

## *Land Health Assessment East Paradox Area, 1999*

### SUMMARY

This land health assessment evaluated 78,068 public land acres to determine what amount of acreage was meeting the Rangeland Health Standards, what was not meeting, and what and where the problems were. The following table shows the amount of land meeting or not meeting the Standards:

<b>Acres Meeting Standards 1, 3,&amp; 4</b>	<b>Acres Not Meeting Standards 1,3,&amp;4</b>	<b>Acres Unknown 1,3,&amp;4</b>
69,830	8,198	40
<b>Stream Miles Meeting Standards 2&amp;5</b>	<b>Stream Miles Not Meeting Standards 2&amp;5</b>	<b>Stream Miles Unknown 2&amp;5</b>
46.1	2.6	0

In order to make the above determination, the East Paradox Area was first rated according to each of the five Rangeland Health Standards separately. The following table better indicates what the general problems are in the assessment area.

<b>Standard</b>	<b>Meeting</b>	<b>Meeting but Problem Areas</b>	<b>Not Meeting</b>	<b>Unknown</b>
<b>Standard 1-Soils (acres)</b>	70,354.0	6,115.8	1,558.7	39.7
<b>Standard 2-Riparian (miles)</b>	11.4	17.4	2.6	0
<b>Standard 3-Healthy Communities (acres)</b>	61,743.4	8,086.6	8,198.5	39.7
<b>Standard 4-T&amp;E Species (acres)</b>	78,068	0	0	0
<b>Standard 5-Water Quality (miles)</b>	11.8	36.9	0	0

### **Major Land Health Problems**

**Standard 1:** Lack of protective groundcover was the primary problem for soils not meeting this standard. A major part of this problem was made up of those areas dominated by annual plants which do not provide protective canopy cover or basal cover, particularly when climate conditions do not promote their germination in some years. In numerous places this had led to gullying.

**Standard 2:** Dominance of some riparian areas by the nonnative salt cedar and channel

changes (entrenchment) were the main problems observed.

**Standard 3:** Dominance of areas by exotic annual plants, lack of adequate perennial forbs and cool season grasses were the primary problems encountered with the vegetation. Some areas had poor seral stage diversity, but not as skewed as in other parts of the Resource Area. This lack of seral stage diversity is affecting habitat quality and winter range quality for big game. Additional wildlife problems include declines in the mule deer population, increases in the elk population, and declines in populations of some neo-tropical songbird species.

**Standard 4:** There do not appear to be any problems associated with threatened and endangered species, or other special status species in the landscape unit.

**Standard 5:** The drainages with the lowest watershed cover are likely to produce more sediment. These were East Paradox Creek, Wild Steer Canyon, portions of both the San Miguel and Dolores River Canyons, and several small ephemeral systems, that drain both Long Park and Sawtooth Ridge.

## **Recommendations**

### **Standard 1 Soils:**

- 1) Assess identified gullied systems in Paradox Valley, Long Park, and Saucer Basin as to their stage of development and causal factors, and prepare corrective actions.
- 2) Reduce bare ground and increase perennial basal cover in areas circled on maps by using the following tools, in order of effectiveness:
  - 1) Increase herbaceous dominated early and early-mid seral patches in the land unit by using a combination of fire, mechanical, possibly chemical treatments, followed by seeding
  - 2) Preserve existing cryptogamic cover and encourage its development in early-mid, late-mid and late seral areas by reducing trampling, improving road management, and avoiding disturbance treatments where good cryptogamic communities exist
  - 3) Adjust livestock grazing to leave more litter on herbaceous perennial sites where it has been determined that current livestock grazing is a causative factor, through practices like: reduced duration and increased intensity, reduced utilization during dormant seasons, more rest, increased trampling as opposed to trailing, two growing season's rest on treated sites, and short duration grazing rotated with some rest to maintain herbaceous species growing on treated sites
- 3) Complete road inventory for unit to provide data for improving road management
- 4) Prepare map of high risk soils to help identify road and vegetation treatment priority areas using the soil k factor  $>0.2$ , bare soil  $>50\%$ , and slopes  $>4\%$
- 5) Increase perennial basal cover in annual dominated communities (Paradox Valley soil map unit 73)  
by:
  - 1) Information review on restoring cheatgrass dominated areas
  - 2) Data collection/revisit of existing treatment efforts in valley
  - 3) Series of trial plots experimenting with most promising treatments
  - 4) Widespread application of most successful approach

## **Standard 2 Riparian:**

- 1) Salt cedar treatments (cut and paint herbicide) working way down from upstream-most infestations in washes, cowpounds and tributaries, and finishing along rivers. Treatment should take place along following streams in descending order of priority: Lasal Creek, San Miguel River, Dry Creek, Gregory Creek, Wild Steer Canyon, and the Dolores River.
- 2) Establish monitoring studies to evaluate grazing impacts along the riparian areas of Lasal Cree, Dry Creek and the Dolores River. Manage livestock grazing to avoid use of or trampling damage to sandbar willow and other native riparian shrubs that can compete with salt cedar.
- 3) Evaluate impacts of road encroachment on Lasal Creek and River Road maintenance activities on riparian vegetation along Dolores and San Miguel Rivers.

## **Standard 3 Healthy Native Communities:**

- 1) Improve perennial grass cover, forb cover, and cool season grass cover in circled areas on maps by:
  - 1) Increasing herbaceous dominated early and early-mid seral patches in the land unit by using a combination of fire, mechanical, possibly chemical treatments, followed by seeding with a diverse seed mix of native grass and forb species
  - 2) Converting cheatgrass communities to native grass and forb communities (see below)
  - 3) Trial plots to investigate effectiveness of different cool season and forb interseeding treatments in warm-season grass parks, more widespread application of successful methods to suitable sites in circled areas (deep soil parks)
  - 4) Where it has been determined that livestock grazing is a causative factor, implementing grazing strategies that: minimize grazing on regrowth during active growing stages, incorporate rest, vary timing of use from year to year, allow two growing seasons of rest following treatment and seeding of areas, and that encourage livestock to graze some of the less palatable species (either through herding, increased numbers and reduced time, or through livestock supplements like protein.)
- 2) Convert cheatgrass dominated flats in Paradox Valley (Paradox Valley soil map unit 73) to plant communities where native species dominate by:
  - 1) Information review on restoring cheatgrass dominated areas
  - 2) Data collection/revisit of existing treatment efforts in valley
  - 3) Series of trial plots experimenting with most promising treatments and most successful native species for establishing and competing with cheatgrass
  - 4) Widespread application of most successful approach
  - 5) Develop and implement grazing strategies that will not perpetuate the spread and dominance of cheatgrass based on outcome of an information review on impacts of different grazing seasons in cheatgrass dominated systems
- 3) Complete road and weed inventory for unit to provide data for improving road management

and rehabilitating unnecessary roads which are a major corridor for weed spread and detrimental to some wildlife species when the road network is too dense.

4) Treat all noxious weed infestations mapped by road inventory and rapid assessment points.

5) Reseed all fires, vegetation treatments, or soil disturbing activities in areas where exotic species are present so that exotics will not overtake the disturbed areas.

6) Improve shrub vigor in circled areas by treating portions of low vigor shrub stands with a rollerchopper to chop up to 50% of area within a stand. Seed at the same time with native grass/forb/shrub mix.

7) Avoid potential management-caused barriers to wildlife movements in Davis Mesa and Saucer Basin like fences, or large mine developments

8) Improve the landscape mosaic to be compatible with the Fire Management Plan landscape objectives. Treatments should take place using a combination of fire, mechanical, and potentially chemical methods in the following units in order of priority: 1) units C9, C1 and C11 2) unit C12, and 3) units C13 and D9.

9) Adjust grazing to allow for the accumulation of fine fuels in burnable areas in some years in order for cool ground fires to be able to burn more of the landscape and maintain a more desirable mosaic.

#### **Standard 4 Special Status Species:**

The special status species in the assessment area appear to be doing well, and there are no specific problems that beg for a solution at this time. While it would be nice to have additional information on the population trends and species ecology of the rare plants in the area, but there is no indication that any BLM authorized activity is having much effect on these species. No specific recommendations are suggested.

#### **Standard 5 Water Quality:**

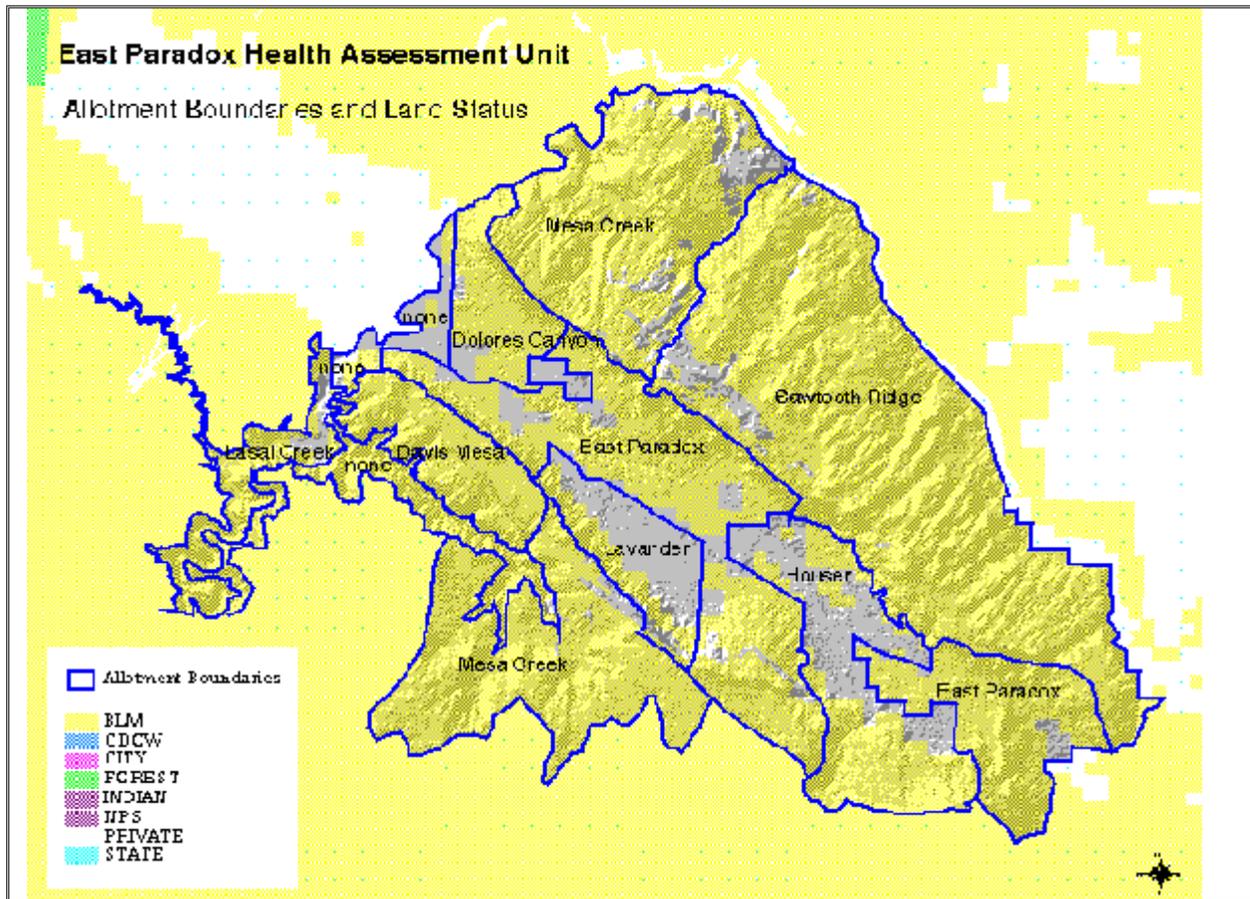
1) Monitor for Fecal coliform bacteria in Dry Creek, and the Dolores and San Miguel Rivers to ensure concentrations do not exceed 200 colonies/100 ml. Dry Creek has a limit of 2,000 colonies/100ml but drains into and could influence bacteria concentrations in the San Miguel River.

2) Improve watershed condition (vegetation cover) in East Paradox, Wild Steer Canyon, portions of both the San Miguel and Dolores River Canyons, and several small ephemeral systems, that drain both Long Park and Sawtooth Ridge.

3) Assess identified gullied systems as to their stage of development and causal factors, and prepare corrective actions.

## INTRODUCTION

### Land Status



The health assessment unit boundary encompasses 91,133 acres, of which 78,068 are public land, and 13,065 are private. The assessment took place only on the public lands. Private lands are concentrated along the bottom of Paradox Valley, and in scattered mining claims on the northern and south central parts of the unit. Eight cattle grazing allotments make up the unit.

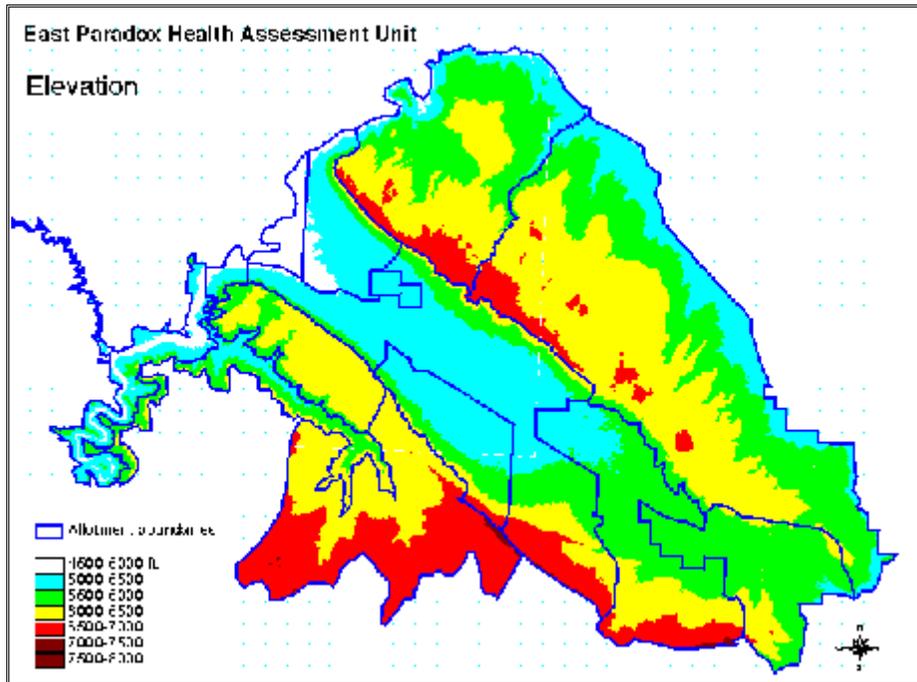
The unit is covered by the San Juan/San Miguel Resource Management Plan. The majority of the area is in the Livestock Emphasis Area, particularly on Sawtooth Ridge and Monogram Mesa. Small Wildlife Emphasis Areas are located along upper LaSal Creek and Dry Creek, and a peregrine falcon area along the Paradox cliffs south of the Dolores River. A Wilderness Emphasis Area is located along the western portion of the Dolores River, LaSal Creek and the canyons on the western side of Monogram Mesa. Scattered Mineral (uranium) Emphasis Areas are designated along Long Park, near Uravan, and on part of Monogram Mesa, where an oil and gas designation also occurs. The bottom of Paradox Valley is designated as a Soil and Water Emphasis Area.

### Landform and Topography

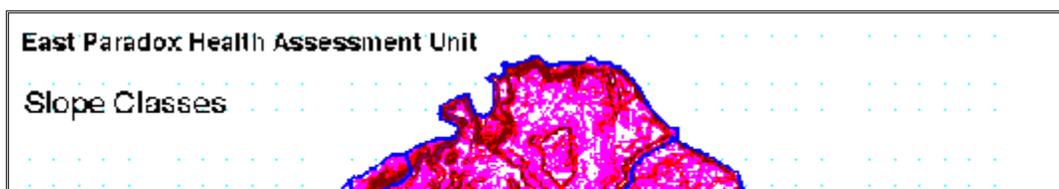
Elevations range from about 4,800' to above 7000' in the assessment unit. The central part is made up of the southeast to northwest oriented Paradox Valley, which is framed by the high,

sloping mesa country of Monogram and Davis Mesas to the southwest, and by Sawtooth Ridge to the northeast. The San Miguel River forms the

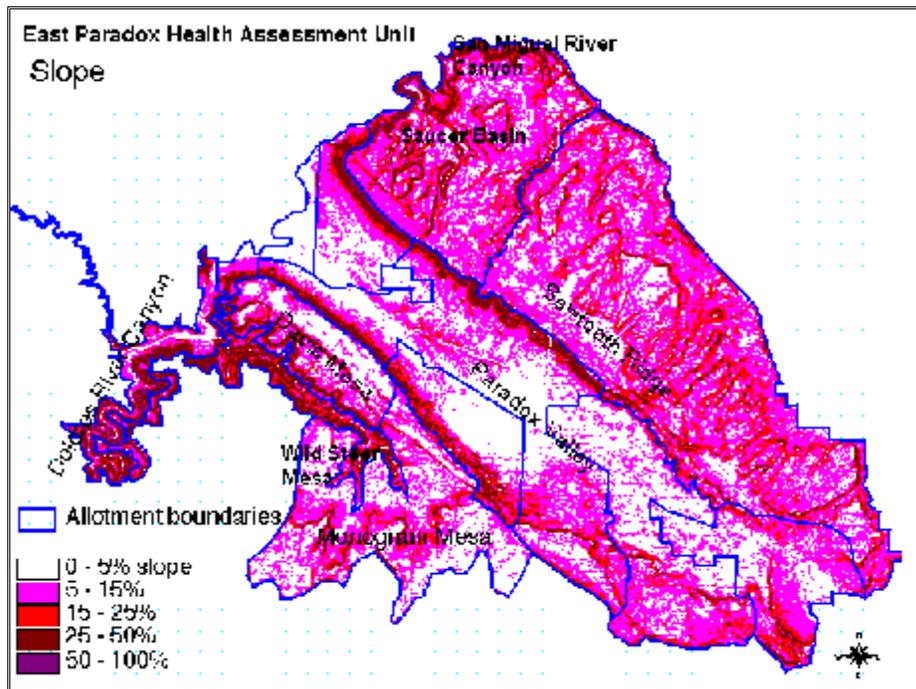
northeast. Miguel forms the



northeastern boundary, and the Dolores River Canyon makes up the northwestern boundary, with LaSal Creek included in the unit.



The unit is characterized by gentle topography along most of the bottom of Paradox Valley. Impassable cliffs frame the northeastern part of the valley, and very steep slopes form the

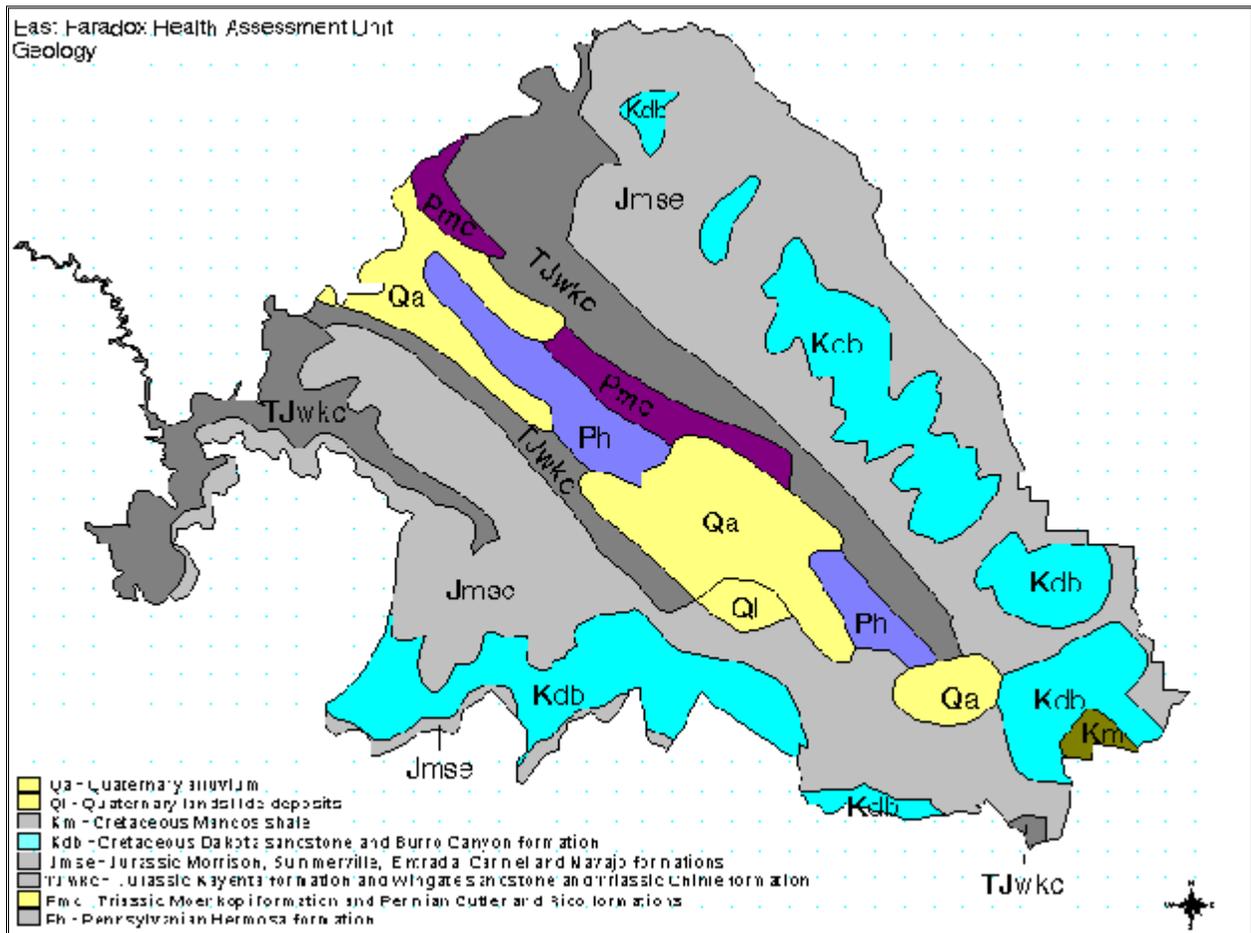


southwestern valley rim. Monogram and Davis Mesas are relatively flat but dissected with a few steep canyons that feed into Wild Steer Canyon and on into the Dolores River. The Sawtooth Ridge country generally slopes more, and is highly dissected in addition with numerous, steep-sided pediments.

## **Soils and Geology**

The Paradox Basin is located in the Colorado Plateau Geomorphic Province. The area is typical of Colorado Plateau geology: gently dipping sedimentary rocks, altitudes exceeding 5,000 feet, the climate is semi-arid to arid, erosion has produced innumerable escarpments and structural benches and relief is the result of the incision of deep canyons below moderately flat terrain.

The geologic formations exposed in the Paradox Basin range from paleozoic to recent sedimentary rocks. They are the Pennsylvanian Hermosa formation, the Permian Rico and Cutler formations, the Triassic Moenkopi and Chinle formations, the Jurassic Wingate, Kayenta, Navajo, Entrada, Summerville, Carmel, and Morrison formations, the Cretaceous Dakota Sandstone, and Burro Canyon formation as well as quaternary alluvium, colluvium and landslide deposits. The geologic formation not exposed in the area, but which may be found at depth is precambrian rocks which underlie the paleozoic rocks in the region.



The lower portion of the San Miguel River and its major tributaries are incised in the Nucla syncline that plunges gently to the northwest. The river generally flows along or near the axis of the syncline. East Paradox Creek also flows along the axis of the eroded Paradox Valley Anticline. Similar to the other salt anticlines in the region, the Paradox Valley Anticline has a salt core and numerous small faults and grabens associated with the salt movement. The Hermosa formation, the salt bearing formation, is exposed near the center of the valley and consists of interbedded limestone, shale, gypsum and salt.

Soils in the unit are varied, a result of the diverse geological formations. They are described in detail in the draft San Miguel Soil Survey (NRCS 1988.) The dominant soil map units are listed in the table below. The majority of soils in the unit have relatively low potential for plant production.

Soil Map Unit	Name	Acreage in Unit	Characteristics
23	Bodot, dry-Ustic Torriorthents complex, 5 to 50% slopes	19,061	deep, bouldery clay loam
88	Rock outcrop-Orthents, 40-90% slopes	10,533	barren escarpments, sandstone, bouldery clay loam
87	Rock outcrop, 40-120% slopes	10,216	barren exposures of sandstone
45	Gladel-Bond-Rock outcrop complex, 1 to 50% slopes	9,767	shallow sandy loam and fine sandy loam
76	Pinon-Bowdish-Rock outcrop complex, 3 to 30% slopes	7,488	shallow and moderately deep loams
73	Paradox fine sandy loam, 1 to 4% slopes	4,806	deep fine sandy loam
79	Pojoaque-Chilton complex, 5 to 30% slopes	3,682	deep, very stony loam and deep, stony fine sandy loam
75	Pinon-Bowdish-Progresso loams, 1 to 12% slopes	2,860	shallow to deep loams
17	Barx-Progresso complex, 3 to 12% slopes	2,139	deep fine sandy loam and moderately deep loam

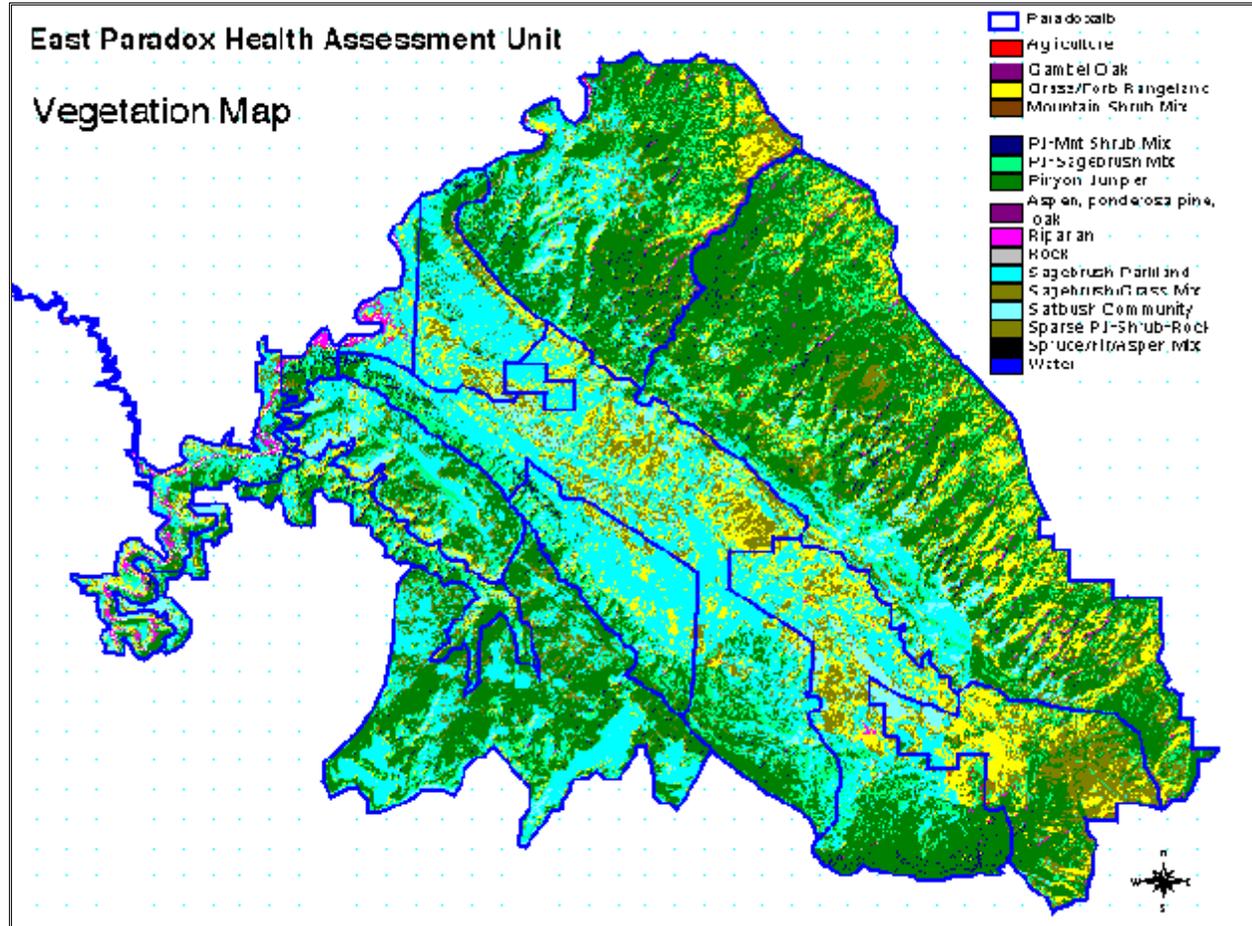
## Climate

The East Paradox assessment area is semi-arid and precipitation is variable in nature. Average annual precipitation over the past 20 years at the town of Paradox is just over 16 inches but has ranged from 7 to 19 inches. There is also variability in the unit based on landscape position and elevation, for example, average annual precipitation at Uravan is 13.4". Temperatures typically range from average January lows of 17° Fahrenheit to July highs of 90°. Precipitation is relatively evenly distributed across the year with monthly averages between 1 and 2", except for June—the driest month.

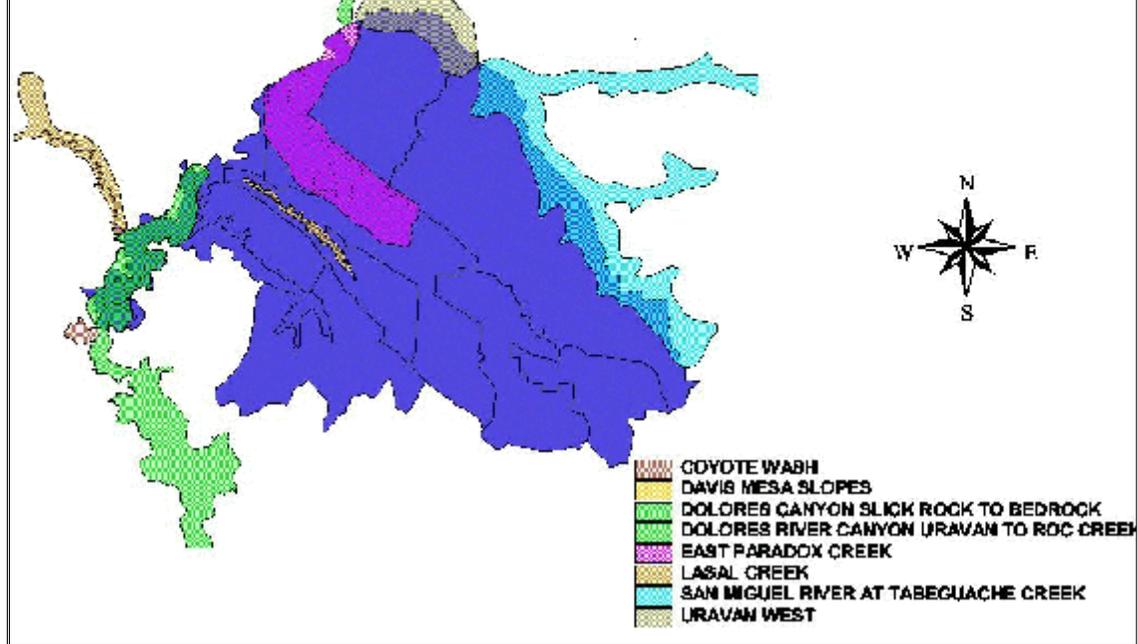
The unit is subject to frontal, convectional and monsoonal storm patterns. Soil moisture in spring is generally consistent and abundant, drying out in late May and June, and then subject to localized short-term recharge from thunderstorm activity in late July through September. The storms bring with them significant amounts of lightning activity which generates many fire starts in dry years.

## Vegetation

The majority of Paradox Valley is made up of grass/forb rangeland (cheatgrass,



cheatgrass-sand dropseed, annual forb, needleandthread grass-blue grama/four-wing saltbush, or sand dropseed-blue grama/four-wing saltbush plant associations), sagebrush, and sage/grass communities. Specialized communities that include Green rabbitbrush, winterfat and Torrey mormontea occur on the gypsiferous hills in the central part of Paradox Valley. The Monogram Mesa and Davis Mesa areas are pinyon-juniper, pinyon-juniper/sagebrush, and grassland--



mainly crested wheat on old plow and seed treatments. The Sawtooth Ridge country is primarily pinyon-juniper, sparse pinyon-juniper/rock, with small patches of native grassland (mainly galleta grass and sand dropseed or blue grama) or sagebrush interspersed. Stringers of mountain shrub vegetation occur in the draws. Riparian vegetation is found next to the Dolores and San Miguel Rivers, and along LaSal Creek. Much of the riparian community along the Dolores River is made up of salt cedar, New Mexican privet, skunkbush and sandbar willow. The San Miguel River has some exceptional quality cottonwood gallery forests and skunkbush and privet stands, mostly in private ownership. Box elder and river birch occur along La Sal Creek—another exceptional stand of riparian vegetation, and some scattered cottonwoods grow along Dry Creek.

The Colorado Natural Heritage Program has identified a number of rare, unique, or high quality plant communities within the assessment area. They include the New Mexico privet riparian shrubland, Fremont cottonwood riparian forest, foothills riparian shrubland, great plains salt meadows, mesic western slope pinon-juniper woodland, skunkbrush/coyote willow riparian shrubland, lower montane riparian shrubland, coyote willow/bare ground, cold desert shrubland, blue gramma/galleta shortgrass prairie, needle and thread Great Basin herbaceous vegetation, and xeric western slope pinyon-juniper woodland. The Colorado Natural Heritage Program has also identified five sites that are all or partly within the assessment area that have assemblages of species that they feel warrant recognition as potential conservation areas (PCAs). These sites are all good examples of the assemblage of species they represent. At this time BLM does not have complete location data for all of these communities in our GIS system, but the PCAs are represented by the polygons shown on the following map.

At this time BLM's Resource Management Plan and activity level plans do not contain any specific management guidance or objectives for these sites.

### **Watersheds, Drainages, and Water Quality**

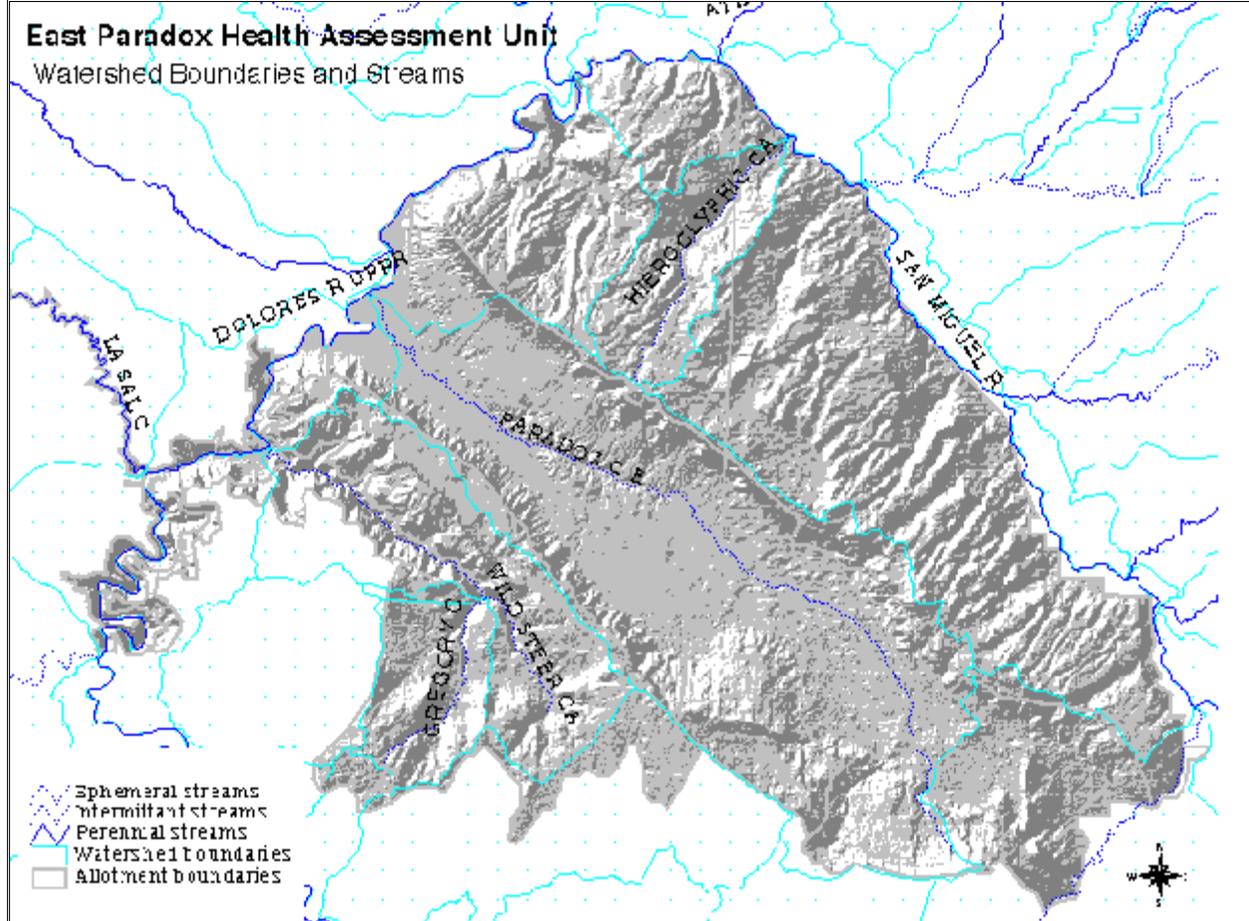
The East Paradox Landscape Unit is within the Dolores River Basin, a major tributary in the Upper Colorado River System. The northeast and southeast portions of the landscape unit, drain into the San Miguel River, the largest tributary in the Dolores River (Hydrologic Unit Code (HUC): 14030003). Within this HUC, the lower reach of the San Miguel River is the only perennially flowing water source. Intermittent and ephemeral channels dominate the remaining portions of the landscape unit within HUC: 14030003, with the largest drainages being Hieroglyphic Canyon, and a portion of Dry Creek Basin.

The remainder of the landscape unit is within HUC: 14030002. With the exception of La Sal Creek, this portion of the landscape unit is drained by intermittent or ephemeral drainages, into the Dolores River. The largest drainages include: East Paradox Creek, and Wild Steer Canyon and one of its tributaries, Gregory Creek. The valley bottom associated with La Sal Creek was included in the landscape unit. La Sal Creek headwaters arise in the La Sal Mountains in Utah, and is the only drainage in the unit draining to the Dolores River from the west.

The 29 miles of both intermittent and ephemeral drainages within the landscape unit predominantly, flow in response to rainfall events associated with the Southwest Monsoon, in late summer and early fall. The unit's soils are largely, medium to fine textured, being derived from sedimentary sandstones and shales. Consequently, intense precipitation events have the capacity to erode surface soils, especially on the steeper slopes and where vegetation cover is less than at potential.

The 19.9 miles of perennial streams in the landscape unit experience high flows from both snowmelt and rainfall events, most of which is generated in the high elevation, headwaters of the Dolores and San Miguel Basins, upstream of the landscape unit. Baseflow in these river systems is a result of groundwater discharge, originating in the San Juan and La Sal mountains. The flow in the Dolores River is highly regulated and depleted by the operation of McPhee Dam and Reservoir, approximately 100 river miles upstream of the landscape unit.

All of the tributaries to both the Dolores and San Miguel Rivers, within the landscape unit, have been designated by the Colorado State, Water Quality Control Division (Colorado Department of Health) as "Use Protected", and are use classified as "Aquatic Life Warm 2", "Recreation 2", and "Agriculture". The numeric standards on these drainages include: Dissolved Oxygen = 5.0 mg/l, pH = 6.5 - 9.0, and Fecal Coliform = 2,000 colonies/100 ml. The Colorado Water Quality Control Commission designates waters of the state, "Use Protected" if they do not warrant special protection provided by the outstanding waters designation or the antidegradation



review process. Basically, the “Use Protection” designation allows for some water quality degradation, as long as the use classifications are protected (see, Colorado Water Quality Control Commission).

The state has designated and classified both the Dolores and San Miguel Rivers, within the landscape unit, as “Aquatic Life 2”, Recreation 1”, “Agriculture”, and “Water Supply” (San Miguel River only). The “Recreation 1” classification, lowers the allowable Fecal coliform concentrations compared to “Recreation 2” from 2000 to 200 colonies/100ml. Additionally, inorganic and metal, numeric standards apply to these streams.

In addition to the state’s water quality designations, classifications and numeric standards, all surface waters of the State are subject to the Basic Standards (Colorado Water Quality Control Commission), which in part read: state surface waters shall be free from substances attributable to human-caused point or nonpoint source discharge in amounts, concentrations or combinations that:

1. Can settle to form bottom deposits detrimental to the beneficial uses (e.g. silt and mud).
2. Are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life.
3. Produce a predominance of aquatic life.

None of the stream or river segments within the landscape unit are on the state’s 303(d) list for impaired water quality. However, Dry Creek Basin is on the Colorado 1998 Monitoring and Evaluation List for suspected impairment for excessive sediment loading (Colorado Water Quality Control Division). An ongoing 319-funded management plan in Dry Creek Basin is targeting the reduction of both sediment and salinity into surface water systems, as primary goals. Additionally, the San Miguel Watershed Coalition is implementing a community-based planning effort that includes the entire San Miguel Basin. This San Miguel Watershed Plan has an objective to minimize non-point source pollution of surface and ground water from sediment,

biological pathogens, excess nutrients, urban pollutants, heavy metals and hazardous wastes in order to meet existing water uses.

### Wildlife

The East Paradox Unit supports an undetermined variety of wildlife species. Some species are year-long resident, while others are migrant. Table 1 below lists the most common terrestrial wildlife species, or group of species, their occurrence, and the basic habitat types in which they are found. Habitat variety is great, and is created by diversity in topography, slope, aspect, vegetation, soils, and climate. The description of the existing vegetation in the Vegetation section of this report provides a good description of most wildlife habitats that occur in the management area.

Table 1. East Paradox Area list of most common terrestrial wildlife species, or groups of species, their occurrence, and basic habitat types in which they are found.

Species (Common Name)	Habitat Type	Occurrence
Mule deer	Pinyon-juniper, oak-mountain shrub, riparian, sagebrush, grassland.	Common, Yearlong, mostly during winter
Elk	Pinyon-juniper, oak-mountain shrub, riparian, sagebrush, grassland.	Common, mostly during winter.
Cougar	All types, mostly along rim-rock areas.	Common, yearlong
Bobcat	All types	Uncommon, yearlong
Coyote	All types	Common, yearlong
Cottontail rabbit	All types	Common, yearlong
Porcupine	Pinyon-juniper, riparian	Common, yearlong
Prairie dog (whitetailed)	Sagebrush, desert shrub	Common, yearlong
Raptor	All types	Common, yearlong
Neo-tropical birds	All types	Common, warm season
Small mammals	All types	Common, yearlong
Amphibians-herps	All types	Common yearlong

Riparian habitat is present along the perennial and most intermittent streams mentioned above, and is extremely important for a number of wildlife species, especially small birds, mammals, reptiles, and raptors. The status of most of these species is unknown.

Aquatic wildlife species and their habitats are limited to the Dolores and San Miguel Rivers, and La Sal Creek. Native fish species, Bluehead Sucker, speckled dace, sculpin, and rainbow trout are known to be present in these streams. Surveys conducted in May, 2000 confirm this. Also, some frogs, toads, and water snakes are known to be present, but their status is unknown.

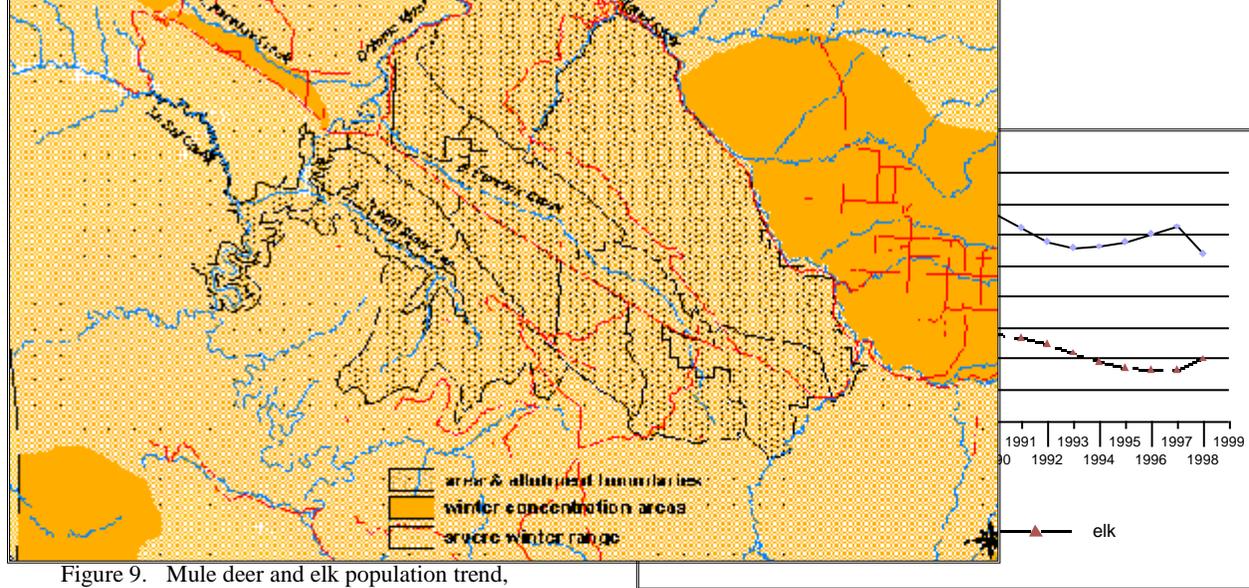
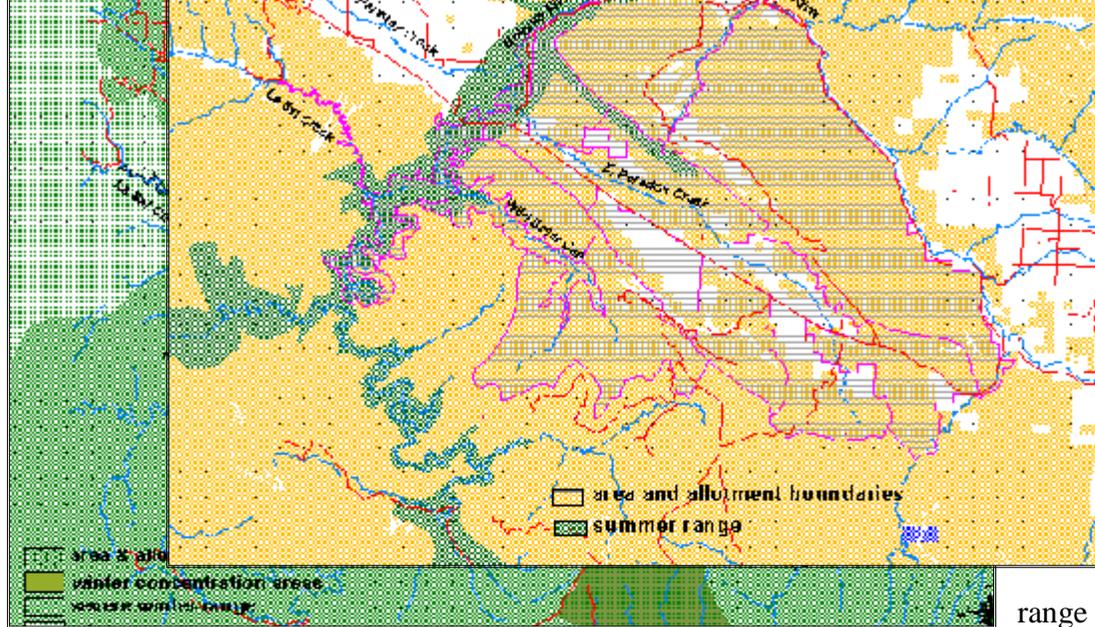


Figure 9. Mule deer and elk population trend, 1980-1998.

Both mule deer and elk are found in the unit. Mule deer are present year-round, but mostly use the unit as winter range. Elk use the unit primarily as winter range. Mule deer and elk come from the higher elevation summer ranges toward Lone Cone Mt. to the east, the La Sal Mts. to the west, and from the Uncompahgre Plateau to the North and East. Most of the unit is classified by the Colorado Division of Wildlife as winter range and severe winter range for mule deer and elk (Figures 10 & 11). Winter concentration areas are not present on the unit, but exist just outside the unit at various locations. There are three primary centers for wintering animals; the gypsum hills in central and eastern Paradox Valley, the foothills along the San Miguel River on the northeastern side of the unit, and Saucer Basin located on the northwestern side of the unit. Most of the mule deer and elk migrate to the unit for winter use rather than just moving down slope to winter areas on the same mountain. Some animals move greater than 15-20 miles. However, the intensity of deer and elk use varies some from year to year and is controlled primarily by the variation in timing and amount of snowfall at higher elevations. During most winters there is a high degree of overlap in mule deer and elk use on several of the wintering areas. The extent of competition is unknown. Regionally, both the quantity and quality of winter range for mule deer and elk is declining, apparently more quickly for mule deer. The long-term (15-20 yr) mule deer population trend is down slightly, while elk are increasing. Figure 9 shows deer and elk population trends respectively, 1980-1998. Mule deer numbers are up slightly since 1995, while elk numbers are down since 1991, reflecting more restrictive hunting regulations for mule deer and more liberal hunting regulations for elk.

**Figure 10.** Mule deer winter range in the East Paradox Unit.



**Figure 11.** Elk winter range in the East Paradox Unit.

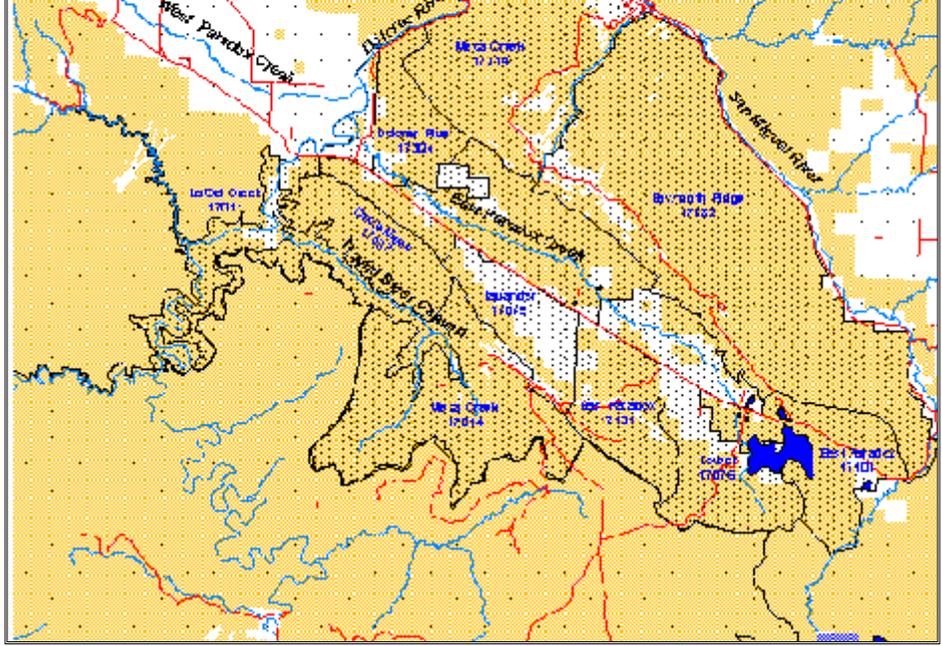
A small herd of 150-200 desert bighorn sheep inhabit the Dolores River Canyon on the south and west sides of the area. The Dolores River Canyon and surrounding area is historic habitat. This herd was transplanted into the area under cooperative agreement with the CDOW. Releases were made in 1986 (35 sheep), 1987 (20 sheep), and 1989 (20 sheep). Sheep use occurs mostly in the Dolores River Canyon, while some occurs on the adjacent mesa tops. Figure 12 shows the desert bighorn range along the Dolores River Canyon in the East Paradox area.

**Figure 12.** Desert bighorn sheep range in the East Paradox Area.

Large predators, such as coyotes, bobcats, and cougars are present in the unit and use it regularly within their established ranges. Black bear use the area infrequently, primarily during poor food years at the higher elevations. Of the predators, coyotes are the most numerous and wide spread. When present in the area, black bears use the major drainages with well developed riparian vegetation, especially during spring and late summer and fall for feeding. Cougars probably use the more rugged, rim-rock features of this area at some time or another while hunting, or raising young. The number of cougars present is probably very low, limited mostly to the ones who have established their territories, or parts of their territories in this area. There appears to be some suitable denning habitat in the bluffy areas along the major canyon rims. Although bobcats are present their numbers are not numerous. While the exact status of these predators are undetermined, they are all believed to be doing well.

Whitetail Prairie Dogs are present in the assessment unit. Potentially they may occur any place where suitable habitat is found, grassland/sagebrush areas. During 1987 a survey was conducted in Paradox Valley to determine prairie dog town locations. Although only a few towns were located in the East end of the valley (Figure 13) prairie dog numbers were relatively high. Towns were located in and around an old "plow and seed" areas. Crested wheatgrass was used to seed these areas, and as expected, it created a monoculture. It appears that the plowing process created a suitable site for prairie dogs, and their numbers exploded. Although exact figures are not available, prairie dog holes were very dense and prairie dog numbers high. Prairie dogs had such an influence on the seeding it was thought to be a failure for many years, until they died out. This area was also a key elk wintering area, and livestock grazing area. Not enough forage was produced for all three. Since 1987 most of the prairie dogs in this area have died out, probably due to the plague. Presently, there are prairie dog towns present in the assessment unit, but there is no information as to their exact locations or numbers. There don't

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**Figure 13.** Whitetail prairie dog towns in the Paradox Unit, 1987.

**Threatened and Endangered Species:** A complete list of species considered for this analysis is contained in the Uncompahgre Field Office 6840 file. There is no designated critical habitat present in the assessment area. The assessment area provides habitat for the bald eagle, and southwestern willow flycatcher.

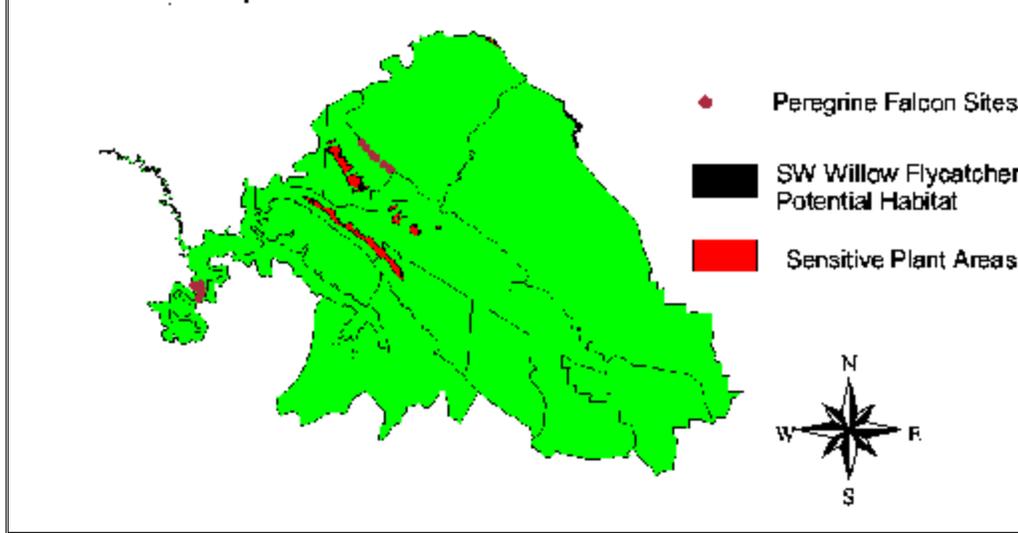
Wintering bald eagles may be found foraging anywhere within the assessment area, but

there is a tendency for the birds to concentrate along the San Miguel and Dolores Rivers. Although bald eagle populations in this area appear to be improving, there is no current data on the local population to confirm this. There are no essential habitats (nests, communal roosts, etc.) identified for bald eagles within the assessment area. Southwestern willow flycatchers have been detected in Roc Creek, just outside the assessment area, and on the lower San Miguel River. There is no data to confirm nesting of this species within the assessment area boundary. A number of potential habitat sites for this species have been identified by BLM, and all have been surveyed several times for the presence of this species. There are no listed, candidate, or proposed plant species within the assessment area.

**BLM sensitive** animal species potentially present in the assessment area include: Allen's big eared bat, spotted bat, fringed myotis, Yuma myotis, Townsend's big eared bat, long-billed curlew, ferruginous hawk, roundtail chub, bluehead and flannelmouth sucker, midget faded rattlesnake, long-nosed leopard lizard, northern leopard frog, canyon tree frog, and rocky mountain capshell. Of these species, only the northern leopard frog, midget faded rattlesnake, roundtail chub, bluehead sucker, and flannelmouth sucker are confirmed to utilize habitats within the analysis area. Native habitat for the bats is believed to be essentially unchanged since pre-European settlement, but the addition of many abandoned mines has expanded habitats now occupied by bats. Therefore standards for these species are being met. The northern leopard frog has been documented in the area as has the midget faded rattlesnake. We have very little data on the abundance or population trends of these two species, but believe that standards are being met for them.

Rare plants within the analysis area are the San Rafael milkvetch (*Astragalus rafaelsensis*), Paradox Valley lupine (*Lupinus crassus*), and Paradox breadroot (*Pediomelum aromaticum*). The lupine is present in Paradox Valley as well as the Atkinson Creek area and near Nucla. The Paradox Valley population is the largest of the group, but many of the Paradox individuals are outside the assessment area. Within Paradox valley, the breadroot is often found in the same habitats as the lupine. Both plants appear to be doing well in this area. The San Rafael milkvetch is found in limited numbers in the Uravan area. There are still questions about whether this species and the Grand Junction milkvetch are the same species. Both are BLM sensitive species and both tend to occupy sites where livestock grazing pressure, or OHV impacts are unlikely.

**Peregrine Falcon:** Peregrine falcons are no longer listed under the ESA, and they are also not considered a BLM sensitive species. There are two active peregrine falcon nest complexes within the assessment area. Both are fairly immune from most disturbances. The Paradox eyrie is the oldest in the San Miguel and Montrose County areas, and a seasonal closure on human activities remains in place around this complex. As of May 2000 the adult birds were still incubating eggs as were the adults in the LaSal Creek area. Since 1980 the number of nesting peregrines in the Dolores River drainage has been steadily increasing, and the birds appear to be doing well.



## **METHODS**

The land health assessment was conducted on public lands in the East Paradox Area during July and August of 1999. The following procedure was used:

- 1). The area was first broken apart into around 80 different polygons. Polygons were based on soil mapping units and allotment boundaries. Polygons ranged from 32 to 6232 acres in size.
- 2). The team ranged between 6-8 people. At the beginning of each week, the team worked together collecting data together, trying to gain consistency. Afterwards data was collected primarily by interdisciplinary teams of three people.
- 3). Each polygon was visited in the field, and land health assessment forms were used to describe the plant community characteristics, and various soil and community health attributes. Polygons were evaluated at five points spread across the polygon. Data collection occurred in the field, and preliminary evaluations of each polygon against Standards 1 and 3 were made within 1-3 days of the site visit by the entire team. Nearly every point was mapped by a GPS unit in the field. A photo of each stop point was taken.
- 4). Riparian data from the riparian PFC assessment that took place in 1994-1997 was used to address Standard 2. Standard 5 was evaluated based on the PFC data, the data from the Rapid Assessment, and Colorado's stream water quality designations.
- 5). Data from the forms was entered into DBASE (several modules: speciera, grpcvrra, healthra, headerra), and polygons and stop points from the maps were entered into ARC. The databases were then linked to the polygons and to the stop points to provide a system that allows maps to be made based on any of the data attributes collected.
- 6). A final polygon determination for Standards 1 and 3 was made by the ID team using mean scores for each attribute on each soil type. The ID team judged each polygon as to whether it was meeting the standard, not meeting the standard, or meeting with problem areas, based on a

preponderance of evidence. Reasons for the rankings were documented.

**9).** Polygon rating (meeting, not meeting, meeting with problems (Functioning At Risk)) was then entered into the ARC polygon map attribute table which also contained attribute fields to document reasons for the rating, and to list causes. Causes for polygons not meeting or FAR for any standard were discussed by an ID team using grazing dates, actual use, and by evaluating the type of problem.

**11).** Numerous maps were created showing the locations of different types of problems across the assessment area, using the stop points as sample points.

**12).** Large scale health issues were assessed by using the Landsat vegetation map and the desired landscape map being developed for the fire planning process.

**13).** Standard 4 was rated based on existing location data of special status species and Colorado BLM's listed species of concern together with habitat needs data and the data from the Rapid Assessment.

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## RESULTS

### **Standard 1:**

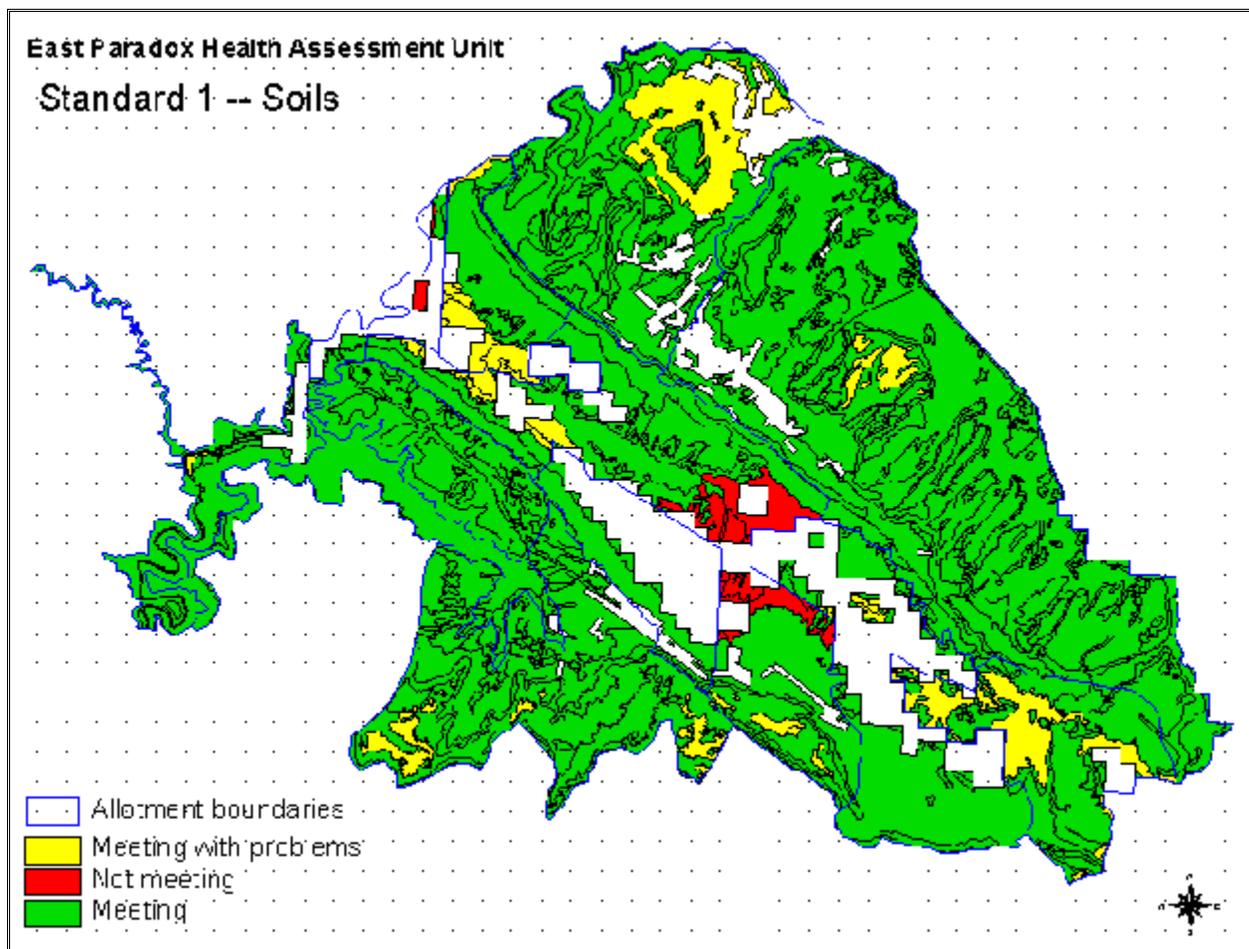
*Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic process. Adequate soil infiltration and permeability allows for the accumulation of soil moisture necessary for optimal plant growth and vigor, and minimizes surface runoff.*

*Indicators used to assess this standard include: rills and **pedestals**, active **gullies**, appropriate **groundcover** and plant canopy cover, **litter accumulation**, **litter movement**, appropriate soil organic material, plant species diversity and vigorous, desirable plants.\**

\* *bolded text identifies the indicators which were most important for this assessment*

### **Acreage Figures**

A total of 70,354 acres (90%) were judged to meet Standard 1, while an additional 6,116



acres (8%) were considered to meet, but with some problem areas. Another 1,559 acres (2%) were identified as not meeting the standard, and 40 (<1%) acres remain unknown because they were not assessed.

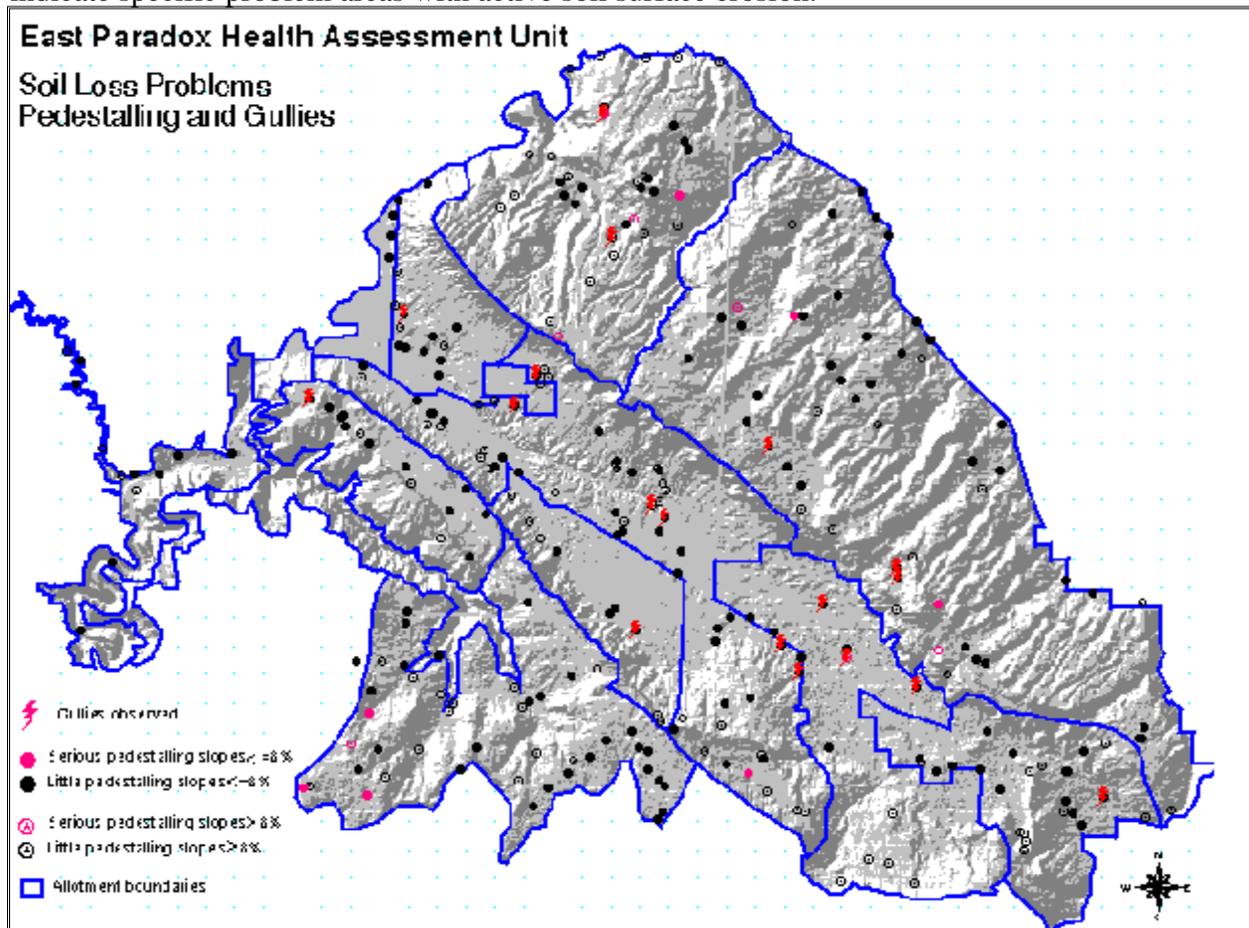
### **Specific Problems**

Polygons which had lower than average soil protecting ground cover, or where annual

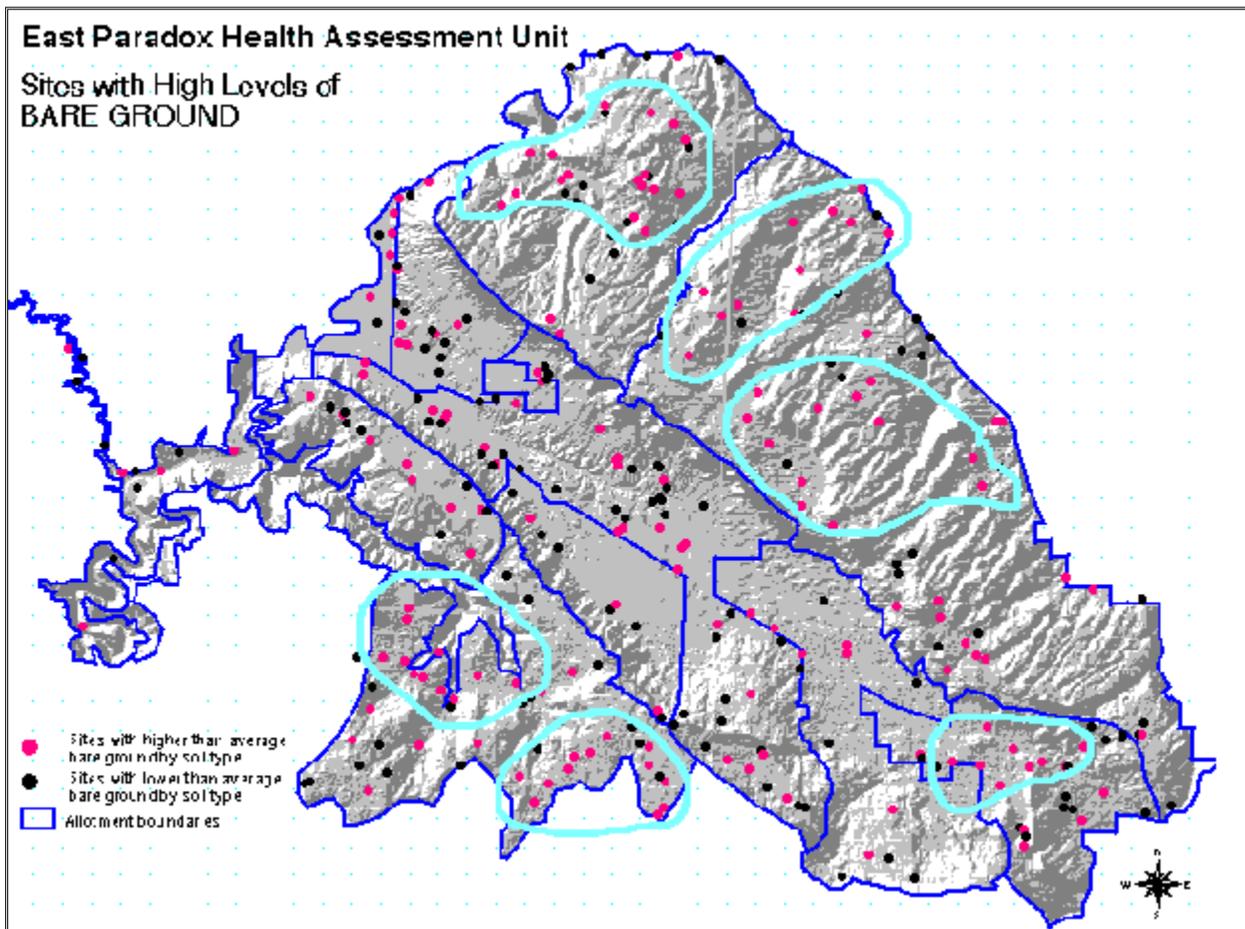
plants dominated the vegetation on three or more of the five sample stops were rated as not meeting the standard. This was a major problem on some soils in the Paradox Valley where cheatgrass and annuals dominate. While those sites generally had high litter cover protecting the soil surface this year, litter production is highly variable, and can be absent on these annual-dominated areas making them prone to erosion. Most of the problem areas outside of the Paradox Valley related to pedestalling and drainage path problems (signs of active soil erosion), or high levels of bare soil (lack of protective groundcover for erosion prevention). Polygons were considered to meet with some problem areas if only one or two of the five sample stops had worse than average scores for these parameters.

Gullies were common in the bottom of Paradox Valley (eleven were observed). Many of these are part of a large gully network associated with the deeply downcut East Paradox Creek. Isolated incidences of gullies were found in the Long Park area and in some small parks in the Saucer Basin country.

Pedestalling does not appear to be a significant problem in the unit. Only isolated incidences were documented, and no clear patterns or concentrations were found that would indicate specific problem areas with active soil surface erosion.

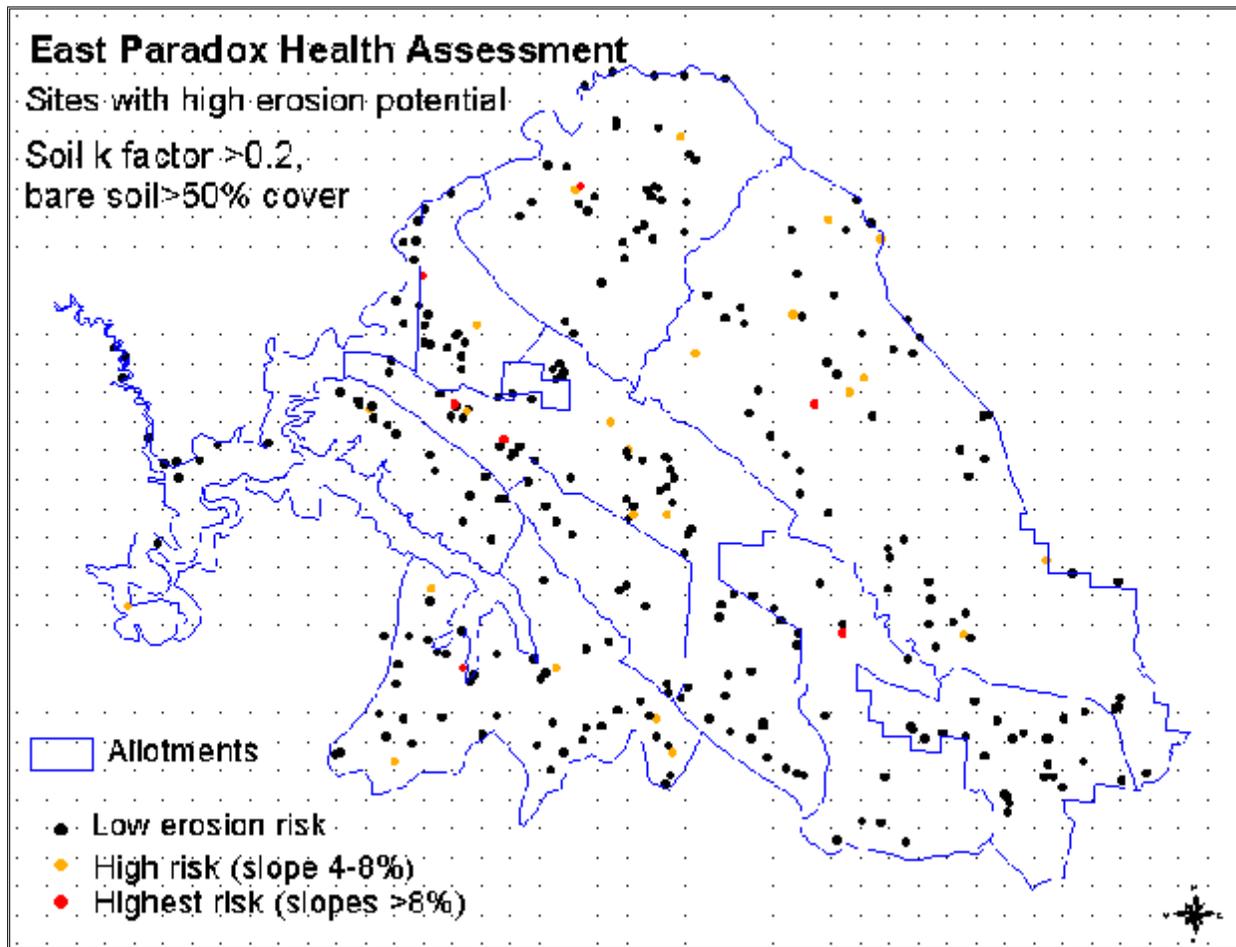


Bare ground-- which signifies vulnerability to soil erosion because of a lack of protective cover for the soil surface-- appears to be a widespread problem across the unit. Because the map shows site scores as higher than average or lower than average bare ground by a given soil type,

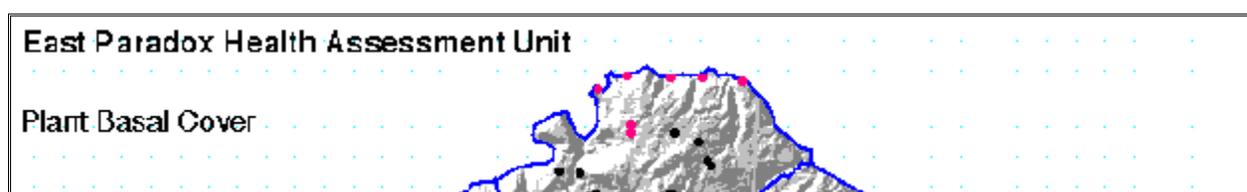


it stands to reason that about half of the sites will be shown in red. However, where large concentrations of red points are found, a prevailing problem of susceptibility to soil erosion can be concluded. Such concentrations are seen on Monogram and Wild Steer Mesas, in the southernmost part of Paradox Valley, and in much of the Sawtooth Ridge country.

The soil k factor enables different soils to be compared with each other in terms of susceptibility to soil erosion. When soils on moderate or steeper slopes with high k factors and high levels of bare ground are mapped for the assessment unit, the most erosion-vulnerable sites are shown. Overall, despite many sites having high bare ground there appears to be little erosion risk. Small concentrations of high risk soils occur on the Paradox Valley floor, in an isolated part of Saucer Basin, on the northwestern part of Sawtooth Ridge, and scattered across Monogram Mesa.

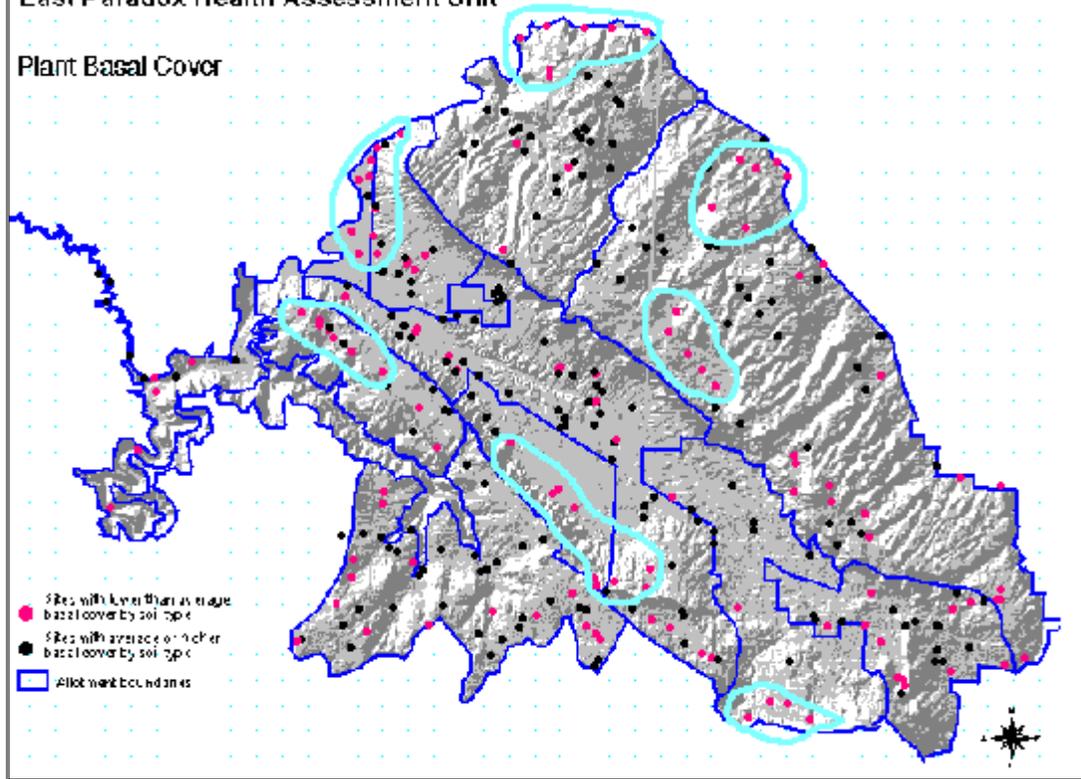


Perennial plant basal cover is perhaps the most important type of groundcover for protecting a site from soil erosion. Small concentrations of sites with lower than average basal cover by soil type were observed along the cliff outwash area at the northwestern-most extent of Paradox Valley, along the San Miguel River Canyon near the confluence with the Dolores River, in the Long Park area, along the Dolores River Canyon in the extreme western part of the unit, in the south central part of the unit, and on Davis Mesa. Comparing this information with the map of plant basal cover, areas within the unit with lowest perennial basal cover—regardless of soil type— occur along the Paradox Valley floor and in part of Saucer Basin.



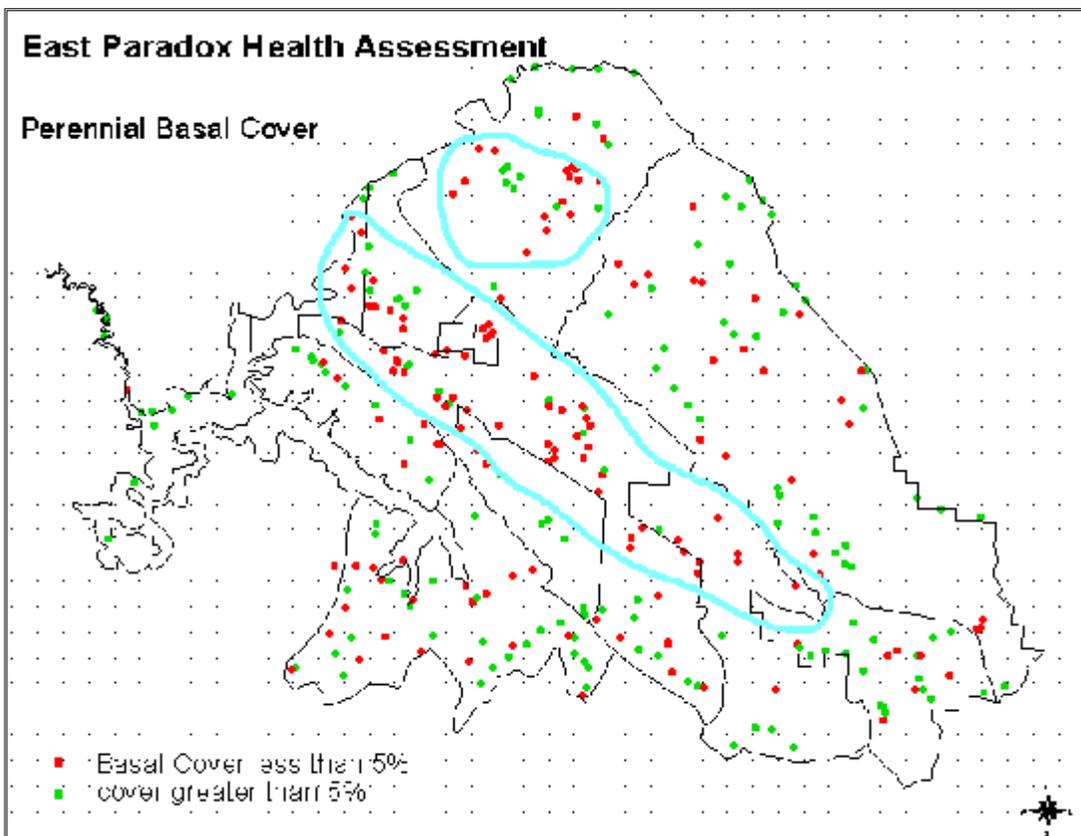
### East Paradox Health Assessment Unit

#### Plant Basal Cover



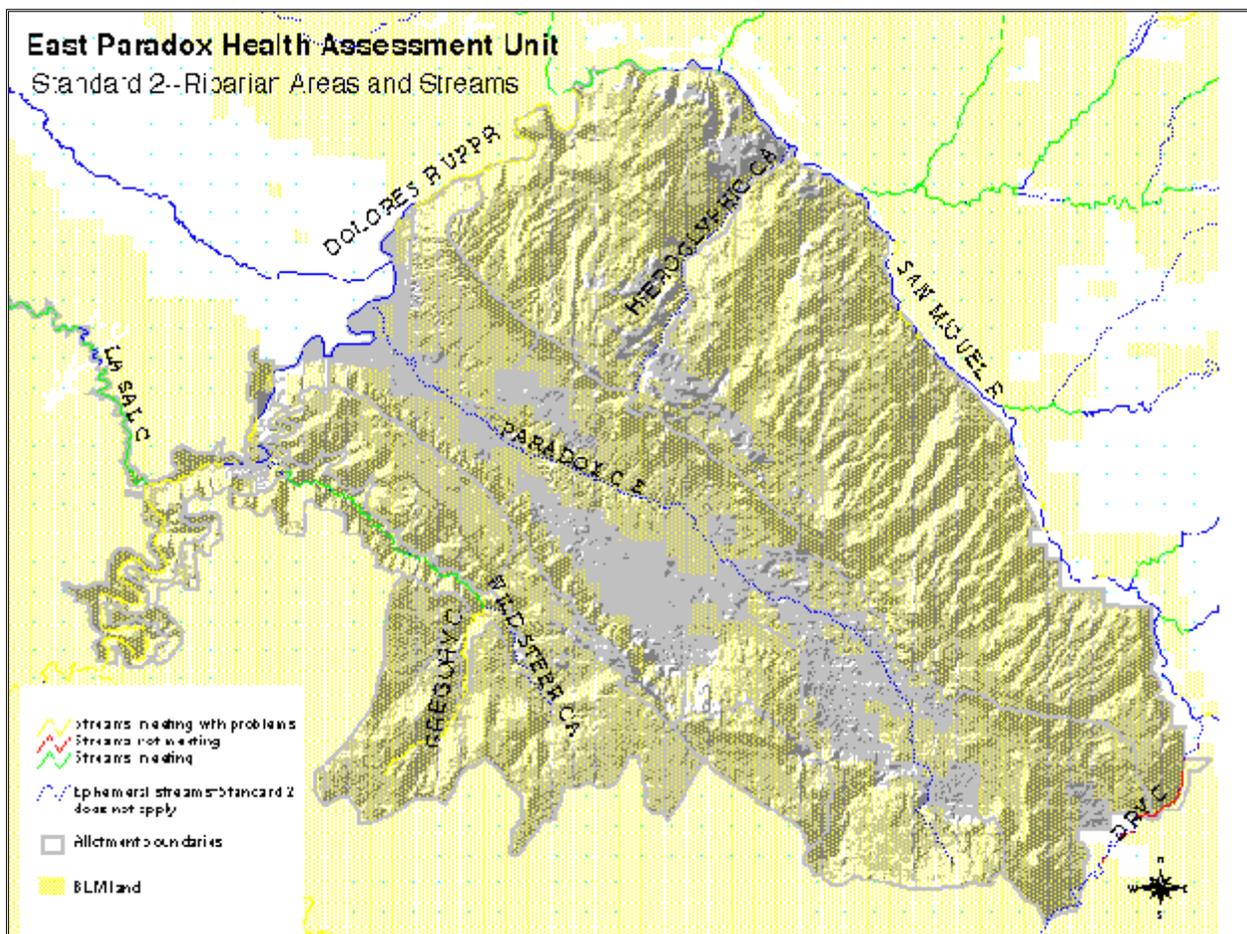
### East Paradox Health Assessment

#### Perennial Basal Cover



**Standard 2:** *Riparian systems associated with both running and standing water, function properly and have the ability to recover from major disturbance such as fire, severe grazing, or 100 year floods. Riparian vegetation captures sediment, and provides forage, habitat and biodiversity. Water quality is improved or maintained. Stable soils store and release water slowly.*

*Indicators used to assess this standard include: native or desirable vegetation dominant, vigorous vegetation, diversity of vegetation age classes, vertical and compositional structure, vegetation has root systems capable of withstanding high stream flows, species indicate maintenance of riparian moisture, stream in balance with water and sediment supplied from watershed, indications of high water tables, point bars colonized by vegetation in range of age classes, active floodplain, floodplain vegetation available to capture sediment and dissipate flood energies, appropriate channel meander patterns, woody debris a part of stream*



*morphology where appropriate.*

### **Mileage Figures**

A total of 11.4 stream miles was rated as Properly Functioning Condition, 17.4 miles were Functioning At Risk, and 2.6 miles were rated as Non-Functioning.

### **Specific Problems**

Upper Dolores River: both reaches of this river on BLM lands were rated as functioning at risk. Problems identified from aerial photo interpretation included lack of woody debris, absence of

riparian zone widening, and vertical streambank stability. In addition, much of the streambank is dominated by the nonnative saltcedar. The altered flow regime resulting from the dam upstream was cited as a probable cause of many of these problems.

LaSal Creek: was rated in Properly Functioning Condition in 1994, and again in 1999. Minor problems noted with this stream included some road encroachment along the stream in the upper parts of the reach, and isolated old saltcedar plants growing below the old copper mine.

Wild Steer Canyon: The lower reach of this stream was considered to be intermittent, and rated in Properly Functioning Condition. The only problems noted along this reach were frequent patches of the nonnative white sweetclover and salt cedar.

Gregory Creek: This stream was considered to be intermittent with numerous seeps, and was rated as Functioning at Risk in 1994. Most of the vegetation was young age class, and there was evidence that a flood may have destroyed the older plants. Small areas of downcutting were noted, as were occasional salt cedar.

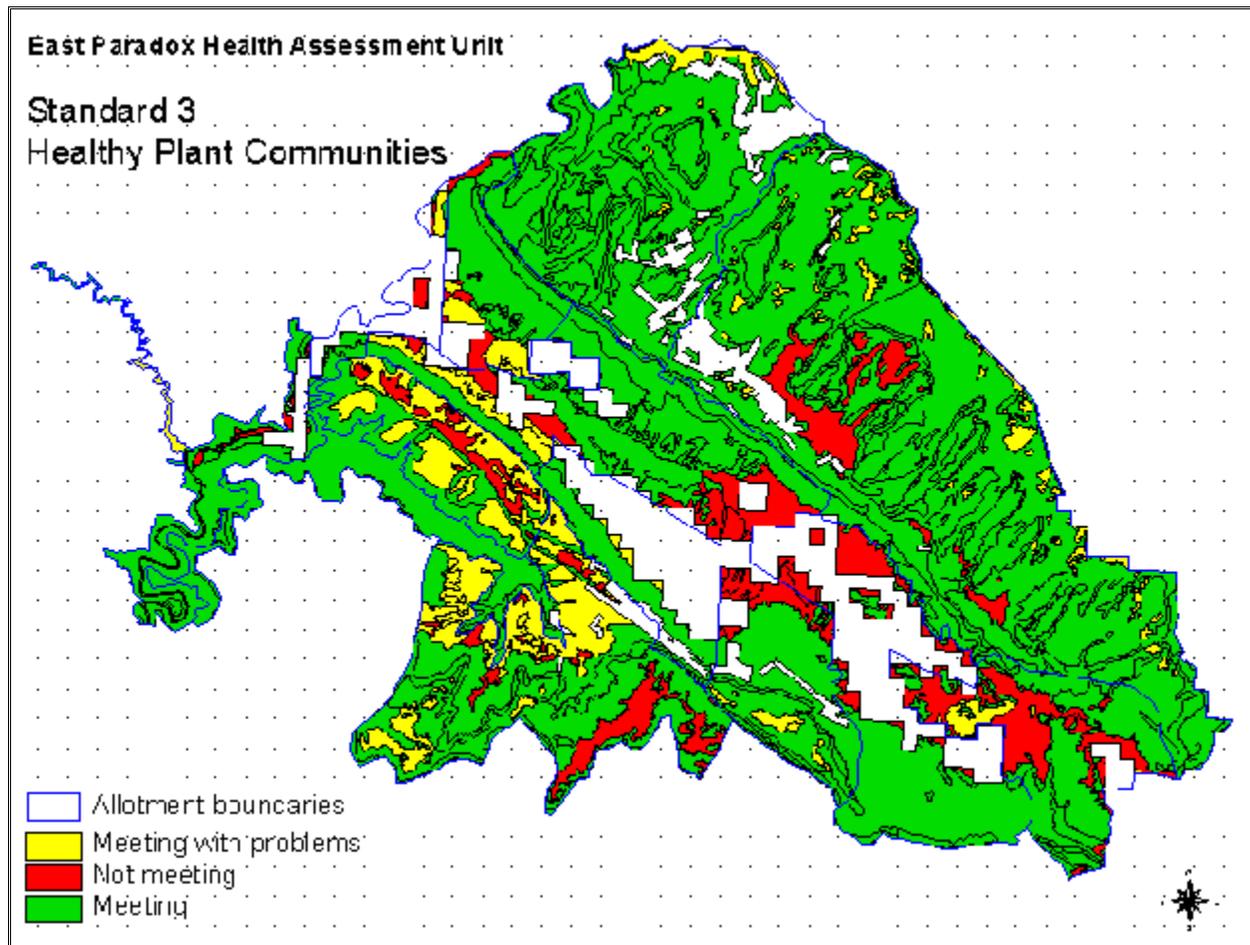
San Miguel River: The lowest reach was rated in Properly Functioning Condition in 1994. The next reach up, in which the river is mostly in private ownership was rated as Functioning at Risk. Problems cited along this reach include presence of salt cedar near Uravan, the influence of the highway and road, and evidence of some erosion and channelization of the river.

Dry Creek: The lowest reach of Dry Creek was rated as Not Functioning in 1994. Problems with nonnative vegetation (salt cedar and white sweetclover), low vigor cottonwoods, and probable impacts from the adjacent highway were noted. The evaluation also identified the severe downcutting and bank erosion that is occurring upstream in San Juan Resource Area.

**Standard 3:** *Healthy productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species' and habitats potential. Plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations, and ecological processes.*

*Indicators used to assess this standard include: native plant and animal communities distributed adequately to assure sustainability, age class diversity to sustain recruitment and mortality fluctuations, adequate habitat connectivity, photo synthetic activity throughout growing season, resilience to human activities, appropriate plant litter accumulations, and landscapes composed of a variety of successional stages.*

### Acreage Figures



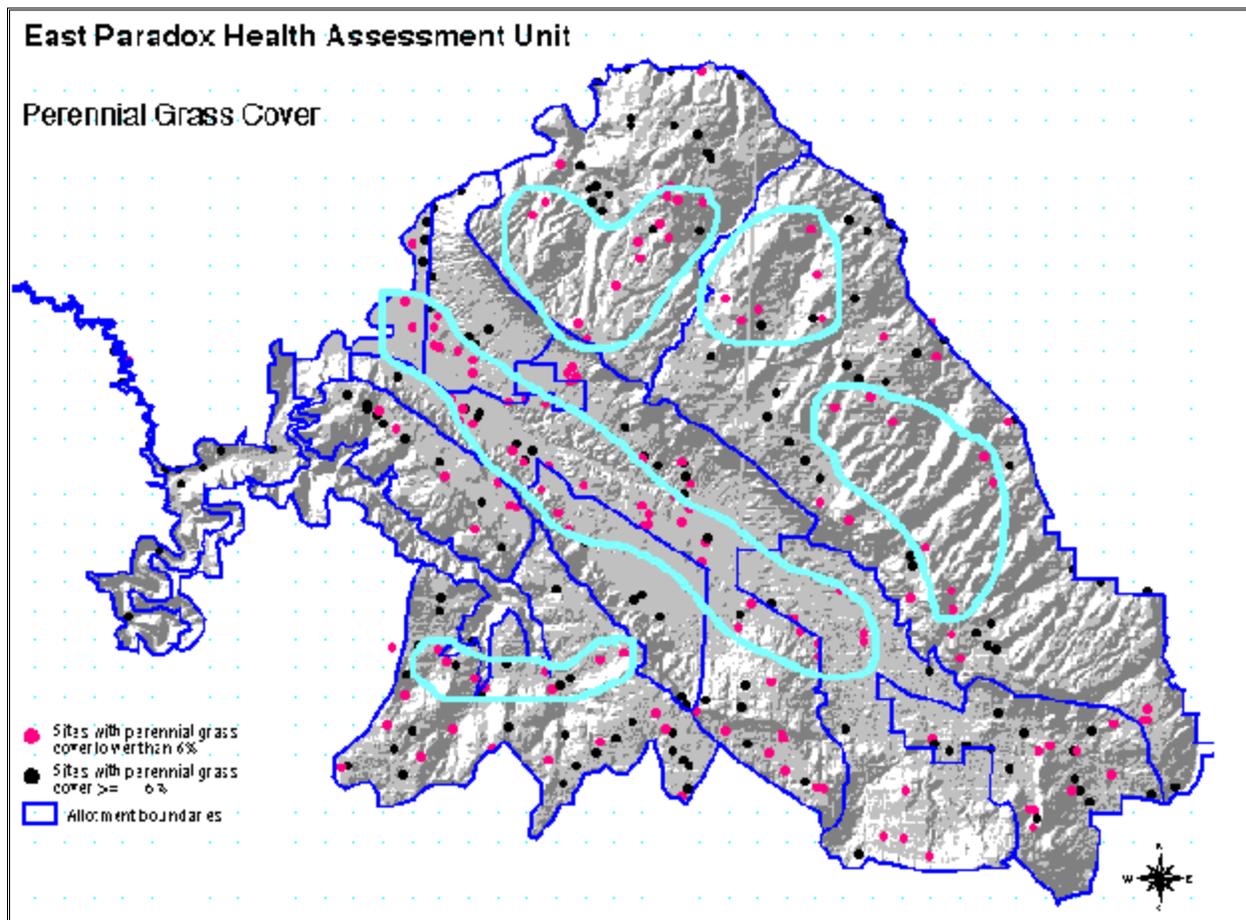
A total of 61,743 acres (79%) were judged to meet Standard 3, while an additional 8,086 acres (10%) were considered to meet, but with some problem areas. Another 8,198 acres (11%) were identified as not meeting the standard, and 40 (<1%) acres were not assessed.

### Specific Problems

The predominant problems that relate to plant and animal community health included

dominance by exotic annual plants (mainly cheatgrass, filaree, and Jim Hill mustard), or adequate presence of these species in otherwise native communities such that recovery from a natural disturbance would be threatened. Lack of cool season grasses in many of the parks was another common problem, as was lack of perennial forb cover. This indicates that the seedbank is likely to be deficient in these species pointing to lower than expected population densities of the species, lower site diversity, and reduced habitat quality for wildlife species that use the grass/forb, shrub and shrub/grass communities. Additional problems found in some areas included site dominance by the nonnative crested wheatgrass in old plow and seed areas, and some areas had poor plant age class diversity (seral stage diversity.)

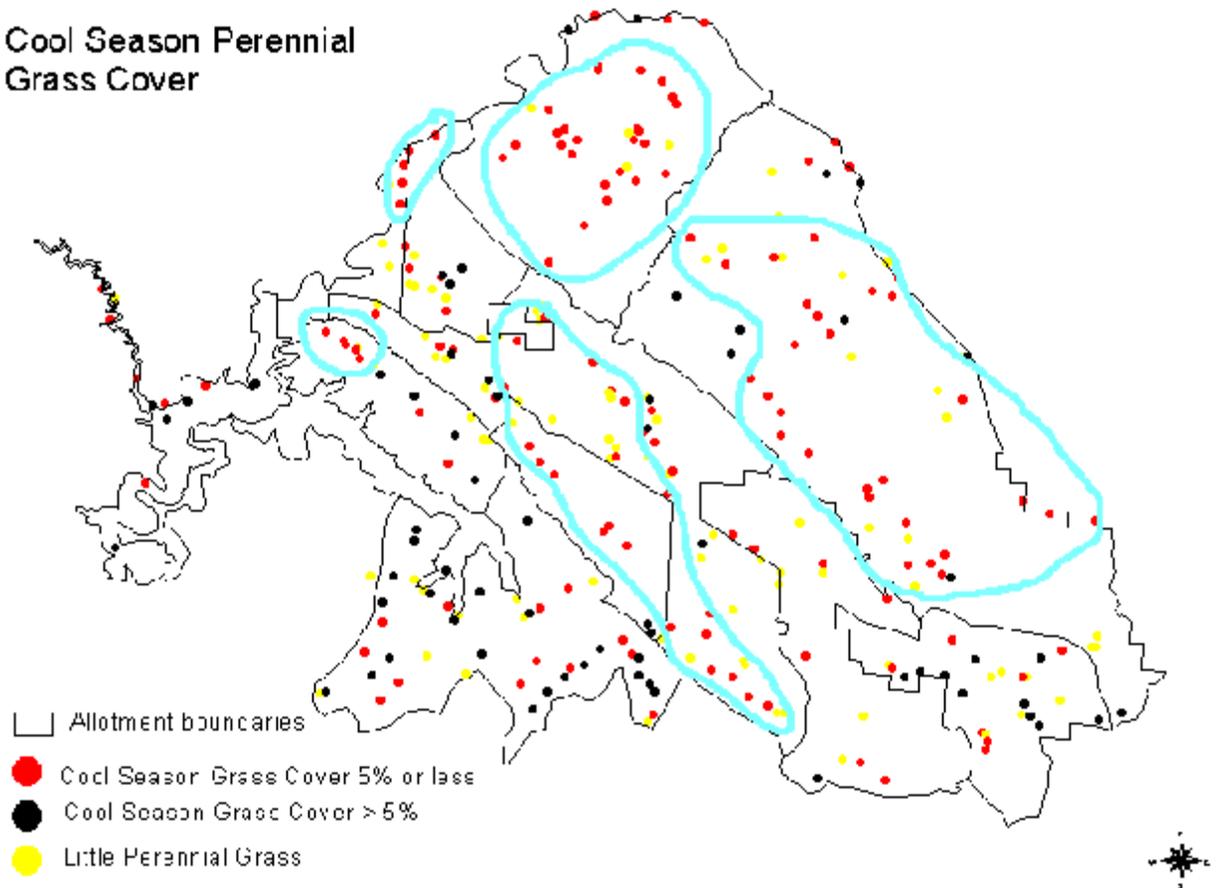
Low perennial grass cover was observed along the bottom of Paradox Valley where cheatgrass, thick sagebrush, or Green rabbitbrush dominate the communities. Low grass cover was also found across the central portion of Monogram Mesa (sites heavily dominated by pinyon and juniper), in the southern part of the Saucer Basin area (also dominated by pinyon-juniper),



and on many sites scattered across the Sawtooth Ridge and southeastern parts of the unit.

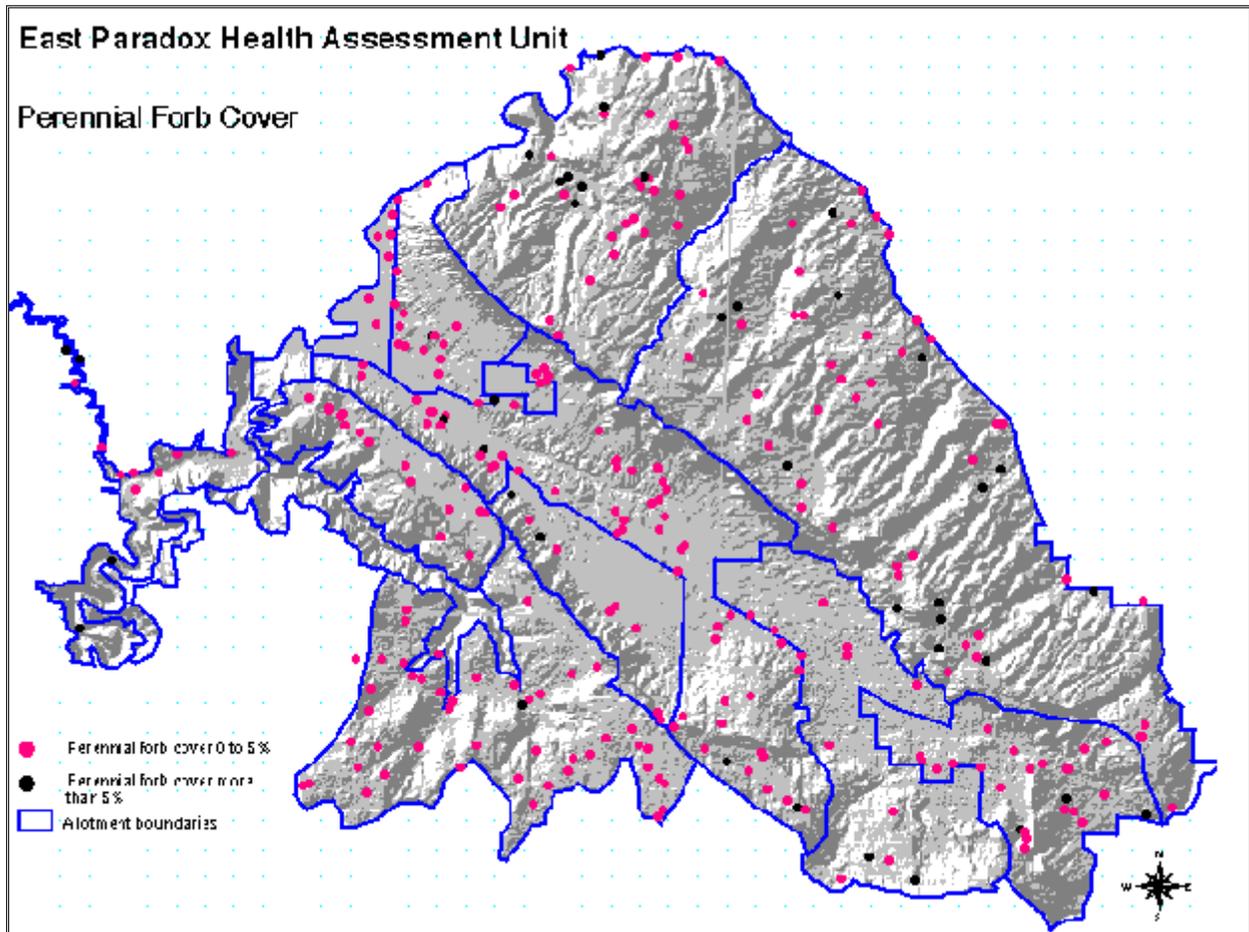
## East Paradox Health Assessment

### Cool Season Perennial Grass Cover



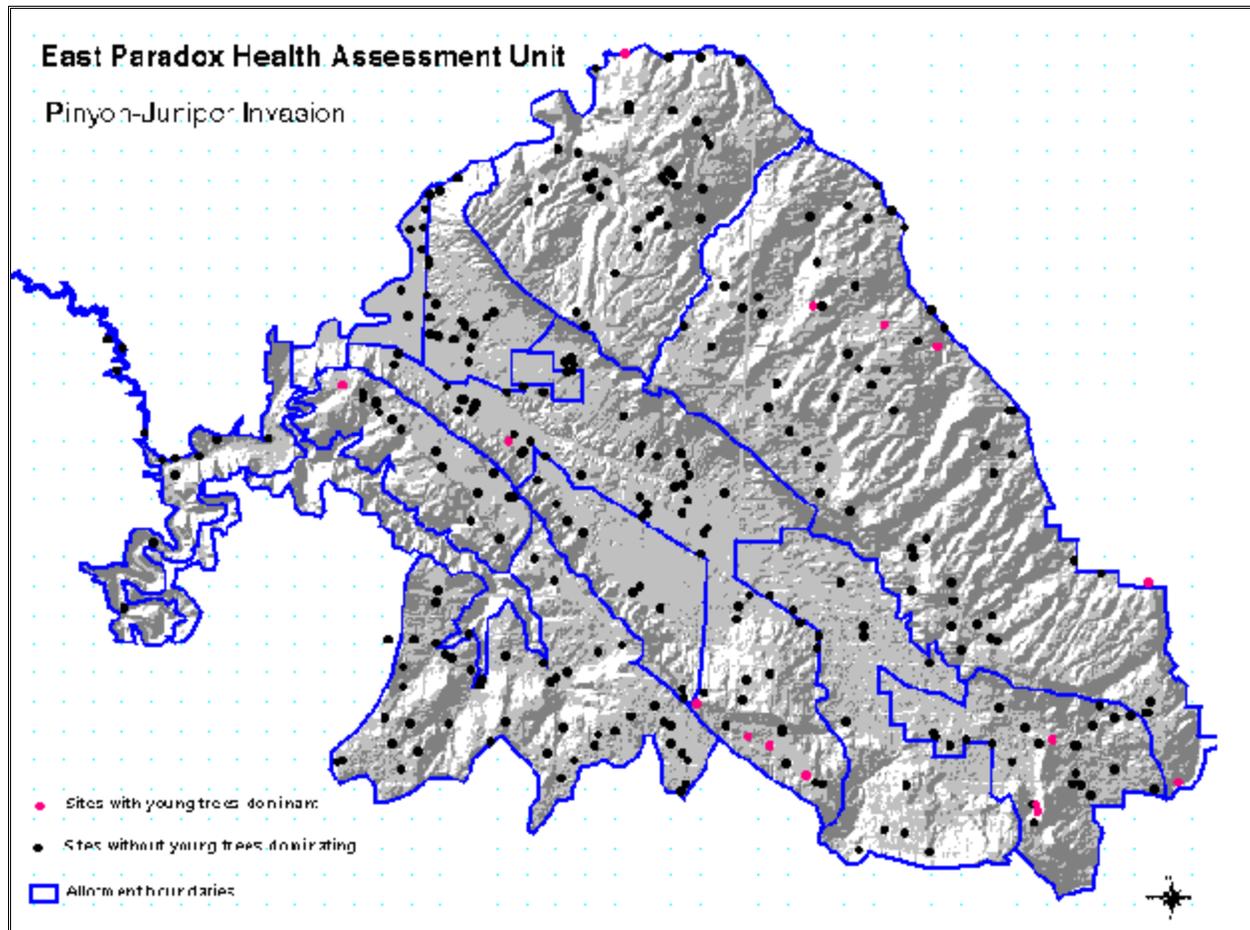
Where perennial grasses were a significant part of the community ( $\geq 6\%$  canopy cover), cool season perennial grasses were noticeably lacking from the Saucer Basin Area, the Sawtooth Ridge country, central Paradox Valley, and the south-central part of the assessment unit.

Perennial forb cover was lower than desirable across the vast majority of the assessment unit. Only a few pockets of perennial forb cover greater than 6% were found. These were in part



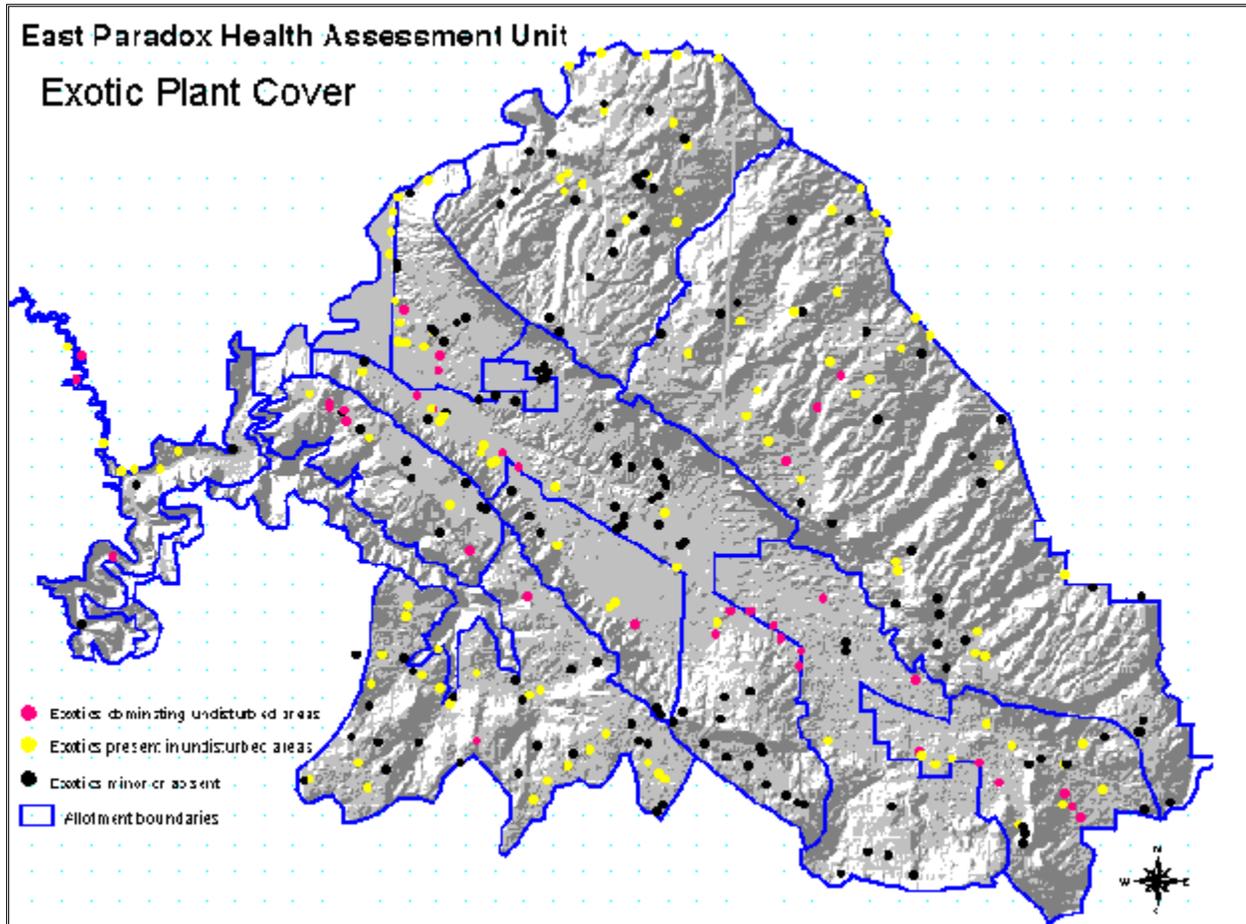
of the Saucer Basin area, scattered across the Sawtooth Ridge area, and at the base of the southwestern ridge that borders Paradox Valley. This indicates both poor site diversity, lower than expected population densities of native perennial forbs, and reduced habitat quality for wildlife species that use grass/forb and shrub/grass communities.

Pinyon-juniper invasion was found in isolated areas, and was not a broad-scale problem across the assessment unit (fig. on next page). The most obvious concentrations of sites with pinyon-juniper invasion were found just east of Monogram Mesa and at the southeastern end of Paradox Valley. The general lack of pinyon-juniper invasion suggests that shrub and grass species on the deep soil parks are for the most part maintaining dominance, and that there have



not been many vegetation disturbances in the past 40 years. It is not clear whether the lack of fires over the past decades has led to an unnatural amount of mature pinyon-juniper woodland dominating the landscape.

Exotic species (primarily cheatgrass, some filaree and Jim Hill mustard) are a problem across much of the assessment unit (fig. on next page). The Paradox Valley floor has the most immediate problem, with exotics dominating disturbed and undisturbed areas across a large fraction of its area. On the valley floor, exotics are present, even where they don't dominate, except against the Paradox cliffs and outwash where exotics are minor or absent on many of the native grass benches. About half of the sites in the Saucer Basin and Sawtooth Ridge areas have exotic species present although not dominating. This suggests that the sites are unlikely to fully recover to healthy native communities in the event of natural disturbances. Monogram Mesa and

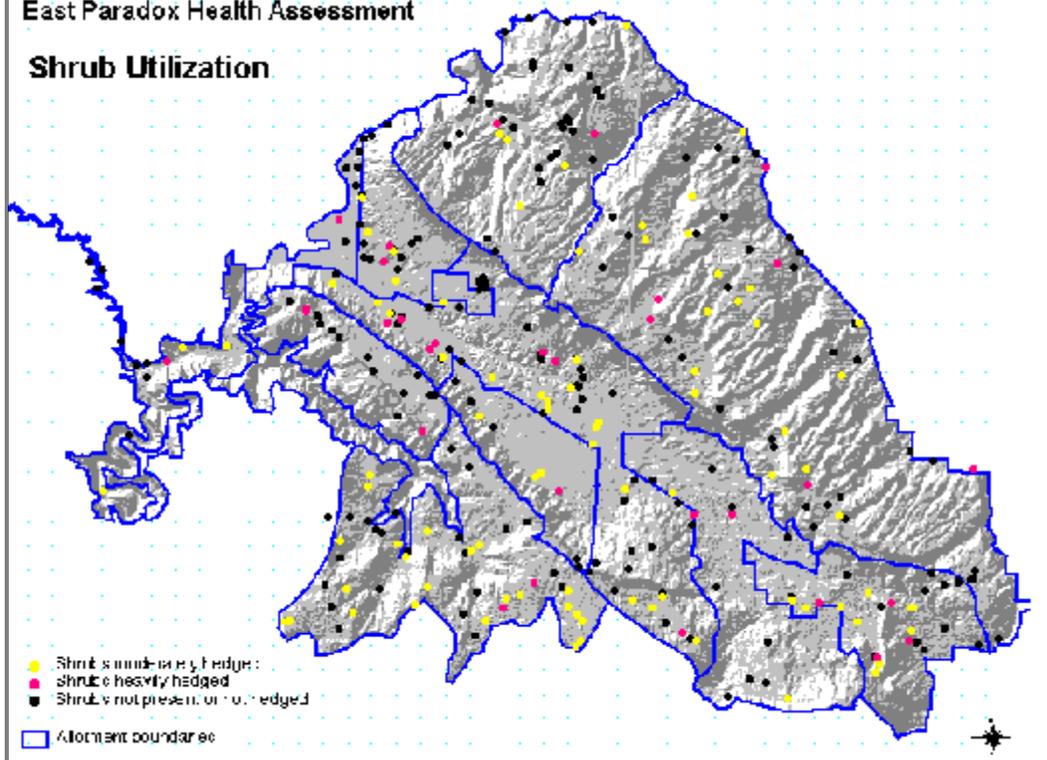


Davis Mesa areas are in the same condition relative to exotic species, except in areas which were treated and seeded with the exotic crested wheatgrass, where exotics dominate. Despite its high quality riparian community, LaSal Creek is also noteworthy for its abundance of cheatgrass on some of the higher terraces.

Shrub utilization as evidenced by hedging in the assessment area was typically absent, low or moderate (see figs. on next page). Utilization was heavy only in isolated areas-- at the mouth of Paradox Valley and at the upper end of the valley. This suggests that browsing animals are in balance with the amount of shrub production in most areas of the unit. Shrub vigor, on the other hand, was low on about half the sites where total shrub cover was greater than 5%. Concentrations of low shrub vigor were observed across every corner of the assessment unit.

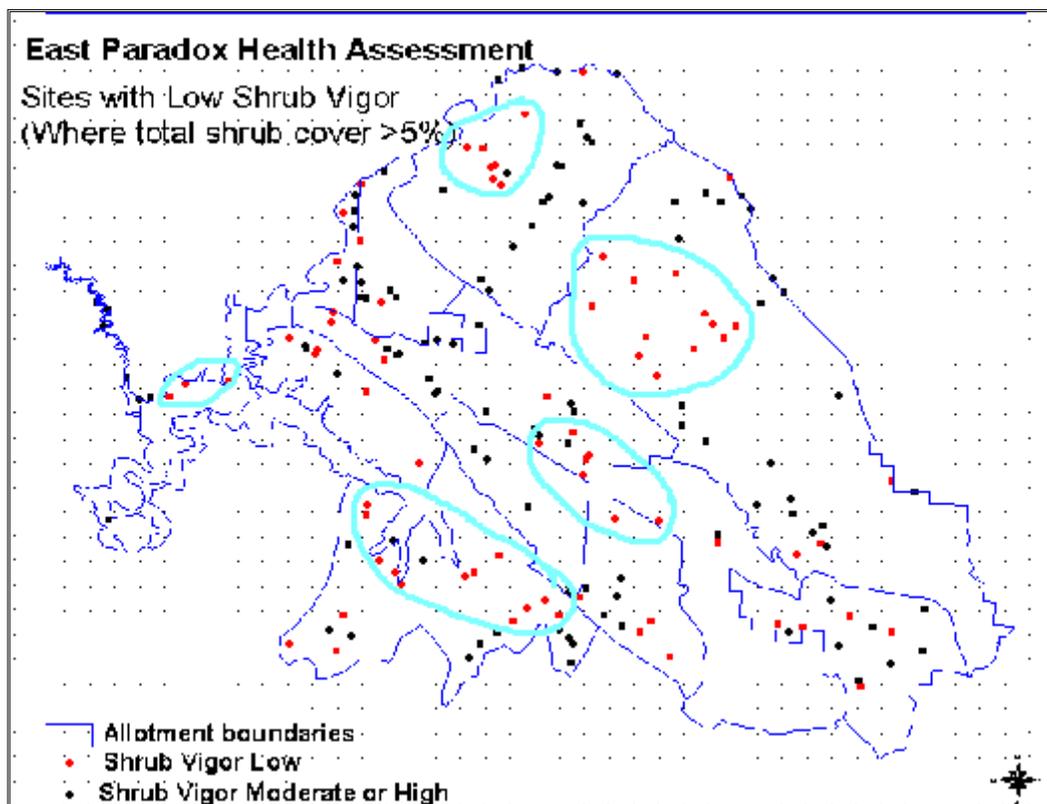
### East Paradox Health Assessment

#### Shrub Utilization



### East Paradox Health Assessment

#### Sites with Low Shrub Vigor (Where total shrub cover >5%)



### **Standard 3 Landscape Scale Indicators**

#### **Healthy Wildlife Community**

The wildlife community health assessment in the East Paradox unit, including habitat, was made using existing CDOW and BLM data, and qualitative knowledge in addition to data collected during the rapid assessment process. The rapid assessment process by itself does not provide adequate information. A much more complex and time consuming effort would be necessary to collect sufficient information for an accurate assessments of health of the wildlife community. Information is not available, nor is it possible to obtain these data quick enough to determine the status of many wildlife species and their habitats for this report. Additional information is needed for many of the wildlife species and their habitats. Specifically small mammals, herp's birds, and predators.

Based on the available information, the main problems or changes that relate to Standard 3 which are occurring in the East Paradox unit at a landscape scale include: 1) major changes to habitat structure, condition, and arrangement components across the landscape, 2) the long-term mule deer population trend is down slightly, 3) winter range quantity and quality is declining in the East Paradox unit, 4) the elk population trend is up slightly, and 5) several species of neo-tropical birds in the Western Colorado region are declining. The natural dynamics of this system appear to have been slowed down, due to lack of disturbances, thus vegetation is getting older with less diversity.

#### **Specific problems or changes:**

**1. Wildlife habitat changes are occurring across the Landscape.** Commutatively, the problems listed above in the Healthy Plant Community section are indicators of changes occurring to habitat structure, condition, and arrangement of components in the East Paradox unit, and across the larger landscape. As these habitat changes occur, so will the species present, their abundance and distribution, and perhaps their role in the community. As habitat abundance and quality declines for some species, it will improve for others.

Habitat changes that are occurring in the unit, and much of the adjacent landscape that affect the wildlife habitat quantity and quality are: Vegetation seral stage is advancing, the average patch size is getting larger, the amount of "edge" is decreasing, the size and quality of browse stands are declining, and the abundance and amount of area supporting exotic and noxious vegetative species is increasing. In general, this area as well as much of the adjacent landscape is becoming more favorable for species that require larger patch sizes of later seral stage vegetation, and with less diversity. This ecosystem is becoming more stable, with fewer disturbances occurring.

**2. The mule deer population trend is declining** in this region (Game Units 70, 71, & 711), and is consistent with declines in mule deer populations throughout the west. Although erratic annual fluctuations in mule deer numbers are typical, the 15-20 year trend is downward. The CDOW's desired mule deer population level for this area is 31,000 with a herd composition of 14 bucks : 100 does : 55 fawns. During the early 1980's the population was estimated at over 39,000. The 1998 estimated population was 26,000, the lowest in recent years (Figure 9).

Habitat changes due to fire suppression, historic grazing, development, and fragmentation; human impacts due to commercial activities and rapidly increasing recreational use; predation from coyotes, cougars and black bears; and competition from the increased elk populations are among the suspected and possible factors interacting to contribute to this decline.

In this unit mule deer depend heavily upon sagebrush for winter forage. For mule deer

to utilize sagebrush without ill effects they need an abundance of herbaceous vegetation. Mule deer do not do well when their diets consist of >30-35% sagebrush. Our assessment data shows widespread low shrub vigor and utilization, and most of the shrubs are sagebrush. Also, assessment data shows widespread low presence of cool season grasses and perennial forbs, which helps to explain the lack of utilization on sagebrush, and perhaps is a factor in the decline of mule deer numbers.

**3. Winter range quantity and quality is declining in the East Paradox Unit**, due mostly to: 1) the lack of disturbances scattered throughout the unit to reset succession, hence creating a more desirable mosaic of feeding and cover areas, and improving the herbaceous species composition and vigor of browse plants, 2) existing browse stands are advancing in seral stage, and in some areas browse plants are being replaced by pinyon and juniper mostly and, 3) over use by mule deer and elk, caused by their number being concentrated on the remaining amount of shrinking winter range, thus quickening the decline of winter range condition. See the Desired Landscape Objectives map for a comparison of existing mule deer winter range conditions to the desired landscape objectives for winter range.

The highest potential value of the East Paradox unit to mule deer and elk is winter range. There is abundant summer range at higher elevations of the surrounding areas. Presently, too much of the shrub area, especially the sagebrush stand, is too old and decadent, and without a good herbaceous under-story of cool season grasses and forbs. Also, not enough sites of early to mid seral stages, supporting sagebrush and/or mountain shrubs are interspersed throughout the area. **4. The elk population is increasing** on the East Paradox unit, and is consistent with increasing elk populations throughout Colorado, and most of the west. Elk have a greater capacity to increase in this unit than they currently are, due to intentional heavy hunting pressure to control population growth. Unchecked, the elk population growth would likely have greater affects on the mule deer population status.

The CDOW's desired elk population level in this area is 10,200, with a herd composition of 14 bulls : 100 cows : 45 calves. By 1990 elk numbers had grown to nearly 15,000, when high levels of antlerless permits were issued to start reducing elk numbers. Since then elk numbers have declined (Figure 9). The 1998 estimated elk population was 10,034. Habitat changes resulting in larger areas of more mature vegetation, especially on their summer range is believed to be a significant factor in this increase. Without continued high levels of harvest to this population, it would increase rapidly. This potential of the elk population to increase is a good indicator that the wildlife community is changing to meet the conditions created by changing vegetation. **5. Several Neo-Tropical Migrant Bird species show population trend declines, or have inadequate data for making trend determinations** in the Western Colorado region,. The Breeding Bird Survey provides the most complete and accurate data available for NTMB species throughout their range, and in the East Paradox unit.

Thirteen species (see table 1) shown population trend declines in both the 26 and 10 year Breeding Bird Survey data sets. All of these species have high "importance of area" rankings, indicating a high proportion of their habitat in this region provides essential breeding habitat components. Five of these species, Vesper Sparrow, Swainson's Hawk, Say's Phoebe, Rock Wren, and Loggerhead Shrike have very low abundance ratings, therefore, indicating they are the species' of highest concern in this unit and landscape. The eight remaining species, Horned Lark, Common Nighthawk, Killdeer, Northern Flicker, Western Wood-Pewee, Chipping Sparrow, Sage Thrasher, and Brewer's Sparrow have moderate to good abundance ratings, thus, making them species' of second highest concern. Species for which inadequate data are

available (Table 2) to make status determinations with a high degree of certainty are considered priority #3 species. Many other NTMB species are present in this area, but their status appears to be good, and not of high concern at this time. The East Paradox unit is part of the larger overall landscape that provides habitat for all these species, which is important for their long-term sustainability.

Table 1: NTMB species showing declines during the 26 and 10 year BBS data sets in Western Colorado.

NTMB SPECIES	HABITAT	26 year Population Trend Ranking (PT26)	10 year Population Trend Ranking (PT10)	Abundance Ranking (AB)	Importance of Area Ranking (IA)
<b>Priority #1 species:</b> PT26 & PT10 ranking = 4 or 5, AB ranking = 3-5, and IA ranking = 3- 5.					
Vesper Sparrow **	Annuals/Grassland	4	5	3	4
Swainson's Hawk *	Annuals/Grassland	4	4	3	3
Say's Phoebe **	Annuals/Grassland	4	4	3	5
Rock Wren **	Barren Land	4	5	3	3
Loggerhead Shrike *	Riparian	5	4	3	3
<b>Priority # 2 Species:</b> PT26 & PT10 ranking = 4 or 5, AB ranking = 1 or 2, and IA ranking = 3-5.					
Horned Lark **	Annuals/Grassland	5	5	1	5
Common Nighthawk	Annuals/Grassland	4	5	2	5
Killdeer *	Annuals/Grassland	4	4	1	3
Northern Flicker *	Generalist	5	5	1	3
Western Wood-Pewee *	Generalist	4	4	2	3
Chipping Sparrow **	Ponderosa Pine-Doug Fir	5	5	1	4
Sage Thrasher **	Sagebrush	4	5	2	4
Brewer's Sparrow **	Sagebrush	4	4	2	5

Breeding Bird Survey rankings: 1= low concern, 5 = high concern.

\* =Low, \*\*=moderate, \*\*\*=highest potential for effects (+ or -) in Escalante area based on Breeding Bird Atlas information.

Table 2. NTMB species with inadequate data for making trend determinations (Priority #3 species.)

SPECIES	HABITAT	Abundance Ranking (AB)	Importance of Area Ranking (IA)	26 year Pop. Trend Ranking (PT26)	26 year Uncertainty Ranking (PTU26)	10 year Pop. Trend Ranking (PT10)	10 year Uncertainty Ranking (PTU10)
Northern Harrier *	Annuals & Grassland	4	3	3	4	3	4
Savannah Sparrow *	Annuals & Grassland	3	3	3	4	3	4
Common Poorwill *	Mountain Shrub	3	5	3	4	3	4
Gray Flycatcher ***	Pinyon-Juniper	3	4	3	4	3	4
Gray Vireo ***	Pinyon-Juniper	3	4	3	4	3	4
Long-eared Owl *	Riparian	3	3	3	5	3	5
Bank Swallow *	Riparian	3	3	3	4	3	5
Swainson's Thrush*	Swainson's Thrush*	3	3	3	4	3	4

Breeding Bird Survey rankings: 1= low concern, 5 = high concern.

\* =Low, \*\*=moderate, \*\*\*=highest potential for effects (+ or -) in East Paradox area based on Breeding Bird Atlas information.

## Plant and Animal Distribution

**Plants:** 98 different plant species were documented as occurring in significant amounts on at least one site. Utah juniper was the most widespread species, found on 127 out of a total of 308 sites. Broom snakeweed was the next most common major plant on 119 sites, and Basin big sagebrush third on 111. The nonnative annual cheatgrass was the most widespread grass and a major component on 100 sites, while the warm season galleta grass was the most common native grass appearing in significant amounts on 93 sites, and the cool season needleandthread grass was the most common of this group on 40 sites. Scarlet globemallow was the most widespread forb documented as a major species on 43 sites. 23 species occurred at substantial levels on only one site, and another 43 occurred on less than 10 sites.

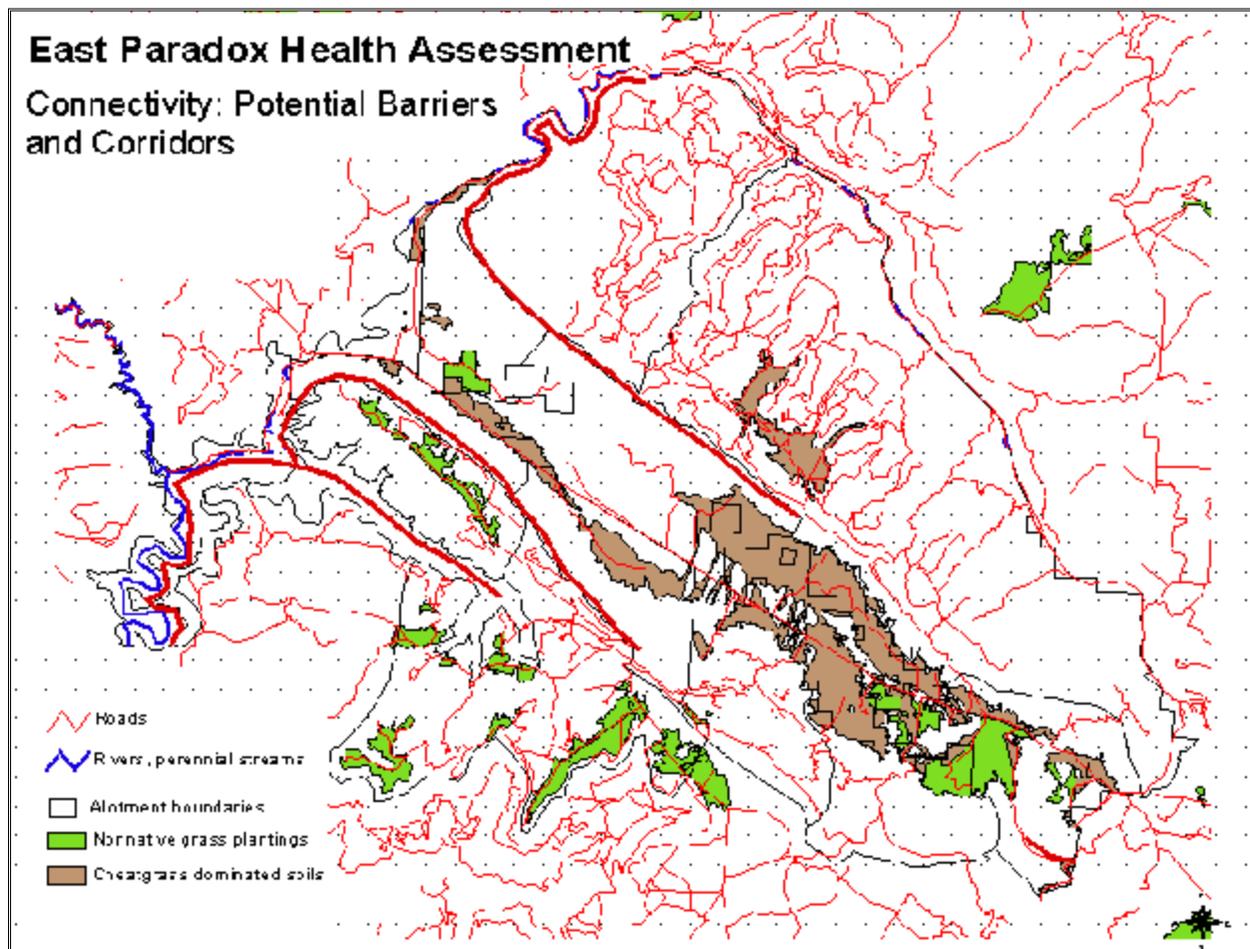
Mapping some of the species distributions indicates that most of the plants occur across the assessment area and are not arranged within the unit based on elevation, although some are strongly tied to soils. At the level of data collection, no problems with plant distribution that would interfere with region-level population viability or resilience were identified. A potential concern may be the loss of early seral native species as cheatgrass becomes more widespread, and as more of the landscape moves into late seral stages with lack of disturbance.

**Animals:** Quantified data are inadequate to assert much about distribution of any of the animal species that may be present other than mule deer and elk. Qualitative information however, suggests there are no problems with the distribution of any animal species in the East Paradox unit that would interfere with population viability or resilience.

## Connectivity

Not much information is available on assessing connectivity of habitat in dry woodland or semi-desert shrubland vegetation types, particularly in very rough terrain. A map of likely barriers and dispersal routes is included.

## Possible Barriers:



**Impassable topographic features like rock walls and very steep slopes:** There are vertical cliffs along the Dolores River, on either side of Paradox Valley, and along the San Miguel River near its confluence with the Dolores. Nearly impassible cliffs also rim the Davis Mesa country on three sides. The most dramatic vertical cliffs line the northeast side of Paradox Valley. Southeast to northwest travel out of the unit is very difficult to impossible for most terrestrial vertebrates except for along the floor of Paradox Valley. We need to be aware of potential management-caused barriers in Davis Mesa and Saucer Basin areas since connectivity is already tightly constrained in these areas.

The Dolores and San Miguel Rivers also restrict travel for species unable to cross the approximately 30-50' wide water barriers that frame the northwest and northeast sides of the unit. There are no significant barriers to connectivity like dams or water depletion drying up segments within these rivers.

**Agriculture or intensive human land uses:**

There is concentrated area of agriculture or human residences within the assessment area. The largest significant conversions of natural habitat to other human uses are the radioactive tailings dump on only a few hundred acres next to Heiroglyphic Canyon in the northern corner of the unit, and the large Cotter Uranium mine pile and pit midway down Paradox Valley.

**Roads:**

Roads can be a barrier to movement because they are a strip of bare or altered ground, or because they are a focus of human activity and disturbance. The road network is densest in the northern part of Sawtooth Ridge and the eastern part of Saucer Basin. These roads are mainly associated with seismic activity and uranium mining, and do not receive much use currently. However, some roads, because they are open and unobstructed provide travel ways for some species, like coyotes, elk, and mule deer. Deer and elk may learn to bypass traditional use areas

and go on to other areas resulting in too heavy of use and habitat damage. Highway 90—a paved 2 lane highway represents a more significant barrier as it carries occasional fast moving traffic.

**Old treatment areas converted to nonnative grasses:**

Old treatments seeded to crested wheatgrass and other Eurasian species are located on Monogram, Wild Steer and Davis Mesas. Newer seedings are located along the floor of Paradox Valley, however only the southeastern ones are still dominated by the seeded species. These may present barriers to movement by small mammals and reptiles, particularly the larger treatments.

**Extensive stands of single vegetation type:**

Cheatgrass has become the dominant species on the Paradox fine sandy loam soils in the bottom of the valley. This low-quality habitat may present a barrier to movement for some small mammals and reptiles. Thick, mature sagebrush with almost no herbaceous understory dominates some areas of the valley in large blocks. This vegetation type may also prevent easy movement across the unit by some species.

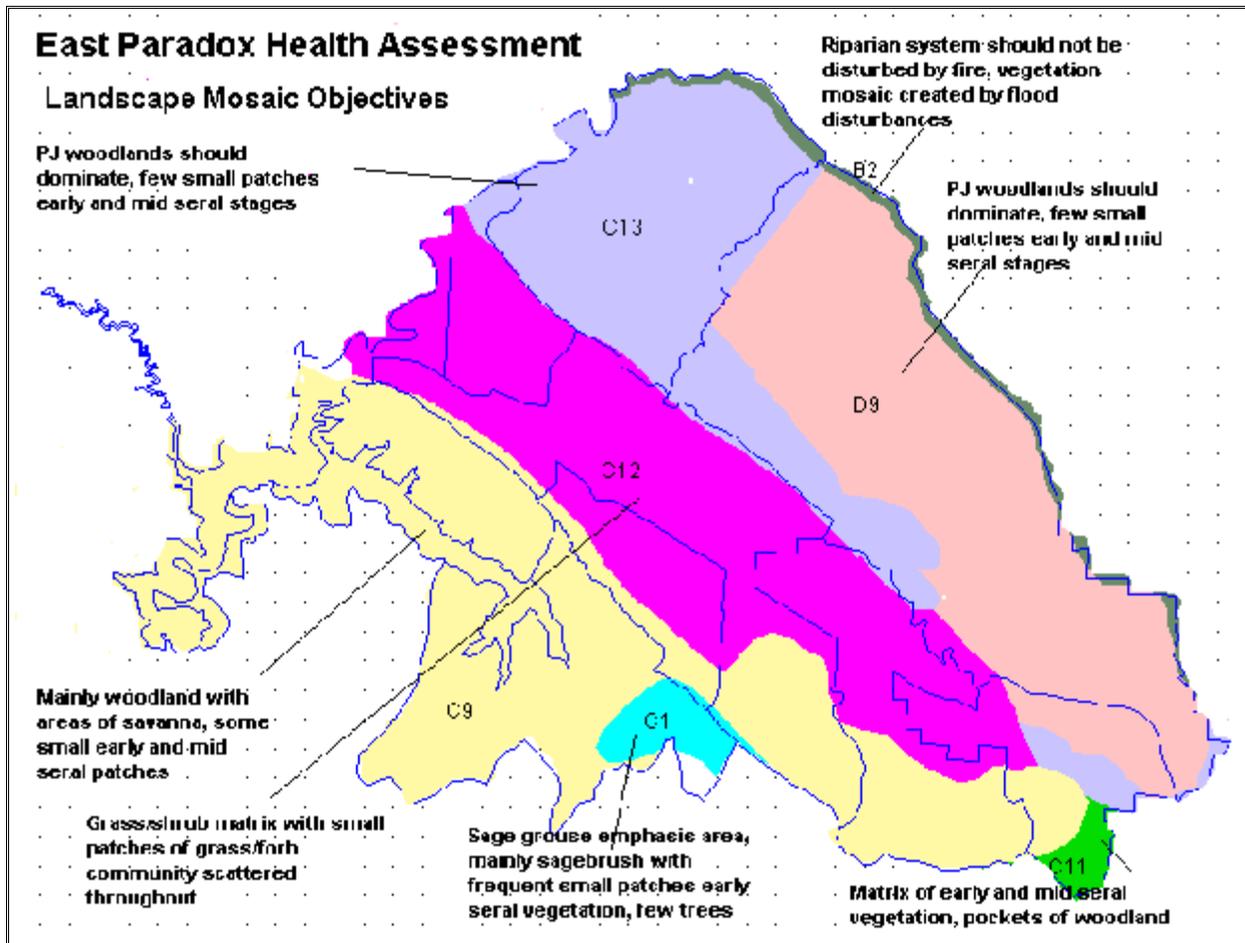
**Possible new dispersal corridors:**

**Roads:**

Roads serve as easy dispersal corridors for some species such as disturbance-related plant species. Noxious weeds were seen primarily along roads during the assessment. Cheatgrass may have become widespread partly due to roads.

**Livestock, People, Vehicles and Pets:**

Livestock provide a mechanism for dispersal of seeds, insects and other small biota, as do people, their vehicles and pets. The presence of barnyard plant species in the native vegetation illustrates the effectiveness of these mechanisms.



## Mosaic

The assessment area is broken into six different units representing different landscape mosaic objectives.

The table on the following page shows the desired proportions and patch sizes for each of the landscape units shown above.

**Units C13 and D9** The existing condition is fairly close to the desired mosaic. The biggest discrepancies are too little shrub/tree and too much mature tree stages. Patch sizes were within desired ranges, except to the shrub/grass stage where patches were larger than desired.

**Unit C12** The existing condition is quite different from desired condition in that there is much more early seral grass/forb stage and much less shrub/grass stage than desired. Patch sizes are appropriate.

**Unit C9** Proportions of seral stages in this unit are out of balance with the desired conditions. There is too little early grass/forb, too much grass/shrub, too little grass/tree, and too much mature woodland. Patch sizes for the early seral stage are too small, and too large for the early-mid stage.

**Unit C1** This unit has too little grass/forb and shrub/grass stages, and far too much mature woodland. Patch sizes of grass/forb need to be bigger, and the shrub/grass stage needs to become the matrix. The mature woodland needs to be reduced from the matrix into 20-100 acre patches.

**Unit C11** There is too much mature woodland in this unit, and too little of the other three stages. Patch sizes are in the right ranges, but woodland should not form the matrix, instead a patchwork of all stages is desired.

Landscape Obj. Unit	Seral Stage	Seral Stage % Objectives	Seral Stage % Estimated	Desired Patch Size (acres)	Estimated Patch Size (acres)
C13 and D9	grass/forbs	10	8	1-25	<40
Natural fire regime mosaic desired	shrub/grass	20	18	1-25	80-100
	shrub/tree	30	8	matrix	<40
	mature tree	40	66	matrix	matrix
C12	grass/forbs	20	41	½ <20, ½ >20	½ 5-10, ½ 40 to 80
Natural fire regime mosaic desired	shrub/grass	80	58	matrix	matrix
	shrub/tree	NA	--	NA	NA
	mature tree	NA	1	NA	10
C9	grass/forbs	20	2	½ <20, ½ 20-100 or more	5
Natural fire regime mosaic desired	shrub/grass	20	35	½ <20, ½ 20-100 or more	100-200
	shrub/tree	20	8	matrix	10
	mature tree	40	55	matrix	matrix
C1	grass/forbs	10-15	2	20-100	2
Sage Grouse optimal habitat mosaic desired	shrub/grass	60-70	48	½ 5-20, ½ 20-100	300
	tree/shrub	10-15	5	½ 5-20, ½ 20-100	5
	mature tree	10-20	45	20-100	matrix
C11	grass/forbs	30	10	1-50	20
Natural fire regime mosaic desired	shrub/grass	30	20	1-50	20
	shrub/tree	20	8	1-50	5
	mature tree	20	62	1-50	matrix

**Standard 4:** \_

*Special status, threatened and endangered species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities.*

*Indicators used to assess this standard include: stable and increasing populations of endemic and protected species, suitable habitat is available, minimal levels of undesirable or noxious*

*plants, native plant and animal communities distributed adequately to assure sustainability, age class diversity to sustain recruitment and mortality fluctuations, adequate habitat connectivity, photosynthetic activity throughout growing season, community exhibits resilience to human activities, appropriate plant litter accumulations, and landscapes are composed of a variety of successional stages.*

## **Acreage Figures\_**

### **Specific Problems**

**Stable or increasing populations of endemic and protected species:** The two listed species that occur in the assessment area are part of populations that occupy much larger ranges than that covered by this assessment. Because of the limited percentage of occupied habitat that is represented by the assessment area, there is little direct population level impact on either of these species from BLM actions that occur in the assessment area. Populations of wintering bald eagles in the area appear to have increased in the last ten years. Populations of the southwestern willow flycatcher have never been documented in this area, and there is not sufficient data to determine if this species was ever present in greater numbers. Monitoring of suitable habitat areas for the occurrence of this species has been underway for several years and is expected to continue into the future. BLM sensitive plant populations appear to be as healthy as they have been over the last twenty years. Primarily due to improved inventory data, there are more documented locations of both the Paradox Valley lupine, Paradox breadroot, and San Rafael milkvetch than were ever known to occur previously. There is insufficient information to determine the actual populations trends for these species, and ideally some monitoring studies should be established to determine this information. There does not appear to be any current BLM management impact on these species either beneficial or negative.

**Suitable habitat is available:** Suitable habitat for the southwest willow flycatcher appears to be available although unoccupied. All suitable habitats for wintering bald eagles appear to be used. The rare plants in the area appear to occur reliably on the substrates which are suitable for the individual species, but there appear to be vacant areas suitable for colonization.

**Minimal levels of undesirable or noxious plants:** Although noxious plants occur in the area, there is no evidence to indicate that they are causing problems for the rare plants and animals in the area. Although Paradox Valley is heavily infested with cheatgrass, this species has not had a significant impact on the slopes and geology where the Paradox Valley lupine and Paradox breadroot are found. Based on the habitat preference for these two plants it is doubtful that they ever occupied any of the areas now dominated by cheatgrass.

**Native plant and animal communities distributed adequately to assure sustainability:** Based on habitat selection, and requirements, the listed, and sensitive, plant and animals in the assessment area are believed to be distributed adequately to insure sustainability.

**Age class diversity to sustain recruitment and mortality fluctuations:** There is no data available to determine if age class diversity is optimal for the species involved. At this time nothing indicates that there are survival or recruitment problems for any of the species considered under Standard #4, except perhaps sage grouse.

**Photosynthetic activity throughout growing season:** In most areas photosynthetic activity is present throughout the growing season. Exceptions to this would be the cheatgrass areas in Paradox Valley, but these areas have no detectable effect on special status species within the assessment area.

**Community exhibits resilience to human activities:** We have no data at this time to verify that resilience to human activities has an effect on the special status species that are present in the assessment area.

**Appropriate plant litter accumulations:** This indicator does not pertain to the species involved in this standard.

**Landscapes are composed of a variety of successional stages:** As reported under Standard 3 only 11% of the plant communities in the area are considered to not be meeting standards for community health. The same section also indicates that many of the plant communities appear to be stable as evidenced by very little pinon-juniper invasion. Each of the landscape mosaic objective areas seems to have a variety of successional stages represented and based on current knowledge, this appears to be adequate to support the special status species present in the area.

**Standard 5:** *The water quality of all water bodies, including groundwater where applicable, located on or influenced by BLM lands will achieve or exceed the Water Quality Standards established by the state of Colorado. Water Quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and antidegradation requirements set forth under State law as found in (5 CCR 1002-8), as required by Section 303(c) of the Clean Water Act.*

*Indicators used to assess this standard include: appropriate populations of macroinvertebrates, vertebrates, and algae, pollutants and sedimentation attributable to human activity is within amounts specified by the Water Quality Standards established by the State of Colorado.*

**Acreage Figures: Stream Miles Evaluated Against Standard 5**

<b>Stream Type</b>	<b>Miles Meeting</b>	<b>Meeting but Problem Areas</b>	<b>Miles Not Meeting</b>	<b>Unknown</b>
<b>Perennial</b>	0	19.9	0	0
<b>Intermittent</b>	6.6	4.9	0	0
<b>Ephemeral</b>	5.2	12.1	0	0

**Specific Problems:**

The potential nonpoint source water pollutants yielded from the landscape unit include, sediment, nutrients, and biological pathogens (primarily bacteria and protozoans). Much of the accelerated levels of sediment production are a result of historic and some present uses that have resulted in poor watershed condition and unstable stream channels. The influence of recent livestock grazing on water quality varies considerably with site specific conditions and is highly dependent on the frequency, magnitude and timing of runoff events, watershed condition, number and class of livestock, proximity of livestock to surface water systems, duration of grazing and season of use.

Because reliable water quality data is lacking to make a definite determination as to how any given water source compares to its intended uses, classifications and standards, no stream or stream segment was judged to be “Not Meeting” Standard 5, using the philosophy of being innocent until proven guilty. Acres of stream found to be “Meeting but Problem Areas” were based on the condition of the upland drainage area and the adjacent riparian system on perennial and intermittent streams, livestock use within close proximity to live surface waters, and livestock use during or just prior to seasons with a high potential for runoff events. Factors evaluated for upland condition include: sites with high levels of bare soil, sites with low levels of plant basal cover, sites exhibiting soil pedestalling, and actively, eroding incised channels. Riparian conditions were evaluated for stream channel stability, low vegetation cover, and on the perennial streams, presence and type of aquatic life. Areas exhibiting minor problems with upland and riparian conditions, or existing grazing management were rated as meeting Standard 5. As previously described, the “Use Protection” designation on the area’s waters is the most liberal for allowing elevated levels of pollutants.

All three perennial stream systems (San Miguel and Dolores Rivers, and La Sal Creek) in the landscape unit, support aquatic life, typically warm water fisheries. The "Recreation 1" classification on both the San Miguel and Dolores Rivers allows for Fecal coliform concentrations to reach 200 colonies/100ml. This limit on bacteria assumes there is the potential for some human ingestion of water, such as would be expected from swimming or small, boating activities. Recreational use on these rivers includes boating and camping, primarily during the spring runoff season. Livestock grazing use also occurs along these river systems. Both the recreational uses and livestock grazing having the potential to introduce water-borne biological pathogens to these surface water systems. Consequently, to maintain adequate protection to river recreationists and to ensure compliance with state water quality standards, water quality monitoring for fecal coliform concentrations should be initiated on both the San Miguel and Dolores Rivers. Until multi-year monitoring indicates that there is not a problem with fecal coliform, these stream reaches will be considered to meet Standard 5 with problem areas. Monitoring for fecal coliform started in the Spring of 2000, in accordance with monitoring plan. The sampling protocol included collecting samples both during and after livestock grazing in selected allotments, for comparative purposes. The results of fecal coliform sampling for the 1999-2000 season are in the following table. The two sample sites on the Dolores River were selected to monitor the influence of livestock grazing on allotment #17011, which includes pastures that encompass reaches of both the Dolores River and LaSal Creek. Livestock use occurs from 12/1 to 3/31 on normal forage availability years. Sample results show that fecal coliform concentrations were higher in the Dolores River at Gypsum Valley, upstream of the allotment, when compared to the Dolores River at Bedrock, downstream of the allotment. The geometric mean (the fecal coliform standard is based on the geometric mean of representative stream samples) of samples at both sites were well below the state standard of 200.

Dry Creek, designated "Recreation 2" was monitored just above the Coke Ovens ford to assess its influence on the San Miguel River, which is designated "Recreation 1". Livestock use on the East Paradox Allotment just ended when the 2/16 sample was taken, and grazing on the Coke Ovens Allotment was occurring during the latter samples. Dry Creek was well below the standard fecal coliform concentration of 2000 colonies/100 ml.

A general trend obvious with this sampling effort is the positively correlated increase in fecal coliform concentrations with both increased stream discharge and water temperature. Since present day science says that the life span of fecal coliform is negatively correlated with water temperature, it is most likely that overland flow and increased stream stage, from snowmelt, are primarily responsible for conveying additional coliform to sampled water courses.

Elevated concentrations of sediment in the local water systems potentially occurs from both channel and soil surface erosion. High levels of bare ground were commonly encountered throughout the landscape unit, as well as low levels of perennial plant basal cover. These conditions allow for accelerated soil erosion and runoff, which has the potential to increase the total sediment yield, and transport other nonpoint source pollutants to stream courses. The drainages that showed the highest concentration of inventory transects with limited upland watershed cover were: East Paradox Creek, Wild Steer Canyon, portions of both the San Miguel and Dolores River Canyons, and several small ephemeral systems, that drain both Long Park and Sawtooth Ridge.

**Table 1.** Results of Fecal Coliform monitoring, Spring 2000.

Water Source	Location	Sample Dates	Flow cfs /Temp C	Fecal Coliform colonies/100ml	Geometric Mean of Site Samples	State Std. for FC
Dolores Rv. (Gyp Valley)	T.45N., R18 W., S. 17, NESW	1. 2/16/2000 2. 3/3/2000 3. 4/10/2000	1. 63 / 4 2. 60 / 9 3. 450 / 13	1. 4 2. 8 3. 240	19	200
Dolores Rv. (Bedrock)	T.47N., R18 W., S. 19, SWSE	1. 2/16/2000 2. 3/3/2000 3. 4/10/2000	1. 63 / 4 2. 60 / 8 3. 450 / 13	1. 2 2. 4 3. 80	8	200
Dry Creek abv. Coke Ovens	T.46N., R16W., S. 27, SESE	1. 2/16/2000 2. 3/3/2000 3. 4/10/2000	1. 1 <sup>e</sup> / 3 2. NA / 6 3. NA / 11	1. 4 2. 114 3. 300	50	2000

Superscript e denotes flows that were visually estimated

Accelerated channel erosion, usually expressed by the presence of incised or gullied channels, occurs in some of the valley bottoms having relatively deep, fine textured alluvium. Gullies were most commonly encountered in East Paradox Valley, and portions of Long Park and Saucer Basin. Gullied channels commonly form, from the forces exerted on the channel from increased runoff from upland sites that lack adequate watershed cover. Valley bottoms that have lost the woody shrub and/or perennial grass and forb component can magnify the rate and magnitude of gully formation. The cheatgrass invasion that dominates the vegetation community in much of East Paradox Valley has contributed to the loss of channel stability. The weak root system on this annual, grass species provides little resistance to the forces that result in gully migration and enlargement.

## **CAUSATIVE FACTORS**

**Historic Grazing:** Regional accounts of settlement in this part of Colorado indicate that livestock numbers grazing the public rangelands were once many times what they are now, and that the vegetation changed dramatically following the introduction of livestock. The interdisciplinary team identified 9,765 acres where historic grazing had contributed to a polygon either failing to meet a standard, or meeting with problems. The primary indicators used to infer this included landscape position and topography coupled with lack of cool season grasses in otherwise grassy communities, lack of forbs, or dominance by annual plants.

**Current Grazing:** The main evidence used to conclude that current livestock grazing was causing problems were signs of heavy use (abundant cow pies) in poor condition areas, or heavy use on four-wing saltbush. While these are not definitive indicators that current livestock grazing is the cause, they point toward a potential problem. Utilization information would be stronger evidence, however this has not been gathered very consistently nor uniformly across the area in the past. There were also some polygons where the team was not sure whether grazing was contributing to problems and identified the need to monitor impacts more closely. Combining these two together, there 1,362 acres where the ID team identified current grazing practices as likely to be causing a polygon to fail to meet a standard or to meet with problems.

**Old Vegetation Treatments:** Vegetation treatments which were completed mainly to improve livestock forage conditions in the 1950s through the 1980s were the primary cause for 4,732 acres failing to meet a standard, or for meeting with problems. The use of and subsequent dominance by nonnative grass species, or where improper follow-up management had led to poor groundcover or exotic annuals taking over the site caused the polygons to fail to meet standards.

**Roads:** Poor road placement, maintenance or weeds associated with a road were identified as causing 765 acres not to meet a standard, or to meet with problems.

**Fire Suppression:** The absence of a natural fire regime caused by aggressive fire suppression policies of the past and lack of fine fuels necessary to carry burns contributed to 9,050 acres failing to meet a standard, or to meet with problems. Dominance of large landscape areas by old age class woody species and residual low vigor shrub and grass species in pinyon-juniper woodland were considered to be evidence supporting lack of fire as a causative factor.

**Poor Seedbank:** Impoverished seed banks were thought to be a contributing factor for 516 acres failing to meet a standard, or for meeting with problems. Although other factors may have caused the seed bank to diminish, the ID team thought the problem with meeting the standard could not be remedied without putting new seed on these sites.

**Noxious Weed Infestation:** (this includes cheatgrass). Weed dominance, and the competitive nature of the weeds was considered have caused 516 acres to fail to meet a standard, or to meet with problems.

**Heavy Browsing on Shrubs:** Heavy browse utilization caused by grazing animals (wildlife and

livestock) contributed to 2,348 acres failing to meet a standard, or to meet with problems.

Adjustments in grazing and rejuvenation of old shrub stands may help to ease this problem.

**Old Cultivation/settlement:** Parts of Paradox Valley were cultivated up into the 1930s, and these have now returned to rangelands, but often weed-dominated. This was thought to contribute to 2,969 acres failing to meet a standard, or to meet with problems.

**Recreation:** Recreational activities including off-road driving and dispersed campsite creation contributed to 333 acres failing to meet a standard or to meet with problems. Hunting season is the primary time that this occurs in the assessment unit.

**Flow Regulation:** McPhee Reservoir has dramatically changed the hydrograph along the Dolores River, and has probably been the main cause that salt cedar now dominates much of the riparian area. Flow regulations were cited as causing 100 acres to fail to meet a standard, or to meet with problems.

## **RECOMMENDATIONS**

### **Standard 1 Soils:**

- 1) Assess identified gullied systems in Paradox Valley, Long Park, and Saucer Basin as to their stage of development and causal factors, and prepare corrective actions.
- 2) Reduce bare ground and increase perennial basal cover in areas circled on maps by using the following tools, in order of effectiveness:
  - 1) Increase herbaceous dominated early and early-mid seral patches in the land unit by using a combination of fire, mechanical, possibly chemical treatments, followed by seeding
  - 2) Preserve existing cryptogamic cover and encourage its development in early-mid, late-mid and late seral areas by reducing trampling, improving road management, and avoiding disturbance treatments where good cryptogamic communities exist
  - 3) Adjust livestock grazing to leave more litter on herbaceous perennial sites where it has been determined that current livestock grazing is a causative factor, through practices like: reduced duration and increased intensity, reduced utilization during dormant seasons, more rest, increased trampling as opposed to trailing, two growing season's rest on treated sites, and short duration grazing rotated with some rest to maintain herbaceous species growing on treated sites
- 3) Complete road inventory for unit to provide data for improving road management
- 4) Prepare map of high risk soils to help identify road and vegetation treatment priority areas using the soil k factor  $>0.2$ , bare soil  $>50\%$ , and slopes  $>4\%$
- 5) Increase perennial basal cover in annual dominated communities (Paradox Valley soil map unit 73)  
by:
  - 1) Information review on restoring cheatgrass dominated areas
  - 2) Data collection/revisit of existing treatment efforts in valley
  - 3) Series of trial plots experimenting with most promising treatments

4) Widespread application of most successful approach

**Standard 2 Riparian:**

- 1) Salt cedar treatments (cut and paint herbicide) working way down from upstream-most infestations in washes, cowpounds and tributaries, and finishing along rivers. Treatment should take place along following streams in descending order of priority: Lasal Creek, San Miguel River, Dry Creek, Gregory Creek, Wild Steer Canyon, and the Dolores River.
- 2) Establish monitoring studies to evaluate grazing impacts along the riparian areas of Lasal Cree, Dry Creek and the Dolores River. Manage livestock grazing to avoid use of or trampling damage to sandbar willow and other native riparian shrubs that can compete with salt cedar.
- 3) Evaluate impacts of road encroachment on Lasal Creek and River Road maintenance activities on riparian vegetation along Dolores and San Miguel Rivers.

**Standard 3 Healthy Native Communities:**

- 1) Improve perennial grass cover, forb cover, and cool season grass cover in circled areas on maps by:
  - 1) Increasing herbaceous dominated early and early-mid seral patches in the land unit by using a combination of fire, mechanical, possibly chemical treatments, followed by seeding with a diverse seed mix of native grass and forb species
  - 2) Converting cheatgrass communities to native grass and forb communities (see below)
  - 3) Trial plots to investigate effectiveness of different cool season and forb interseeding treatments in warm-season grass parks, more widespread application of successful methods to suitable sites in circled areas (deep soil parks)
  - 4) Where it has been determined that livestock grazing is a causative factor, implementing grazing strategies that: minimize grazing on regrowth during active growing stages, incorporate rest, vary timing of use from year to year, allow two growing seasons of rest following treatment and seeding of areas, and that encourage livestock to graze some of the less palatable species (either through herding, increased numbers and reduced time, or through livestock supplements like protein.)
- 2) Convert cheatgrass dominated flats in Paradox Valley (Paradox Valley soil map unit 73) to plant communities where native species dominate by:
  - 1) Information review on restoring cheatgrass dominated areas
  - 2) Data collection/revisit of existing treatment efforts in valley
  - 3) Series of trial plots experimenting with most promising treatments and most successful native species for establishing and competing with cheatgrass
  - 4) Widespread application of most successful approach
  - 5) Develop and implement grazing strategies that will not perpetuate the spread and dominance of cheatgrass based on outcome of an information review on impacts of different grazing seasons in cheatgrass dominated systems
- 3) Complete road and weed inventory for unit to provide data for improving road management and rehabilitating unnecessary roads which are a major corridor for weed spread and detrimental to some wildlife species when the road network is too dense.

- 4) Treat all noxious weed infestations mapped by road inventory and rapid assessment points.
- 5) Reseed all fires, vegetation treatments, or soil disturbing activities in areas where exotic species are present so that exotics will not overtake the disturbed areas.
- 6) Improve shrub vigor in circled areas by treating portions of low vigor shrub stands with a rollerchopper to chop up to 50% of area within a stand. Seed at the same time with native grass/forb/shrub mix.
- 7) Avoid potential management-caused barriers to wildlife movements in Davis Mesa and Saucer Basin like fences, or large mine developments
- 8) Improve the landscape mosaic to be compatible with the Fire Management Plan landscape objectives. Treatments should take place using a combination of fire, mechanical, and potentially chemical methods in the following units in order of priority: 1) units C9, C1 and C11 2) unit C12, and 3) units C13 and D9.
- 9) Adjust grazing to allow for the accumulation of fine fuels in burnable areas in some years in order for cool ground fires to be able to burn more of the landscape and maintain a more desirable mosaic.

#### **Standard 4 Special Status Species:**

The special status species in the assessment area appear to be doing well, and there are no specific problems that beg for a solution at this time. While it would be nice to have additional information on the population trends and species ecology of the rare plants in the area, but there is no indication that any BLM authorized activity is having much effect on these species. No specific recommendations are suggested.

#### **Standard 5 Water Quality:**

- 1) Monitor for Fecal coliform bacteria in Dry Creek, and the Dolores and San Miguel Rivers to ensure concentrations do not exceed 200 colonies/100 ml. Dry Creek has a limit of 2,000 colonies/100ml but drains into and could influence bacteria concentrations in the San Miguel River.
- 2) Improve watershed condition (vegetation cover) in East Paradox, Wild Steer Canyon, portions of both the San Miguel and Dolores River Canyons, and several small ephemeral systems, that drain both Long Park and Sawtooth Ridge.
- 3) Assess identified gullied systems as to their stage of development and causal factors, and prepare corrective actions.

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