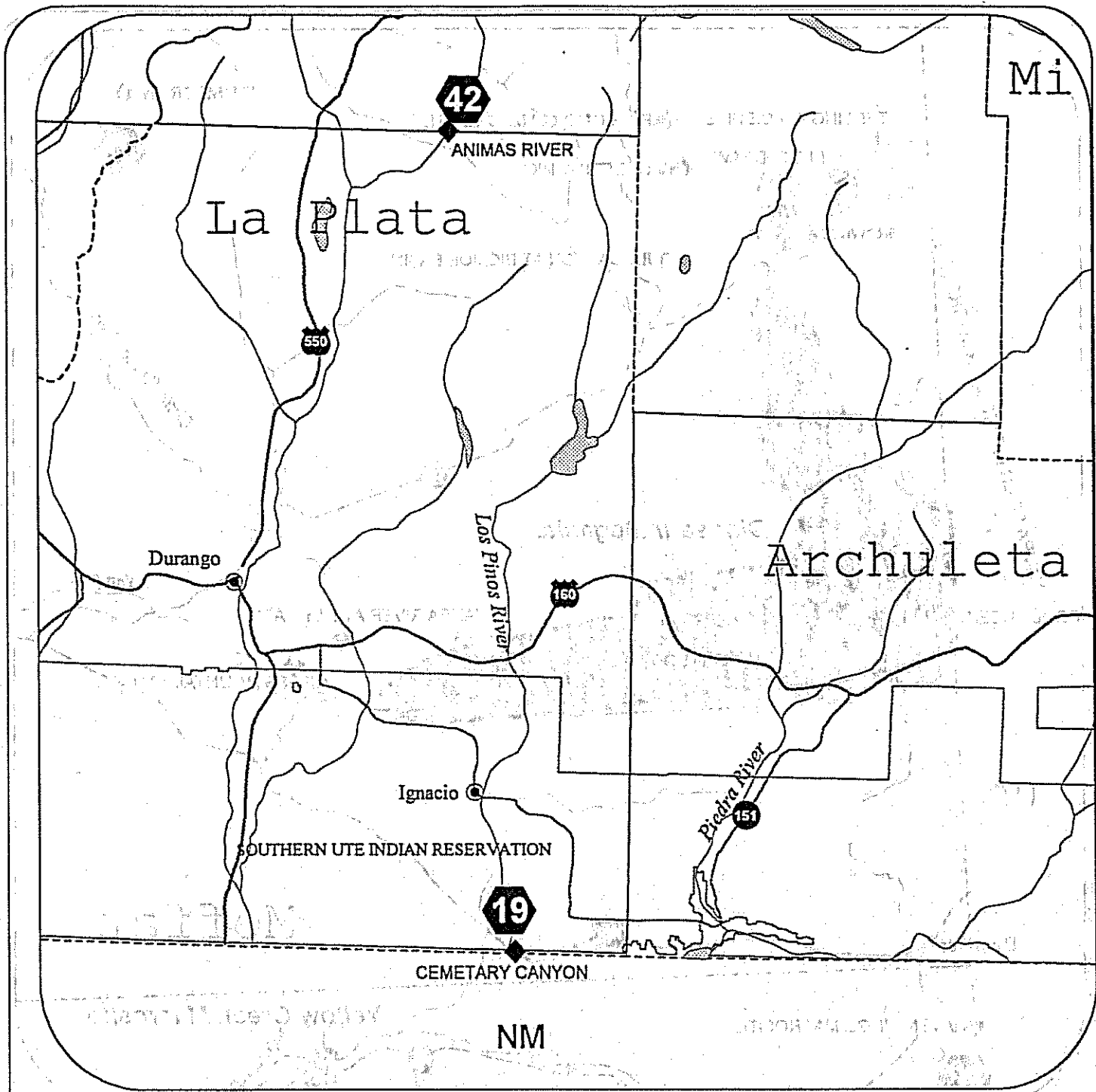
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-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







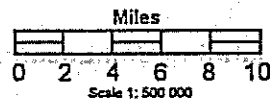
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.



**Uncompahgre Peak (17), Redcloud Peak (18), Lake Fork of the Gunnison (35), and Animas River (42) Planning Units**

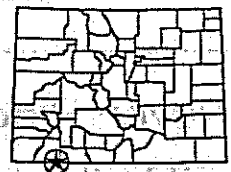


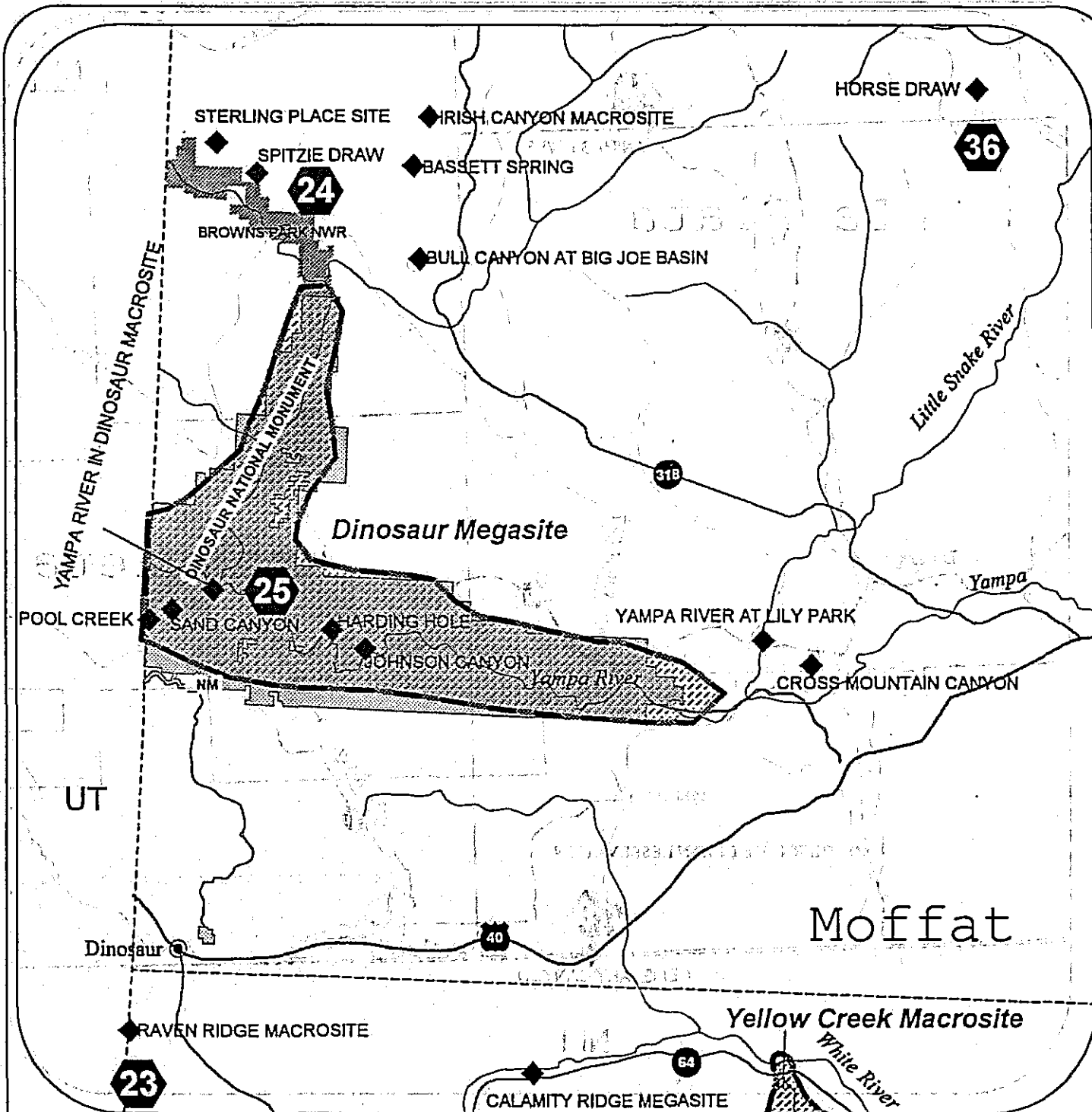
-  **Planning Unit Locator**
-  **Conservation Site**
-  **Macro- or Mega- Conservation Site**
-  **SITES WITHOUT DELINEATED BOUNDARY**







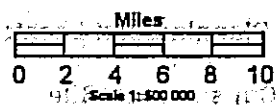
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.

## Southern Ute (19) Planning Unit

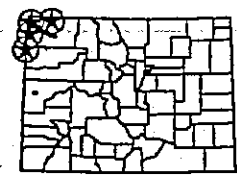




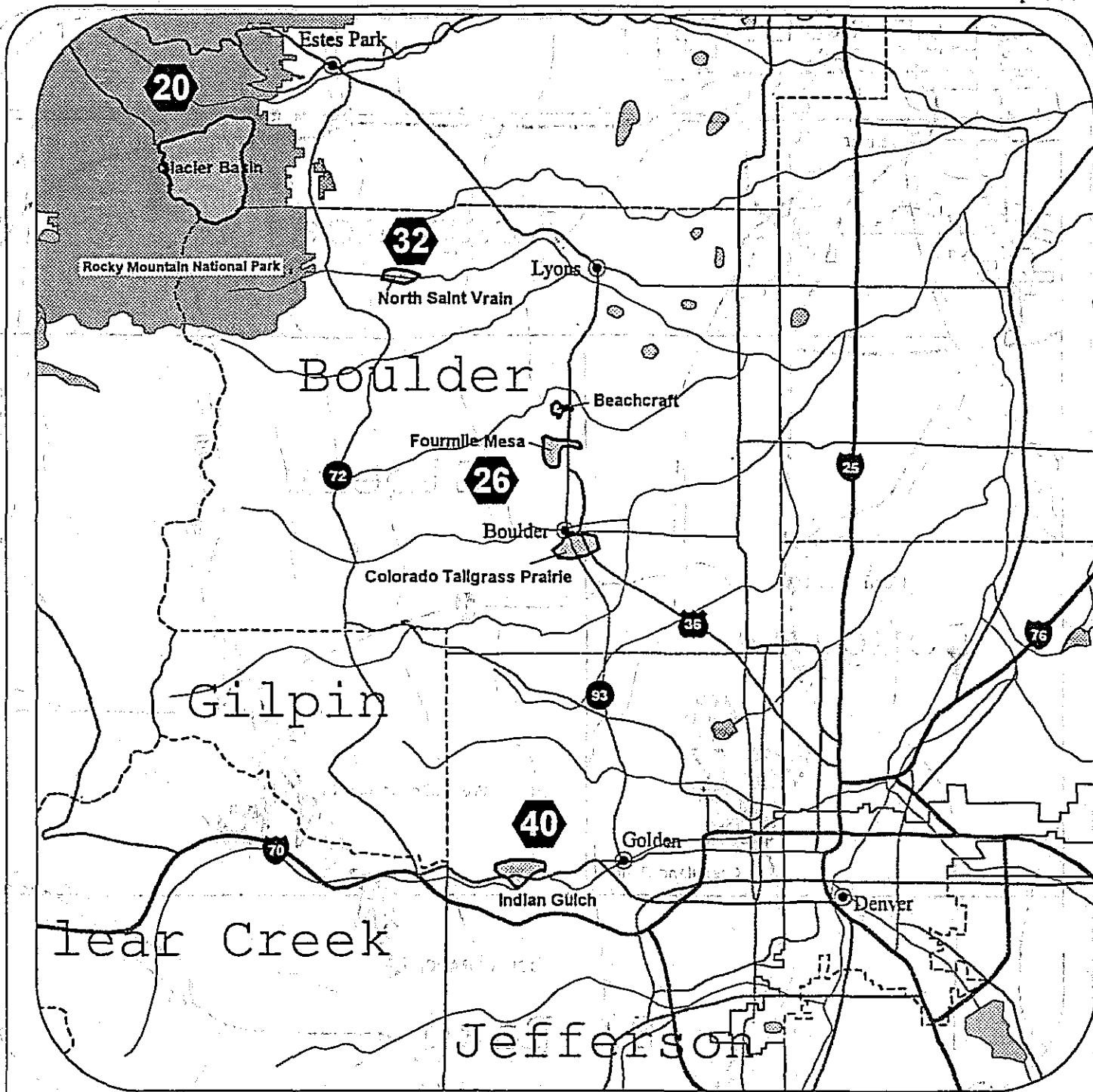
-  Planning Unit Locator
-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







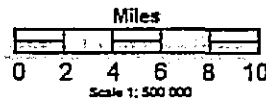
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.



**Raven Ridge (23), Brown's Park (24), Dinosaur NM (25), and Little Snake (36) Planning Units**

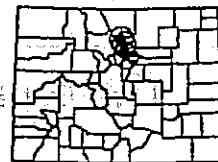


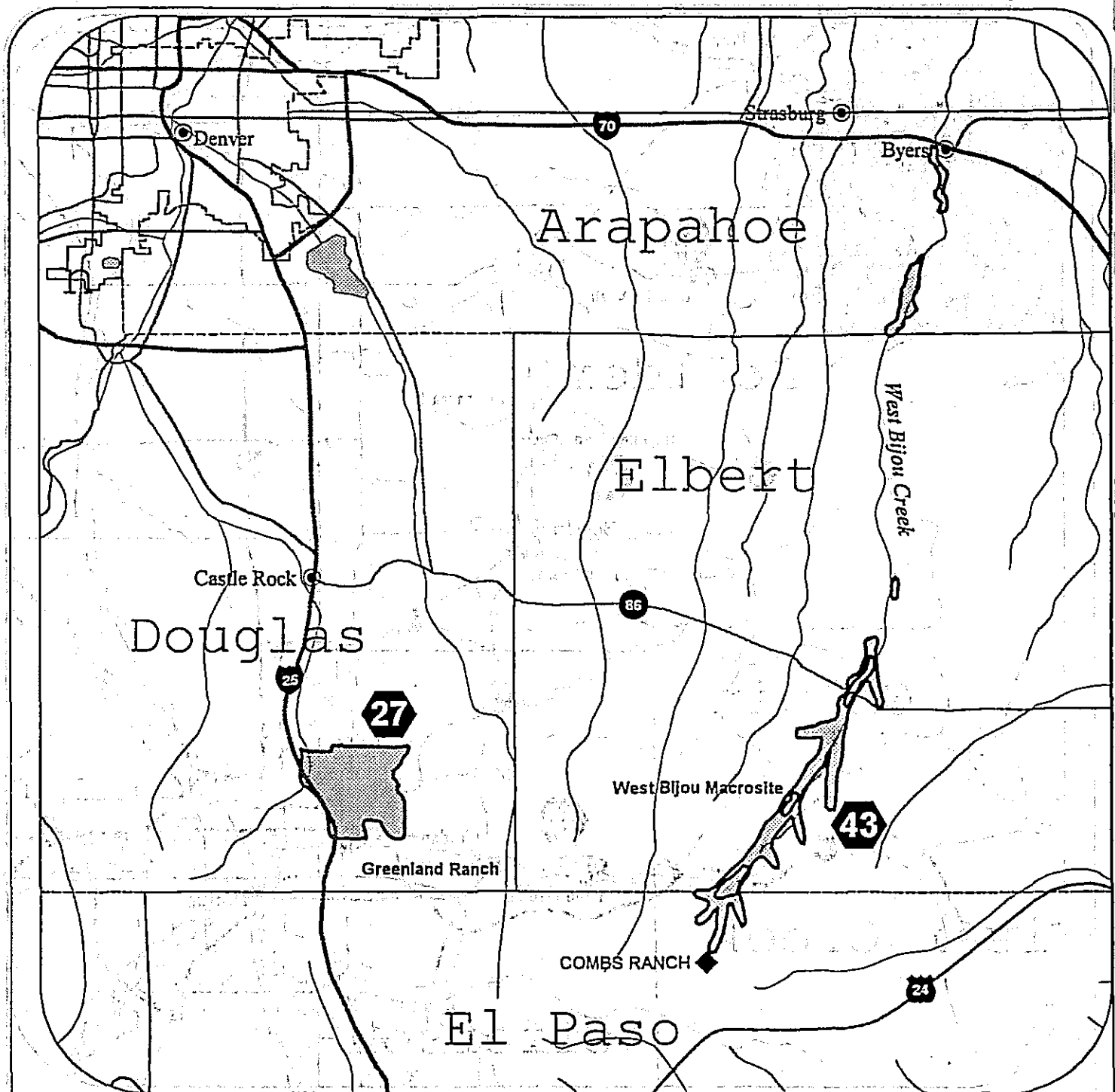
-  Planning Unit Locator
-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







Conservation site boundaries from Colorado Natural Heritage Program (preliminary), or Site Conservation Plans.- Planning Unit boundaries not delineated.

***Boulder County (26), North St. Vrain (32), and Jefferson County (40) Planning Units***



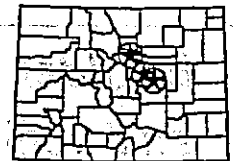


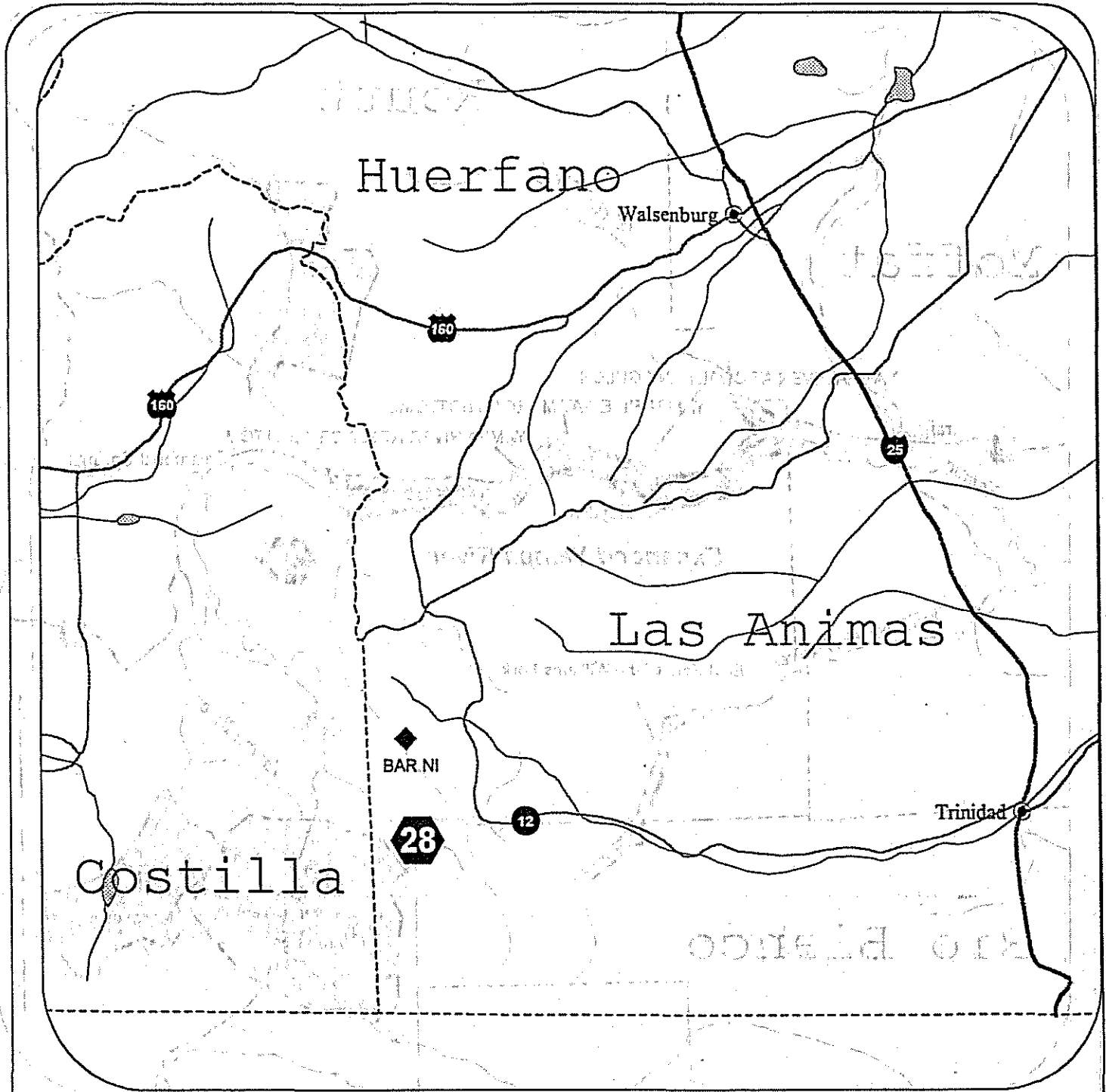
-  Planning Unit Locator
-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY

Miles  
 0 2 4 6 8 10  
 Scale 1:500,000

Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.

**Greenland Ranch (27) and West Bijou Creek (40) Planning Units**





**Planning Unit Locator**



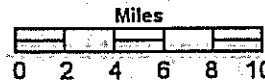
**Conservation Site**



**Macro- or Mega- Conservation Site**

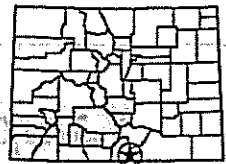


**SITES WITHOUT DELINEATED BOUNDARY**

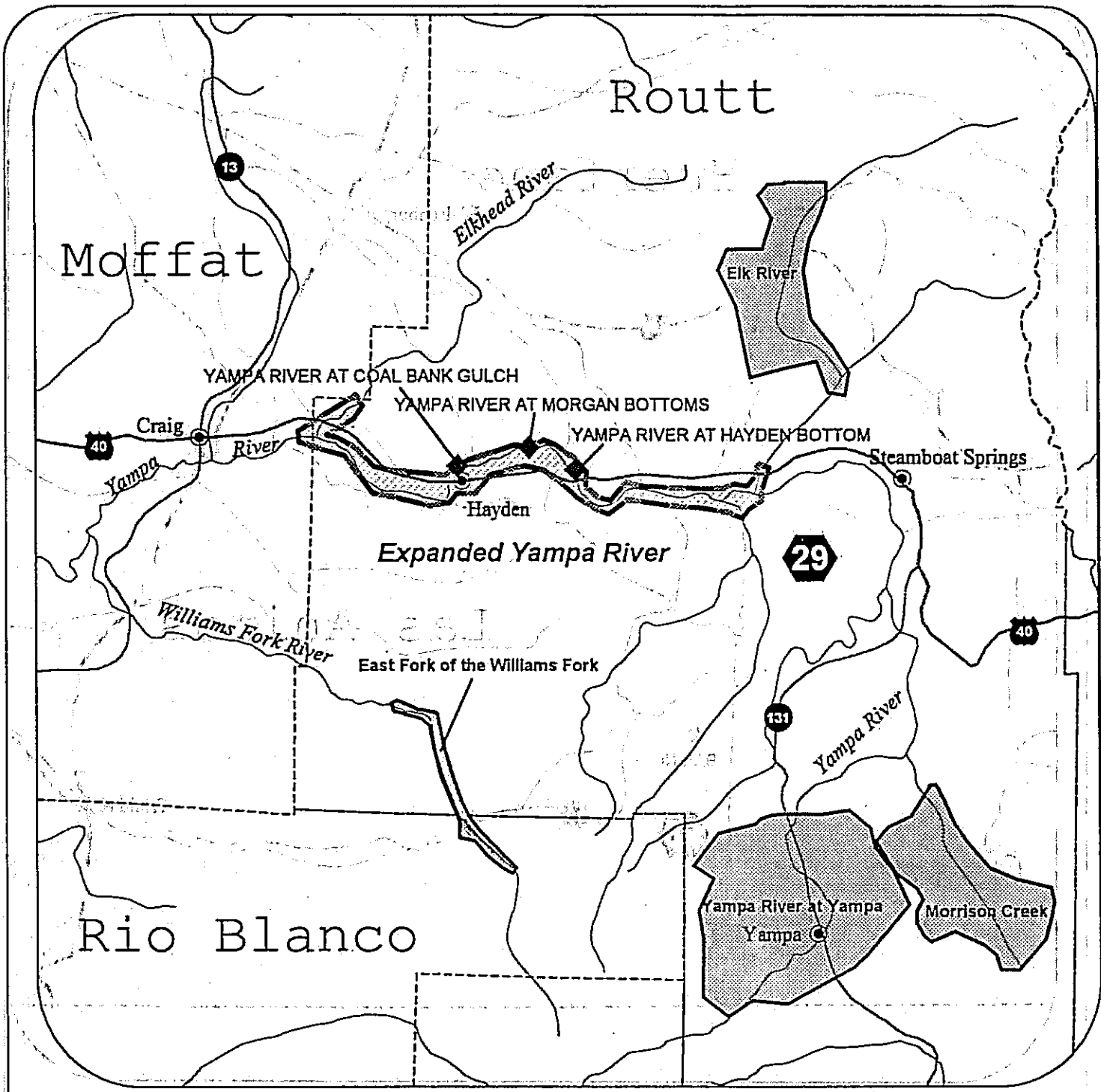






Scale 1: 500 000

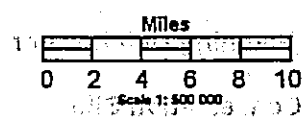
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.



**Bar NI (28) Planning Unit**

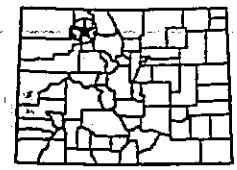


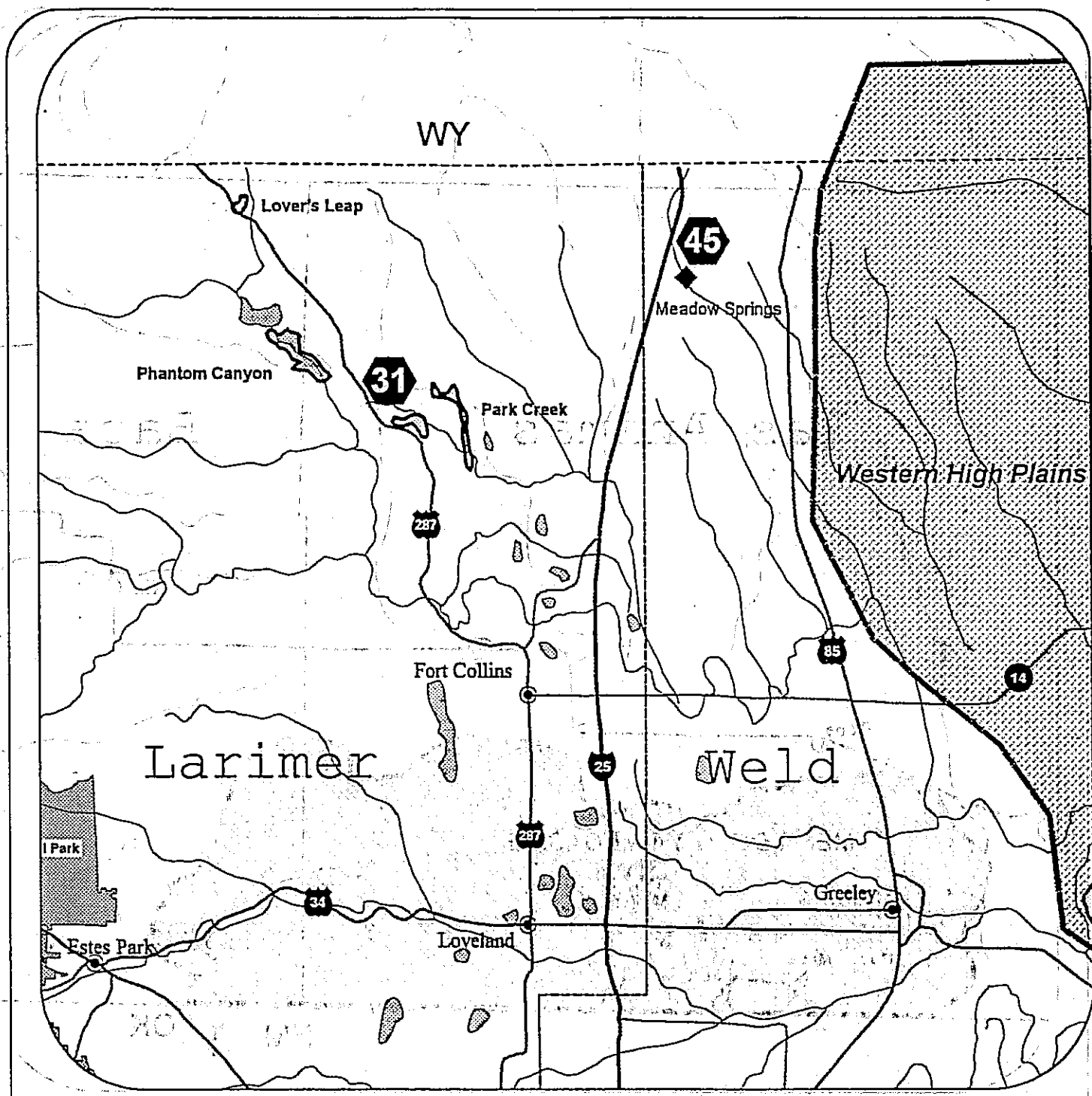
-  **Planning-Unit Locator**
-  **Conservation Site**
-  **Macro- or Mega- Conservation Site**
-  **SITES WITHOUT DELINEATED BOUNDARY**







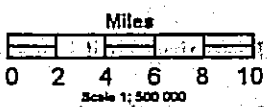
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.

# Yampa River (29) Planning Unit

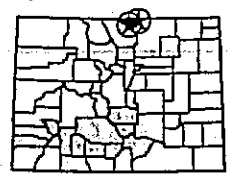




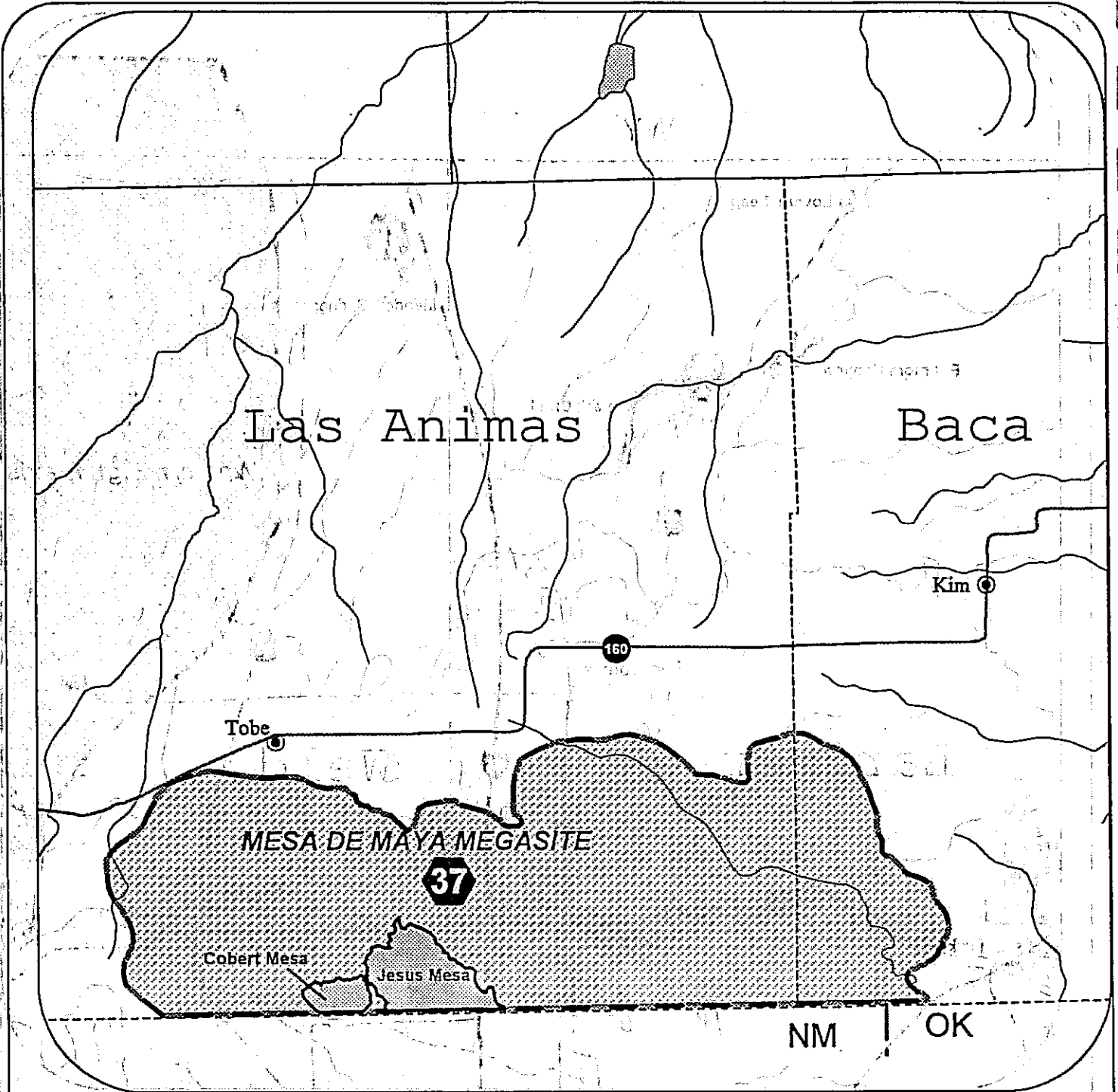
-  Planning Unit Locator
-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY



Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.



## Laramie Foothills (31) and Meadow Springs (45) Planning Units



**Planning Unit Locator**



**Conservation Site**



**Macro- or Mega- Conservation Site**



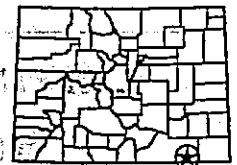
**SITES WITHOUT DELINEATED BOUNDARY**

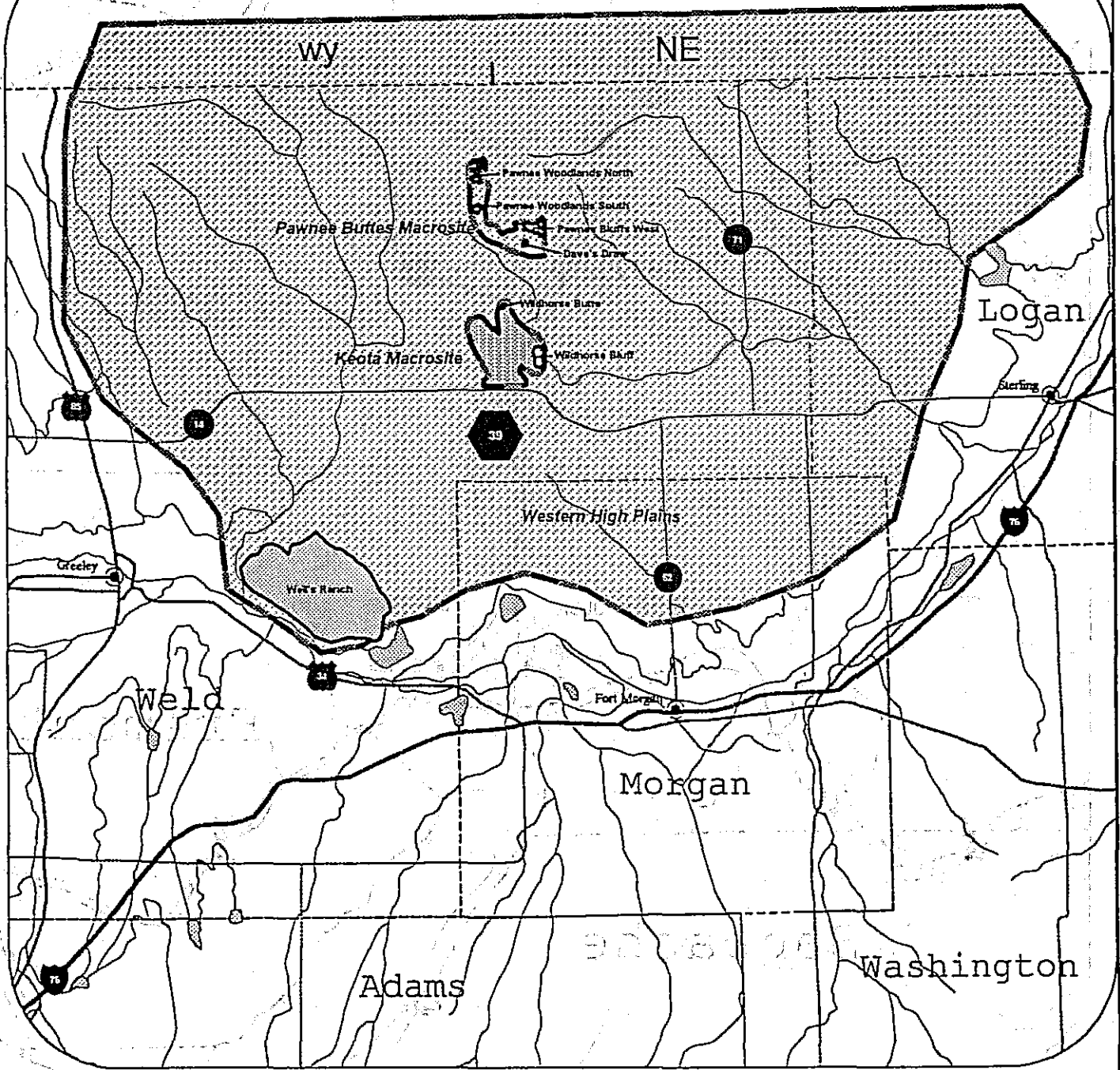






Scale 1: 500,000

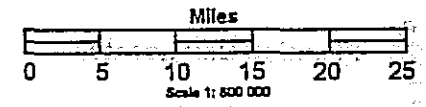
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.

# Mesa de Maya (37) Planning Unit

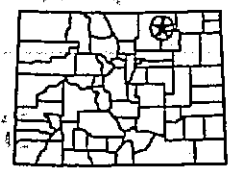




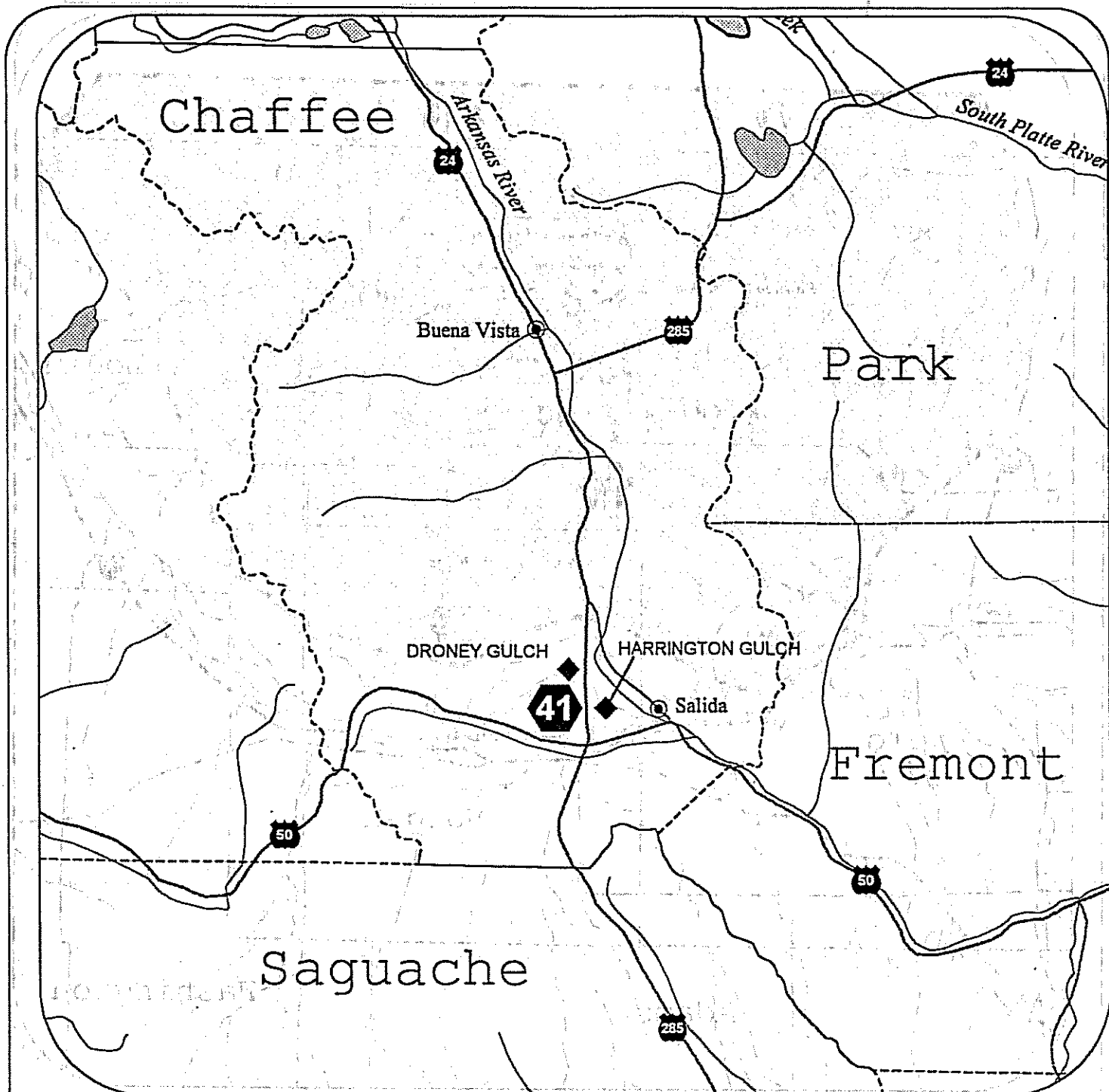
-  Planning Unit Locator
-  Conservation Site
-  Macro- or Mega- Conservation Site
-  SITES WITHOUT DELINEATED BOUNDARY







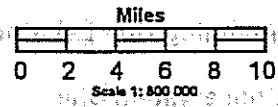
Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.



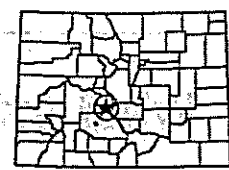
## Western High Plains (39) Planning Unit



-  **Planning Unit Locator**
-  **Conservation Site**
-  **Macro- or Mega- Conservation Site**
-  **SITES WITHOUT DELINEATED BOUNDARY**



Conservation site boundaries from Colorado Natural Heritage Program (preliminary) or Site Conservation Plans. Planning Unit boundaries not delineated.



**Salida (41) Planning Unit**