NATURAL HERITAGE INVENTORY OF THE TOWN OF VAIL

FINAL REPORT

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The Town of Vail
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EXECUTIVE SUMMARY

In 1992 the Colorado Natural Heritage Program (CNHP)) was enlisted by the Town of Vail to conduct a Natural Heritage Inventory of potential conservation sites within the Town of Vail and immediate vicinity. The goal of the inventory was to systematically identify the localities of rare, threatened, or endangered species and the locations of significant natural communities (as represented by plant associations).

The Natural Heritage Inventory was conducted in five steps:

1. Review aerial photographs, topographic maps, soil maps, and geological maps.

2. Gather existing information, including land ownership.

3. From information gathered in steps 1 and 2, map the "potential natural areas" (PNA's).

4. Perform ground surveys of the PNA's.

5. Compile the results and prepare a final report.

Thirteen PNAs were identified during the preparatory and inventory stages of this study. Of those found to be of state or global significance, preliminary conservation planning boundaries were determined. The delineation of preliminary conservation planning boundaries in this report does not confer any regulatory protection on recommended areas. These boundaries are intended to be used to support wise planning and decision-making for the conservation of these significant areas. The Colorado Natural Heritage Program encourages the Town of Vail to take actions that will protect these sites. CNHP offers its assistance in working with the Town and County to ensure protection of these areas.

The report includes five recommendations for the Town of Vail:

1. **Develop an implementation plan for designations of areas the Town determines fulfill criteria for protection.**

2. **Incorporate the information included in this report in the review of activities in or near areas identified as significant.**

3. **Increase public awareness of the benefits of protecting areas determined to be significant to the County's natural diversity.**

4. **Promote cooperation among pertinent organizations.**

5. **Properly manage significant elements of natural diversity within the Town of Vail.**

Finally, the Colorado Natural Heritage Programs determination of sites of significance

is based on criteria that assure no loss of the world's and state's biological diversity. There are going to be many sites of local interest and importance that do not necessarily rank as areas of statewide or global significance. Such areas may be considered for designations as opens space, local natural areas, greenways, or as parts of trail systems. Such areas can make significant contributions to the quality of life of a local area and are to be recommended. The results of this study are not meant to preclude the designation of any area the Town of Vail sees as important open space, rather, the report should be used to assist in establishing priorities for protection and management.

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INTRODUCTION

In December 1992, the Colorado Natural Heritage Program was enlisted by the Town of Vail to conduct an inventory of potential natural areas within the county. The goal of the inventory was to systematically identify areas containing natural heritage resources. Natural heritage resources are defined as rare, threatened, endangered, or sensitive species and significant natural communities that are monitored by the Colorado Natural Heritage Program. In short, we were to identify those sites supporting unique or exemplary natural communities, rare plants and animals, and other significant natural features of state or global significance.

This inventory has been completed, and the results of it are presented herein. A brief overview of the natural condition of the study area is presented first. This is followed by an outline of the mission and methodology of the Colorado Natural Heritage Program. The results of the inventory are briefly discussed. Finally, the areas of biodiversity significance identified during this study are described and future recommendations, including protection options, are introduced.

Overview of the Study Area

Climate. Precipitation is generally well distributed throughout the year, although a distinct peak in rainfall occurs during the months of July and August. The weather in late fall and early winter is characterized by a moderate decline in precipitation (Baker 1944). The growing season is generally short and as expected, elevation has a pronounced affect on precipitation and temperature.

Soils. Can change within a relatively small area.

Geology. The geology of the area is complex. The nearby Gore Range is a faulted anticline with Precambrian age rocks at the core, while the red rocks visible from the area are Paleozoic and Mesozoic aged sandstones (Chronic and Chronic 1972).

Current Vegetation. The vegetation of the area is a mosaic of types dependent to some degree on elevation, aspect, geology, soils, and disturbance history (fire, disease, insects, etc.). The uplands are dominated by Engelmann spruce and subalpine fir with lodgepole pine occurring on more recently disturbed areas. Aspen stands also occur throughout the area. Sagebrush shrublands are common along the lower slopes and benches above streams. The riparian areas are usually a mosaic of blue spruce forests or willow dominated shrublands. Willow carrs are shrubby wetlands that generally occur in level basins, floodplains, or high elevation seeps. These carrs are highly significant to the fauna of the area.

Faunal Composition. The fauna of the Vail Valley area is typical of the southern Rocky Mountain subalpine and montane zones. Historically, the mammals were typified by wolverine, gray wolf, lynx, elk, mule deer, common raven, Stellar's jay, gray jay, pine

grosbeak, and Colorado River cutthroat trout. Most of these species remain, but several species are actually or functionally extirpated from the Valley: gray wolf, lynx, and wolverine. Remnant populations of the Colorado River cutthroat trout exist in the upper reaches of Gore Creek.

Colorado's Natural Heritage Program

The Colorado Natural Heritage Program (CNHP) is the latest stage of a fifteen year development. CNHP was relocated from the Division of Parks and Outdoor Recreation into the University of Colorado Museum in the spring of 1992. With an increased staff, the Program has revitalized and updated comprehensive information on the rare, threatened, and endangered species and significant ecosystems in Colorado. The multi-disciplinary team of scientists and information managers gather information and incorporate it into their continually updated databases. CNHP is part of an international network of conservation data centers (Biodiversity Information Network) that use the Biological and Conservation Databases (developed by The Nature Conservancy). Concentrating on site-specific data for each element of natural diversity, the accurate status of each element becomes known. The mapped data illustrate sites that are important to the conservation of Colorado's natural biological diversity. By using the element ranks and the quality of each occurrence, priorities can be established for the protection of the most sensitive or imperilled sites. It is by having an updated locational database and priority-setting system that CNHP can provide its most effective, proactive land-planning tools.

The information gathered by CNHP is on species, natural communities, and ecosystems. Each of these significant natural features (species and community types) is an **element of natural diversity**, or simply an **element**. Each element is assigned a rank that indicates its relative rarity, or degree of imperilment, on a five-point scale (1 = extremely rare; 5 = abundant; **Table 1**).

The primary criterion for ranking elements is the number of occurrences, i.e. the number of known distinct localities or populations. Also of great importance is the number of individuals at each locality or, for highly mobile organisms, the total number of individuals. Other considerations include the condition of the occurrences, the number of protected occurrences, population trends, and threats. However, the emphasis remains on the number of occurrences, such that ranks are an index of known biological rarity. These ranks are assigned both in terms of the element's rarity within Colorado (its State or S-rank) and the element's rarity over its entire range (its Global or G-rank). Taken together, these two ranks give an instant picture of the degree of imperilment of the element. Although most species protected under state or federal endangered species laws are extremely rare, not all rare species are listed as Endangered or Threatened and **Natural Heritage rarity ranks should not be interpreted as legal designations.**

Table 1. Definition of Natural Heritage state rarity ranks. Global rarity ranks are similar, but refer to a species' rarity throughout it range. State and Global ranks are denoted, respectively, with an "S" or a "G" followed by a character. Note that GA and G#N are not used and GX means extinct. These ranks should not be interpreted as legal designations.

S1	Extremely rare: usually 5 or fewer occurrences in the state; or may be a few remaining individuals; often especially vulnerable to extirpation.
S2	Very rare; usually between 5 and 20 occurrences; or with many individuals in fewer occurrences; often susceptible to becoming endangered.
S3	Rare to uncommon; usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
S4	Common; usually > 100 occurrences, but may be fewer with many large populations; may be restricted to only a portion of the state; usually not susceptible to immediate threats.
S5	Very common; demonstrably secure under present conditions.
SA	Accidental in the state.
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.
S#B	Same rank as the numbered S-series, but refers to the breeding season rarity of migrants.
S#N	Same rank as the numbered S-series, but refers to the non-breeding season rarity of migrants; where no consistent location can be discerned for migrants or non-breeding populations, a rank of SZN is used.
SU	Status uncertain, often because of low search effort or cryptic nature of the element.
SX	Apparently extirpated from the state.

The spot on the landscape that supports a particular population of a specific species or a specific stand of a given community type is an **element occurrence**. The Colorado Natural Heritage Program has mapped over 4500 element occurrences in Colorado. Information on the location and quality of these element occurrences is also entered into the computerized Biological and Conservation Datasystem (BCD). This computer system is utilized by the international network of natural heritage programs and conservation data centers (the Biodiversity Information Network). All centers utilize the same methodology, allowing a unique, direct comparison of information throughout the area covered.

In addition to ranking each element in terms of rarity, Natural Heritage staff scientists rank each element occurrence so that protection efforts can be aimed not only at the rarest elements, but at the best examples of each. Element occurrences are ranked in terms of the **quality** (size, vigor, etc.) of the population or community, the **condition** or naturalness of the habitat, the long-term **viability** of the population or community, and the **defensibility** (ease or difficulty of protecting) of the occurrence. Given the intimate relationship between a natural community and its environment, community occurrences are largely ranked in terms of their quality and size.

One of the strongest ways that the Colorado Natural Heritage Program uses these element and element occurrence ranks is to assess the overall significance of a site, which may include one or many element occurrences. Based on these ranks, each site is assigned a **biodiversity** (or B-) **rank**:

- B1 Outstanding Significance: only site known for an element or an excellent occurrence of a G1 species.
- B2 Very High Significance: one of the best examples of a community type, good occurrence of a G1 species, or excellent occurrence of a G2 or G3 species.
- B3 High Significance: excellent example of any community type, good occurrence of a G3 species, or a large concentration of good occurrences of state rare species.
- B4 Moderate Significance: good example of a community type, excellent or good occurrence of state-rare species.
- B5 General Biodiversity Significance: good or marginal occurrence of a community type, S1, or S2 species.

What is Biological Diversity?

Biological diversity has recently become an important management issue for many natural resource professionals. In the most simple terms, biological diversity, or simply biodiversity, is the full variety of plant and animal life in an area **AND** the ecological processes of which they are a part. This concept includes all living organisms from bacteria and fungi, invertebrate animals, mosses and lichens, and the "higher life forms" of plants and animals.

The biological diversity of an area can be described at four levels:

1. Genetic Diversity -- the genetic variation within a population and among populations of a plant or animal species. The genetic makeup of a species is variable between populations of a species within its geographic range. Loss of a species' population results in a loss of genetic diversity for that species and a reduction of total biological diversity for the region.

2. Species Diversity -- the total number and abundance of plant and animal species in an area.

3. Community Diversity -- the variety of natural communities or ecosystems within that area. These communities may be diagnostic or even endemic to an area. It is within these ecosystems that all life dwells.

4. Landscape Diversity -- the type, condition, pattern, and connectedness of natural communities or ecosystems within a landscape. Fragmentation of forested landscapes, loss of connections and migratory corridors, and loss of natural communities all result in a loss of biological diversity for a region. Humans and the results of their activities are integral parts of most landscapes.

All of the conservation sites presented in this report support important components of the total biological diversity of the Town of Vail (Table 4, Figure 4). These sites, if protected, will represent protection for genetic, species, community, and landscape diversity for the county. To protect the widest array of the natural diversity of the Town of Vail, the creation of additional natural areas, corridors, and buffers from excessive human impacts will be necessary.

Relating this Report to Managing Biological Diversity at the Landscape Level.

The management of Biological Diversity must consider more than species specific management criteria and consider the elements of human-use across the Town of Vail. The conservation sites identified in this study may be considered as core areas for the protection of the most imperilled elements of biological diversity. Some of these areas are best considered as candidates for special area designations, others as sites within a landscape that should be managed to include the maintenance of the site's integrity.

A basic premise in the landscape management approach starts with the delineation of core protected areas that can be represented by special designations. Where possible, these should be connected through corridors and appropriately buffered. Buffer zones should include the ecological processes supporting the diversity of the core area. Such is the basis of the development of preliminary conservation planning boundaries. It is hoped that this report will assist the Town of Vail in creating a landscape that permits the fruitful coexistence of humans and other organisms.

METHODS

Natural Heritage staff initiated prioritized inventories in order to gather information on Colorado's rare species and communities in a more thorough and systematic manner. Given that some regions of the state face greater development pressures than others, Natural Heritage staff and network scientists are attempting to inventory the most highly threatened areas first. The Natural Heritage staff conducts a natural heritage inventory in five stages:

1. Review aerial photographs. Aerial photographs of the entire survey area were reviewed in detail to identify Potential Natural Areas (PNA's) to be studied in the following stages. These photographs were compared with topographic maps, soil maps, and geological maps to enhance our ability to detect significant habitats.

2. Gather existing information. Published and unpublished information for the inventory information was reviewed as time allowed. This included the gathering of maps, reviewing the BCD and manual Natural Heritage data, and consulting experts.

3. Refinement of Potential Natural Area numbers and boundaries. From information gathered in steps 1 and 2, the "potential natural areas" were mapped with ecosystem boundaries.

4. Field inventory of the PNAs. Detailed information was collected on the presence and status of unique or exemplary natural communities and rare species that were present, the extent of the feature(s) that made the PNA significant, and the area that needs to be protected to preserve those features. Threats and past or present disturbances were also noted. For element occurrences found to be of statewide significance, these data were transcribed onto Natural Heritage Program maps and entered into the BCD. (See **Appendix B** for examples of Natural Heritage data forms.)

5. Compilation of results and preparation of final report. As fieldwork was completed, Natural Heritage staff scientists reviewed the information gathered. Based on a review of all natural heritage resources present, the staff prioritized the sites in terms of their significance and the threats facing them, developed and mapped preliminary conservation planning boundaries, and drafted protection and management recommendations.

RESULTS

The Natural Heritage Inventory of the Town of Vail has been completed. During the 1993 field season, Natural Heritage staff and network scientists concentrated on completing field surveys of priority PNAs, species, and natural communities (step 4 of the inventory). Based on the results of the inventory, preliminary conservation planning boundaries were developed for natural heritage resources, and these sites were prioritized in terms of their

contribution to maintaining the State's and Vail's natural biological diversity. Two areas in or adjacent to the Town of Vail were found to be of state or global significance and are recommended for high priority conservation efforts.

Information Collection Phase

Aerial photographs of the entire study area (dated August 1991) were reviewed in conjunction with 1:24,000 scale topographic maps. When compared with information existing in the Biological Conservation Databases (BCD), a total of Potential Natural Areas (PNAs) were identified (Figures 2 and 4).

Information was collected from the files of the Colorado Natural Heritage Program. From this search few rare plants or animals were identified for the Town of Vail. Others were considered extremely difficult to survey in a single year. Plant and animal searches were confined to a few priority areas and species, with the results presumably setting the stage for locations of highest probability for rare species occurrences. The Colorado Natural Heritage Program currently has records of three vertebrates, one plant, and two significant natural communities from the study area in its databases (**Figure 1, Table 2**).

Table 2. Rare species and significant natural communities of the Town of Vail.

ELEMENT	COMMON NAME	GLOBAL RANK	STATE RANK	FEDERAL[1] STATUS	STATE[2] STATUS
VERTEBRATES					
Oncorhynchus clarki pleuriticus	Colorado River Cutthroat trout	G5T2T3	S2	C2	SC
Felis lynx canadensis	Lynx	G5	S1	C2	E
VASCULAR PLANTS					
Cypripedium fasciculatum	Purple lady's-slipper	G3	S3	C2	
COMMUNITIES					
Salix drummondiana/ calamagrostis canadensis	Lower montane willow carr	G3	S2S3		
Salix drummondiana-salix planifolia/calamagrostis candensis	Lower montane willow carr	GU	S2S3		

1 Abbreviations are as follows:
C2 = Category 2 Candidate
LE = Listed Endangered

2 Abbreviations are as follows:
1 = federal threatened or endangered that are rare throughout their range
2 = plant species which are rare in Colorado but relatively common elsewhere within their range
3 = species which appear to be rare but for which conclusive information is lacking;

Field Survey Phase

Field surveys conducted as part of the Town of Vail Natural Heritage Inventory have revealed significant information on the natural history of the study area. Thirteen potential natural areas were identified (Table 3, Figure 2). Of the thirteen PNA's, 9 were visited during the study to determine the ecological status. The resulting distribution of the known elements of natural diversity in the Vail Valley area are illustrated in Figure 3.

Table 3. Potential Natural Areas Identified during the Town of Vail Inventory.

PNA #	PNA NAME
1	Miller Creek
2	Black Gore Creek
3	East End
4	East Pond
5	Aspen Slope
6	South-face Grassland
7	South-face Shrubland
8	Vail Streamside
9	Slope's Bottom
10	West Vail Creek
11	Buffehr Creek
12	West West Vail
13	Downs Junction

Notes on sites not chosen as Conservation Sites.

In studying aerial photographs, maps, and actual sites, we observed a large portion of the Town of Vail. The Town has a limited terrain within the Valley, portions of which remain at least somewhat natural. We have argued that Conservation Sites identified herein are a high priority from the perspective of protecting the State's natural heritage. Other priorities exist and that to save all of the County's natural heritage will not be done exclusively in the sites designated herein. Other priorities include viewsheds, backcountry opportunities, wildlife habitat, organized sports areas, and sound buffers. However, the Conservation Sites presented herein are documented to be of highest priority and urgency to assure that the sites and their associated imperiled elements of natural diversity don't disappear forever.

Most of the areas we visited were remnants of the pre-European valley. Some sites were inhabited by abundant wildlife or beautiful displays of wildflowers. These sites often meet criteria as open space or even as local natural areas. Such sites are listed and briefly described in **Appendix A** for use by the County if it so desires.

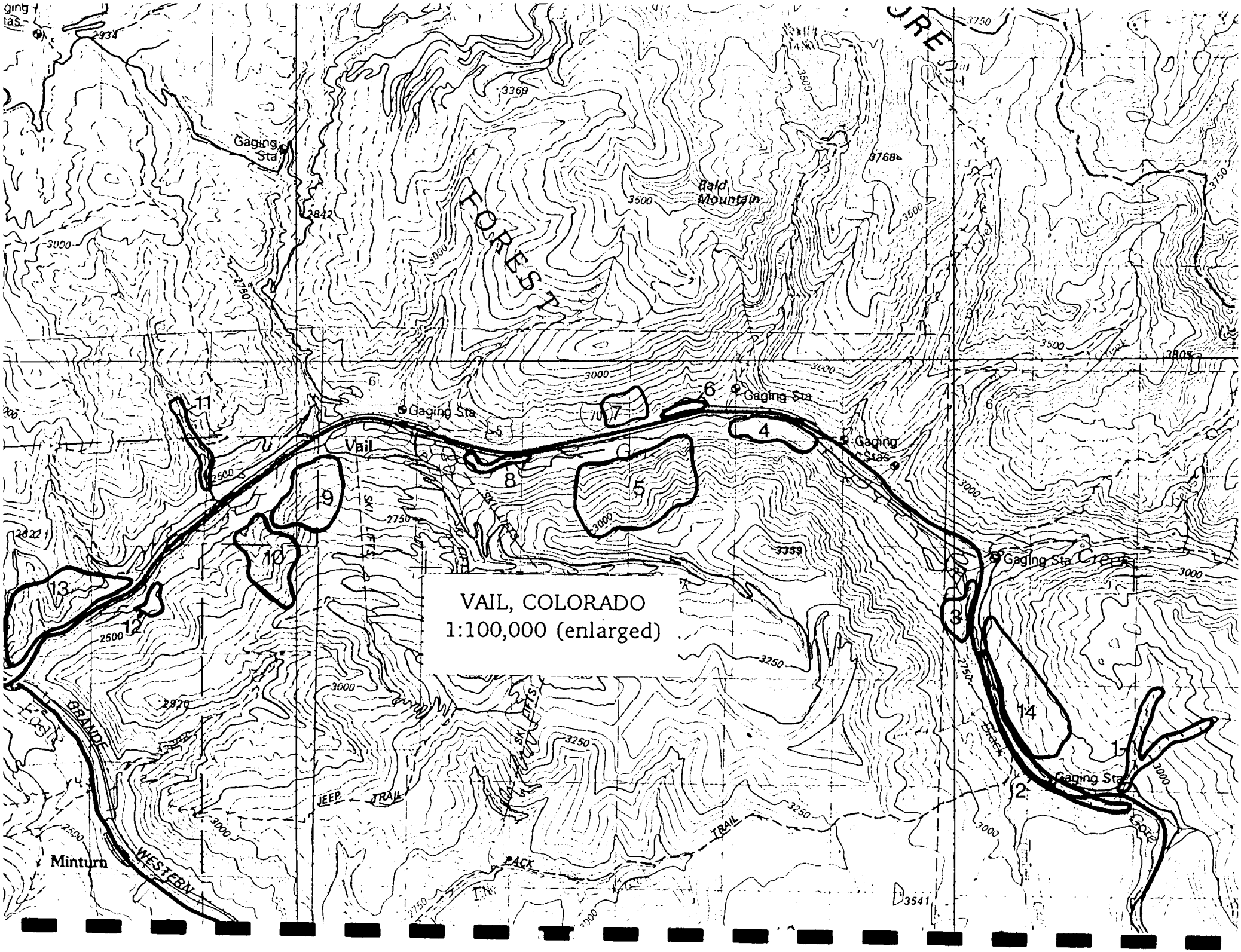
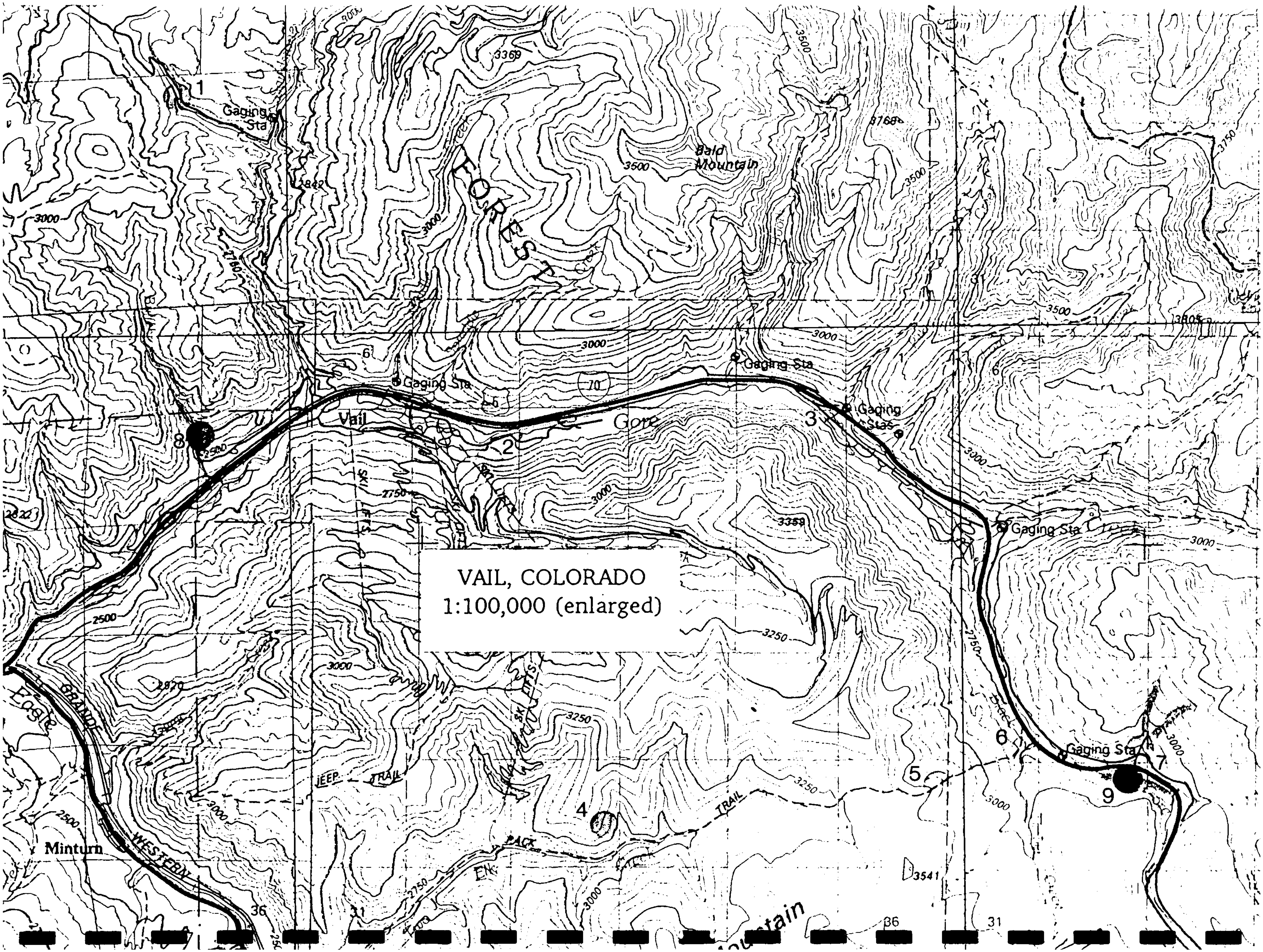

VAIL, COLORADO
1:100,000 (enlarged)
Vail
Bald Mountain
Gaging Sta
Minturn
WESTERN
JEEP TRAIL
PACK TRAIL
SKI LIFTS
SKI TRAIL
FOREST
1
2
3
4
5
6
7
8
9
10
11
12
13
14

Figure 3. The locations of significant elements in the vicinity of the Town of Vail, post-inventory. The names of the elements are as in Figure 1 except: 8 = Drummond's willow montane riparian shrubland, 9 = Colorado blue spruce/black twinberry community.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Bald Mountain
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1
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7
8
9

PROTECTION OF SIGNIFICANT BIODIVERSITY AREAS

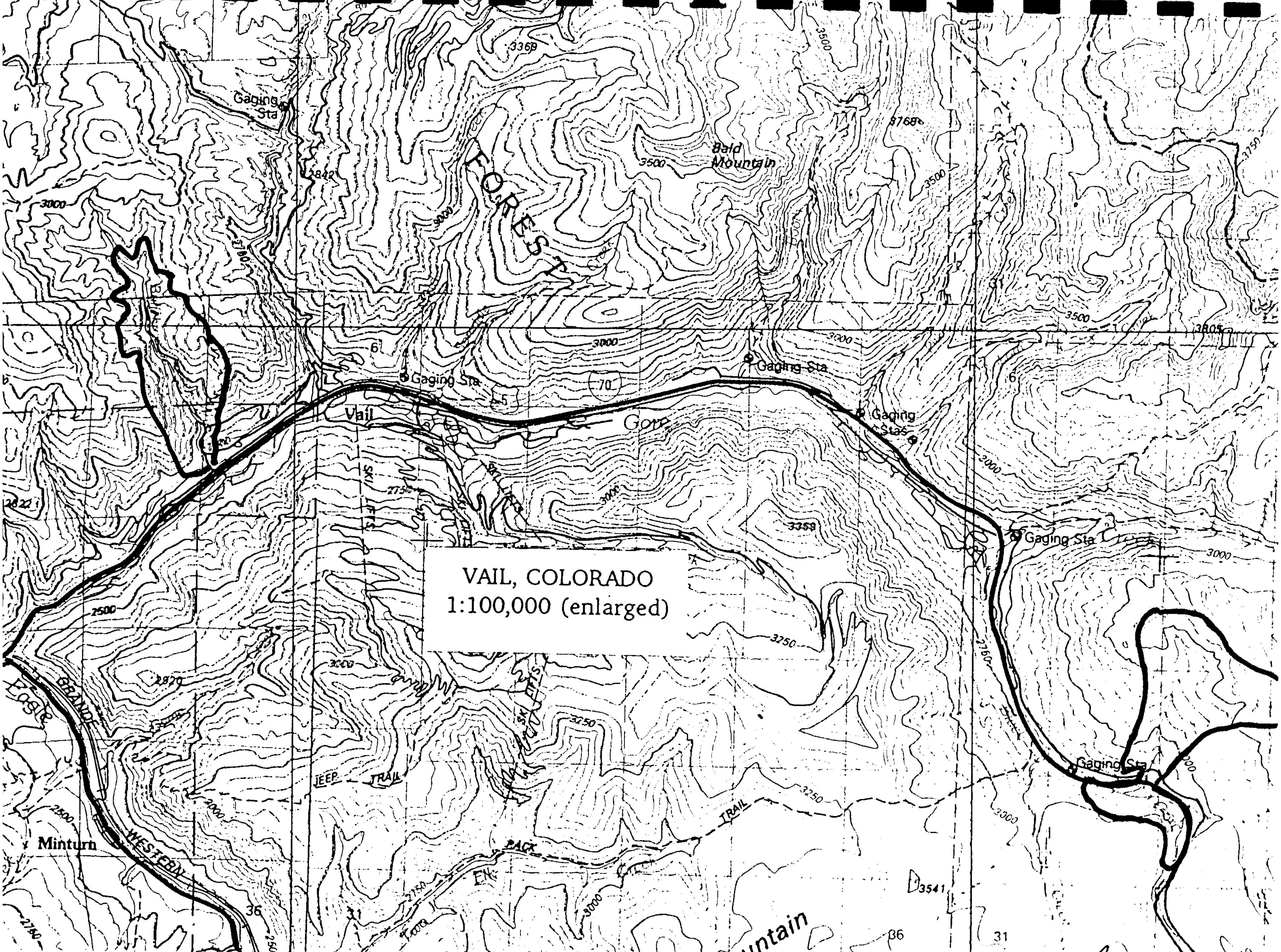
Of the 13 Potential Natural Areas (PNAs) identified during the study (Table 3, Figure 2), 11 were not determined to qualify as natural areas of statewide or global significance (**Appendix A**). The remaining two sites were found to support rare or significant examples of natural communities. These sites are recommended to Town of Vail as areas in need of special protection (Table 4, Figure 4). Again, we emphasize that the CNHP in no way implies that areas that were studied but not considered conservation sites are not of importance for conservation purposes. The ranking system used establishes site priorities for protection relative to the degree of imperilment of known significant features. Therefore, the two sites identified herein comprise the highest priority sites, based on known information, for the conservation of the study area's natural diversity. Other sites are worthy of conservation, but in those sites, species and natural communities that might be lost are found in many additional areas.

Once a Conservation Site has been identified, the first step in protecting the sensitive species or communities is to delineate a preliminary conservation planning boundary for the site. In developing these boundaries, Natural Heritage Program staff considered a number of factors. These included, but were not limited to:

- the extent of current and potential habitat for natural heritage resources, considering the ecological processes necessary to maintain or improve existing conditions;
- species movement and migration corridors;
- maintenance of surface water quality within the site and the surrounding watershed;
- maintenance of the hydrologic integrity of the groundwater, e.g. by protecting recharge zones;
- land intended to buffer the site against future changes in the use of surrounding lands;
- exclusion or control of invasive exotic species; and
- land necessary for management or monitoring activities.

Table 4. Conservation sites identified during the Town of Vail natural areas inventory.

Conservation Site	Biodiversity Rank	PNA #
Miller and Black Gore Creeks	B4	1,2
Buffehr	B4	11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SKI LIFTS
JEEP TRAIL
PACK TRAIL
GRANDE
WESTERN
Eagle
Minturn
3369
3768
3805
3359
3541
3500
3250
3000
2750
2500
70
6
36
31

As the label "conservation planning" indicates, the boundaries presented here are for planning purposes. They delineate ecologically sensitive areas where land-use practices should be carefully planned and managed to ensure that they are compatible with protection goals for natural heritage resources and sensitive species. All land within the conservation planning boundary should be considered an integral part of a complex economic, social, and ecological landscape that requires wise land-use planning at all levels. The maps accompanying each Conservation Site illustrates these preliminary.

Descriptions of Conservation Sites.

The conservation sites are described in standard site reports and appear in alphabetical order by site name. The sections of these reports and their contents are outlined and explained below.

SIZE: The approximate acreage included within the conservation planning boundary for the conservation site.

BIODIVERSITY RANK: The overall significance of the conservation site in terms of rarity of the natural heritage resources and the quality (health, abundance, etc.) of their occurrences. As discussed on page 5, these ranks range from B1 (Outstanding Significance) to B5 (General Biodiversity Significance).

LOCATION: The county and USGS 7.5' quadrangles that include the Conservation Site. The Natural Heritage Program code for the quadrangle is noted in parentheses (e.g. 3910573 is the Ralston Buttes quad).

GENERAL DESCRIPTION: A brief narrative picture of the topography, vegetation, and current use of the conservation site. Common names are used along with the scientific names.

NATURAL HERITAGE RESOURCE SIGNIFICANCE: A synopsis of the rare species and significant natural communities that occur on the conservation site. Many rare species and some natural communities are sensitive to disturbance or may be sought out by collectors; therefore, the exact locations of each element are not shown on the maps. Requests for additional information should be addressed to the Colorado Natural Heritage Program.

CURRENT STATUS: A summary of the ownership, degree of protection currently afforded the conservation site, and threats to the site or natural heritage resources as determined to date.

BOUNDARY JUSTIFICATION: The preliminary conservation planning boundary delineated in this report includes all known occurrences of natural heritage resources and the adjacent lands required for their protection. A discussion of the major factors that were considered is on pages iii-vi.

PROTECTION AND MANAGEMENT CONSIDERATIONS: A summary of the major issues and factors that are known or likely to affect the protection and management of the conservation site.

CONSERVATION SITE PROFILE

Buffehr

SIZE: 2.78 acres **BIODIVERSITY RANK:** B4

LOCATION: Vail West Quadrangle (3910664)

GENERAL DESCRIPTION: Buffehr Creek is a second order perennial stream free of diversions and dams, and flows in a southerly direction from 10,000 to 8,000 feet in elevation over about a 3 mile distance. Upslopes are dominated by Douglas fir (*Pseudotsuga menziesii*) and lodgepole pine (*Pinus contorta*) with patches of aspen (*Populus tremuloides*) and open areas of snowberry (*Symphoricarpos rotundifolia*), elderberry (*Sambucus* sp.) and xeric forbs. The riparian area is dominated by Drummond's willow (*Salix drummondiana*) and mesic forbs such as cow-parsnip (*Heracleum lanatum*). Exotic grasses are abundant. A trail with heavy use by mountain bikers and hikers crosses through the site and stream.

NATURAL HERITAGE RESOURCE SIGNIFICANCE: The riparian area has been classified as a *Salix drummondiana*/mesic forb community type:

Element	Common Name	Occurrence Rank	Global Rank	State Rank	Federal Status	State Status
Salix drummondiana/ mesic forb	Drummond's willow montane riparian shrubland	B	G3	SU	-	-

CURRENT STATUS: No special protection is currently provided to this site. The majority of this land is owned by White River National Forest.

BOUNDARY JUSTIFICATION: The preliminary conservation planning boundaries include Buffher Creek watershed and the adjacent slopes, therefore providing some protection to the essential watershed. While the known occurrence of the riparian community is small, upstream use and water diversions will affect the site. The boundary also includes adjacent riparian communities of thin-leaf alder and rocky mountain maple.

PROTECTION AND MANAGEMENT CONSIDERATIONS: The riparian area is heavily impacted by recreational use. This should be monitored to determine type and seasonality of most damaging usage. In-stream flows and annual flooding need to be maintained for long term viability, flood control and wildlife habitat values. Exotic herbaceous species are invading this site due to disturbance. By reducing the most damaging recreational use and maintaining water levels site quality with improve. Logging and adjacent urban development also threaten the site.

Vail
Ctr 2
Ctr 1
Buffehr
Creek
TRAIL
JEEP
SKI

CONSERVATION SITE PROFILE

MILLER AND BLACK GORE CREEKS

SIZE: 12.4 acres **BIODIVERSITY RANK:** B4

LOCATION: Red Cliff (3910653) and Vail Pass (3910652)

GENERAL DESCRIPTION: Miller Creek and Black Gore Creek flow through steep narrow valley in a Spruce-fir forest. The riparian community is dominated by Colorado blue spruce (*Picea pungens*) and mesic forbs such as twisted stalk (*Streptopus fassetii*) and chiming bells (*Mertensia ciliata*). I-70 and highway 6 cross the creek just upstream of survey site and passes within 200 meters of site. This area is quite free of disturbance and exotic weeds considering its close proximity to the highways and re-seeding with non-native species for erosion control.

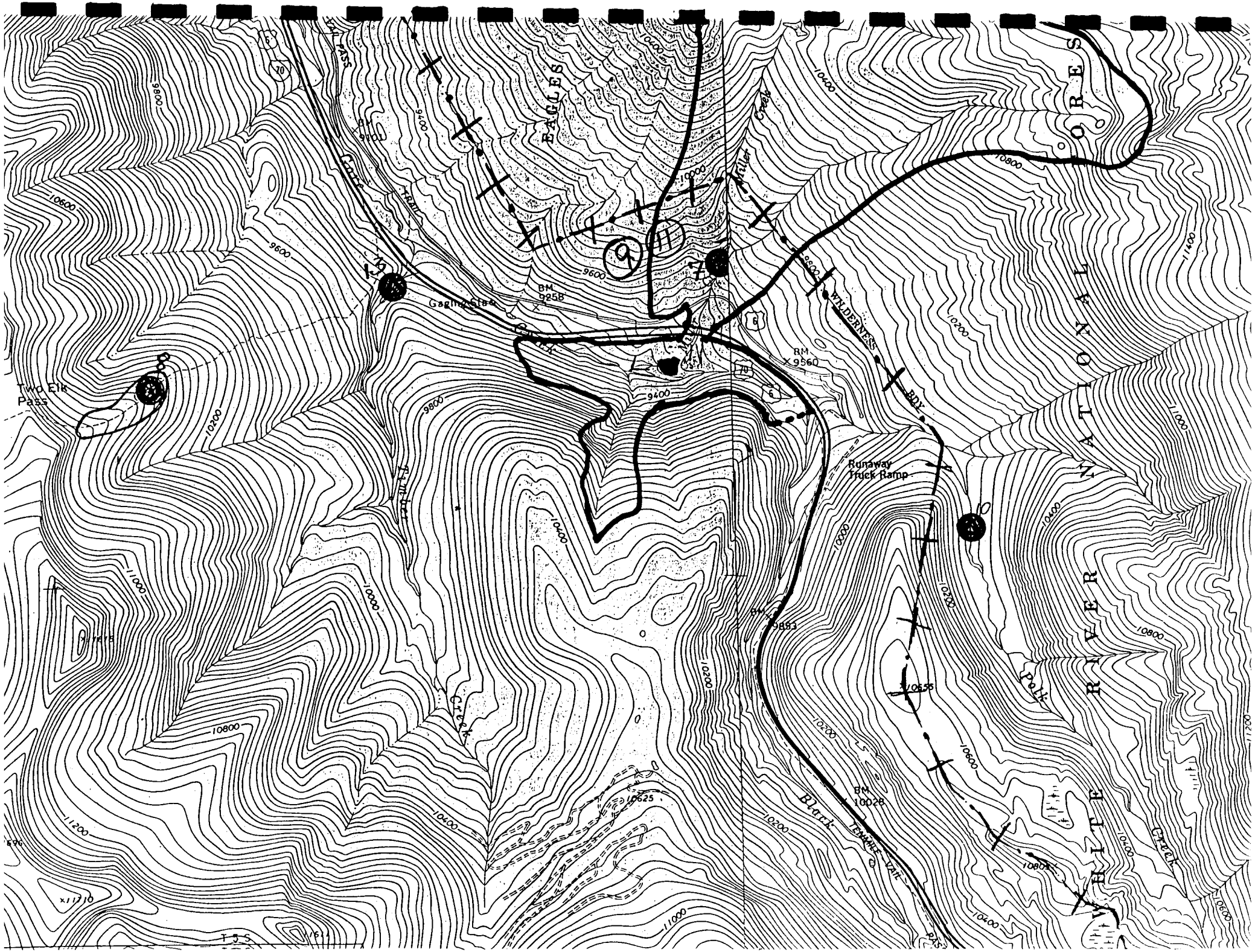
NATURAL HERITAGE RESOURCE SIGNIFICANCE: The riparian community has been classified as a globally threatened community that was once common and wide spread throughout the Rocky Mountains. Today it is rare to find large and long, unfragmented stands of this montane riparian forest.

Element	Common Name	Occurrence Rank	Global Rank	State Rank	Federal Status	State Status
Picea pungens/ Lonicera involucrata	Colorado blue spruce/ black twinberry	A	G2	S2	-	-

CURRENT STATUS: The area is just outside the Eagles Nest Wilderness boundary and occurs within the White River National Forest. It is not under any special management or protection status.

BOUNDARY JUSTIFICATION: The conservation site boundaries include the immediate watershed of Miller and Black Gore Creeks and their adjacent upslopes.

PROTECTION AND MANAGEMENT CONSIDERATIONS: Highways I-70 and 6 crossing Miller Creek may fragment the natural animal migration/movement corridor. The steep terrain is a barrier to recreational use. Threats from development along the highway corridor is present and the site should be monitored for invasions of non-native species used in road erosion control re-seeding efforts. Annual flooding and year-round minimum in-stream flows are essential to long-term viability of the riparian ecosystem.


Two Elk Pass
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BM 9258
BM X9560
Runaway Truck Ramp
BM X9853
BM 10028
Miller Creek
WILDERNESS
BDY
Polk Creek
Black Tenmile Trail
WHITE RIVER NATIONAL FOREST
EAGLES
9400
9600
9800
10000
10200
10400
10600
10800
11000
11200
11400

Protection Tools

Intensive land use in Colorado and multiple demands on many areas contribute to the continual degradation of natural communities, endangered species habitats, and other types of natural areas. Best management practices can help protect critical buffers, but may not be adequate in the protection of sensitive species and sites. The first and most significant and proactive tool for protection is the identification of locations of rare species, natural communities, and the ecosystems that support them. Only with this information can informed decision-making occur.

The Town of Vail has demonstrated concern for its remaining natural areas. This document provides preliminary information to begin a planned protection effort for the significant biodiversity features within those portions of the Town of Vail included in the study area. By using careful planning, and a monitoring program, the significant elements of natural diversity identified herein will be adequately conserved.

RECOMMENDATIONS

1. **Develop an implementation plan for designations of areas the Town determines fulfill criteria for protection.**

This inventory has documented the existence of two sites determined to be significant for the protection of Colorado's and the Town of Vail's natural diversity (**Table 4, Figure 4**). The Town should consider including this report's recommendations in a master planning document.

2. **Incorporate the information included in this report in the review of activities in or near areas identified as significant.**

The areas identified in this study are known to support unique or exemplary natural communities and rare species. As proposed activities within the county are considered, they may be compared to the maps presented herein (**see Conservation Site Profiles**). Should the proposed project potentially impact one of these areas, the Town of Vail can decide if it is desirable to contact persons, organizations, or agencies with expertise. The Colorado Division of Wildlife, Colorado Natural Areas Program, and Colorado Natural Heritage Program routinely conduct environmental reviews statewide and should be considered as a resource available to the Town of Vail.

3. **Increase public awareness of the benefits of protecting areas determined to be significant to the County's natural diversity.**

Given the development rate of the Town of Vail, natural lands are becoming ever more scarce. Rare species will continue to decline if not given appropriate protective measures. Increasing the public's knowledge of the remaining significant areas will build support for the programmatic initiatives necessary to protect them. Such activities could be done through interpretive facilities, conferences or meetings to stimulate public

involvement, and information pamphlets. Finally, it would be desirable for the Town to promote any protective designations to the public and scientific community to build awareness of the commitment to the protection of natural areas within the scope of open space projects.

4. **Promote cooperation among pertinent organizations.**

The long-term protection of the Town of Vail's natural diversity will be facilitated with the cooperation of many organizations. The Town has played a leadership role in attempting to incorporate diverse opinions in the planning process. Efforts to this end should continue, providing the Town with stronger ties among federal, state, and local and private interests involved in the protection or management of natural lands.

5. **Properly manage significant elements of natural diversity within the Town of Vail.**

The first step in accomplishing this recommendation would be the appropriate designation of identified Conservation Sites. In doing so, the development of management plans would be a necessary component of the designations. Several organizations and agencies are available for consultation in the development of Management Plans for significant natural lands (e.g., Colorado Natural Areas Program, The Nature Conservancy, the Colorado Division of Wildlife, and the CNHP). We would also encourage the development of partnerships that could research and develop techniques for maintaining or restoring conservation sites to aid in the preservation of rare, threatened, or endangered species or significant natural communities (e.g. Colorado Division of Wildlife, Colorado Native Plant Society, The Nature Conservancy, and various academic institutions).

Protection of Wide-ranging Species

Site level protection is not adequate for some natural features. For example, the conservation of bird populations, particularly those that occur over large geographical areas, may best be implemented by establishing complementary management practices over the entire occupied area. Most familiar to the Town of Vail will be the problems of protecting elk populations which utilize large areas and are mobile. Local site protection efforts generally will only apply to a small, usually inadequate, portion of the entire population of such species. Such considerations may be of most importance for migrating birds.

Many of the sites we examined contained riparian vegetation. Riparian habitats are known to be of great significance in the protection of natural diversity. This habitat is particularly important for neotropical migratory birds (Partners-In-Flight's Western Working Group draft list). Many of the migratory bird species are known to be declining in numbers over large parts of their ranges (Terborgh 1988). Conservation efforts for these species will by necessity be land management considerations. However, as sites are identified that may be significant to concentrations of these species, land protection should again be considered. We note that two types of natural communities should be considered as important for conservation of these and other birds: riparian habitats and wetlands. Any

efforts to protect such areas will benefit many declining bird species. This is particularly applicable to this study since most of the riparian and wetland habitats of the Town of Vail have been heavily impacted by humans. Nonetheless, the riparian habitats should be considered of high priority for protection.

Other rare, wide-ranging bird species that utilize the study area include raptors, particularly peregrine falcons, golden eagles, and goshawks. In general, these birds are locally sensitive to increased human activity. Peregrine falcons and golden eagles utilize nesting sites year after year. Any known nesting sites for these species should be protected.

Wetlands and biodiversity.

Wetlands and riparian habitats are known to be of significance to wildlife (Windell et al. 1986 and references cited within). The diversity of plants and animals is higher in such areas due to the high productivity, diversity of structural habitat, and simply the availability of water. In the dry western United States, most life forms congregate around water. Humans are no exception. Water is needed for consumption, agriculture, livestock, and the support of industry. It is because of the necessity of water combined with its scarcity that the wetlands and riparian habitats, particularly in the western United States have suffered serious ecological degradation or losses.

It is estimated that more than 50% of the original wetlands have been lost. Much of the remaining habitat is heavily altered. Therefore, it can be expected that in a survey such as a natural heritage inventory, where naturalness and rarity are used as key factors establishing priorities, wetlands may not appear strongly represented. We do not argue with the need to protect wetlands for their extremely important ecological contributions. Such areas were considered a high priority in determining the PNA's. But other tools are available for the identification of all wetland types.

The significance of wetlands to large numbers of species is an important consideration in land use planning. To protect the natural diversity of an area, wetlands must take a high priority. The approach we have taken will assist in the protection of those wetlands that are the rarest, those with the natural characteristics and species. Often these have rare or endangered species with them. Again, we agree that there should be no loss of wetlands and that every local government should do everything possible to assure that. There are several strong laws in place to assist in this type of protection. We also recognize the role that opportunism must play in the protection of any land. However, we believe that this study will provide scientifically-based priorities to guide the protection and disposition of such areas. Among the many good reasons for protecting wetlands with high ecological integrity is the need to have "control" sites. It is from such sites that we can gauge the success of our attempts to reclaim or restore wetlands. Also of great significance is the fact that wetlands that contain rare species or rare natural communities, once lost, cannot be regained. This is the basis for the results presented here.

We encourage the Town of Vail to take a progressive stand on wetland protection and management. While visiting the many riparian and wetland sites in the Town of Vail we viewed the degradation of many such sites. But we have also been able to find some sites that despite intensive human activity, remain largely natural in their function, structure, and species composition. It is these sites that we believe are of the highest priority in wetland protection.

LITERATURE CITED

Baker, F. S. 1944. Mountain climates of the western United States. Ecological Monographs 14:223-254.

Chronic, J. and H. Chronic. 1972. Prairie, Peak and Plateau. Colorado Geological Survey Bulletin 32, Denver. 126 pp.

Terborgh, J. 1989. Where Have All the Birds Gone? Princeton University Press, Princeton, N.J.

Windell, J. T., B. E. Willard, D. J. Cooper, S. Q. Foster, C. F. Knud-Hansen, L. P. Rink, and G. N. Kiladis. 1986. An ecological characterization of Rocky Mountain montane and subalpine wetlands. U. S. Fish and Wildlife Service, Biological Report 86(11). 298 pp.

APPENDIX A:

Comments from field notes on Potential Natural Areas visited during the Town of Vail Natural Heritage Inventory.

TOV-1 Miller Creek:

A steep narrow valley of high quality in close proximity of I-70. This site had the highest quality riparian area found within the survey area. It should be monitored and protected.

TOV-2 Black Gore Creek:

A continuation of the high quality riparian area found in TOV-1. The headwaters of Black Gore Creek are known to contain a remnant population of the Colorado River Cutthroat trout. This trout species was once the only trout native to the Colorado River basin and now remains only in remnant populations of a few Colorado streams.

TOV-4 Gore Creek between Booth and Pitkin Creeks (east of downtown Vail):

This area is a wide floodplain containing a sensitive wetland harboring beavers and willows. Close proximity to town and the bike path and I-70 make this area an ideal park or open space, with careful management of recreational use. The area has abundant wildlife, including beaver, riparian bird species, and abundant small mammal sign. In addition, the creek provides good trout fishing. Although this area has been disturbed beyond conditions that would recommend it as a natural area of statewide significance, we consider this one of the last large areas of the Town of Vail which would provide significant wildlife and natural community values. The Town should strongly consider designating this as a natural area, protecting the existing values and restoring selected other natural values.

TOV-6 South-face Grassland:

This area is between a residential area and I-70 on the north side of the Vail Golf Course. The structure of the grassland is complex with and abundance of graminoids and forbs. However, the area is extremely weedy. The small size of the area, lack of connectivity to natural habitats, and proximity to disturbances preclude its significance as a natural area. Nonetheless, the grassland does have scenic values and provides a buffer from the interstate to the adjacent community.

TOV-7 South-face Shrubland:

Time restraints precluded our visiting this site except from the eastern edge. Although the edges appeared to be somewhat disturbed and weedy, with

binoculars, the interior appeared to retain some natural integrity. The vegetation is not currently represented in any natural areas in the Town of Vail and would contribute to the conservation of the overall natural diversity of the Valley.

TOV-8 Gore Creek in the Town of Vail:

This area is heavily developed residential/condominium-ski-resort area in downtown Vail. The riparian area consists of shady cool conifer forests intermixed with tall willows and other shrubs. The forests shades the stream and provides good fish habitat. Paths and trials along creek provide light recreational use. There is a small willow carr at the eastern end which supports some native bird species. This area is already heavily used by fishing recreationists. The riparian habitats provide some birdwatching as well as other recreational opportunities. The proximity to the center of town provides numerous opportunities for education. We noted that much of the vegetation retained a natural character in spite of obvious disturbances; however, non-native species of grasses used in recent revegetation work will undoubtedly increase the weedy composition. We encourage the Town, whenever possible, to use native grass species to revegetate disturbed areas.

TOV-10 West Vail Creek

Due to time restraints, this Potential Natural Area was not visited. Rather, we examined the area with telescopes and binoculars. The integrity of the area appeared high. Rock outcrops, seepages, and relatively lush vegetation dominated the area. Raptorial birds (such as eagles, falcons, and owls) probably use the rock outcrops for perches while hunting or resting. The rugged nature of the land makes it unlikely that uses other than natural areas could prevail. Although the vegetation was not considered uncommon (viewed from the distance), we suggest that this area be considered as potential open space.

TOV-11 Buffehr Creek:

This area has a wide diversity of riparian communities along the stream. Lower areas closest to the highway and town had the heaviest impact from recreation and development pressures. Further upstream the impacts lessened somewhat. Adjacent forest types showed various signs of impact, including small past shelters. The vegetation was heavily impacted by smooth brome (grass) and several other weedy species. However, we note that the integrity of the forest appears good. The abundant dead and downed trees provided habitat for many bird species. In addition, there was an abundance of wild fruits, providing another recreational value along with wildlife values. Intensive management of recreational use is a must for long term management of this area. We encourage a cooperative management strategy between the Town of Vail and the Forest Service to ensure that the natural characteristics of this area are maintained.

TOV-13 Downs Junction

We visited the eastern 250 acres of this area. While the structural diversity of the area was high, the composition of the vegetation indicated that disturbance had occurred in the past. Weeds and non-native forbs were present in abundance. An old cabin and several old roads/trails indicated a long history of use. We encourage the Town of Vail to determine if the small cabin site has historical value to the State of Colorado or to the Town. Portions of the grass and shrub areas adjacent to the Forest Service land (largely on the drier ridges) were largely natural in composition. These habitats contained a large number of butterfly and grasshopper species. The forested area contained a variety of coniferous trees and were inhabited by most of the local bird species. The area would make an excellent local natural area or open space. Any development in the area should consider the slopes and soils, particularly to prevent erosion into the adjacent stream corridor. We encountered abundant deer and squirrels and observed sign of elk. The role of this area in the movement of large ungulates of the area should be considered during any plans for use (contact the Colorado Division of Wildlife).

The remainder of this Potential Natural Area was not visited due to time constraints. Aerial photograph interpretation indicates that it may be an important wildlife habitat and perhaps contribute significantly to the protection of a once more common vegetation type for the Town of Vail.

APPENDIX B:

RARE, THREATENED AND ENDANGERED SPECIES KNOWN FROM
EAGLE COUNTY
DATA PROVIDED BY THE COLORADO NATURAL HERITAGE PROGRAM ON 29 MAR 1994

	SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	STATE RANK	FEDERAL STATUS	STATE STATUS	FEDERAL SENSITIVE
** Animals: Vertebrate							
*** Birds							
	ARDEA HERODIAS	GREAT BLUE HERON	G5	S3B/SZN			
*** Fish							
	ONCORHYNCHUS CLARKI PLEURITICUS	COLORADO RIVER CUTTHROAT	G5T2T3	S2	C2	SC	FS
*** Mammals							
	FELIS LYNX CANADENSIS	LYNX	G5	S1	C2	E	FS
*** Natural Communities							
	JUNIPERUS OSTEOSPERMA/ARTEMISIA TRIDENTATA	XERIC WESTERN SLOPE PINYON-JUNIPER WOODLANDS	G5	S?			
	POPULUS ANGUSTIFOLIA-(PICEA PUNGENS)/ALNUS INCANA-CORNUS SERICEA	MONTANE RIPARIAN FORESTS	GU	SU			
	SALIX DRUMMONDIANA-SALIX PLANIFOLIA/CALAMAGROSTIS CANADENSIS	LOWER MONTANE WILLOW CARRS	GU	S2S3			
	SALIX DRUMMONDIANA/CALAMAGROSTIS CANADENSIS	LOWER MONTANE WILLOW CARRS	G3	S2S3			
*** Plants							
	CYPRIPEDIUM FASCICULATUM	PURPLE LADY'S-SLIPPER	G3	S3	C2	2	
	ERIOPHORUM ALTAICUM VAR NEOGAEUM	ALTAI COTTONGRASS	G4T?	S1		2	FS
	LISTERA BOREALIS	NORTHERN TWAYBLADE	G5?	S2		2	
	PENSTEMON CYATHOPHORUS	MIDDLE PARK PENSTEMON	G3G4	S2		3	
	PENSTEMON HARRINGTONII	HARRINGTON BEARDTONGUE	G3	S3	C2	1	FS
	PLATANTHERA SPARSIFLORA VAR ENSIFOLIA	CANYON BOG-ORCHID	G?T?	S2		2	

APPENDIX C: Examples of Colorado Natural Heritage Field Forms

PLANT SPECIES OF SPECIAL CONCERN SURVEY FORM
COLORADO NATURAL HERITAGE PROGRAM

C/O UNIVERSITY OF COLORADO MUSEUM*HUNTER 115 CB 315*BOULDER, CO 80309-0315*(303)492-4719

DATE OF SURVEY: ___/___/___

OBSERVER(S) _____

_____

TAXONOMY:

SCIENTIFIC NAME: COMMON NAME _____

LOCATION: (Attach a copy of pertinent 7.5' or 15' topographic map section with locations of populations/subpopulations outlined, one map for each sensitive species described)

SURVEY SITE NAME: _____

COUNTY: _____ USGS QUADRANGLE: _____

TOWNSHIP: _____ RANGE: _____ SECTION: _____ 1/4 SEC.: _____

ADDITIONAL T/R/S, SECTIONS OR 1/4 SECs.: _____

ELEVATION (at population center (and range of population if known)): _____

NATIONAL FOREST/BLM DISTRICT: _____ F.S. DISTRICT/BLM RESOURCE AREA _____

LAND OWNERSHIP/MANAGEMENT (if not USFS/BLM): _____

DIRECTIONS TO SITE (refer to roads, trails, geographic features, etc.:

_____

_____

_____

HABITAT:

VEGETATION STRUCTURE WITHIN POPULATION AREA:

TOTAL TREE COVER (%) _____ TOTAL SHRUB COVER (%) _____

TOTAL FORB COVER (%) _____ TOTAL GRAMINOID COVER (%) _____

TOTAL MOSS/LICHEN COVER (%) _____ TOTAL BARE GROUND COVER _____

ASSOCIATED PLANT COMMUNITY: (list dominant species currently present, include age structure if known):

_____

_____

HABITAT TYPE: _____

ADDITIONAL ASSOCIATED PLANT SPECIES: _____

_____

_____

ASPECT (S, SE, NNW, etc.): _____ % SLOPE _____ SLOPE SHAPE (concave, convex, straight, etc.) _____

LIGHT EXPOSURE (open, shaded, partial shade, etc.): _____

TOPOGRAPHIC POSITION (crest, upperslope, midslope, lowerslope, bottom, etc.): _____

MOISTURE: (dry, moist, saturated, inundated, seasonal seepage, etc.) _____

PARENT MATERIAL: _____

GEOMORPHIC LAND FORM (e.g. glaciated mountain slopes and ridges, alpine glacial valley, rolling uplands, breaklands, alluvial-colluvial-lacustrine (floodplains, terraces, etc.), rockslides):

_____

SOIL TEXTURE: _____

EVIDENCE OF THREATS AND DISTURBANCE: (be specific; effects on populations viability)

_____

_____

POPULATION SIZE:

ESTIMATED NUMBER OF INDIVIDUALS (or exact count, if feasible; if plants are spreading vegetatively, indicate number of aerial stems)_____

NUMBER OF SUB POPULATIONS (if applicable): _____

SIZE OF AREA COVERED BY POPULATION (acres):

_____

BIOLOGY:

PHENOLOGY (percentage flowering, fruiting, vegetative): _____

ANY SYMBIOTIC OR PARASITIC RELATIONSHIPS? (e.g. pollinators): _____

EVIDENCE OF DISEASE, PREDATION OR INJURY? _____

REPRODUCTIVE SUCCESS (evidence of see dispersal and establishment): _____

_____

DOCUMENTATION:

PHOTOGRAPH TAKEN? (if so, indicate photographer and repository): _____

SPECIMEN TAKEN? (if so, list collector, collection number, and repository): _____

_____

IDENTIFICATION (list name of person making determination, and/or name of flora or book used): _____

_____

ECODATA PLOT NUMBER (attach photocopied data sheets): _____

COMMENTS:

COLORADO NATURAL HERITAGE PROGRAM

POTENTIAL NATURAL AREA SURVEY FORM

PNA Name: _____ PNA #: _____

Location: _____

Quadrangle: _____ Code: _____

Map and Aerial Photo examination

Initials	Date	Photo Source	File Code	Photo No.	Photo Date	Notes

Survey Feature: _____

Description: _____

Is aerial survey needed? Y/N Why? _____

Experts & Other Sources

Ownership

COLORADO NATURAL HERITAGE PROGRAM

POTENTIAL NATURAL AREA SURVEY FORM, p. 2

PNA Name: _____ PNA #: _____

Aerial Survey Investigators: _____ Date: _____

Forest Age: Young____ Mature____ Old____ All-age____

Logging: None____ Light Selective____ Heavy Selective____ Clearcut____

Grazing: None____ Light____ Moderate____ Heavy____

Hydrology: Natural____ Ditched____ Flooded____

Additional Notes: _____

Field Check Priority: High____ Moderate____ Low____ No Longer Natural____

Preliminary Survey Investigators: _____ Date: _____

Description/evaluation: _____

Comments: _____

Significant Elements: Most Significant Element Occurrence

Communities	S	L	N	_____
Animals	S	L	N	_____
Plants	S	L	N	_____

Additional Notes: _____

SITE SURVEY SUMMARY

NEW: _____ EXISTING: _____ UNDECIDED: _____

SITE NAME | | SURVEY SITE | |

SITE VISIT CHRONOLOGY:

Date (year)	(mo)	(day)	Time		Surveyor(s)	Source Code
1. 9. .	.	.	_____	to _____		F
1. 9. .	.	.	_____	to _____		F
1. 9. .	.	.	_____	to _____		F
1. 9. .	.	.	_____	to _____		F
1. 9. .	.	.	_____	to _____		F

COUNTY/CITY (CO): _____ QUADNAME: _____ QUADCODE: _____

PRECISE LOCATION (distance and direction from a prominent feature shown on the topographic map, or some other map):

ROAD DIRECTIONS TO SITE:

LOCATION OF SITE ACCESS POINT (where to park, location of important trail):

ELEMENT OCCURRENCES:

Under "Element Name" list all elements sought, reported, or confirmed from the site. If known, record the Occurrence Numbers (EONUM) for each. Generate simple letter or number codes which identify the location of each element occurrence on the base map; these codes help keep the base map uncluttered. Indicate whether the element was found (Y, N, N/A) on the date of the site visit, and whether a return visit is needed.

			Date: 1. 9. . . .	1. 9. . . .	1. 9. . . .	1. 9. . . .	1. 9. . . .	
Element Name	EONUM	Code on Base Map	Found?	Found?	Found?	Found?	Found?	Revisit needed?

SITE DESCRIPTION:

SITE MAP?: _____ MAPDATE: 1. 9. . . . . DESIGNER: _____

TOPOGRAPHIC BASE MAP:
Attach a photocopy of the topographic map and/or aerial photograph showing the site. Complete steps 1 and 2 below.

Completed?

____yes ____no 1. Indicate precise element locations and/or boundaries (use solid lines). Identify each element with the codes you used on page 1.

____yes ____no 2. If knowledge of the site permits, draw primary ( ) and secondary ( ) ecological site boundaries. Within the primary site boundary include all known element occurrences and lands necessary for the immediate protection of the EOs. The secondary boundary (or buffer) includes lands intended to mitigate future unforeseen negative impacts to the EOs (e.g. to control erosion, trespass related damage, natural succession, exotic species, urban sprawl). Use ( ) where primary and secondary boundaries coincide. Below, provide a brief written justification of the boundary locations.

Boundary Justification:

APPROX. TOTAL ACRES WITHIN PRIMARY AND SECONDARY BOUNDARIES: _____ ACRES WITHIN PRIMARY BOUNDARY: _____

GENERAL SITE COMMENTS:

BIODIVERSITY SIGNIFICANCE RANK (B1 B2 B3 B4 B5) AND COMMENT:

PROTECTION URGENCY: (circle one)
- P1 immediately threatened
- P2 threat expected within 5 yrs.
- P3 threatened, but not in next 5 yrs.
- P4 no threats imminent
- P5 land protection complete

Protection Urgency Comments (& date):

MANAGEMENT URGENCY: (circle one)
- M1 management needed this year
- M2 management needed within 5 yrs. to prevent loss of EOs
- M3 management needed within 5 yrs. to maintain current EO quality
- M4 management may be needed in future
- M5 no management needed

Management Urgency Comments (& date):

LAND DESIGNATION: Public _____ Private _____ Adjacent Public _____

STEWARDSHIP:

Land Use Comments:
Describe current and past land use, improvements, and structures, and possible stewardship implications.

Potential Hazards Comments:
Describe any potential hazards, both natural (e.g. cliffs, caves, venomous snakes, etc.), and of human origin (e.g. mine shafts, old wells, dangerous structures). Prescribe appropriate precautions.

Exotic Flora/Fauna Comments:
List problem exotic species, describe their effects on the EOs, and, if possible, prescribe control methods.

Off-site Considerations:
Describe off-site land uses (e.g. farming, grazing, mining, urban development, stream perturbations) and how these uses might affect the EOs on the site and their future management.

Information Needs:

Site and Element Management Needs:
Summarize the expected management needs for the site and its EOs.

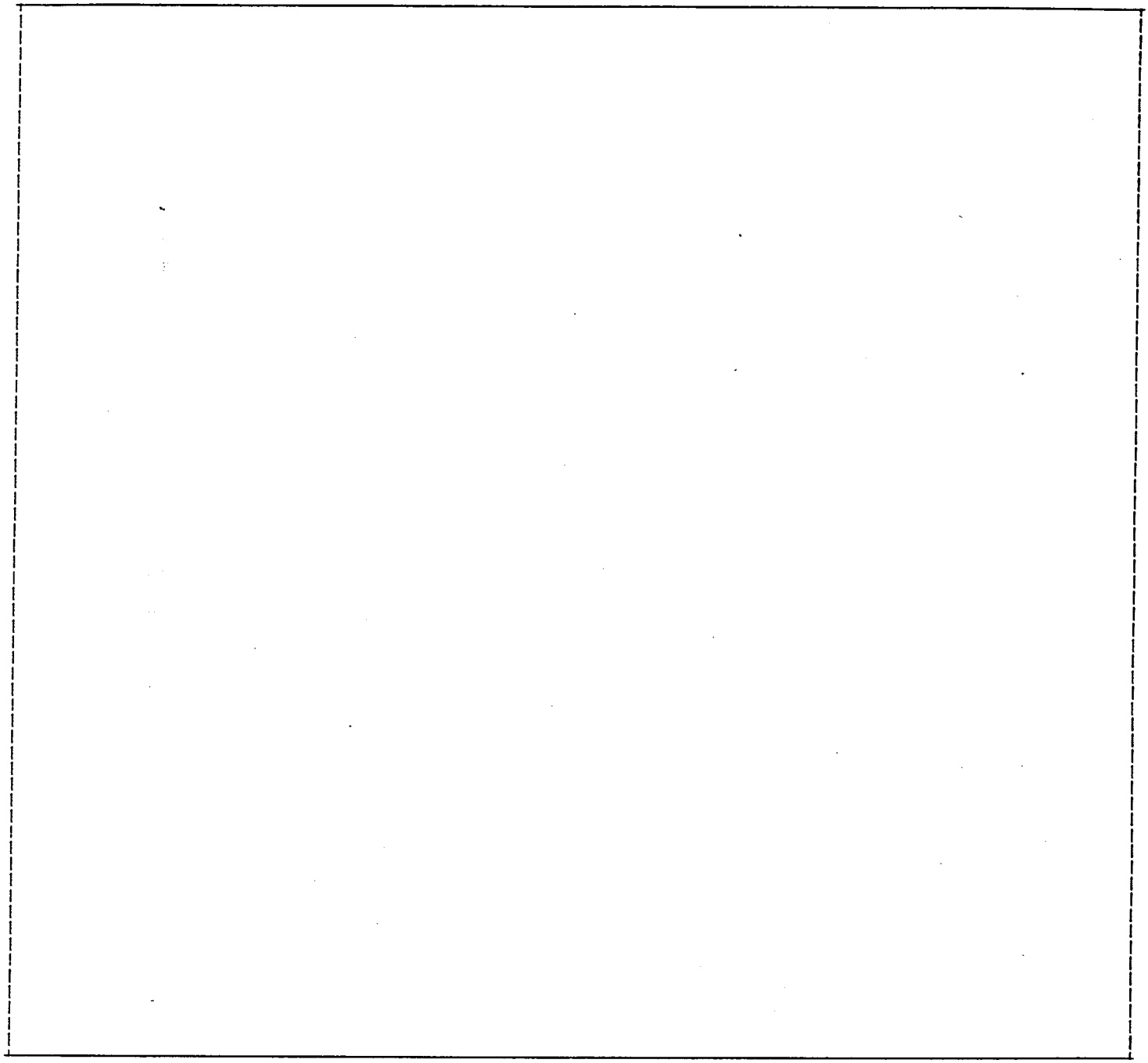
Managed Area Comments:

CZM SITE: (y, n) ____

Tract Ownership or Managed Area Name (names, addresses, phone #):

DETAILED SKETCH MAP:

The purpose of this map is to show fine details of the site which are not shown on the topographic base map. This map can be used to show: (1) EO locations, (2) study plots or marked individuals, (3) natural landmarks, and (4) disturbance features, such as structures and trails. Include scale and indicate north.



ANIMAL SPECIES OF SPECIAL CONCERN SURVEY FORM
COLORADO NATURAL HERITAGE PROGRAM

C/O UNIVERSITY OF COLORADO MUSEUM*HUNTER 115 CB 315*BOULDER, CO 80309-0315*(303)492-4719

DATE OF SURVEY: ___/___/___

OBSERVER(S) _____

_____

TAXONOMY:

SCIENTIFIC NAME: COMMON NAME _____

LOCATION: (Attach a copy of pertinent 7.5' or 15' topographic map section with locations of populations/subpopulations outlined, one map for each sensitive species described)

SITE NAME: _____

COUNTY: _____ USGS QUADRANGLE: _____

TOWNSHIP: _____ RANGE: _____ SECTION: _____ 1/4 SEC.: _____

ADDITIONAL T/R/S, SECTIONS OR 1/4 SECs.: _____

ELEVATION (at population center (and range of population if known)): _____

NATIONAL FOREST/BLM DISTRICT: _____ F.S. DISTRICT/BLM RESOURCE AREA _____

LAND OWNERSHIP/MANAGEMENT (if not USFS/BLM): _____

DIRECTIONS TO SITE (refer to roads, access routes, trails, geographic features, etc.):

_____

_____

_____

HABITAT:

VEGETATION STRUCTURE WITHIN POPULATION AREA:

TOTAL TREE COVER (%) _____ TOTAL SHRUB COVER (%) _____

TOTAL FORB COVER (%) _____ TOTAL GRAMINOID COVER (%) _____

TOTAL MOSS/LICHEN COVER (%) _____ TOTAL BARE GROUND COVER _____

ASSOCIATED PLANT COMMUNITY: (list dominant species currently present, include age structure if known):

_____

_____

HABITAT TYPE: _____

ADDITIONAL ASSOCIATED PLANT SPECIES: _____

_____

_____

_____

TIME OF DAY _____ WEATHER _____

ASPECT (S, SE, NNW, etc.): _____ % SLOPE _____ SLOPE SHAPE (concave, convex, straight, etc.) _____

LIGHT EXPOSURE (open, shaded, partial shade, etc.): _____

TOPOGRAPHIC POSITION (crest, upperslope, midslope, lowerslope, bottom, etc.): _____

MOISTURE: (dry, moist, saturated, inundated, seasonal seepage, etc.)

PARENT MATERIAL: _____

GEOMORPHIC LAND FORM (e.g. glaciated mountain slopes and ridges, alpine glacial valley, rolling uplands, breaklands, alluvial-colluvial-lacustrine (floodplains, terraces, etc.), rockslides)

_____

SOILTEXTURE: _____

EVIDENCE OF THREATS AND DISTURBANCE: (be specific; effects on population viability) _____

_____

_____

SPECIAL MANAGEMENT CONSIDERATIONS: _____

_____

POPULATION SIZE:

ESTIMATED NUMBER OF INDIVIDUALS (exact count, if feasible)

_____

NUMBER OF SUB POPULATIONS (if applicable): _____

SIZE OF AREA COVERED BY POPULATION (estimate or measured acres):

_____

BIOLOGY:

PHENOLOGICAL CONDITION: (larvae, adults, breeding, fledging, metamorphosing, etc.): _____

_____

EVIDENCE AND EXTENT OF PARASITISM? (e.g. pollinators): _____

EVIDENCE OF DISEASE, PREDATION OR INJURY? _____

REPRODUCTIVE SUCCESS (evidence of reproduction and success): _____

_____

BEHAVIORAL NOTES: _____

_____

DOCUMENTATION:

POPULATION DOCUMENTED VIA: Specimen ___ Sight ___ Tracks/Sign ___ Songs/Calls ___ Road kill ___ Photo ___ Verbal ___

IF PHOTOGRAPH TAKEN (indicate photographer and repository): _____

IF SPECIMEN TAKEN (list collector, collection number, and repository): _____

_____

IDENTIFICATION (list name of person making determination, and/or name of paper or book used): _____

_____

ECODATA PLOT NUMBER (attach photocopied data sheets): _____

COMMENTS:

SUPPLEMENTAL FIELD DATA: COMMUNITY OCCURRENCE

SLOPE: _____ ASPECT: _____ ELEV.: _____ TOPO. POS.: _____

HYDROLOGIC REGIME: _____ GEOLOGY: _____

SOIL: _____

HABITAT COMMENTS: _____

_____

DISTURBANCE: _____

_____

THREATS: _____

II. VEGETATION STRUCTURE, DOMINANCE, AND PHYSIOGNOMY.

For each stratum, circle a height/density code, list 1 to 3 dominant species, and select a physiognomy code.

Density		TREE LAYER(s) Height (m) 60+ 35 20 15 10 6	SHRUB TALL (2-6 m)	SHRUB LOW (1-2 m)	HERB TALL (> 1 m)	HERB LOW (< 1 m)	MOSS/ LICHEN
dense:	100%	A0 A1 A2 A3 A4	ST0	SL0	HT0	HL0	M0
somewhat open:	80%	B0 B1 B2 B3 B4	ST1	SL1	HT1	HL1	M1
open:	60%	C0 C1 C2 C3 C4	ST2	SL2	HT2	HL2	M2
very open:	40%	D0 D1 D2 D3 D4	ST3	SL3	HT3	HL3	M3
sparse:	25%	E0 E1 E2 E3 E4	ST4	SL4	HT4	HL4	M4
	5%						

DOMINANT SP. (taller stratum)				
(lower stratum)				
PHYSIOGNOMY: (taller)	F FC CF C	SD SE SC	P H G E	M L
(lower)	F FC CF C	SD SE SC	P H G E	

ADDITIONAL PLANT AND ANIMAL SPECIES (identify diagnostic species with an asterisk):

EO RANKING CONSIDERATIONS:

SIZE: Very large Large Average Small Very small ACRES: _____

CONDITION: Excellent Good Average Fair Poor