WILD AND SCENID ELIGIBILITY ANSLYSIS FOR ECOLOGY
San Juan Forest and BLM

DRAFT 5/3/06

I. Region of comparison:

"*The interdisciplinary team must identify the area of consideration that will serve as the basis for meaningful comparative analysis. This area of consideration is not fixed; it may be a national forest, grassland, prairie, or comparable administrative unit, a portion of a state, or an appropriately scaled physiographic or hydrologic unit. Once the area of consideration is identified, a river's values can then be analyzed in comparison with other rivers*." (FSH 1909.12-80)

For this resource, we used the following area of consideration.

____SW Colorado
____Southern Rocky Mountains Province
____Colorado Plateau Province
__X__ other (explain) Ecological importance is considered based in a state-wide and global context using TNC ranking of known occurrences of communities and species. For instance the San Juan National Forest and BLM in San Juan County contain 5 occurrences out of 13 known global occurrences of Iron Fens. Also used BLM/FS sensitive species lists.

II. Analysis procedure

"*There are a variety of methods to determine that certain river-related values are so unique, rare, or exemplary as to make them outstandingly remarkable. The determination that a river area contains outstanding values is a professional judgment on the part of an interdisciplinary team, based on objective, scientific analysis*." (FSH 1909.12-80)

In order to be assessed as outstandingly remarkable, a river-related value must be a unique, rare, or exemplary feature that is significant at a comparative regional or national scale. A river-related value would be a conspicuous example of that value from among a number of similar examples that are themselves uncommon or extraordinary. (FSH 1909.12-80)

"The following eligibility criteria are offered to foster greater consistency within the agency and with other federal river-administering agencies. They are intended to set minimum thresholds to establish outstandingly remarkable values and are illustrative and not all-inclusive. These criteria may be modified to make them more meaningful in the area of comparison, and additional criteria may be included".(FSH 1909.12-80)

While no specific national evaluation guidelines have been developed for the "other similar values" category, assessments of additional river-related values consistent with the foregoing guidance may be developed, including, but not limited to, hydrology, paleontology, and botany resources (FSH 1909.12-80)

What references consulted: Information based on San Miguel County and San Juan County Biological Assessments completed by the Colorado Natural Heritage Program. Assessments were cooperative assessments with GO Colorado, BLM and USFS funding.

How decide what is unique/rare versus what is good example of common species: Colorado Natural Heritage Program/TNC rankings of species and communities based on global occurrences and species of state concern using Heritage program protocol.

How determined what is river-related. Species and communities that are obligate to water resources, wetlands and riparian areas within river canyons.

Our analysis was based on information in San Miguel County and San Juan County Biological Assessments completed by the Colorado Natural Heritage Program. Assessments were cooperative assessments with GO Colorado, BLM and USFS funding. To decide what was unique/rare, we used Colorado Natural Heritage Program/TNC rankings of species and communities based on global occurrences and species of state concern using Heritage program protocol. To determine what was river-related, we only used Species and communities that are obligate to water resources, wetlands and riparian areas within river canyons. In the write-ups inserted below, there is discussion of other species (e.g., pinyon-juniper communities) that were **not** used to determine unique river-related plant communities.

Colorado's Natural Heritage Program

To place this document in context, it is useful to understand the history and functions of the Colorado Natural Heritage Program (CNHP).

CNHP is the state's primary comprehensive biological diversity data center, gathering information and field observations to help develop statewide conservation priorities. After operating in Colorado for fourteen years, the Program was relocated from the State Division of Parks and Outdoor Recreation to the University of Colorado Museum in 1992 and then in 1994 to the College of Natural Resources at Colorado State University.

CNHP's multi-disciplinary team of scientists and information managers gathers comprehensive information on rare, threatened, and endangered species and significant plant communities of Colorado. Life history, status, and locational data are incorporated into a continually updated data system. Sources include published and unpublished literature, museum and herbaria labels, and field surveys conducted by knowledgeable naturalists, experts, agency personnel, and our own staff of botanists, ecologists, and zoologists. Information management staff carefully plot the locations on 1:24,000 scale U.S.G.S. maps and enter it into the Biological and Conservation Data System (BCD). The data are also stored in a geographic information system (Arc/INFO and ArcView GIS). The database can be accessed through a variety of attributes, including taxonomic group, global and state rarity rank, federal and state legal status, source, observation date, county, quadrangle map, watershed, management area, township, range, and section, precision, and conservation unit.

CNHP is part of an international network of conservation data centers that use the Biological and Conservation Data System (BCD) developed by The Nature Conservancy. CNHP has effective relationships with several state and federal agencies, including the Colorado Natural Areas Program, Colorado Department of Natural Resources and the Colorado Division of Wildlife, the U.S. Environmental Protection Agency, the U.S. Bureau of Land Management and the U.S. Forest Service. Numerous local governments and private entities also work closely with CNHP. Use of the data by many different individuals and organizations, including Great Outdoors Colorado, encourages a proactive approach to development and conservation thereby reducing the potential for conflict. Information collected by the Natural Heritage Programs around the globe provides a means to protect species before the need for legal endangerment status arises.

Concentrating on site-specific data for each species or community enables the evaluation of the significance of each location with respect to the conservation of natural biological diversity in Colorado and the nation. By using species imperilment ranks and quality ratings for each location, priorities can be established for the protection of the most sensitive or imperiled sites. A continually updated locational database and priority-setting system such as that maintained by CNHP provides an effective, proactive land-planning tool.

The Natural Heritage Ranking System

Each of the plant and animal species and plant communities tracked by CNHP is considered an element of natural diversity, or simply an element. Each element is assigned a rank that indicates its relative degree of imperilment on a five-point scale (e.g., 1 = extremely rare/imperiled, 5 = abundant/secure). The primary criterion for ranking elements is the number of occurrences, i.e., the number of known distinct localities or populations. This factor is weighted more heavily because an element found in one place is more imperiled than something found in twenty-one places. Also considered in the ranking is the size of the geographic range, the number of individuals, trends in population and distribution, identifiable threats, and the number of already protected occurrences.

Element imperilment ranks are assigned both in terms of the element's degree of imperilment within Colorado (its State or S-rank) and the element's imperilment over its entire range (its Global or G-rank). Taken together, these two ranks give an instant picture of the degree of imperilment of an element. For example, the lynx, which is thought to be secure in northern North America but is known from less than 5 current locations in Colorado, is ranked G5S1. Naturita milkvetch, which is known from 37 locations in the Four Corners Area, is ranked a G3S3. Further, a tiger beetle that is only known from one location in the world at the Great Sand Dunes National Monument is ranked G1S1. CNHP actively collects, maps, and electronically processes specific occurrence information for elements considered extremely imperiled to vulnerable (S1 - S3). Those with a ranking of S3S4 are "watchlisted," meaning that specific occurrence data are collected and periodically analyzed to determine whether more active tracking is warranted. A complete description of each of the Natural Heritage ranks is provided in Table 1.

This single rank system works readily for all species except those that are migratory. Those animals that migrate may spend only a portion of their life cycles within the state. In these cases, it is necessary to distinguish between breeding, non-breeding, and resident species. As noted in Table 1, ranks followed by a "B", e.g., S1B, indicate that the rank applies only to the status of breeding occurrences. Similarly, ranks followed by an "N", e.g., S4N, refer to non-breeding status, typically during migration and winter. Elements without this notation are believed to be year-round residents within the state."[1]

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[1] San Juan County Biological Assessment Colorado Natural Heritage Program College of Natural Resources Colorado State University Fort Collins, CO 80523-8002 March 2003

III. Justification for each ORV

References:

CNHP Potential Conservation Area descriptions are from:

1. San Juan County Biological Assessment, Prepared for San Juan County By Peggy Lyon, Denise Culver, Maggie March and Lauren Hall Colorado Natural Heritage Program; College of Natural Resources Colorado State University Fort Collins, CO 80523-8002 March 2003
    a. Cement Creek Iron Fen (B2)
    b. Cinnamon Pass (B3)
    c. Maggie Gulch (B3)
    d. California Gulch at Animas River (B3)
    e. Chattanooga Iron Fen (B2)
    f. South Fork Mineral Creek (B2)

2. A Natural Heritage Assessment San Miguel and Western Montrose Counties, Colorado Prepared for San Miguel County, Telluride, Colorado March, 2000; By Peggy Lyon and John Sovell, Colorado Natural Heritage Program; Colorado State University Fort Collins, Colorado 80523
    a. Dolores Canyon-Slick Rock to Bedrock (B1)
    b. Dolores Canyon South of Slick Rock (B2)
    c. Coyote Wash (B2)
    d. La Sal Creek (B1)*(Montrose BLM will evaluate)*
    e. McIntyre Canyon (B2)
    f. Summit Canyon (B4)

1) Dolores River McPhee Dam to Bedrock - Sections below Disappointment (2d-2e) have unique New Mexico privet (dessert olive) communities. This plant community is known only from the major rivers in the Four Corners area. Other portions of the river corridor support Naturita milkvetch and Eastwoods monkey flower, which are are BLM sensitive species and state sensitive species. Descriptions from CNHP are as follows:

"*The canyon bottoms support a nearly continuous occurrence of the riparian plant association known as New Mexico privet foothills riparian shrubland, the globally imperiled riparian shrub community dominated by New Mexico privet* (*Forestiera pubescens*).

… an excellent occurrence of the globally imperiled New Mexico privet riparian shrub community. Also Flannel Mouth suckers, roundtail chubs

... A good occurrence of the Naturita milkvetch, considered to be vulnerable both globally and in Colorado

...Hanging garden communities, imperiled to vulnerable on a global scale, contained small populations of the globally vulnerable, state rare Eastwood monkeyflower (2).

Dolores Canyon-Slick Rock to Bedrock

Biodiversity Rank: B1 (Outstanding Biodiversity Significance) The Dolores Canyon Slick Rock to Bedrock PCA has an excellent occurrence of the globally imperiled New Mexico privet riparian shrub community.

Protection Urgency Rank: P4 No threat is known for the foreseeable future.

Management Urgency Rank: M4 Although not urgently required, management may be needed in the future to maintain the current quality of element occurrences.

Location: This PCA extends between the old townsite of Slick Rock, Colorado and Bedrock, Colorado in northwestern San Miguel County and southwestern Montrose County.

U.S.G.S. 7.5 minute quadrangles: Anderson Mesa, Bull Canyon, Gypsum Gap, Hamm Canyon, Horse Range Mesa, Joe Davis Hill, Paradox

Legal description: T44N R19W Sections 12, 13, 21, 24, 25; T44N R18W Sections 7, 8, 9, 18, 19, 30; T45N R19W Sections 1, 12; T45N R18W Section 4-9, 17-21, 28, 29, 32, 33; T46N R18W Sections 30, 31; T46N R19W Sections 1, 2, 10, 11, 12, 14, 15, 22, 23, 25, 26, 35, 36; T47N R19W Sections 35, 36; T47N R18W Sections 19, 30, 31.

Elevation range: 4,966 to 6,200 feet

Size: 15,384 acres

General Description:

The Dolores River has carved a spectacular deep canyon through Jurassic and Triassic sandstones at this PCA. Steep vertical cliffs dominate the canyonsides, broken only when tributaries enter the canyon. Major geologic formations in the canyon are

Wingate, Kayenta, Navajo and Entrada sandstones. The Morrison Formation appears near the southern end of the PCA.

This PCA includes the riparian zone and adjacent uplands along the Dolores River for approximately fifty miles, from Slick Rock north to Bedrock. Most of this area is roadless and accessible only by raft, canoe or kayak. The canyon bottoms support a nearly continuous occurrence of the riparian plant association known as New Mexico privet foothills riparian shrubland. Typical vegetation along the river includes a band of coyote willow, mixed with giant reed at the water's edge between the low and high water marks. On slightly higher ground is a band of New Mexico privet, often accompanied by skunkbrush, big sagebrush, giant reed and wild rose. Cottonwoods and box elders are occasional. Most of this area has few weeds, and surprisingly little tamarisk compared with other parts of the river.

In an alcove seep at river mile 77.5, CNHP researchers found a hanging garden community with Eastwood's monkeyflower and Mancos columbine. While the columbine was abundant, the monkeyflower was represented by only six plants. Adjacent species were Utah juniper, Mormon tea, skunkbrush, single leaf ash, New Mexico privet, and two ferns, purple cliffbrake and slender lip-fern. Kachina daisy was not present. Several other alcoves in this stretch were investigated, but did not contain any of the targeted species.

A cliff base just upstream of Spring Creek was the site of a good population of helleborine orchids. Another smaller occurrence was found below the seep at mile 77.5.

Uplands in this area have pinyon-juniper woodlands, sagebrush, or barren sandstone cliffs. Naturita milkvetch was found in the pinyon-juniper community at a campsite at mile 72. Benches sometimes have patches of native grasslands. Relic patches of high quality grasslands were identified by BLM in 1980. Formerly known as "*Stipa comata* – West", this community is now called *Stipa comata,* or "Needle and thread Great Basin herbaceous vegetation". The species composition of the communities varies. It usually includes, in addition to needle-and-thread grass, galleta, Indian ricegrass, and blue grama. In the occurrences in this PCA, needle-and-thread was the dominant grass, ranging from 6% to 20% cover. Blue grama accounted for 1% to 11% cover.

This area has a number of occurrences of animal species with conservation significance, the rarest of which are the roundtail chub and flannelmouth sucker. Nesting Peregrine Falcons also occur at this PCA. The peregrine eyries occur along the cliff tops to approximately 100 feet below the cliff tops of the Dolores River Canyon. Also found within the PCA are a number of animals that globally are demonstrably secure (G5) including the Yuma skipper, canyon tree frog, plateau striped whiptail, and tree lizard.

Natural Heritage element occurrences at the Dolores Canyon-Slick Rock to Bedrock PCA

Element	Common Name	G	S	Federal/Stat	EO*
Forestiera pubescens	**New Mexico privet foothills riparian shrubland**	**G1G2**	**S1**		**A**
Forestiera pubescens	**New Mexico privet foothills riparian**	**G1G2**	**S1**		**A**
Erigeron kachinensis	Kachina daisy	G2	S1	BLM	H

Stipa comata	Needle and thread (Great Basin herbaceous	G2G4	S2?		A
Stipa comata	Needle and thread (Great Basin herbaceous	G2G4	S2?		B
Gila robusta	Roundtail chub	G2G3	S2	BLM, CO-SC	H
Astragalus naturitensis	Naturita milkvetch	G2G3	S2S3	BLM, USFS	B
Aquilegia micrantha-Mimulus eastwoodiae	Hanging gardens	G2G3	S2S3		C
Astragalus naturitensis	Naturita milkvetch	G2G3	S2S3	BLM, USFS	H
Pediomelum aromaticum	Paradox breadroot	G3	S2	BLM	H
Mimulus eastwoodiae	Eastwood monkey-flower	G3?	S1	BLM	C
Catostomus latipinnis	Flannelmouth sucker	G3G4	S3	BLM, CO-SC	E
Epipactis gigantea	Helleborine	G4	S2	BLM	B
Epipactis gigantea	Helleborine	G4	S2	BLM	C
Vireo vicinior	Gray Vireo	G4	S2B,SZN		E
Penstemon lentus	Abajo penstemon	G4Q	S2		D
Falco peregrinus anatum	American Peregrine Falcon	G4T3	S2B,SZN	LE-PDL	E
Ochlodes yuma	Yuma skipper	G5	S2		C
Hyla arenicolor	Canyon treefrog	G5	S2	BLM, CO-SC	E
Hyla arenicolor	Canyon treefrog	G5	S2	BLM, CO-SC	H
Hyla arenicolor	Canyon treefrog	G5	S2	BLM, CO-SC	H
Cnemidophorus velox	Plateau striped whiptail	G5	S4		B
Cnemidophorus velox	Plateau striped whiptail	G5	S4		B
Urosaurus ornatus	Tree lizard	G5	S4		B
Salix exigua/mesic graminoid	Coyote willow/mesic graminoid	G5	S5		A
Pellaea glabella ssp. *simplex*	Smooth cliff-brake	G5T4?	S2		B

*EO=Element Occurrence

Biodiversity comments: There are good to excellent occurrences of the globally imperiled riparian shrub community dominated by New Mexico privet along the Dolores River. This plant community is known only from the major rivers in the Four Corners area.

A historic record of the Kachina daisy from Bull Canyon has not been relocated since 1978. A good occurrence of the Naturita milkvetch, considered to be vulnerable both globally and in Colorado was located in the PCA. **Hanging garden communities, imperiled to vulnerable on a global scale, contained small populations of the globally vulnerable, state rare Eastwood monkeyflower.** Paradox breadroot was located near Bedrock in 1981.

Excellent occurrences of relic native bunchgrass communities were identified on benches in this PCA during the BLM's inventory of 1984.

Peregrine falcons nest along the cliffs above the Dolores River Canyon. Eyries have been actively used in this PCA throughout the 1990's.

The Yuma Skipper and canyon tree frog are both rare in Colorado, although apparently secure globally. The primary factors justifying a conservation concern for canyon treefrogs are the small number of occurrences, restricted range and relatively low numbers (qualitative judgement) of individuals. There are no quantitative data on population size or trends.

The Dolores River throughout the length of the PCA supports populations of the roundtail chub and flannelmouth sucker. These fish are imperiled and vulnerable on a global scale, respectively, and the chub is rare within the state, while the sucker is vulnerable. In Colorado, both fish inhabit the Colorado River mainstem and its larger tributaries, including the White, Yampa, Dolores, San Juan, and Gunnison rivers (Woodling 1985). Colorado populations of the chub are at the upstream margin of the species' range and comprise the majority of occurrences for this species. The sucker has disappeared from some water systems like the Gunnison River above Blue Mesa were it was displaced by white and longnose suckers (Woodling 1985).

Boundary Justification: The boundary is drawn to include the riparian zone of the Dolores Canyon, as well as upland benches that contain relic grassland communities. It encompasses both the river itself, containing the chub and sucker populations, and cliffsides that provide habitat for Peregrine Falcons. Hydrological processes originating upstream, and not included within the boundary, particularly the regulation of water flows at McPhee Reservoir, have a profound effect on this PCA. The health of the riparian vegetation as well as the endangered fish is dependent on the timing and adequacy of flows. Likewise, upland diversions of water could have a detrimental effect on the hanging garden communities.

Protection Rank Comments: The roadless section of BLM land in the Dolores Canyon between McIntyre Canyon and La Sal Creek warrants special protection as wilderness, based on its biological significance and remoteness.

The BLM Resource Management Plan of 1985 found this to be the only one of seven Wilderness Study Areas in the Uncompahgre and San Juan Resource Areas that is suitable for wilderness designation. It was found to possess "highly outstanding characteristics for primitive and unconfined recreation, solitude, and naturalness, as well

as scenic grandeur and superb wilderness characteristics. It is a nationally unique area and is worthy of preservation in its natural state." The significant values listed are: Wild and Scenic River candidate; "outstanding primitive and unconfined recreation opportunities associated with the river, canyons, and mesas; unique plant and animal communities found within the WSA that contain threatened and endangered species habitat; and extremely diverse topography and geology that create outstanding scenic vistas and excellent solitude opportunities." BLM recommended wilderness designation for a total of 28,539 acres, which includes some side canyons represented here in separate PCAs. Effects of such designation, while protecting the PCA in perpetuity, could lead to an increase in visitors, with resulting impacts to plants, animals and plant communities.

Relic natural communities such as the Stipa comata Great Basin Herbaceous Vegetation could be protected by BLM as Research Natural Areas. They are valuable as reference sites to compare ungrazed areas with those currently grazed.

Management Rank Comments: If private river use greatly increases in the future, BLM may need to initiate a permit system as is presently in place for commercial rafters. There are a few disturbed areas in this fifty-mile stretch, mostly near campsites used by rafters and kayakers. These areas often have significant Russian knapweed infestations. The quality of the riparian area noticeably deteriorates a few miles south of the confluence of La Sal Creek, where tamarisk is well established. There has been some problem with trespass cattle in the lower portion of La Sal Creek, and grazing issues remain to be settled.

Conservation of the high quality relic sites of *Stipa comata* Great Basin herbaceous vegetation could be aided by protection from livestock grazing by maintaining their remoteness and abstaining from building of any new roads, trails or water developments in their vicinity. Periodic monitoring of these areas would permit the detection of changes in condition that might warrant management action.

Both the roundtail chub and flannelmouth sucker are sensitive to disturbance, including the blockage of migration routes, introduction of non-native fish, and the alteration of hydrologic and thermal characteristics of the river, including channelization, modifications of flow regimes, and increased sedimentation.

Tamarisk invasion may threaten Yuma skipper habitat by displacing its host plant, the giant reed (CNHP 1999). Protection of natural wetlands with stands of giant reed will help to assure the continued existence of this species in Colorado.

Dolores Canyon South of Slick Rock

Biodiversity Rank: B2 (Very high biodiversity significance) This section of the Dolores River has a good to excellent occurrence of the globally imperiled New Mexico privet foothills riparian shrubland.

Protection Urgency Rank: P4 No threat is known for the foreseeable future.

Management Urgency Rank: M4 Although not urgently required, management may be needed in the future to maintain the current quality of element occurrences.

Location: San Miguel County. Extending from Slick Rock to the San Miguel-Dolores County line.
U.S.G.S. 7.5 minute quadrangles: Joe Davis Hill, Hamm Canyon, Horse Range Mesa.

Legal description: T42N R17W Section 6, 7; T42N R18W Sections 11-15, 22-24; T43N R17W Section 31; T43N R18W Sections 2-5, 10, 11, 14, 15, 21-23, 26-28, 33-36; T44N R18W Sections 29-34.

Elevation range: 5,500 to 8,100 feet

Size: 11,207 acres

General Description:

The Dolores River, between Slick Rock and the southern border of San Miguel County has many of the same attributes as the Dolores Canyon Slick Rock to Bedrock PCA. Geologic formations in the canyon include Permian Cutler Formation, Triassic Wingate, Kayenta and Navajo sandstones, Jurassic Entrada, Morrison, and Summerville sandstones and shales, and Cretaceous Burro Canyon and Dakota sandstones.

A large part of the PCA is roadless and remote. The majority of the PCA is on BLM land managed by the San Juan Resource Area in Durango.

The impoundment of the river at McPhee Reservoir has had a profound effect on riparian vegetation of the Dolores River. Water levels are strictly controlled, and absence of normal spring flooding has reduced the reproduction of native cottonwoods and willows, while encouraging the spread of the exotic tamarisk. However, good examples of native New Mexico privet and Coyote willow riparian shrublands remain. Inaccessible benches above the river contain good examples of pinyon-juniper and grassland communities.

Natural Heritage element occurrences at the Dolores River Canyon South of Slick Rock PCA.

Element	Common Name	G rank	S rank	Federal/St	EO*
Forestiera pubescens	**New Mexico privet foothills riparian shrubland**	**G1G2**	**S1**		**A**
Falco peregrinus anatum	American Peregrine Falcon	G4T3	S2B,SZN	LE-PDL	E
Hyla arenicolor	Canyon treefrog	G5	S2	BLM, CO-SC	E
Asio flammeus	Short-eared owl	G5	S2B,SZN		H
*Salix exigua/*mesic graminoid	Coyote willow/mesic graminoid	G5	S5		A
*Salix exigua/*mesic graminoid	Coyote willow/mesic graminoid	G5	S5		A

*EO=Element Occurrence

Biodiversity comments: This PCA supports good to excellent occurrences of riparian shrub communities dominated by New Mexico privet or coyote willow. The PCA is home to Peregrine Falcons, Short-eared Owls, and canyon tree frogs. None of these occurrences has been ranked. The U.S. Fish and Wildlife Service, due to recent increases in numbers have proposed removal of the American Peregrine Falcon from the Endangered Species List.

Boundary Justification: The boundary is drawn to encompass both the riparian zone in the canyon bottom, and the steep cliffs of the canyonsides that provide nesting habitat for the Peregrine Falcons. It does not provide for all of the needs of the falcon or the Short-eared Owl. The PCA is tentatively drawn to end at the San Miguel-Dolores County line, but should probably be extended, once surveys have been completed in Dolores County. Although the upstream part of the river is not included within the boundary, activities upstream, including the regulation of flows in the Dolores River at McPhee Reservoir, have a profound effect on the health of the riparian plant communities in this PCA.

Protection Rank Justification: This PCA is located primarily on BLM land, with a small amount of private land at the confluence of Disappointment Creek. The Colorado Wilderness Network has proposed the area for wilderness designation with support from U. S. Representative Diana DeGette. BLM has not recommended the area as wilderness because of the presence of several roads.

Management Rank Justification: BLM management calls for an emphasis on recreation in this PCA (USDI 1985). The remote nature and opportunity for solitude in most of the canyon may warrant special designation as wilderness. Present BLM management policy treats this area as wilderness (Thrash personal communication 2000). Although this section of the Dolores River is popular with rafters, it has not experienced the invasion of

Russian knapweed that is commonly associated with recreational use. Riparian communities would benefit from the control of tamarisk and other exotic species; however, the intensive management that would be required probably make tamarisk control impractical until biological controls are available. Monitoring for impacts from recreation as use increases would help managers to determine whether the establishment of designated campsites is necessary. Monitoring of the riparian vegetation will also aid in understanding the hydrological processes necessary for the health of the New Mexico privet community in relation to stream flows.

2) Summit Canyon - *"A fair population of Naturita milkvetch (*Astragulus naturitensis), *a globally vulnerable plant. There is also an unranked occurrence of the canyon treefrog, rare in Colorado, although globally secure".*

Summit Canyon

Biodiversity Rank: B4 (Moderate Biodiversity Significance) This PCA contains a fair occurrence of Naturita milkvetch, a plant that is vulnerable on a global scale.

Protection Urgency Rank: P4 No threat is known for the forseeable future.

Management Urgency Rank: M4 Although not urgently required, management may be needed in the future to maintain the current quality of element occurrences.

Location: Summit Canyon is located 0.5 air miles west of the old townsite of Slick Rock, Colorado in northwestern San Miguel County.

U.S.G.S. 7.5 minute quadrangles: Horse Range Mesa

Legal description: T44N R19W Sections 25, 26, 35.

Elevation range: 5,500 to 6,000 feet.

Size: 328 acres

General Description:

Summit Canyon is a spectacular red sandstone canyon that is a tributary of the Dolores River in the pinyon-juniper zone. The area has numerous uranium mines. The Naturita milkvetch was found in isolated soil pockets of exposed Navajo sandstone. Associated species at the site were hairy golden aster, blue grama, and prickly pear cactus.

Natural Heritage element occurrences at the Summit Canyon PCA.

Element	Common Name	G	S rank	Federal/Stat	EO*
Astragalus naturitensis	**Naturita milkvetch**	**G3**	**S3**	**BLM, USFS**	**C**
Vireo vicinior	Gray Vireo	G4	S2B, SZN		C
Hyla arenicolor	Canyon treefrog	G5	S2		E

*EO=Element Occurrence

Biodiversity comments: This PCA contains a fair population of Naturita milkvetch, a globally vulnerable plant, and a fair breeding population of the Gray Vireo, considered to be rare in Colorado. There is also an unranked occurrence of the canyon treefrog, rare in Colorado, although globally secure.

Boundary Justification: The PCA is designed to include the portion of Summit Canyon that is the location of the Naturita milkvetch, and adjacent similar habitat. The entire canyon has not been surveyed.

Protection Rank Comments: The PCA is entirely within the BLM lands managed by the San Juan Resource Area. No special protection needs are known.

Management Rank Comments: The PCA is managed with emphasis on livestock grazing. However, the rocky habitat of the Naturita milkvetch is probably not threatened by grazing. No other management needs are known.

3) McIntyre Canyon - It has unique hanging gardens with rare Eastwoods monkey flower (mimulus eastwoodiae), and the rare naturita milkvech (astgragalus naturitensis) at the base of the sandstone cliffs. "*In alcoves of Navajo sandstone cliffs, are found hanging garden communities dominated by yellow columbine, and containing a small population of the rare Eastwood monkeyflower . It appears that the Eastwood's monkeyflower requires more permanent water than the more common columbine. In this and other sites, it grows in a deep horizontal crack that holds moisture, and on spongy, algae covered walls." (2)*

McIntyre Canyon

Biodiversity Rank: B2 (Very high biodiversity significance) McIntyre Canyon has a good occurrence of xeric western slope pinyon-juniper woodlands, considered to be rare on a global scale.

Protection Urgency Rank: P4 No threat is known for the foreseeable future.

Management Urgency Rank: M3 Ongoing, recurrent management action would help to maintain the current quality of element occurrences.

Location: McIntyre Canyon is located 3.5 air miles northwest of the old townsite of Slick Rock, Colorado in northwestern San Miguel County.

U.S.G.S. 7.5 minute quadrangles: Horse Range Mesa
Legal description: T44N R19W Sections 2-4, 7-15, 17, 18; T45N R19W Sections 33-36.
Elevation range: 5,400 to 6,200 feet.
Size: 3,104 acres

General Description:

McIntyre Canyon is a major tributary of the Dolores River, draining a large area of western San Miguel County and southeastern Utah. Except for a small amount of private land at the confluence, the canyon is on BLM land. An unmapped dirt road that apparently services a pipeline was observed. There is some evidence of grazing. Otherwise, the lower part of the canyon is remote and difficult to access, except by raft or kayak from the Dolores River.

Vegetation of the area is sagebrush shrubland with widely spaced pinyon and juniper. The major grass in the lower part of the canyon is blue grama, with some needle and thread, six-weeks fescue and cheatgrass. Other common plants were Indian ricegrass, galleta, scarlet globemallow, sand aster, actinea, many-lobed groundsel, prickly-pear cactus, snakeweed, hairy golden aster, Townsend's Easter daisy, rough-seed cats-eye, four o'clocks, and princes plume.

Baker documented an excellent occurrence of the common plant association of pinyon pine and mountain mahogany on benches in the upper part of the canyon in 1983 (Baker 1984). Also, the pinyon pine/needle-and-thread association, considered to be less common, was found to be in good condition. It was observed in 1999, as well. This association occurs frequently in openings in the pinyon juniper woodland, usually in small patches, making it difficult to map.

A new occurrence of the Naturita milkvetch was found in 1999, along the base of the cliffs on the north side of the canyon, in red sandy soils derived from the Navajo Formation. The plants were particularly abundant in the disturbed area along the road. This supports our observations from other sites, that this species seems to thrive on some disturbance. Over 200 individuals were counted, and there are doubtless many more. In 1983, a smaller population of the milkvetch was found several miles upstream from the confluence, again on the disturbed pipeline route and on cryptogamic soil.

In alcoves of Navajo sandstone cliffs, are found hanging garden communities dominated by yellow columbine, and containing a small population of the rare Eastwood monkeyflower. Other associated species in this habitat included Utah serviceberry, fendlerbush, mountain mahogany, New Mexico privet, skunkbrush (forma *simplicifolia,* the form with unlobed leaves), single leaf ash, and gray aster. Survival of the hanging garden community is dependent on the continued availability of the water source from the mesa above. Water diversions or prolonged drought could obliterate this habitat. It appears that the Eastwood's monkeyflower requires more permanent water than the more common columbine. In this and other sites, it grows in a deep horizontal crack that holds moisture, and on spongy, algae covered walls. The columbine is more often present in drier sites, and may be able to tap a deeper source of water.

Natural Heritage element occurrences at the McIntyre Canyon PCA.

Element	Common Name	G rank	S	Federal/St	EO*
Pinus edulis/Stipa comata	**Xeric western slope pinyon-juniper**	**G2?**	**S2**		**B**
Astragalus naturitensis	**Naturita milkvetch**	**G3**	**S3**	**BLM, USFS**	**A**
Aquilegia micrantha-Mimulus eastwoodiae	Hanging gardens	G2G3	S2S3		B
Astragalus naturitensis	Naturita milkvetch	G3	S3	BLM, USFS	B
Mimulus eastwoodiae	Eastwood monkey-flower	G3?	S1	BLM	B
Mimulus eastwoodiae	Eastwood monkey-flower	G3?	S1	BLM	E
Pinus edulis/Cercocarpus	Mesic western slope pinyon-juniper	G5	S4		A

*EO=Element Occurrence

Biodiversity comments: This PCA gains its high significance rank from the good occurrence of Xeric western slope pinyon-juniper woodlands, with a significant component of needle-and-thread grass. In addition, there are good occurrences of a globally imperiled hanging garden community, containing the globally vulnerable Eastwood's monkey-flower. An excellent example of globally common woodlands with Colorado pinyon and mountain mahogany occurs at the PCA.

Boundary Justification: The boundary encloses the element occurrences listed above, located near the mouth of the canyon and several miles upstream, and the intervening

canyon. Although the entire canyon was not surveyed, the habitat appears to be continuous, and Naturita milkvetch can be expected in the areas between the documented occurrences.

Protection Rank Comments: This PCA is primarily on BLM land, with a small amount of private land located at the confluence with the Dolores River. Due to its inaccessibility, this PCA probably does not require special protection at this time.

Management Rank Comments: There is Russian knapweed along the pipeline road and near the confluence. Weed control and revegetation of disturbed areas would improve the site.

4) Bull Canyon – Canyon tree frogs (see wildlife)

5) Coyote Wash - ***Colorado's largest population of the Kachina daisy is located here.*** *It grows in horizontal crevices in seeping alcoves. This species is the most imperiled of all plants found in San Miguel and Montrose counties. Eastwood's monkeyflower is also found in horizontal crevices on seeping canyon walls.* Coyote Wash PCA contains the best known Colorado occurrence of the globally imperiled Kachina daisy. As one of only two known populations in Colorado."

Coyote Wash

Biodiversity Rank: B2 (Very high biodiversity significance) The Coyote Wash PCA contains the best known Colorado occurrence of the globally imperiled Kachina daisy.

Protection Urgency Rank: P4 No threat is known for the foreseeable future.

Management Urgency Rank: M4 Although not urgently required, management may be needed in the future to maintain the current quality of element occurrences.

Location: Coyote wash is located 9.5 air miles south of Paradox, Colorado in extreme southwestern Montrose County.

U.S.G.S. 7.5 minute quadrangles: Anderson Mesa

Legal description: T46N R19W Sections 15, 21, 22.

Elevation range: 5,100 to 5,800 feet

Size: 329 acres

General Description:

Coyote Wash is a steep-sided tributary canyon that joins the Dolores Canyon in

the roadless area between Slick Rock and Bedrock. Its flat sandy bottom has a small meandering stream that occasionally floods.

Vegetation in the wash includes giant reed, bulrushes, and Baltic rush. The rocky sandstone canyon sides are covered with pinyon-juniper woodland, with some open grasslands on benches and mesa tops. Seeping alcoves in the sandstone canyon walls high above the wash are the sites of hanging garden communities that support several rare plants.

Colorado's largest population of the Kachina daisy is located here. It grows in horizontal crevices in seeping alcoves. Studies currently underway suggest that the Colorado populations of this plant are distinct from those in Utah, and may warrant at least separate varietal status (Woolstenhulme personal communication). Eastwood's monkeyflower is also found in horizontal crevices on seeping canyon walls, along with the more common yellow columbine and poison ivy. Helleborine orchids are found in the wet grassy areas just below the seeps, along with several sedges, rushes, and bulrushes. Side drainages entering the wash support box elder, hackberry, single leaf ash, skunkbrush, New Mexico privet, Baltic rush, giant wild rye, and Rocky Mountain juniper. Grasslands on flat benches have been identified by the BLM as ungrazed relic communities of needle and thread, galleta, blue grama, and Indian ricegrass. There are few exotic plant species in the area.

The rocky outcrops, steep cliffs, and canyons of the area offer ideal roosting sites for the spotted bat, *Euderma maculatum*. There are fewer than 20 occurrences, with few individuals in each, in Colorado. One member of this species was recorded at this vicinity in 1994.

Red spotted toads and Woodhouse's toads were observed in pools in the wash. Bighorn sheep have been reintroduced in the canyon, and are apparently surviving.

Coyote Wash has been selected as a Colorado Natural Area.

Natural Heritage element occurrences at the Coyote Wash.

Element	Common Name	G	S	Federal/State	EO*
Erigeron kachinensis	**Kachina daisy**	**G2**	**S1**	**BLM**	**A**
Stipa comata	Needle and thread (Great Basin herbaceous vegetation)	G2G4	S2?		A
Mimulus eastwoodiae	Eastwood monkey-flower	G3?	S1	BLM	B
Epipactis gigantea	Helleborine orchid	G4	S2	BLM	A
Epipactis gigantea	Helleborine orchid	G4	S2	BLM	B
Euderma maculatum	Spotted bat	G4	S2	BLM, USFS	E

*EO=Element Occurrence

Biodiversity comments: The Coyote Wash PCA contains the best known Colorado occurrence of the globally imperiled Kachina daisy. This species is the most imperiled of

all plants found in San Miguel and Montrose counties. As one of only two known populations in Colorado, this PCA is extremely important for further research. Current taxonomic research on the Kachina daisy may result in assigning the Colorado plants to a separate species or variety, in which case this population would be considered even more rare and imperiled, perhaps raising its biodiversity rank to B1 (outstanding significance). An excellent example of the Great Basin Herbaceous Vegetation dominated by needle and thread grass was documented in the PCA. A high quality population of Eastwood monkey-flower, a plant that is vulnerable throughout its range, and extremely rare in Colorado, was found in hanging gardens in Coyote Wash. An excellent and a good occurrence of the helleborine orchid, rare in Colorado, also were found in the PCA.

Boundary Justification: The boundary is drawn to include the element occurrences known from Coyote Wash, including the riparian area and the cliffs that are the location of the hanging garden communities. It includes the habitat of the Kachina daisy that is known to be occupied, as well as adjacent areas that are potentially available for future colonization by this species. Upstream portions of the wash that are not included in the PCA may also contribute significantly to the quality of the riparian area.

Protection Rank Comments: The PCA is located on lands managed by the BLM. This area has been identified as a State Natural Area, recommended as a Research Natural Area, and is a BLM Wilderness Study Area (WSA). Continuance of the Kachina daisy population is probably not threatened by direct human disturbance. However, a prolonged drought or diversion of the source water on Ray Mesa could cause its extinction at this PCA. The grassland is located on a small mesa top that is inaccessible except by helicopter, and is therefore secure from disturbance. There is no question that the area is significant and remote enough to warrant wilderness status. Wilderness designation of this site could afford additional permanent protection. On the other hand, it could lead to an increase in visitors, causing more impacts on plants and plant communities.

Management Rank Comments: No current management needs are known for the plants in the PCA, but increased visitation could impact them in the future. Periodic monitoring of this important rare plant population would enable the detection of any changes in size or condition that might require management action. The PCA is extremely important for further research on the Kachina daisy. Little is known about the reproductive ecology of this species, and as the best known site in Colorado, this PCA would be the primary location for obtaining that information.

6) Cement Creek - . The ecological ORV includes the unique iron fens, which have been identified as rare specimens of this type by the Colorado Natural Heritage Program

Biodiversity Rank: B2. Nearly irreplaceable. A good occurrence of a globally imperiled (G2) plant community.

Protection Urgency rank: P2. Protection actions may be needed within five years. It is estimated that stresses may reduce the viability of the elements within this approximate time frame. The Potential Conservation Area is located on both BLM and private lands. There is currently no special protection for the area.
Management Urgency rank: M2. New management actions may be needed within five years to prevent the loss of the element occurrences. The area is located adjacent to State Highway 110 and within the impact area of several active mining claims.
Location: San Juan County, State Highway 110, along Cement Creek, north of Silverton.
Legal Description: U.S.G.S. 7.5 minute quadrangle: Silverton and Ironton. T42N R7W Sections 19, 20, 29, 30, 31; T41N R7W Sections 6, 7, and 8.
Size: Approximately 56 acres
Elevation: 10,200 ft. to 11,300 ft.

Cement Creek is one of the three major tributaries of the upper Animas River, between the Mineral Creek and main stem of the Animas. It is located northwest of the Town of Silverton and south of the Town of Gladstone. Cement Creek flows along a steep, narrow valley, with peaks on both sides ascending to over 13,000 ft. The creek runs through the center of the Silverton Caldera, which is composed of Oligocene andesitic lavas. Iron fens and associated limonite ledges can be found along 4 miles of Cement Creek starting just south of the Town of Gladstone. The most prominent iron fens are located at Tiger Gulch and Topeka Gulch.

Iron fens are hydrologically similar to other Colorado fens in that there is discharge of ground water. However, the source water for iron fens flows through iron pyrite rich bedrock and talus. The oxidation of pyrite by flowing water results in the formation of sulfuric acid and production of naturally acidic waters. As the pyrite oxidizes it will stain red, sometimes over large areas such as at Red Mountain. The low pH is unique to Colorado wetlands; a low pH is typically found in bogs in the eastern U.S. or Canada. Colorado's iron fens are also unique in that one would expect to find low ion concentrations in surface and pore waters such as documented in eastern and northern bogs. In contrast, iron fens have high ion concentrations because acids are produced on mountain slopes where ions can be leached from mineralized rock and dissolved in the flowing water. In particular, Ca^{2+} and $S0_4$ concentrations can be high. Dr. David Cooper found in a preliminary study an average Ca^{2+} of 10-120 and $S0_4$ of 70-700 mg/kg (n = 8) (Cooper unpublished).

The Cement Creek Iron Fens are fed by groundwater seeping from eastern and western valley walls, as well as overflow from Cement Creek. A common feature of iron fens is limonite terraces or iron precipitates that have been deposited onto organic matter in layers. These terraces will perch the water table and form an extensive network of pools and ponds. The Cement Creek Iron Fens are good examples of this process.

Cement Creek Iron Fens are dominated by acid-tolerant shrubs with a thick ground cover of a variety of Sphagnum spp. and other mosses. Engelmann spruce (Picea engelmannii) dominates the tree layer. Bog birch (Betula glandulosa) and dwarf blueberry (Vaccinium cespitosum) dominate the shrub layer. Mosses, bluejoint (Calamagrostis canadensis), water sedge (Carex aquatilis), and alpine spicy wintergreen (Gaultheria humifusa) make up the lowest canopy layer.

Natural Heritage element occurrences at the Cement Creek PCA

Scientific name	Common name	Global Rank	State Rank	State/Federal status	Element occurrence rank
(Picea engelmannii)/Betula glandulosa/Carex aquatilis/ Sphagnum angustifolium	Iron fen	G2	S2		B

Biodiversity comments: This site supports a good occurrence (B rank) of a globally imperiled (G2) iron fen plant community. Currently there are only 13 iron fens known globally, four of which occur in San Juan County.

Boundary Justification: The boundary is drawn to include the Cement Creek floodplain from Gladstone to just above the confluence of Cement Creek with the Animas River. The boundaries incorporate an area that will allow natural hydrological processes such as seasonal flooding, sediment deposition, and new channel formation to maintain viable populations of the wetland. It should be noted that the hydrological processes necessary to the riparian elements are not fully contained by the site boundaries. Since the wetlands are dependent on natural hydrological processes associated with Cement Creek, any upstream activities such as water diversions, impoundments, and mining development could potentially be detrimental to the wetland. This boundary indicates the minimum area that should be considered for any conservation management plan.

Protection Comments: The PCA is owned by BLM and private landowners. There is currently no special protection for the area.

Management Comments: The iron fen is located adjacent to State Highway 110 and may be threatened by road maintenance and improvements. It is recommend that the County Road Department and Colorado Department of Transportation be notified of the importance and location of the fen to avoid impacts.

Wetland Soils Description: Soils have Histic epipedon with fibric to sapric peat up to 60 cm deep. Many areas of the wetlands were “quaking”. In areas where a mineral soil was

reached with the shovel it was gleyed (Chart 1 6/10Y).

Wetland Functional Assessment for the Cement Creek Iron Fen at Tiger Gulch

Function	Ratings	Comments
Overall Functional Integrity	At Potential	This wetland is functioning at potential.
Hydrological Functions		
Flood Attenuation and Storage	High	The wetland is large > 20 acres, vegetation is dense, presence of microtopography, presence of ponds and pools, low gradient
Sediment/Shoreline Stabilization	High	Cement Creek is densely vegetated with shrubs and herbaceous species, some evidence of bank erosion due to mining activity
Groundwater Discharge/ Recharge	High	Several springs observed.
Dynamic Surface Water Storage	N/A	
Biogeochemical Functions		
Elemental Cycling	Normal	Wetland is located in the mineral belt of the San Juan Mountains, and therefore is naturally acidic; however due to current and past mining activities it is likely more acidic due to leaching from tailing piles.
Removal of Imported Nutrients, Toxicants, and Sediments.	High	Wetland contains peaty soils, presence of permanently flooded areas, dense vegetation.
Biological Functions		
Habitat Diversity	Low	Wetland supports 1 Cowardin Class
General Wildlife Habitat	Low	None were observed
General Fish/Aquatic Habitat	Low	Wetland is too acidic to support fish.
Production Export/Food Chain Support	Moderate	Wetland does not support the best habitat for fish or wildlife
Uniqueness	Very High	There are 13 known occurrences of iron fens in the world and all of them occur in Colorado.

7) Cinnamon Creek - The ecological ORV is the excellent specimen of the altai cottongrass and thickleaf witlowgrass communities unique to the alpine tundra.

Biodiversity Rank: B3 High biodiversity significance
Protection Urgency Rank: P3 Protection actions may be needed, but probably not within the next 5 years. Future plans for private land in the site are not known. There is currently no special protection for the area.
Management Urgency Rank: M3 New management actions may be needed within 5 years to maintain the current quality of the element occurrences in the PCA.\
Location: San Juan County, Alpine Loop, San Juan County Road 5, about ten air miles northeast of Silverton.
Legal Description: U.S.G.S. 7.5 minute quadrangle: Handies Peak. T42N R6W Sections 4, 5; T43N R6W Sections 32, 33
Size: 630 acres
Elevation: 12,000 ft. to 13,328 ft.
General Description: This site contains most of the northeast-facing bowl below Cinnamon Mountain. It is bisected by a jeep road that connects Animas Forks and Lake City. Geologically, it is situated on the San Juan volcanic ash flow tuff. High ridges define the site, forming a tight horseshoe-shaped alpine bowl, with Cinnamon Mountain (13,328 ft.) as the high point, on the south side of the site. The terrain is variable, with three or four obvious terraced benches distributed throughout the upper portions of the site. Talus fields and semi-permanent snow fields dominate the steep slopes that form the upper-most reaches of the site. Soil moisture is variable, with low-lying areas remaining moist to saturated from snow-melt and elevated areas being moist only in early summer.

Soils in the wetland areas of the PCA are mapped as typic cryaquents-cryaquolls-cryofibrist complex, 0 to 5 percent slopes, (deep poorly drained soils on flood plains, valley bottoms and depressions, formed in alluvium derived from mixed sources). The soils of the hillsides are identified as Moran very gravelly loam, 30 to 65 percent slopes, (a very deep, well drained soil on alpine valley fills and mountain slopes, formed in colluvium and slope alluvium derived from rhyolite).

The headwaters of Cinnamon Creek contain some excellent quality wetlands. Drier upper slopes support typical alpine tundra with rock outcrops. The highest areas are dominated by snow willow (Salix reticulata ssp. nivalis), the host plant of the extremely rare Uncompahgre fritillary butterfly (Boloria improba acrocnema). More mesic slopes are dominated by alpine avens (Geum rossii). Other common species in the site include Holm's ragwort (Senecio amplectens var. holmi)i, false strawberry (Sibbaldia procumbens), moss campion (Silene acaulis) and fleabane (Erigeron vagus). Thick-leaf whitlow-grass (Draba crassa) was found in rock crevices and in shallow soils surrounding rock outcrops on north facing slopes. The wetlands have small areas of

standing water and permanently saturated peat soils that support a variety of grasses and sedges, including tufted hairgrass (Deschampsia cespitosa), globe sedge (Carex perglobosa), black sedge (Carex nova), smallwing sedge (Carex microptera), and native sedge (Carex vernacula), along with Altai cottongrass (Eriophorum altaicum var. neogaeum).

Natural Heritage element occurrences at the Cinnamon Pass PCA

Scientific Name	Common name	Global rank	State rank	State/Federal status	Element occurrence rank
Draba crassa	**Thick-leaf whitlow-grass**	G3	S3		B
Eriophorum altaicum var. *neogaeum*	Altai cottongrass	G4?T3T4	S3	S-FS	A
Boloria improba acrocnema	Uncompahgre fritillary	G5T1	S1	LE	F
Carex vernacula	Alpine wetlands	GU	SU		A

Biodiversity comments: The Cinnamon Pass PCA supports a good (B ranked) occurrence of thick-leaf whitlow-grass, a plant that is vulnerable (G3) globally. There is also an excellent (A ranked) occurrence of alpine wetlands dominated by Carex vernacula, (Carex vernacula), a plant community for which more information is needed before a rank can be assigned. The community has been documented only five times, all in Colorado. However, more research may prove it to be more common and widespread than is now known. The wetland areas contain excellent quality (A ranked) patches of Altai cottongrass, a subspecies that is listed as sensitive by the U.S. Forest Service. Although the Uncompahgre fritillary, a critically imperiled subspecies (T1) is known from this site, it has not been observed recently. A total of five individuals were documented on August 8, 1995 (L.D. Beutler pers. comm.). The colony has not been confirmed since, and may be extirpated.

Boundary Justification: The boundary is drawn to encompass the occurrences of the alpine wetland community and areas upslope that provide moisture from snow melt that support the wetland. This area also includes the habitat of the Altai cottongrass and thick-leaf whitlow-grass. The boundary is not intended to include all of the area that would be required to sustain a population of the Uncompahgre fritillary. It does, however, contain appropriate habitat, including the snow willow upon which the butterflies depend.

Protection Rank Comments: The area is primarily BLM land, with a few private mining claims. There is no special protection in place.

Management Rank Comments: No exotic species were observed in the site. Some erosion resulting from sheep trailing was observed. The site has been subject to past mining activity and relatively intense domestic sheep grazing. Sheep grazing may have already had negative effects on the Uncompahgre fritillary by reducing floral diversity for nectar sources and possible trampling of larvae and snow willow (Ellingson, pers. comm.).

8) Maggie Gulch - . It has also been identified by CNHP as the site of Eriophorum altaicum (altai cotton-grass*)

Biodiversity Rank: B3 High biodiversity significance
Protection Urgency Rank: P3 Protection actions may be needed, but probably not within the next 5 years. Future plans for private land in the site are not known. There is currently no special protection for the area.
Management Urgency Rank: M3 New management actions may be needed within 5 years to maintain the current quality of the element occurrences in the PCA.
Location: San Juan County, Alpine Loop, County Road 23, about six air miles east of Silverton.
Legal Description: U.S.G.S. 7.5 minute quadrangle: Howardsville. T41N R6W Sections 4-6, 9, 21; T42N R6W Section 32.
Size: 1,946 acres
Elevation: 10,200 ft. to 12,843 ft.

General Description: Maggie Gulch is a major tributary of the Animas River, originating at the Continental Divide, and passing through a series of different habitats as it progresses downstream. A county road follows the gulch to a mine, and from there a hiking trail continues up across the divide to Stony Pass.

The PCA is in the eastern portion of the Silverton Caldera, composed of andesitic lavas and ashflows from the Tertiary volcanic period. Soils vary from shallow to very deep and are well drained, derived from volcanic rocks. They have been mapped as Telluride-Rock outcrop complex, 45 to 75 percent slopes; Quazar-Varden complex, 15 to 65 percent slopes; Moran very gravelly loam, 10 to 30 percent slopes; and Needleton-Snowdon complex, 30to 80 percent slopes.

The landscape is typical of several of the drainages in the area. At the head of the gulch, steep walls surround a large glacial cirque with ponds and wetlands; then the drainage narrows to a steep sided canyon. At the highest elevations, dry, rocky tundra harbors a good population of Colorado Divide whitlow-grass (Draba streptobrachia), growing in rock crevices and ledges. Other species here include blackroot sedge, false strawberry, American bistort, cinquefoil, sky pilot, and snow willow (Carex elynoides, Sibbaldia procumbens, Bistorta bistortoides, Potentilla subjuga, Polemonium viscosum and Salix reticulata ssp. nivalis). Below this is a large wetland dominated by water sedge (Carex aquatilis), with alpine bistort, marsh marigold, reedgrass, rose crown, alpine speedwell, gray sedge, black sedge, bentgrass, paintbrush, elephant head, brook saxifrage, alpine timothy and fringed gentian (Bistorta vivipara, Caltha leptosepala, Calamogrostis canadensis, Sedum rhodanthum, Veronica nutans, Carex canescens, Carex nova, Agrostis thurberi, Castilleja sulphurea, Pedicularis groenlandica, Micranthes odontoloma, Phleum commutatum, and Gentianopsis thermalis). As the land

slopes downward from the level wetland, alpine meadows have a high diversity of plant species, including showy whitlow-grass, tufted hairgrass, hairy arnica (dominant in large areas), shortfruit willow, alpine avens, small-winged sedge, alpine timothy, orange sneezeweed, larkspur, reedgrass, king's crown, slender wheatgrass, cinquefoil, planeleaf willow, two species of fleabane, fireweed, rockcress, nodding ragwort, and wild candytuft (Draba spectabilis var. oxyloba, Deschampsia cespitosa, Arnica mollis, Salix brachycarpa, Geum rossii, Carex microptera, Phleum commutatum, Dugaldia hoopsii, Delphinium barbeyi, Calamagrostis canadensis, Rhodiola integrifolia, Elymus trachycaulus, Potentilla pulcherrima, Salix planifolia, Erigeron coulteri, Erigeron elatior, Chamerion subdentatum, Arabis lemonii, Ligularia bigelovii, and Noccaea montana). Where the canyon narrows, steep talus slopes support Harbour beardtongue (Penstemon harbourii), a San Juan endemic that grows in the barren rock. In less recently disturbed areas with soil, Thurber fescue grassland (Festuca thurberi) dominates. The lower part of the PCA contains dense spruce-fir forests. Here, two smaller streams tumble down in waterfalls that provide a nesting site for Black Swifts (Cypseloides niger), and rock crevices for rare plants. Some extensive active beaver ponds are found in the stream at this elevation. All of these varied habitats depend on the processes of snowfall and erosion that occur on the upper slopes.

Natural Heritage element occurrences at the Maggie Gulch PCA

Scientific Name	Common name	Global rank	State rank	State/Federal status	Element occurrence rank
Draba spectabilis var. *oxyloba*	**Showy whitlow-grass**	**G3?T3Q**	**S3**		**A**
Draba streptobrachia	**Colorado Divide whitlow-grass**	**G3**	**S3**		**B**
Draba crassa	Thick leaf whitlow-grass	G3	S3		C
Penstemon harbourii	Harbour beardtongue	G3G4	S3S4		C
Cypseloides niger	Black Swift	G4	S3B		E
Cypseloides niger	Black Swift	G4	S3B		E

Biodiversity comments: The Maggie Gulch PCA supports a variety of rare elements, including an excellent (A ranked) occurrence of showy whitlow-grass, a globally vulnerable subspecies (G3?T3Q), and a good (B ranked) occurrence of Colorado Divide whitlow-grass, a globally vulnerable (G3) species. There are also fair (C ranked) occurrences of two globally vulnerable (G3) plants, thick leaf whitlow-grass (Draba crassa) and Harbour beardtongue. Black Swifts, a species vulnerable in Colorado (S3B), were nesting behind two waterfalls in the PCA (Schultz 2002). These occurrences are unranked.

Boundary Justification: The boundary is drawn to include all of the element occurrences in Maggie Gulch. Areas between occurrences are included to provide habitat for pollinators and movement of plant populations over time. The boundary follows the Continental Divide at the upper end of the gulch. These varied species and habitats are united by their dependence on the hydrological and erosional processes that occur in the entire gulch. The PCA does not contain the entire foraging area of the Black Swifts.

Protection Rank Comments: Ownership is a combination of BLM land and private mining claims. There is no special protection in place.
Management Rank Comments: Some erosion from sheep trailing was noted. Monitoring the effects of sheep grazing would help to determine if management action is necessary.

9) Mineral Creek - The Chattanooga iron fen, which borders Mineral Creek, has been identified by CNHP as a unique wetland site. It is home to a rare moss, sphagnum balticum, that has not been found anywhere else in the continental US. This wetland may qualify as a world heritage site.

Chattanooga Iron Fen

Potential Conservation Area

Biodiversity Rank: B2 Nearly irreplaceable. A good occurrence of a globally imperiled (G2) plant community and several disjunct Sphagnum spp.
Protection Urgency Rank: P3 Protection actions may be needed but probably not within the next five years. The Potential Conservation Area is located on USFS and private lands. Future plans for private land in the site are not known. There is currently no special protection for the area.
Management Urgency Rank: M3 New management actions may be needed within five years to maintain the current quality of the element occurrences. The area is located adjacent to Hwy 550 and within the impact area of several active mining claims.
Location: San Juan County, along U. S. Highway 550 and Mineral Creek, about five air miles northwest of Silverton.
Legal Description: U S.G.S. Quadrangles: Silverton and Ironton. T42N R8W Sections 26 and 27.
Size: approximately 30 acres
Elevation: 10,200 ft. to 11,300 ft.
General Description: Chattanooga Iron Fen lies in the Mineral Creek floodplain in the San Juan Mountains, 3 miles south of Red Mountain Pass and 5 miles northwest of the Town of Silverton. Ohio Peak and Anvil Mountain border the iron fen to the east and two unnamed peaks over 12,000 ft. border to the west. Mineral Creek flows along a fault zone through quaternary glacial deposits at the west edge of the Silverton Caldera. To the north, Mineral Creek follows the trace of the caldera rim faults. The highly altered Henson and Burns Formations make up the valley wall east of the fault zone and lower third of the west valley wall. The upper two-thirds of the west valley wall are the San Juan Formation, derived from ancient volcanoes located northeast of Silverton, and a sequence of rhyolite ash flows, including the Ute, Blue Mesa, and Sapinaro Mesa Tuffs.

The Chattanooga Iron Fen is fed by groundwater seeping from eastern valley walls under Highway 550 and overflow by Mineral Creek. Highly acidic groundwater from mineralized springs emerging from the lower west wall of the valley feeds the iron fen. A common feature of iron fens is limonite terraces or iron precipitates that have been deposited onto organic matter in layers. These terraces will perch the water table and form an extensive network of pools and ponds. Chattanooga Iron Fen is a good example of this process.

Soils of the wetland are mapped as typic cryaquents-cryaquolls-cryofibrist complex, 0 to 5 percent slopes, deep poorly drained soils on flood plains, valley bottoms and depressions, formed in alluvium derived from mixed sources.

The vegetation of Chattanooga Iron Fen is characterized by acid-tolerant shrubs with a thick ground cover of a variety of Sphagnum and other mosses. Engelmann spruce (Picea engelmannii) dominates the tree layer. Bog birch (Betula glandulosa) and whortleberry (Vaccinium cespitosum) dominate the shrub layer. Mosses, bluejoint (Calamagrostis canadensis), water sedge (Carex aquatilis), and alpine spicy wintergreen (Gaultheria humifusa) form the herbaceous layer. Open water accounts for 25 to 30% of the surface.

Dr. David Cooper of Colorado State University documented several new bryophyte records for Colorado and the United States in Chattanooga Iron Fen. Sphagnum balticum is common in the fen. Until its discovery in Colorado, its known range in North America extended southward to approximately 51 degrees latitude in British Columbia. S. balticum is the primary moss in shallow pools with water sedge (Carex aquatilis) and beaked sedge (Carex utriculata). A rare liverwort, Jungermannia rubra, was documented at the springs and in the water tracks on the exposed limonite (Carsey 1999).

Common mosses collected at Chattanooga Fen were identified by Dr. William Weber as: Aulacomnium palustre, Brachythecium oedipodium, Brachythecium oedipodium, Ceratodon purpureus, Gymnocolea inflata, Hypnum cupressiforme, Lophozia incisa, Palustriella falcata, Philonotis marchica, Pohlia nutans, Polytrichastrum alpinum, Polytrichum juniperinum, Racomitrium canescens, Scorpidium cossonii, Sphagnum angustifolium, Sphagnum fuscum, Sphagnum russowii, Tomentypnum nitens, and Warnstorfia exannulata.

Natural Heritage element occurrences at the Chattanooga Fen PCA

Natural Heritage element occurrences at the Chattanooga Fen PCA

Scientific Name	Common name	Global rank	State rank	State/Federal status	Element occurrence rank
(Picea engelmannii)/Betula glandulosa/Carex aquatilis/Sphagnum angustifolium	Iron fen	G2	S2		B
Sphagnum balticum	Arctic peat moss	G2G4	S?		E
Jungermannia rubra	Liverwort	G2G4	S?		E
Sphagnum contortum	Peat moss	G?	S?		E
Sphagnum platyphyllum	Peat moss	G5	S?		E
Sphagnum girgensohnii	Peat moss	G5	S?		E

Biodiversity comments: This site supports a good (B ranked) example of a globally imperiled (G2) plant community and multiple occurrences of disjunct Sphagnum species known to occur in acidic wetlands at more northerly latitudes. Currently there are only 13 iron fens known globally, four of which occur in San Juan County.
Boundary Justification: The boundary is drawn to include the Mineral Creek floodplain and slopes below the cliffs, which rise on both sides of the river at the base of Red Mountain Pass. The boundaries incorporate an area that will allow natural hydrological processes such as seasonal flooding, sediment deposition, and new channel formation to maintain a viable wetland. It should be noted that the hydrological processes necessary to the riparian elements are not fully contained by the site boundaries. impoundments, and mining development or cleanup could potentially be detrimental to the wetland. This boundary indicates the minimum area that should be considered for any conservation management plan.
Protection Comments: The PCA is owned by USFS, San Juan National Forest and private landowners. There is currently no special protection for the area. Slopes above the wetland were used historically for mining. A dirt road along the south end and upper slopes of the site and several abandoned mine adits on the road remain from past mine activities. The extremely limited range of these species makes protection of their habitat crucial. Efforts should be made to educate and work with the private landowners for the protection of this unique wetland type.
Management Comments: The area has been mined in the past and it is not readily apparent if mining is currently going on. Highway 550 bisects the upper end of the PCA, and continues along the eastern side of the wetland. The impact of road maintenance, e.g., chemicals, sediments or road widening activities, is unknown. A monitoring study for both the vegetation and hydrology is recommended to document impacts of the highway and past and current mining activities, including mine cleanup that may take place upstream.
Wetland Soils Description: Soils have Histic epipedon with fibric to sapric peat up to 60 cm deep. Many areas of the wetlands were “quaking”. In areas where a mineral soil was

leached with the shovel it was gleyed.

Wetland functional assessment for the slope wetland at the Chattanooga Iron Fen.

Function	Ratings	Comments
Overall Functional Integrity	At Potential	This wetland is functioning at potential.
Hydrological Functions		
Flood Attenuation and Storage	High	The wetland is large > 20 acres, vegetation is dense, presence of microtopography, presence of ponds and pools, low gradient
Sediment/Shoreline Stabilization	High	Mineral Creek is densely vegetated with shrubs and herbaceous species, some evidence of bank erosion due to mining activity
Groundwater Discharge/ Recharge	High	Several springs observed.
Dynamic Surface Water Storage	N/A	
Biogeochemical Functions		
Elemental Cycling	Normal	Wetland is located in the mineral belt of the San Juan therefore is naturally acidic, however due to current and past mining activities is more acidic due to leaching from tailing piles.
Removal of Imported Nutrients, Toxicants, and Sediments.	High	Wetland contains peaty soils, presence of permanently flooded areas, dense vegetation.
Biological Functions		
Habitat Diversity	Low	Wetland supports 1 Cowardin Class
General Wildlife Habitat	Low	None were observed
General Fish/Aquatic Habitat	Low	Wetland is too acidic to support fish
Production Export/Food Chain Support	Moderate	Wetland does not support the best habitat for fish or wildlife
Uniqueness	Very High	There are 13 known occurrences of iron fens in the world and all of them occur in Colorado.

10) West Fork Animas, California Gulch. The CNHP has identified a important ecological community of altai cottongrass and clustered sedge, wetland plants that grow near the stream.

Biodiversity Rank: B3 High Diversity Significance. The site is drawn for a good occurrence of a globally vulnerable herbaceous wetland, an excellent occurrence of an apparently secure montane wet meadow, and a good occurrence of demonstrably secure Altai cottongrass.
Protection Urgency rank: P3. Protection actions may be needed, but probably not within the next 5 years. It is estimated that stresses may reduce the viability of the elements within the site if protection action is not taken. The Potential Conservation Area is located on USFS land, with private in-holdings. There is currently no special protection for the area. A special designation for this area is suggested to protect this unique wetland.
Management Urgency rank: M3. New management actions may be needed within five years to maintain the current quality of the wetland. Off road vehicle and mining activities have the potential to have deleterious effects on the wetland.
Location: San Juan County, along the West Fork of the Animas River, approximately 12 air miles northwest of Silverton, Colorado.
Legal Description: U.S.G.S. 7.5-min. quadrangle: Handies Peak. T43N R7W Sections 35, 36; T42N R7W Sections 1, 2, 10, 11
Elevation: 11,600 –12,800 ft.
Size: Approximately 31 acres
General Description: The California Gulch at Animas River site is a scenic subalpine wet meadow located west of Animas Forks. California Gulch is surrounded by several peaks over 13,000 feet: Houghton Mountain, California Mountain and Treasure Mountain. The California Gulch wetland extends for approximately 2 miles from the eastern base of Hurricane Peak to the confluence of the West Fork and Placer Gulch.

Soils in the wetland are mapped as typic cryaquents-cryaquolls-cryofibrist complex, 0 to 5 percent slopes, deep poorly drained soils on flood plains, valley bottoms and depressions, formed in alluvium derived from mixed sources.

The wetland supports several areas of "quaking" fens dominated by clustered sedge (Carex praegracilis) with water sedge (Carex aquatilis), and moss (Sphagnum spp.). There are several perched ponds where the groundwater has been forced up. These ponds are very shallow (> 0.5 meters) and support an extensive population of quillwort (Isoetes bolanderi). The wet meadows above the ponds are dominated by bluejoint (Calamagrostis canadensis) and tufted hairgrass (Deschampsia cespitosa), with planeleaf willow (Salix planifolia) and shortfruit willow (Salix brachycarpa).

Biodiversity Rank Justification: The site is drawn for a good (B-ranked) occurrence of a globally vulnerable (G3) herbaceous wetland, an excellent (A-ranked) occurrence, the best observed during the field season of 2002, of a demonstrably secure (G4) montane wet meadow, and a good (B-ranked) occurrence of an apparently secure (G4?T3) Altai cottongrass.

Natural Heritage element occurrences at the California Gulch at Animas River PCA

Scientific Name	Common Name	Global Rank	State Rank	Federal and State Status	Element occurrence Rank
Carex praegracilis	Clustered sedge herbaceous wet meadow	G3G4	S2		B
Calamagrostis canadensis	Montane wet meadow	G4	S4		A
Eriophorum altaicum var. *neogaeum*	Altai cottongrass	G4?T3T4	S3	S-FS	B

Boundary Justification: The boundary is drawn to include the West Fork of the Animas River floodplain from the base of Hurricane Mountain on the east side to the confluence of the West Fork with Placer Gulch. The boundaries incorporate an area that will allow natural hydrological processes such as seasonal flooding, sediment deposition, and new channel formation to maintain viable populations of the wetland. It should be noted that the hydrological processes necessary to the riparian elements are not fully contained by the site boundaries. Because the wetlands are dependent on natural hydrological processes associated with West Fork, any upstream activities such as water diversions, impoundments, and mining development could potentially be detrimental to the wetland. This boundary indicates the minimum area that should be considered for any conservation management plan.
Protection Comments: The PCA is owned by USFS, San Juan National Forest and private landowners. There is currently no special protection for the area. A special designation for this area is suggested to protect the unique wetland.
Management Comments: New management actions may be needed within five years to maintain the current quality of the wetland. Off road vehicle and mining activities have the potential to have deleterious effects on the wetland.
Wetland Soils Description of “quaking fen”: Soils are < 60 cm of sapric peat. Ground water level was not reached with a sharp-shooter shovel.

Wetland functional assessment for the riparian wetland at the California Gulch at Animas River PCA.

Function	Ratings	Comments
Overall Functional Integrity	At Potential	This wetland is functioning at potential.
Hydrological Functions		
Flood Attenuation and Storage	Low to Moderate	The wetland is located above the stream and does not receive seasonal flood waters; however in the event of a flood the wetland would be able to store flood waters
Sediment/Shoreline Stabilization	N/A	Wetland is not subjected to bank erosion
Groundwater Discharge/ Recharge	High	Several springs and pools observed.
Dynamic Surface Water Storage	N/A	
Biogeochemical Functions		
Elemental Cycling	Normal	Wetland is located in the mineral belt of the San Juan Mountains, and therefore is naturally acidic; however, due to current and past mining activities is likely more acidic due to leaching from tailing piles.
Removal of Imported Nutrients, Toxicants, and Sediments.	High	Wetland does contain peaty soils and is removing minerals inherent to the Mineral Belt of the San Juans.
Biological Functions		
Habitat Diversity	Low	Wetland supports a Cowardin Classes
General Wildlife Habitat	Low	None observed
General Fish/Aquatic Habitat	Low	No open water
Production Export/Food Chain Support	Low	Wetland is has a restricted outlet and low diversity of habitat types.
Uniqueness	Moderate	Wetland plant community types are common, but are the best observed in 2002.

11) South Fork Mineral - There is an important ecological feature of the fen/wetland complex at the mouth.

Biodiversity Rank: B2. Nearly irreplaceable. An excellent occurrence of a globally imperiled wetland, two good occurrences of globally vulnerable montane riparian shrublands, a good occurrence of a globally vulnerable plant, and a good and fair occurrence of state rare ferns.
Protection Urgency rank: P2. Protection actions may be needed within five years. It is estimated that stresses may reduce the viability of the elements within this approximate

time frame. Potential conservation area is located on both USFS and private lands. There is currently no special protection for the area.
Management Urgency rank: M2. New management actions may be needed within five years to prevent the loss of the element occurrences. The area is located adjacent State Highway 110 and within the impact area of several active mining claims.
Location: San Juan County, County Road 7, along South Mineral Creek, about 1.8 miles northwest of Silverton.
Legal Description: U.S.G.S. 7.5 minute quadrangle: Silverton, Ophir. T41N R8W Sections 10-21, 30; T41N R9W Sections 25, 36.
Size: Approximately 114 acres
Elevation: 9,470 ft. to 11,300 ft.
General Description: The South Mineral Creek PCA is a moderately steep sided valley located at the base of several 12,000 and 13,000 ft peaks. The site begins at the base of Rolling Mountain, a 13, 693 ft. peak approximately 5 miles west of Silverton. South Mineral Creek drains west to east through a rolling, glaciated valley flanked by U.S. Forest Road 585. There are two designated USFS campgrounds and several dispersed areas for camping. Areas along the creek bed consist mainly of glacial drift and contain a number of highly mineralized springs. South Mineral Creek meanders only slightly throughout its eight-mile length and eventually joins the main fork of Mineral Creek at Silverton. At the far upper end of the PCA, there are large sedge wetlands in the wide valley that are home to Altai cottongrass (Eriophorum altaicum var. neogaeum). Farther downstream, at the end of the county road, large willow carrs are dominated by planeleaf willow (Salix planifolia) and shortfruit willow (S. brachycarpa) with marsh marigold (Caltha leptosepala) common in the understory. Still farther downstream, several waterfalls are found along the main stream and on its tributaries. Four of these are home to breeding colonies of Black Swifts (Cypseloides niger). Two rare ferns, mountain bladder-fern (Cystopteris montanus) and slender cliff-brake (Cryptogramma stelleri) are found in conjunction with the waterfalls of the main stream. Iron fen wetlands and limonite terraces are located at Cooper Gulch, Snowslide Gulch, and Zuni Gulch above the creek. At middle elevations the riparian zone supports a community of taller willows, Rocky Mountain willow (Salix monticola), Drummond's willow (Salix drummondiana)

and Geyer's willow (Salix geyeriana). A rare plant, kittentails (Besseya ritteriana) was found in this tall willow community. It was growing with false hellebore (Veratrum tenuipetalum), osha (Ligusticum porteri), tansy mustard (Descurainia incisa), Richardson's geranium (Geranium richardsonii), meadowrue (Thalictrum fendleri), and other moisture-loving herbs. Other common understory species along the creek are bluejoint (Calamagrostis canadensis), water sedge (Carex aquatilis) and beaked sedge (Carex utriculata). Uplands above the creek consist of a mosaic of dry hillsides with shrubby cinquefoil (Potentilla fruticosa) and western wheatgrass (Pascopyrum smithii); aspen groves; and moist spruce forest, depending on aspect and moisture availability. (See Appendix for plant species lists for several points within the PCA).

Natural Heritage element occurrences at the South Fork Mineral Creek PCA

Scientific name	Common name	Global rank	State rank	State/federal status	Element occurrence rank
(Picea engelmannii)/Betula glandulosa/Carex aquatilis/ Sphagnum angustifolium	**Iron fen**	**G2**	**S2**		**A**
Salix drummondiana/ Calamagrostis canadensis	Lower montane willow carrs	G3	S3		C
Besseya ritteriana	Kittentails	G3	S3		B
Salix geyeriana-Salix monticola/Calamagrostis canadensis	Montane willow carrs	G3	S3		B
Cypseloides niger	Black swift	G4	S3B		E
Cypseloides niger	Black swift	G4	S3B		E
Cypseloides niger	Black swift	G4	S3B		E
Cypseloides niger	Black swift	G4	S3B		E
Eriophorum altaicum var. *neogaeum*	Altai cottongrass	G4?T3T4	S3	S-FS	B
Cryptogramma stelleri	Slender rock-brake	G5	S2		C
Cystopteris montana	Mountain bladder-fern	G5	S1		A

Biodiversity comments: This site supports an excellent (A ranked) occurrence of a globally imperiled (G2) iron fen plant community. It also includes two good (B ranked) occurrences of globally vulnerable (G3) montane riparian plant communities, a good (B ranked) occurrence of a globally vulnerable (G3) plant, and one good (B ranked) and one fair (C ranked) occurrence of state rare (S1 and S2) ferns. Four breeding colonies of Black Swifts (unranked), a bird that is vulnerable (S3B) in Colorado were found at waterfalls within the PCA boundaries.

Boundary Justification: The boundary is drawn to include the South Mineral Creek floodplain and the lower parts of several tributary streams, from Bandora mine to Highway 550. The boundaries incorporate an area that will allow natural hydrological processes such as seasonal flooding, sediment deposition, and new channel formation to maintain viable populations of the wetlands. It should be noted that the hydrological processes necessary to the riparian elements are not fully contained by the site boundaries. Because the elements are dependent on natural hydrological processes associated with South Mineral Creek, any upstream activities such as water diversions,

impoundments, and mining development could potentially be detrimental to the wetlands and to the black swift's habitat. This boundary indicates the minimum area that should be considered for any conservation management plan.
Protection Comments: The PCA is owned by USFS, San Juan National Forest and private landowners. There is currently no special protection for the area.
Management Comments: The construction of FR 585 appears to have negatively impacted the hydrology of certain areas of the fen by interrupting the water flow and drying out areas of limonite. Further expansion of the road or campgrounds could exacerbate this impact. Off road vehicle travel could seriously damage the iron fen and riparian areas by disrupting the hydrology.
Wetland Soils Description: Soils have Histic epipedon with fibric to sapric peat up to 60 cm deep cm, many areas of the wetlands were "quaking". In areas where a mineral soil was reached with the shovel it was gleyed Chart 1 6/10Y.

Wetland Functional Assessment for the South Fork Mineral Creek Iron Fen

Function	Ratings	Comments
Overall Functional Integrity	At Potential	This wetland is functioning at potential.
Hydrological Functions		
Flood Attenuation and Storage	High	The wetland is large > 20 acres, vegetation is dense, presence of microtopography, presence of ponds and pools, low gradient
Sediment/Shoreline Stabilization	High	South Mineral Creek is densely vegetated with shrubs and herbaceous species, some evidence of bank erosion due to mining activity
Groundwater Discharge/ Recharge	High	Several springs observed.
Dynamic Surface Water Storage	N/A	
Biogeochemical Functions		
Elemental Cycling	Normal	Wetland is located in the mineral belt of the San Juan therefore is naturally acidic, however due to current and past mining activities is likely more acidic due to leaching from tailing piles.
Removal of Imported Nutrients, Toxicants, and Sediments.	High	Wetland contains peaty soils, presence of permanently flooded areas, dense vegetation.
Biological Functions		
Habitat Diversity	Low	Wetland supports 1 Cowardin Class
General Wildlife Habitat	Low	None were observed
General Fish/Aquatic Habitat	Low	Wetland is too acidic to support fish.
Production Export/Food Chain Support	Moderate	Wetland does not support the best habitat for fish or wildlife
Uniqueness	Very High	There are 13 known occurrences of iron fens in the world and all of them occur in Colorado.