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CHAPTER 3

BIOLOGY

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CHAPTER 3
BIOLOGY

310 INTRODUCTION

This chapter presents a description of the biological resources found on the Dugout Canyon permit and adjacent areas. Additional information can be found in the following amendments: Methane Degassification Amendment (August 2003), Refuse Pile Amendment (February 2003), and the Leachfield Addendum A-1 (March 2001). The remainder of the State Lease ML-48435-OBA (SITLA Lease) was incorporated into the Dugout Canyon Mine permit area in 2004.

The data used in preparation of this chapter have been gathered from the Sage Point-Dugout Canyon Mining and Reclamation Plan, Soldier Creek Coal Company Mining and Reclamation Plan, Environmental Research and Technology, Inc., Utah Division of Wildlife Resource (UDWR), Utah State Fish and Game, Eureka Energy Company (Nicolas Temnikov and Christopher A. Slaboszewicz), Soil Survey of Carbon Area, Utah, aerial photography, and Natural Gas Corporation of California.

311 Vegetative, Fish and Wildlife Resources

Vegetative, fish, and wildlife resource conditions in and adjacent to the proposed Dugout Canyon Mine are discussed in Section 320.

312 Potential Impact to Vegetative, Fish and Wildlife Resources

Potential impacts to vegetative, fish, and wildlife resources and the associated mitigation plan are presented in Sections 330 and 340 of this chapter.

313 Description of Reclamation Plan

The reclamation plan used to restore the vegetative, fish and wildlife resources to a condition suitable for the postmining land use is presented in Section 340.

320 ENVIRONMENTAL DESCRIPTION

321 Vegetation Information

This section contains the environmental descriptions of the vegetation for the permit and adjacent areas.

321.100 Plant Communities Within the Proposed Permit Area

Vegetation communities of the permit area were first investigated by Dr. Steven Richardson of Logan, Utah during 1979. These studies encompassed the 22,506 acres of the formerly proposed Sage Point - Dugout Canyon permit area. Dr. Richardson's studies were subsequently upgraded in 1980 by Mr. Steven R. Viert and presented in the Sage Point - Dugout Canyon permit application submitted December 8, 1980 and approved by the Division in May, 1984 (Permit No. ACT/007/009). The vegetation designations used on Plate 3-1 are a combination of their studies, aerial photography, in association with the Soil Survey of Carbon Area, Utah and field verification.

Plate 3-1 has been prepared using the following vegetation designations:

Barren Ground	(B)
Douglas Fir	(DF)
Deciduous Streambank	(DS)
Farmland-Weeds	(FW)
Greasewood-Sagebrush	(GS)
High Shrubs	(HS)
Mixed Conifer	(MC)
Mixed Conifer-Mountain Brush	(MCMB)
Pinyon-Juniper	(PJ)
Ponderosa Pine	(PP)
Quaking Aspen	(QA)
Sagebrush	(S)
Shrub-Grass-Juniper	(SGJ)
Deciduous Stream Bank Vegetation and limited riparian vegetation (Pace and Rock Creek)	(DSR)

As discussed in the report prepared by Mt. Nebo Scientific, the disturbed area contains riparian, rabbitbrush/yellow sweet clover, and Pinyon/Juniper vegetation designations (see Appendix 3-1).

The dominant vegetation communities occurring in the area are somewhere below the climax stage of succession. Historic livestock grazing practices have caused a decline, or disappearance, of many naturally occurring species and their replacement by others (often noxious weeds). Over several years, this effect has altered the composition of the floral communities of the area.

Other impacts to the vegetation communities of the area have resulted from the previous construction of roads. Roads and trails tend to follow drainages and have thereby impacted the riparian, sagebrush, mountain brush, and coniferous communities. Weeds usually dominate the disturbed road banks. Mining facilities constructed prior to the enactment of SMCRA displaced an additional small amount of native vegetation.

Baseline sampling by Dr. Richardson only occurred on five of the ten communities existing within the permit area. These five communities are Douglas Fir, Mixed Conifer, Pinyon-Juniper, Shrub-Grass-Juniper, and Deciduous Streambank. Quantitative descriptions of floral communities presented in this M&RP are based on the former Sage Point-Dugout Canyon permit document. Appendix 3-1 presents data for the vegetation communities discussed in this section. The adequacy of the sampling effort is indicated in Appendix 3-1.

The farmland-weeds vegetation type resulted from abandoned agricultural activities (due to lack of water) and is significant only from the standpoint that mule deer tend to feed on remaining alfalfa during the spring green-up. It should be noted that none of this community occurs within the permit boundary.

Due to multiple consultants/companies gathering vegetation data, the following table has been provided to clarify the plant communities names used by each.

Sampling Organization	Plant Community			
Natural Resources Conservation Service	Riparian	Pinyon-Utah Juniper	Douglas-fir	Disturbed
Richardson/Viert Study	Deciduous Streambank	Pinyon-Juniper	Mixed Conifer and Douglas fir	N/A
Mt. Nebo Scientific Study	Riparian	Pinyon/Juniper	N/A	Rabbitbrush/ yellow sweet clover
Pat Johnston Study	Riparian	Pinyon/Utah Juniper	N/A	N/A

Douglas Fir

The Douglas Fir community occurs on the north facing slopes at upper elevations in deeper productive soils. Floral and structural composition is that of a forest community consisting primarily of Douglas Fir with a few scattered Ponderosa pine, Rocky Mountain juniper, and quaking aspen trees in the overstory.

Ground cover of the overstory in the Douglas Fir community averages 65.0% and productivity of the trees was not determined. This community exhibits an average of 380.5 trees/ac comprised mainly of Douglas Fir (68.8% of all trees), Ponderosa pine (26.1%), and pinyon pine (4.1%). Examination of average basal diameters of the trees indicates a late-successional and mature community.

Ground cover of the understory is dominated by shrubs (18.4% cover), especially serviceberry, big sagebrush, snowberry, and creeping barberry with 4.2, 3.8, 3.8, and 2.5% cover, respectively. Grasses exhibit a sparse 0.8% cover while forbs only average 1.6% cover. Productivity of this understory totals 35.8 g/m^2 or approximately 320 lb/ac. Shrubs contribute 26.2 g/m^2 while grasses and forbs contribute 2.7 g/m^2 and 6.4 g/m^2, respectively. Creeping barberry, mountain mahogany, big sagebrush, and snowberry shrubs dominate with 7.7, 5.0, 4.9, and 4.9 g/m^2, respectively. The adequacy of the sampling effort is indicated in Appendix 3-1.

Mixed Conifer

The mixed conifer vegetation type is an ecotonal community which occurs on the slopes of mid-elevational canyons that cut into the Book Cliffs. Floral and structural composition is that of a forest community consisting primarily of coniferous tree species in the overstory. These overstory tree species include Douglas Fir, Rocky Mountain maple, pinyon pine, and Utah juniper.

Ground cover of the overstory in the mixed conifer community averages 24.5% with Douglas Fir, Rocky Mountain juniper, and Rocky Mountain maple trees dominating with 10.0, 5.0 and 3.5% cover, respectively. Productivity of the trees was not determined; however, the community exhibits a density of 223.7 trees/ac. Examination of average basal diameters of the trees indicates a mid- to late-successional community with young Douglas Fir trees.

Ground cover of the understory is dominated by shrubs (11.5% cover), especially snowberry and big sagebrush with 4.5 and 3.5% cover, respectively. Grasses contribute another 4.5% cover, especially western wheatgrass (3.0% cover), while forbs exhibit only 2.5% cover. Productivity of this understory totals 38.5 g/m^2 or approximately 345 lbs/ac. Of this total, shrubs contribute 20.2 g/m^2, grasses 4.9 g/m^2, and forbs 13.1 g/m^2 with big sagebrush, Louisiana sagewort, and mountain mahogany dominating (7.7, 5.9, and 3.3 g/m^2, respectively).

Pinyon - Juniper

The pinyon - juniper community is primarily an open woodland of mature pinyon pine and Utah juniper with very sparse understory vegetation. The community occurs mainly on mesa tops and broad alluvial deposits at the foot of the Book Cliffs, as well as on the more southern exposed slopes of the lower canyons. Pinyon - juniper is one of the most important vegetation communities for mule deer during the winter.

Ground cover of the overstory in the pinyon - juniper community averages 20.0% and productivity of the trees was not determined. This community exhibits an average of 291.1 trees/ac comprised

entirely of pinyon pine (43.0% of the trees) and Utah juniper (57.0%). Examination of average basal diameters of the trees indicates a near climax mature community.

Ground cover of the sparse understory is dominated by shrubs (5.2% cover), especially by mountain mahogany with 2.5% cover. Cover by grasses was non-existent in the sampled areas and forbs only averaged 3.4% cover with euphorbia (spurge family) the dominant forb with 2.2% of the cover. The productivity of this understory is very light with only 3.3 g/m^2 (30 lbs/ac) of total annual production. Black sagebrush, mountain mahogany, and buckwheat were the dominant plants with 0.7, 0.5, and 0.5 g/m^2, respectively.

The Pinyon-Utah Juniper community within the disturbed area boundary was surveyed during the Fall of 1997 by Patricia Johnston (see Appendix 3-1). During the survey the cover was 65.94%, with the woody species stems per acre being 2,334.4. George Cook of the Natural Resources Conservation Service (NRCS) surveyed the site to determine pre-mining productivity as defined in Item 4, Section IV, Productivity Measurements, UDOGM Vegetation Guidelines, Appendix A, February 1992. Productivity is discussed in Section 321.200.

Deciduous Streambank

The deciduous streambank community occurs only in a narrow band (usually less than 50 ft wide) along portions of Dugout Creek and other narrow valley bottoms with at least intermittent stream flows. This community differs from adjacent vegetation on canyon slopes (usually mixed conifer, Douglas fir, sagebrush, or mountain brush) in that deciduous trees and shrubs are more common on banks of stream channels. Floral and structural composition is that of a forest community consisting primarily of narrowleaf cottonwood, Rocky Mountain maple, and Douglas Fir trees in the overstory.

Total ground cover of the community averages 63.4% with 38.2, 14.6, 2.4, and 0.4% of the cover due to trees, shrubs, grasses, and forbs, respectively. Dominant trees in the overstory include Rocky Mountain maple, narrowleaf cottonwood, Douglas Fir, and water birch with 12.0, 11.3, 6.0,

and 5.3% cover, respectively. Productivity of the overstory was not determined. However, the community exhibits an average of 216.1 trees/ac. Examination of average diameters of the trees indicates a mid- to late-successional community with only fair reproduction of the overstory species.

Ground cover of the understory is dominated by shrubs (14.6% cover), especially elderberry, snowberry and Wood's rose with 3.0, 3.0 and 2.7% cover, respectively. Cover by grasses (2.4%) and to a certain degree, forbs (8.2%), is subdued because of past grazing pressure by livestock, but is still a viable component of the community. Productivity is known only for the community as a whole (102.5 g/m^2 or 912 lbs/ac), and despite past grazing pressures, it is still the most productive community in the area.

In Pace Creek and Rock Creek Canyons, heavy grazing and erosion has resulted in sections of the stream banks having little or no deciduous and/or riparian vegetation. The vegetation within these drainages has been identified on Plate 3-1 with the symbol DSR.

Riparian (1997)

During 1997 a study was performed on the riparian community of Dugout Creek by Patricia Johnston. The study covered approximately 2,100 feet of the creek channel. The study included the gathering of data on cover (84.83%) and woody species density (1,624.6 stems per acre) within the disturbed area boundary. George Cook of the Natural Resources Conservation Service surveyed the site to determine productivity and condition (see Section 321.200). Reports from Patricia Johnston and George Cook are included in Appendix 3-1.

The majority of the riparian vegetation and soils within the study area were disturbed during an earlier mining operation with debris evident along much of the length of Dugout Creek. As was common during early mining, the channel was most likely realigned as additional space for facilities was needed.

Shrub - Grass - Juniper

The shrub - grass - juniper vegetation type is another ecotonal community found between the greasewood - sagebrush and pinyon - juniper communities primarily on south and east facing steep rocky slopes along the base of the Book Cliffs. It can occasionally be found on upland benches

and flats. This community exhibits a greater abundance of perennial grasses than any other vegetation type found within the area.

The shrub - grass - juniper community exhibits a sparse overstory of pinyon and juniper trees (2.9% ground cover) which at maturity do not obtain the size of the trees in the pinyon - juniper community. Density of these trees only averages 57.3 trees/ac, and productivity of this sparse overstory was not measured.

The understory of this community is dominated by grasses with 9.3% ground cover, while shrubs exhibit 6.4% cover and forbs exhibit a sparse 0.4% cover. Dominant species include creeping wildrye, galleta grass, and black sagebrush with 5.4, 3.2 and 4.6% cover, respectively. Productivity of this understory totals 59.3 g/m^2 or 528 lbs/ac with contributions by grasses, shrubs, and forbs of 40.9, 17.1, and 1.2 g/m^2, respectively. Dominant plants are the same as indicated for ground cover.

Ponderosa Pine

Quantitative information for the Ponderosa pine community does not exist as it is too limited in areal extent and it has not been, nor will it be, disturbed by mine facilities. The community is present in the high canyons of the Book Cliffs usually in association with Douglas Fir and mixed conifer vegetation types. Ponderosa pine is the predominant species present; however, Douglas Fir, pinyon pine, and Utah juniper occur with less frequency. A thin growth of mountain shrubs as well as grasses and forbs similar to the mixed conifer community is present in the understory.

Quaking Aspen

Quantitative information about the aspen community was not collected due to its limited areal extent within the upland benches of the Book Cliffs; and because it has not been, nor will it be, disturbed by the mining operation. Quaking aspen is the dominant species in the overstory with

an occasional Rocky Mountain maple or Gambel's oak being present. The understory is often park like, dominated by grasses and forbs with only a few shrubs present (mainly snowberry).

Sagebrush

The sagebrush community occurs on the dip slope between 7,200 and 9,000 feet in elevation. Quantitative information was not collected for this community as no mining disturbance has occurred in the past nor is expected to occur in the future. This community often intergrades with other communities, making delineation difficult in certain instances. However, big sagebrush (usually the subspecies mountain big sagebrush) is the dominant species in the community, existing in characteristically dense stands. Common species existing in the understory include lupines, wheatgrasses, bluegrasses, and scarlet gilia.

In 1996, the mean total living cover for the mine's disturbed area (Plate 3-1B) and reference area were 36.90% and 47.50% respectively (Mt. Nebo Scientific, August 1, 1996). The area surveyed by Mt. Nebo was disturbed in a previous mining operation, with no indication that reseeding was completed when mining ceased. NRCS range site descriptions/conditions indicate that the area (surveyed by Mt. Nebo) prior to disturbance was most likely Pinyon/Utah juniper - upland very steep shallow loam.

Refer to Appendix 3-1 for the 1996 Mt. Nebo report discussing the vegetation sampling done at the Dugout Canyon Mine site within the proposed disturbed area. The Mt. Nebo report discusses the vegetation cover, composition, density, reference area, and includes photographs of the transects and reference area.

321.200 Land Productivity Prior to Mining

The land productivity of the area to be disturbed by mining was not measured in 1925 when mining first disturbed the area. Appendix 3-1 contains additional data pertaining to vegetation.

George S. Cook of the NRCS surveyed the condition and production of the range site areas within the disturbed area boundary in 1997, his findings were as follows:

PJ Sage	Condition - Good	Production - 800	Potential Production - 800
Riparian	Condition - Fair	Production - 1500	Potential Production - 2200

The production is based on air dry weight of total herbage produced per acre. Patricia Johnston accompanied Mr. Cook. See Appendix 3-1 for a copy of the December 3, 1997 letter from Mr. Cook.

322 Fish and Wildlife Information

A summary of the fish and wildlife resource information for the permit and adjacent areas is contained in Sections 322.100 through 322.300. The data pertaining to wildlife in the following sections were collected by the UDWR (J. S. Burruss, L. B. Dalton, Larry J. Wilson, Ben Morris, Bill Bates), Eureka Energy Company personnel, and Environmental Research and Technology, Inc.

322.100 Level of Detail

The scope and level of detail within this M&RP are sufficient to design the protection and enhancement plan for wildlife and fish in the area.

This assessment of wildlife resources has been compiled pursuant to guidelines issued by the Division.

322.200 Site-specific Resource Information

Eight permanent experimental and four permanent control wildlife transects were established in the permit and adjacent areas by UDWR in December 1979. Appendix 3-2 contains a figure showing the transect locations. The transects were located within pinyon-juniper, desert shrub, and mixed

conifer vegetation communities; and used to monitor wildlife habitats. The wildlife habitats included in the study were small mammals, medium-sized mammals, large mammals, raptors, game birds, song birds, reptiles, and amphibians. The four permanent control transects were located in areas not proposed for disturbance by mining operations. Appendix 3-2 contains the information pertaining to the transect studies.

Macroinvertebrates and Fish

Due to the variable nature of the stream flows in the project area and the limited number of species of macroinvertebrates identified by the UDWR and the Division, further study of aquatic macroinvertebrates was not pursued.

The low importance of the streams, as a fishery resource, has categorized them as being of little value for extensive aquatic study. Therefore, detailed aquatic studies were not performed in accordance with permission from the Division in 1979 (see letter from Mary Ann Wright, Appendix 3-3).

Small Mammals

Small mammals represent a significant part of the ecosystem. The majority are herbivores and are the primary source of food for higher trophic levels, particularly raptorial birds, canids, and felids. Small mammals, including shrews, mice, voles, chipmunks, and ground squirrels were sampled with live traplines within each transect. Relative abundance was determined for each species by transect, but not by habitat type, within the individual transects. Data concerning bats were not collected during this study, however a bat survey of the riparian and disturbed area was performed in 1997 by Mark Perkins and included in Appendix 3-3.

Medium Mammals

The transect study did not attempt to make density estimates due to the extreme ecological variability of these mammals. The study did identify species and frequency of habitat use in the area.

Limited portions of Dugout Canyon provide habitats for weasels, badgers, and skunks. Even though the breeding and rearing activities of these non-migratory species and their dens and burrow systems are important to maintenance of their populations, the area to be disturbed is small and the species are widespread and adapt easily to the activities of man.

Large Mammals

Habitat use by all large mammals, other then mule deer, was determined in a quantitative manner. Plate 3-2 (confidential) exhibits the significant habitat for mule deer and elk in the area. Habitat use in the proximity of the permit area was determined by pellet group count and observation of track frequency. Pellet counts were made in late spring, following movement to summer range. Track counts were made once each month in January through May on all transects.

The area to be disturbed parallels a water source and therefore is important to all wildlife species. The fact that elk and deer utilize some portion of the permit area during the year means that all activities must be considered.

Mule deer on the mine area are considered by the UDWR to be part of Herd Unit 32 and the elk as part of Herd Unit 24. The deer utilize the entire permit area but seasonally concentrate in and utilize specific habitat types. During the summer the mule deer generally utilize all of the habitats near water. The most heavily used communities are the sage, mountain brush-mixed conifer, and the composite of aspen, mountain mahogany, manzanita, and pine/fir. There is normally more browse in these communities than in the others.

With the onset of fall and winter, the mule deer latitudinally migrate. Initially (late fall and early winter) they concentrate on the plateau area where they intermingle with the elk; but when the snow gets too deep for them to traverse they move into the low elevation sage and pinyon-juniper areas. The wintering areas for mule deer make them susceptible to road strikes in the vicinity of the proposed haul and access road for the Dugout Canyon Mine. The access roads to Pace and

Rock Canyon crosses area used by deer as winter range, however traffic is sporadic during the winter months and heavier during the summer and fall months.

Raptors

Golden eagles are a common year long resident of the area, with suitable nesting habitat spread throughout the permit area. The cooper's hawk is known to nest in the permit area.

A variety of falcons are year long residents of the area, utilizing cliffs for their nests. To date there are no known aerie sites for falcons within or immediately adjacent to the disturbed area.

Raptors were studied during the 1979 - 1980 UDWR transect study, in 1981 by Janet Lee Young and by Hayden-Wing Associates in 1984. These reports are provided in Appendix 3-3.

Raptor nest surveys were done by the UDWR in 1995, 1997, 1998, and 1999. The nest locations identified in 1997 and 1998 are shown on Plate 3-2 in the mine's UDOGM confidential folder (confidentiality required by UDWR). All nests located in the 1997 survey were cliff nests (Ben Morris, UDWR, January 20, 1998). All nests located in the 1998 and 1999 surveys were cliff nests.

Migratory and Song Birds

Birds were studied during the 1979 - 1980 UDWR transect study. However, a more extensive study was done by Hayden-Wing Associates in 1984. Their report can be found in Appendix 3-3.

Reptiles and Amphibians

Increasing elevation rapidly reduces the number and kind of reptiles and amphibians. Furthermore, in Utah the effects of the more northern latitude reduces the number of herptiles in much the same way as does the increase in elevation.

These geographical and associated climatic factors have eliminated most desert species, leaving species that are adapted either to mountain habitats or montane type habitats. Based on extensive literature review and limited field work, it was determined that potentially 8 species of amphibians and 18 species of reptiles inhabit the area. Of these species only 5 were recorded by the UDWR in 1980: Eastern fence lizard, Sagebrush lizard, Tree lizard, Short-horned lizard, and the Gopher

snake. A WESTECH biologist observed two other species in 1979, the Western whiptail and the Midget faded rattlesnake. All amphibians and reptiles are legally protected, but since the species listed are all widespread throughout the mountains of Utah, none are treated as high-interest species. It is doubtful that the proposed action would seriously impact populations, but localized individuals may be involved in habitat destruction due to subsidence. An exception to this would be if subsidence caused drying of present wet habitats essential to reproduction. Refer to Section 332 for a discussion of "Possible Short-Term and Long Term Impacts to Species Dependent on Springs, Creeks and Drainages".

Threatened and Endangered Plant and Wildlife Species. Passage of the Endangered Species Act of 1973 (Public Law 23-20S) provided the legal basis for establishment of lists of endangered and threatened plant and wildlife species (Appendix 3-3).

Although three species (black-footed ferret, bald eagle, and peregrine falcon) on the list could potentially inhabit the area, an inventory of endangered wildlife species performed in 1979 by the UDWR recorded no threatened and endangered species within the proposed permit area. No confirmed sightings of black-footed ferrets have occurred within Carbon County during 1995, 1996, and the first quarter of 1997, however bald eagles have been seen flying in the vicinity of the mine (Bill Bates, UDWR).

A literature review and field studies for both the Soldier Canyon and the Sage Point - Dugout Canyon permit documents were performed to assess the possible presence of any threatened, endangered, or sensitive plant and wildlife species in the respective permit and adjacent areas.

These study areas included the proposed Dugout Canyon disturbed area. The literature review indicated that no species listed (or proposed as candidates) by the U.S. Fish and Wildlife Service (FWS) as threatened or endangered were likely to inhabit the area. In addition, the field investigations which occurred in 1979, 1980, 1983, and 1984 did not identify or locate any threatened or endangered species. No threatened or endangered plant species including Canyon sweetvetch were found within the disturbed area by Robert Thompson during his 1995 survey (see Robert Thompson letter, Appendix 3-1). Mr. Thompson is qualified and has performed threatened and endangered surveys for the U.S. Forest Service.

As reported in the 1997 bat survey "we noted no suitable habitat, did not record via detectors or capture, or note by indicators presence of *Corynorhinus townsendii*. It is our opinion the bat does

not occur in the immediate vicinity of the proposed disturbance area. We also did not note suitable habitat for or encounter *Euderma maculatum* by mist net, via detectors or during audible bat transects".

Windy Gap Process as it Applies to Existing Coal Mines in the Upper Colorado River Basin

Per meetings with Division of Water Quality personnel during application for a UPDES permit in 2004, "there is no data supporting the premise that surface waters associated with the area of the mine operations reached the Price River or Colorado River prior to or since mining disturbance".

Mining Consumption:

Culinary Water is purchased from PRWID and hauled by D & D Trucking to the Mine.

Estimated **Purchased** Gallons/yr: 1,003,200

Ventilation Consumption/Evaporation:

29,354 gallons/day (3/05/04 ventilation survey)

44,000 gallons/day (9/13/04 ventilation survey)

73,354 X 0.5 = 36,677 gallons/day (survey average)

36,677 x 365 = 13,387,105 gallons/yr

Coal Producing Consumption/Coal Moisture Loss:

Water added to coal produced -		4.03% inherent moisture - source Dugout Geologist
		5.80% run-of-mine moisture - year to date average
		1.77% moisture added to coal by cutting operation
Projected Tonnage 2004		4,245,737 tons
Projected Tonnage 6 year average		4,369,084 tons
Tons water/yr	77,333	
Pounds water/yr	154,665,562	
Gallons water/yr	18,522,822	

Sediment Pond Evaporation:

Mine Site Pond	0.107 acres (surface area)
	18.1 in/yr (high estimate based on HCI Technical Memo, August 22, 2002)
	0.16 ac/ft
	7030 gallons/yr
Refuse Pile Pond	0.41 acres (surface area)
	9 in/yr
	0.31 ac/ft
	5612 gallons/yr (five month period, high estimate)

Spring and Seeps Effects From Subsidence - Not Applicable

Alluvial Aquifer Abstractions into Mines - Not Applicable
Alluvial Well Pumpage - Not Applicable
Deep Aquifer Pumpage - Not Applicable
Postmining Inflow to Workings - Not Applicable
Direct Diversions: - Not Applicable
Dust Suppression - 3,500 gallons per truck load, 3 loads per day, for 30 days = 315,000 gallons plus 3,000 per truck load, 1.25 loads per day, for 45 days = 168,750. Total: 483,750 gallons per year.
Mine Discharge: 6 Month Average 362,118 gpd = 132,172,948 gal/yr

Calculation estimates for water use in 2004 were necessary since we are using 2004 purchases and usage and the year is 2 months short.

Habitats of Unusually High Value. High value habitats in Dugout Canyon include the riparian area and the cliff escarpments. Major portions of established habitat will not be disturbed, but the restricted access by wildlife to the water source within the area of disturbance could displace wildlife. The cliff areas adjacent to the disturbed area could harbor mountain lion, bobcat and bear; and with increased activity and noise they may avoid the area. Elk and deer who may frequent Dugout Canyon will likely avoid the area during the heaviest of activity, but resume their normal patterns once they become accustomed to it.

In a letter dated April 22, 1996 to James W. Carter the director of UDOGM, Robert G. Valentine director of the UDWR makes the following comment "much of the area is classified as critical deer winter range and is heavily used by deer and occasionally by elk and antelope". Use classification drawings of the Dugout Canyon area for large mammals (deer, elk, antelope, etc.) were requested from the UDWR in January of 1996 by SCM. The cover letter dated January 30, 1996 from the UDWR and the drawings are included in Appendix 3-3 for interpretation by UDOGM. SCM has interpreted and transferred the information (provided by UDWR) to Plate 3-2. The use classifications were extended on Plate 3-2 with the incorporation of Federal Lease U-07064-027821.

A survey for bats was performed by Mark Perkins in September of 1997. A report of this survey is included in Appendix 3-3 with a figure showing the bat survey locations. Future surveys for bats will be done concurrent with raptor surveys within the permit boundary prior to cliff disturbing planned subsidence. Pertinent data gathered in these surveys will be included in this M&RP.

No data or definition was available to determine the criteria for an area to be classified as of "unusually high value" for bats. However, since extensive rock faces, cliffs, and escarpments are

present throughout the Book Cliffs Region, the land within the permit boundary is not unusual or unique to the area. The Castlegate Sandstone, Blackhawk, and Price River are the cliff forming formations present in the Dugout Canyon area. Refer to Chapter 6 for descriptions of these formations and Plate 3-3 for their locations.

In the Perkins-Dugout Mine Bat Survey the following statement was made "development plans for the proposed disturbance area contains some mitigation for resident bat species. A proposed runoff pond will likely provide accessible year round water and an associated bio-mass. Presently Dugout Creek is not classified as a perennial stream. In addition, plans include several outdoor flood lights which may act as an attractant for phototropic insects and provide a concentrated and stable food resource for local bat populations. Due to no cliff subsidence and mitigating actions noted above, it is our opinion that excepting the disturbance to and removal of 2,000 ft. of riparian zone, impact (either positive or negative) on local bat populations is minimal".

Raptor and Bat Survey

Raptor nest surveys will be conducted annually in the Spring prior to mining activities or potential subsidence within the permit area and in proposed expansion areas to the permit to obtain base line data. In addition, raptor nest locations will be monitored/surveyed the year following the first monitoring/survey if nests were observed during the survey and if operations result in subsidence. The permittee will contact the Division prior to any raptor nest protection efforts.

A bat survey for Utah sensitive bat species is planned for 2005 (May thru September), this survey will cover the cliff areas adjacent to a proposed fan breakout in Pace Canyon. Baseline bat surveys of Utah sensitive bat species will be conducted between May and September in riparian habitat expected to be impacted by subsidence. In addition, Utah sensitive bat species will be monitored/surveyed the year following the first monitoring/survey if Utah sensitive bat species were observed during the survey and if mining operations result in subsidence impact to the riparian habitat.

Since water and its corresponding vegetation are important throughout the state of Utah, regulatory agencies have been requiring mitigation for disturbance and eventual replacement from the coal industry. SCM will comply with the requirements of mitigation and eventual replacement of the

resources which may be lost or disturbed during this mining operation, refer to Sections 331, 340, 350, and 762.100.

As a mitigation effort SCM replanted 7,500 feet of disturbed riparian streambank above the northern disturbed area boundary with a modified version of Seed Mix No. 1 (mitigation seed mix), to assist in restoring vegetation which has been disturbed by the logging industry.

Mitigation Seed Mix (Hydroseed/Broadcast Quantities)

SPECIES	# pls/acre
Bluebunch wheatgrass	5.0
Intermediate wheatgrass	5.0
Slender wheatgrass	5.0
Smooth brome	5.0
Indian ricegrass	3.0
Blueleaf aster	1.0
Blue flax	1.5
Northern sweetvetch	1.5
Mountain big sagebrush	1.0
TOTAL	28.0

Willows were transplanted along the edges of the stream channel above the mine site disturbed area, with the mitigation seed mix being planted from the east edge of the stream channel to the outside edge of the logging road cut. The area between the edge of the stream channel and road cut varies from 10 to 45 feet as it travels the 7,500 feet planned for replanting. The west side of the channel was not disturbed by logging. For clarification the stream channel changes to the west side of the road upstream from the disturbed area boundary.

Due to the steepness and roughness of the slope the area was hydroseeded. The mitigation seed mix (listed above) was sprayed using hydroseeding equipment over the mitigation area. A second pass of the hydroseeding equipment sprayed the mulch/tackifier on top of the previously sprayed seed mix. Two thousand pounds per acre of the Division approved (Appendix 3-1) wood fiber mulch (Ecofiber, trade name) were used on the mitigation area. The seeding and planting was completed during 1998.

Additional mitigation for disturbance is being done to comply with the requirements of the UDWR. The mitigation included the cutting of grown pinyon and juniper trees to improve the growth of the understory adjacent to the Nine Mile Canyon Road. These mitigation efforts are being coordinated directly with the UDWR.

SCM will plant approximately 4,000 willows including both the mitigation described previously and during final reclamation. A portion of the willows were planted during the spring of 1998 to satisfy the mitigation commitment. Willows were planted wherever the channel afforded sufficient space. The channel above the mine site is covered with rock slides in several stretches of approximately 100 feet each. Additional willows will be planted to complete the commitment, however the numbers being planted may decrease since it was discovered during the Spring planting that the channel affords a limited environment for willows. CFC has discussed this matter with Paul Baker of UDOGM and a commitment made by CFC to continue to keep UDOGM involved in the mitigation process. Paul Baker was contacted in 2001 concerning the progression of the willows planted, photographs were taken and forwarded to Mr. Baker for his review. Survival rate for the willows planted was estimated at 75%.

During a site visit in December of 1997, Bill Bates of the UDWR requested that the riparian mitigation include the installation of habitat/stability enhancement structures within Dugout Creek upstream from the proposed disturbed area. SCM commits to the installation of structures similar to those identified in Figure 7-12 should all regulatory agencies and SCM be in agreement. The location and type of structure will be correlated with UDWR, U.S. Fish and Wildlife Service, and the Division.

322.300 Fish and Wildlife Service Review

If requested, SCM authorizes the release of information pertaining to Section 322 and 333 to the U.S. Fish and Wildlife Service Regional and Field office for their review.

323 Maps and Aerial Photographs

The permit area was mapped by use of a mosaic of aerial photographs and assured by ground inspection in some areas. Maps are contained within the reports provided in Appendices 3-1, 3-2 and 3-3.

During a meeting with the UDWR on January 20, 1998 Ben Morris requested that "the nest locations and related data gathered in the 1997 raptor survey of the Dugout Canyon Mine area be kept confidential". Therefore this survey will not be discussed or presented in this permit document, but can be reviewed by Division personnel within the Dugout Canyon Mine "confidential binder". The confidential binder contains Plate 3-2 which shows the location of nests found during the raptor surveys conducted by UDWR. In a Technical Analysis (Task ID #1915) for the inclusion of the SITLA Lease into the permitted area, instructions were given by UDOGM personnel to remove this information from the confidential folder and include it in the M&RP. This information is currently contained in Appendix 3-3.

Vegetation drawings and appendices within the permit area not included in the M&RP are included in the following amendments:

<u>Refuse Pile Amendment</u>

RA Figure 3-1 Surrounding Representative Vegetation Communities
RA Figure 3-2 Vegetation at Site Prior to Mining Disturbance
RA Attachment 3-1 Vegetation Data

<u>Methane Degassification Amendment</u>

Figure 3-1 Vegetation Reference Areas
Figure 3-2 Adjacent Vegetation
Attachment 3-1 Vegetation Inventory

323.100 Location and Boundary of Proposed Reference Area

SCM will use range sites as described and designated by the NRCS Range Handbook and the UDOGM Vegetation Guidelines. Further description can be found in Section 356.100.

Mt. Nebo Scientific did sample a reference area during its 1996 vegetation survey, however SCM does not currently plan to use this data. Reference area(s) are not designated on any plate or figure within this M&RP, except as noted in Section 323.

323.200 Elevations and Locations of Monitoring Stations

Raptor nest locations and elk and deer range are shown on Plate 3-2. The permit area contains no fish monitoring stations.

323.300 Facilities for Protection and Enhancement

Sections 333.300 and 358.500 contain additional discussion pertaining to protective measures to be taken by SCM in behalf of wildlife.

323.400 Vegetation Type and Plant Communities

Vegetative types and plant communities are outlined on Plate 3-1 and 3-1A of this application.

Vegetation types and plant communities on Plate 3-1 were interpreted directly from aerial photographs except for selected areas. The inclusion of small vegetation units was limited and included the exclusion of small, long or narrow units of vegetation within other units. Vegetation depicted on Plate 3-1A represents vegetation ground surveyed and identified in the field.

330 OPERATION PLAN

331 Measures Taken to Disturb the Smallest Practicable Area

No vegetative disturbance is anticipated beyond that encountered during construction of the surface facilities. The area to be disturbed by operational facilities will be kept to a minimum. Only facilities required to maintain the coal operation or satisfy environmental or safety requirements will be built.

Disturbed areas will be seeded with a mixture which will meet the requirements necessary to stabilize and provide cover; and with sufficient production and diversity characteristic to satisfy regulatory requirements.

Sections 341 describes the seed mixes to be used in both interim and final reclamation of the disturbed areas. For both the interim and final reclamation mixes, the vegetation data were evaluated to determine seed mixture constituents in light of production, cover, and diversity requirements. The soils report was reviewed to select species adapted to the soil's physical and chemical condition. Plant species were selected on the basis of wildlife needs and requirements. In addition, the operations plan was reviewed to determine the need for species with quick establishment, rapid spreading, and high erosion control potentials.

332 Description of Anticipated Impacts of Subsidence

Subsidence and its anticipated impacts are discussed in Sections 333 and 525 of this M&RP.

The potential effects of subsidence on nests could be one or several of the following:

- Displacement and relocation of nesting raptor(s)/birds,
- Injury to or death of nest inhabitants,
- Nest destruction.

Subterranean changes caused by subsidence to wildlife habitat is not currently understood. Subsidence could disrupt burrow systems destroying the home and habitat of burrowing mammals, reptiles, and amphibians and possibly cause death to some species in the immediate area. Since subsidence occurs systematically and in small areas at a given time, only localized populations will be impacted and only for a short period of time. Reproductive potential coupled with dispersal will facilitate recovery and negate the temporary population reduction.

Possible Short-Term and Long Term Impacts to Species Dependent on Springs, Creeks and Drainages

Impact to species dependent on springs, creeks and drainages could include disturbance of shelter, food, increased evaporation, rise and/or decrease in water temperature, water flow, and bank stability. Most species of wildlife are highly adaptable, while others with limited mobility are not. These species (mollusk (Physella virgata) and tiger salamander, mentioned in the TA on Task ID #1915) have likely been impacted by the drought conditions in Utah since 1999. These species have either died or have moved to locations where water and habitat are more abundant. If they have moved, then should their habitat change again, they will likely move to a more suitable area. (Joseph M. Kiesecker - Dept. Of Biology, Pennsylvania State University; Andrew R. Blaustein and Lisa K. Belden - Dept. of Zoology, Oregon State University; Global Amphibian Assessment, AmphibiaWeb (http://elib.cs.berkeley.edu; Alex Kirby, BBC News Online "Global amphibians in deep trouble" October 14, 2004; U.S. Water News Online, "Georgia drought harming wetland species" January 2002; UPI Science News, "Wildlife suffering from record drought" 8/30/02), Subsidence could in the future impact these species, however to the best of the permittee's knowledge neither the listed species or other species dependent on springs, creeks and drainages have been identified as being impacted by subsidence within the permitted area. In addition, there has been no impact identified to springs, creeks or drainages within the Dugout Mine permitted area.

It is anticipated that streams within the permit area will not be significantly impacted as discussed in Chapter 5, Section 525.100. Interruptions of flow within perennial, intermittant, and ephemeral streams is not anticipated. Therefore, flows sustaining riparian and stream bank vegetation should continue during and after subsidence. Refer to Section 731.200 for a proposed monitoring and mitigation plan.

333 Plan to Minimize Disturbances and Adverse Impacts

General control and mitigation measures addressing potential operational related biological impacts will include the following:

- Minimizing the total area of disturbance,
- Design, construction, and operation of facilities to minimize biological impacts including barriers to wildlife movements,
- Design and installation of electrical equipment to minimize electrocution hazards,
- Establishment of stream buffer zones,
- Control and monitoring of surface discharges and water quality,
- Exclusion of wildlife from potentially hazardous areas, and
- Reclamation of disturbed areas when they are no longer needed.

The raptor survey by the UDWR in 1997 lists the three nests within Section 16, T13S, R12E, as being two inactive hawk nests and an old dilapidated golden eagle nest. The dilapidated nest and an inactive hawk nest are located over a area planned for mining during 2001 to 2005 (comparison of Plates 3-2 and 5-7). The second inactive hawk nest is within the area of potential subsidence but not over mining. Since the condition of these nests may change by the time mining reaches their location a plan for their protection or taking will not be determined at this time.

The nests in Section 16 will be monitored in the annual raptor survey. Nine months or the summer prior to the period of potential subsidence a determination by SCM, UDWR (Fish and Wildlife) and UDOGM will be made as to the method(s) to be used for the protection of the nest(s).

Section 22, T13S, R12E contains a raven nest and an active golden eagle nest. Bill Bates and Ben Morris concurred that "the raven nest in Section 22 was not of particular concern, but that the golden eagle nest should be monitored." See Sections 322.200, 333.300 and 358.100 for the raptor monitoring commitments. The golden eagle nest is located over a area planned for

mining during 2000 to 2001 (comparison of Plates 3-2 and 5-7). This nest will most likely continue to be active. The plan to protect the nesting birds will include a survey of the nest location the year prior to second mining to determine activity. In addition, the potential for laying, incubation or existence of young will be evaluated. The spring prior to the period of potential subsidence a determination by SCM, UDWR (Fish and Wildlife) and UDOGM will be made as to the method(s) to be used for the protection of the nest(s) (see Section 333.300).

Only one of the old dilapidated golden eagle nests surveyed in Section 23 during 1997 was surveyed during the 1998 raptor survey. The UDWR in Price and Salt Lake and the Fish and Wildlife Service both in Salt Lake and Denver have been contacted to determine the need for a "take permit" for this nest.

According to a comparison of the raptor surveys performed in 1995 and 1997, the nest inhabitants, conditions and existence may change. Therefore each nest should be evaluated separately and not as a collective. Methods of protection will be determined on a case by case basis using the "best technology available".

The raptor nests located in the survey taken in 1998 are plotted on Plate 3-2 .

333.100 Minimized Disturbance to Endangered or Threatened Species

SCM will apply all methods necessary to minimize disturbances or any adverse effects to endangered and threatened species listed on the tables in Appendix 3-3.

333.200 Species and Habitats

All species and habitats within the permit area will be protected to the best of SCM ability. Wildlife habitat protection will be considered in the construction of facilities. For additional information, see Section 333.300.

333.300 Protective Measures

Upon notification or suspicion of raptor nests within the permit boundary cliff escarpment subsidence zone the following inventory will be taken to determine the potential actions to be taken by SCM.

- Verify the existence of a nest or nests,
- Verify occupation by birds/raptors, eggs or young,
- Determine the condition of nest or nests,
- Location of nest in relationship to recoverable resource (creation of table with nest location number and planned year for undermining).

The information collected in the inventory will be discussed with various agency personnel (i.e., UDOGM, USFWS, DWR, etc.). SCM and the various agencies will determine:

- a method of avoidance when possible,
- determine seasons/months for nests to be covered/uncovered,
- explore alternative methods of protection or removal, and
- develop a mitigation plan when needed.

The method(s) to be used will be determined prior to the period of potential subsidence.

SCM does not currently know the exact locations or thicknesses of recoverable resource, therefore to determine the potential loss of revenues is premature in relation to the avoidance of a raptor nest or nests. Each nest(s) and its corresponding occupant(s) and circumstances will be evaluated by a qualified person nine months or the summer prior to the period of potential subsidence. A determination by SCM, UDWR (Fish and Wildlife) and UDOGM will be made as to the method(s) to be used for the protection/avoidance/removal of the nest(s) (refer above to inventory listing in this section).

SCM commits to include wildlife awareness and protection training in it's annual training curriculum for employees and request the haulage contractors to provide the same training for it's employees.

Wildlife accustom to their current sources of food may be endangered with a change or enhancement of plant species. The improvement or addition of water developments can act to concentrate wildlife in a specific area, thus causing compaction to soils and over grazing of vegetation in an area. Areas which may be fenced to exclude livestock from an area, may also exclude wildlife, thus causing increased competition for food and territory in another area. Since SCM is unaware of the possible advantages or disadvantages to change in an area of habitat, we commit to use the best technology currently available to handle specific concerns, and which will benefit the greatest range of wildlife. Should the enhancement of habitat outside the disturbed area become necessary to attract wildlife away from the mining facilities, efforts will be coordinated with the UDWR.

Revegetation of disturbed areas, as part of the reclamation effort, will include a mixture of grasses, forbs, shrubs and trees which are beneficial to wildlife.

As part of the overall surface water monitoring program, SCM will monitor surface water flow to determine it's relationship to area subsidence. See Chapter 7 of this M&RP for a discussion of the water monitoring program.

Areas of potential mining will be surveyed for raptor nests prior to the beginning of mining and two seasons after mining has ceased. Pertinent data gathered in these surveys will be included in this M&RP and evaluated by qualified personnel to determine the method(s) to be used to avoid, protect, or take the raptor's nest(s).

Before a pesticide is used, the type and concentration will be approved in conjunction with UDWR or the Division.

During the construction of the Dugout Mine, wildlife in the area will most likely be displaced due to the noise and added human activity. Construction, mining, supplier personnel and their corresponding equipment will be required to stay within the disturbed area boundary during construction activities. Loading, unloading, and staging of materials and equipment designated for the construction of the Dugout Canyon Mine facilities will be done within the disturbed area boundary. Fluids used to maintain construction equipment will be stored in a safe method, to prevent contamination.

340 RECLAMATION PLAN

The reclamation plan will include the following: seed mix, rate of seedlings per acre, stocking rates for shrub and tree plantings, planting techniques, fertilization methods, and amount and frequency of application. The fish and wildlife plan for the permit area is outlined in Section 342.

341 Revegetation

The reclamation plan for final revegetation is included in this section for lands to be disturbed by coal mining and reclamation operations.

The short-term goal of this revegetation plan is the immediate stabilization of the disturbed sites through erosion control. This objective will be achieved through controlled grading practices, proper seedbed preparation to encourage rapid plant establishment, inclusion of rapidly establishing species in the seed mixture to be planted, and mulch application.

The long-term goals are to establish useful, productive range and wildlife habitat. These goals will be attained through the selection and placement of desirable and productive plant species, and a commitment to monitor and maintain revegetated areas throughout the bond liability period.

341.100 Schedule and Timetable

The reclamation timetable is outlined in Figure 5-4. The reclamation monitoring schedule is outlined in Table 3-3.

The planting of seeds and seedlings will be undertaken at the most feasible time following disturbance activities. Planting will begin after the plant growth medium has been replaced. Final reclamation grasses, forbs, shrubs, and seedlings will be planned for planting in late August through early October. Should the planting window close prior to completion of seeding, a sterile, quick growing ground cover will be planted to control erosion during the winter months. The final reclamation seed mixture will be planted the following spring and fall.

341.200 Descriptions

Species and Amounts of Seed. All revegetated areas within the disturbed area boundary will be planted with the seed mixes listed below:

Interim Seed Mix (Drilled Quantities)

SPECIES	# pls/acre
Indian ricegrass	2
Western wheatgrass	3
Slender wheatgrass	3
Thickspike wheatgrass	4
Kentucky Bluegrass	1
TOTAL	13

Final Reclamation Seed Mix #1 (Drilled Quantities)

SPECIES	# pls/acre
Grasses, Forbs, and Shrubs	
Bluebunch Wheatgrass	3.0
Western wheatgrass	4.0
Slender wheatgrass	1.0
Thickspike wheatgrass	1.0
Idaho fescue	1.0
Indian ricegrass	2.0
Blueleaf aster	0.5
Blue flax	1.0
Palmer Penstemon	0.5
Northern sweetvetch	1.0
Mountain big sagebrush	0.5
Louisiana sagebrush	1.0
Fourwing saltbrush	1.0
Bitterbrush	1.0
Curl-leaf mountain mahogany	1.0
TOTAL	19.5
Transplants and/or seedlings per acre	
Snowberry	75
Utah serviceberry	75
Pinyon pine	200
Utah juniper	200
TOTAL	550

TABLE 3-3

RECLAMATION MONITORING SCHEDULE

	YEAR									
	1	2	3	4	5	6	7	8	9	10
QUALITATIVE SAMPLING	X	X	X	X	X	X	X	X	X	X
QUANTITATIVE SAMPLING										
Cover		X	X		X				X	X
Frequency		X	X		X				X	X
Woody Plant Density		X	X		X				X	X
Transplant Survival	X	X	X		X					
Productivity									X	X

Final Reclamation Seed Mix #2 (Drilled Quantities)

SPECIES	# pls/acre
Grasses, Forbs, and Shrubs	
Mountain brome	3.0
Western wheatgrass	5.0
Indian ricegrass	3.0
Slender wheatgrass	3.0
Thickspike wheatgrass	3.0
Kentucky bluegrass	1.5
Columbine	1.0
Blue flax	1.0
Palmer penstemon	1.0
Northern sweetvetch	.5
Louisiana sagebrush	1.0
TOTAL	23.0

Transplants and/or seedlings per acre

Carex spp.	500
Horsetail	500
TOTAL	1000

Streambanks/channel bottom will receive the following trees[a] and shrubs

	Seedlings/acre
Narrowleaf cottonwood	250
Rocky Mountain maple	250
Willow [b]	4000
Woods rose	1000
Snowberry	250
Utah serviceberry	250
Blue elderberry	250
Chokecherry	250
Golden current	250
TOTAL	6750

* UDWR requested no conifers be included in the riparian seed mix.

(b) Cuttings/transplants and/or seedlings will be used. The quantity of willows to actually be planted may vary due to the availability of suitable area within the channel for planting. CFC requests permission to consult with a botanist and UDOGM at the time of reclamation to determine the final number of willows to be planted and to prepare a plan for potential planting and replanting should seedling be lost due to pestilence. It may be beneficial to plant the willows over a period of years as the stream has time to deposit sediment, thus providing natural areas for planting. If deemed appropriate by the botanist and UDOGM at the time of reclamation the 4,000 willows per acre commitment will be met.

The rate of seeding per acre when broadcast will be doubled of the rate of seeding when drilled.

Seed Mix No.1 will be used on the majority of the disturbed area (Pinyon-Utah juniper - upland very steep shallow loam, Plate 3-1A). Seed Mix No. 2 will be used to reseed the riparian area of Dugout Creek (Plate 3-1A). Hydrophytic vegetation will be planted during the low flow of the reclamation channel.

Method Used for Planting and Seeding. The surface will be ripped to between 6 and 24 inches to reduce surface compaction. Ripping will be completed on approximately 4-foot centers. Final ripping depths will be determined by the soil materials being ripped. On slopes too steep for ripping the soil materials will be pocked/gouged.

Following ripping, topsoil (or substitute topsoil) will be applied to the ripped surface and left in a roughened state. Topsoil samples will be collected and sent to the laboratory for analysis to determine fertilizer requirements. The area will be broadcast fertilized with the recommended fertilizer using a hand held "cyclone-type" seeder in smaller areas, applied in a hydroseeding mixture or with a rotary implement attached to the revegetation tractor in larger areas. Where possible, a ripper equipped tractor or other appropriate equipment will be used to incorporate the fertilizer into the soil. On slopes too steep to accommodate the use of a tractor or other appropriate equipment the fertilizer will be incorporated with the track hoe bucket teeth or other Division approved technology. All nutrients will be applied in a single application.

Seeding for grasses, shrubs, and forbs will be accomplished by drilling and/or broadcasting. All equipment used will be equipped with metering devices. Except as noted below all areas will be fertilized and seeded using the same methodology.

Broadcast seeding will be used on slopes too steep to accommodate a tractor.

Seedlings/transplants will be planted by first clearing a circle of 12 to 24 inches in diameter from which mulch materials and grasses will be cleared. The hole will be dug 4 to 6 inches deeper than the seedling roots to accommodate positioning of the seedling. Fertilizer will either be mixed with the loose soil from the hole or a fertilizer tablet will be planted with each seedling. After seedling placement, the hole will be backfilled with soil and fertilizer then lightly tamped. A gently sloped basin will be formed around the seedling to catch water. The basin will be mulched to aid in moisture retention.

Technical notes (No. 23, September 1993) and project information data published by the NRCS were consulted to provide detail for planting the riparian area, willows, and cottonwoods.

"Rhisomatous willows usually should be planted on inside curves of a stream channel, they are rarely found on sharp outside curves in nature. Shrubby species are normally planted on outside curves of a stream channel as a continuous barrier. Plant the entire reach with the same species. Taller shrubby species may also be planted mid-bank to upper bank and on the floodplains for diversity and additional stabilization or as a buffer zone. Plant tree species up the bank from the shrubby species or on top of the bank."

"Plug, containerized, bare-root, potted and paper-sleeve planting are best used on mid-bank to upper bank or floodplains where long periods of inundation or water erosion is minimized, but where adequate moisture is available through natural precipitation. Where plant have a low risk of physically being pulled or eroded out due to shallow rooting systems during establishment and where there is no competing vegetation."

Transplants (cuttings, whips, plugs, bare-root, potted) "less than 3/8" inch diameter are not recommended because energy reserves in the stems are limited. Pole cutting (3/4" large diameter unrooted stems) are recommended for most planting from water line to mid-bank. Pole cuttings of willows and cottonwoods are also recommended on upper-banks and flood plains where the water table is relatively deep."

"Cutting length is largely determined by the depth to the mid-summer water table and erosive force of the stream at the planting site. Planting can occur at the water line, up the bank, and on top of bank in relatively dry soil, as long as cuttings are long enough to reach into the mid-summer water table. Make sure, several inches of cutting are in the mid-summer water table, 3-4 buds are above ground, and no less than ½ the total length is in the ground"

"However the larger the cutting diameter, the longer the cutting should be, and the deeper the hole should be. Larger diameter and longer cuttings will be needed for more severely eroding sites and where the water table is deeper."

"Plant the cuttings about 1 - 3 feet apart for shrubby types and 6-12 feet apart for tree types. In areas where you expect erosion, plant shrubby types 1 - 1.5 feet apart to better protect the banks. Exact spacing between tree-types further up the bank and shrubby types below should be based on crown characteristics and height. General ideas on spacing can be found in the Idaho Tree Planting Handbook."

"A tractor-mounted post hole digger, a one or two man post hole digger, a soil auger, a large bar, a planting shovel, or just punching the cutting into most soil have all been used successfully in the past to plant willows."

The reclaimed riparian area will be planted with cuttings/transplants/seedlings using the following guidelines as suggested by NRCS literature.

- The Idaho Tree Planting Handbook or similar instructional material will be consulted during reclamation to determine the spacing for the planting of shrubs and tree cuttings/transplants/seedlings. Trees and shrubs will be interspersed with areas seeded with grasses and forbs.

- Species will be planted with a tractor-mounted post hole digger, a one or two man post hole digger, a soil auger, a large bar, a planting shovel, or punching into soil.
- Tree species will be planted up the bank from the shrub species or on top of the channel slope.
- Shrubs species will be planted between the top of the riprap and the top of the channel slope.
- Willows will be planted in the riprap on the channel side slopes and the edges of the channel bottom.
- Stems for planting will be 3/8" diameter or larger.
- Length of cuttings will be determine by where they are planted (i.e. water line, top of slope or etc.), but will be long/large enough to reach into the anticipated water table, with 3-4 buds above ground.

The cuttings/transplants/seedlings will be interspersed with areas of grass and forbs in a mosaic pattern as in the current riparian area. The shrub density data from the 1997 survey designates the trees within the riparian area to be: 27.2 maples, 96.5 junipers, 107.4 cottonwoods and 28.8 firs per acre. SCM proposes to plant 250 maples and 250 cottonwoods per acre. Junipers and firs have not been included in Seed Mix #2 at the requested of the UDWR. The 500 maples and cottonwoods should be sufficient to achieve bond release if the mortality rate is between 10 and 25% (Dan Ogle, NRCS Plant Material Specialist). NRCS guidelines are considered recommendations and SCM understands they are ultimately responsible for meeting revegetation success standards.

If cottonwoods are planted as cuttings or poles they will be long enough to reach the water table and large enough in size (1 - 3" diameter) to have sufficient energy reserves for survival. An irrigation program will be considered if the cottonwoods are planted as transplants. The particular character of cottonwood to be planted will be determined at the time of reclamation.

Transplants with root balls will be planted as described previously and with the recommendations of published literature available at the time of reclamation. Channel slopes as currently designed, vary between 3 and 4 feet.

Figure 3-1 is provided to approximate the location of each planting zone described above, not as a typical design of the stream channel slopes, their height, width or length.

Seeding methods are discussed previously in this section.

The Division has requested information concerning the average high and low water mark for the reclaimed Dugout Creek channel as a means of evaluating the potential survivability of phreatophytes which will be planted during reclamation. However, from a hydrologic standpoint the concept of average high and low water marks in vague for a channel since the levels are both time- and probability-dependent. For example, it is common to speak of the water-surface profile, which might be expected during the 10-year, 7-day low-flow periods or the 25-year, 6-hour precipitation event, but not the "average" low flow or the "average" high flow. SCM will provide such data if it can be meaningfully defined and will assist with revegetation success. In any event, cuttings/transplants will be planted to facilitate successful re-establishment of the riparian vegetation, with the depth of planting being determined by a consensus of the published literature which is available at the time of reclamation and the drilling of periodic holes along the reclamation channel to determine the depth to the water table.

Mulching Techniques. Following seeding, the disturbed areas will be mulched with a Division-approved mulching material. For bonding calculations, wood fiber mulch will be

the assumed mulching application. Application will be initiated at the tip of the slope and working downhill. Mulch will be applied at the rate of 2000 pounds per acre and anchored with a tackifier.

In consultation with the Division, should a determination be made that a slope(s) is too steep to retain a mulch application, the slope(s) will be pocked/gouged and will receive no mulch application. Mulching and revegetation will not be attempted on sheer rock outcrops.

Mulch used for the mitigation project in 1998 of the upper portion of Dugout Canyon is discussed in Section 322.200.

Irrigation, Pest and Disease Control. No irrigation is planned and pesticides will not be used unless previously approved by the Division.

Measures Proposed for Revegetation Success. SCM will plant species of the same seasonal variety as those existing prior to the proposed disturbance.

To effect bond release at the end of the 10-year responsibility period, SCM will measure required vegetation variables (ground cover, herbaceous productivity, and woody plant density) as outlined on Table 3-3. Measurement will occur during the same time each year using appropriate techniques.

Productivity sampling will involve use of a sample random technique whereby 1 to 2 m^2 plots (rectangular in shape) will be clipped by life form for all current annual production. Sample parameters determined for these variables will be used to test the success of revegetation during each of these years and will prove establishment of adequate cover, suitable productivity, reasonable density, and adequate species composition.

The estimated parameters for the variables of ground cover, herbaceous productivity, and woody plant density will be obtained in a statistically-adequate manner. Refer to Section 356.200 for a discussion on revegetation success standards.

The revegetative success standard for cover in the Pinyon-Juniper area is 66% and 85% for the riparian area.

341.300 Greenhouse Studies, Field Trials or Other Equivalent Studies

SCM will comply, should the Division provide evidence to support additional testing to demonstrate that reclamation as required by the State Program can be accomplished according to information provided in this M&RP.

342 Fish and Wildlife

Revegetation to sustain and improve wildlife habitat will be SCM's primary concern following the termination of mining operations. High value habitats will be restored and enhanced beyond their pre-mining conditions since the area is being redisturbed after previous mining. The plan is consistent with Sections 330 and 358.

342.100 Enhancement Measures

Enhancements of the stream channel are discussed in Sections 322.200 and 762.100. No additional enhancements are planned.

342.200 Plants Used for Wildlife Habitat

The plant species in the reclamation seed mix are consistent with those presently grown in the permit area, with additional species added for diversity as requested by the Division. Section 341.200 contains the proposed reclamation seed, tree, and shrub mix.

Nutritional Value. The nutritional value will be consistent with that of vegetation in the surrounding areas.

Cover. The goal of SCM is to establish plant species which will provide sufficient cover for the fish and wildlife of the area. See Section 341 for additional discussion.

Ability to Support and Enhance. The plant species included in the proposed reclamation mixes have the ability to support and enhance the fish or wildlife habitat after the release of the performance bonds. Shrubs and trees will be planted to enhance survival and provide wildlife habitat. The trees and shrubs in the final reclamation seed mix will be used to ensure establishment of an enhanced vegetation community within the disturbed site. The disturbed riparian community will be restored and enhanced during reclamation efforts.

342.300 Cropland

Cropland is not a postmining land use.

342.400 Residential, Public Service and Industrial Land Use

No residential, industrial or public service use is planned at the present time for the permit area following the termination of mining.

350 PERFORMANCE STANDARDS

351 General Requirements

SCM commits to conduct all operations in accordance with the plans submitted in Sections R645-301-330 through R645-301-340 of the permit application.

352 Contemporaneous Reclamation

Reclamation activities prior to final reclamation will, to the extent feasible, be performed contemporaneously with mining operations. Areas to receive interim reclamation will be seeded with the interim seed mix.

The interim seed mix (Section 341.200) will be used to establish a shallow rooting cover of grasses for those areas disturbed during the development of the Gilson Well pad and relocation of Dugout Creek (west fork). The riparian area associated with the disturbance will receive reclamation as dictated in the stream channel alteration permit and Section 341 of the M&RP.

Revegetation will not be done in areas required to be kept barren of vegetation such as areas around mine ventilation openings.

353 Revegetation: General Requirements

A vegetative cover will be established on all reclaimed areas to allow for the designated postmining land use of livestock grazing and wildlife habitat. Other than a road which will be retained through the facilities area following reclamation to allow access to private land within the permit area, all roads within the disturbed area boundary will be reclaimed. The vegetative cover will be in accordance with the approved permit and reclamation plan. All species of vegetation to be used in reclamation activities, whether planted by seed or seedling, will be approved by the Division (i.e. interim, mitigation, #1 and #2 seed mixes).

353.100 Vegetative Cover

The seed mix proposed for revegetation is intended to provide vegetative cover that will be diverse, effective, and permanent. The seed mixture was selected with respect to the climate, potential seedbed quality, erosion control, drought tolerance, and the mixture's ability for quick establishment and spreading.

Native Species. The reclamation vegetative mixture (seeds, shrubs, and trees) will be comprise of species indigenous to the area, capable of achieving the postmining land use as approved by the

Division. Diversity of species should allow ultimate utilization of plants by wildlife and domestic livestock.

The revegetative species will be purchased from suppliers who will certify their percentages of purity, germination, hard seed, and percentages of maximum weed seed content.

Extent of Cover. The vegetative cover will be at least equal in extent to the cover as determined by the range site sampling as discussed in Section 341.200.

Stabilizing. The vegetative cover mixture is capable of stabilizing the soil surface from erosion.

353.200 Reestablished Plant Species

Compatible. The reestablished plant species have been selected to insure their compatibility with the approved postmining use.

Seasonal Characteristics. The revegetation plant species will have the same growing season as the original vegetation, or in this instance, as the adjacent areas.

Self-generation. The reestablished plants are species capable of self-generation and plant succession.

Compatibility. The seed mix suggested for revegetation contains plants native to the area and compatible with the plant and animal species of the permit area.

Federal and Utah Laws or Regulations. The seed mixture purchased to revegetate the mine area will contain no poisonous or noxious plant. No species will be introduced in the area without being approved by the Division.

353.300 Vegetative Exception

SCM does not require vegetative exception at this time.

353.400 Cropland

The permit area contains no land designated as cropland.

354 Revegetation: Timing

SCM will follow the recommended guidelines for revegetation as discussed in Section 341.100.

355 Revegetation: Mulching and Other Soil Stabilizing Practices

Mulch and/or other soil stabilizing practices (pocking, gouging, roughening, etc.) will be used on all areas that have been regraded and covered by topsoil or topsoil substitutes (see Section 341.200). SCM will exercise care to guard against erosion during and after application of topsoil and will employ the necessary measures to ensure the stability of topsoil on graded slopes.

356 Revegetation: Standards for Success

The standards for revegetation success are discussed in this section.

Range Site Success Standards for Reclamation:

	Pinyon/Utah Juniper	Riparian
Ground Cover	66%	85%
NRCS Production	800 lbs/acre	1500 lbs/acre
Shrub-Tree Density/Stocking	2200 stems/acre	2200 stems/acre
Diversity	2 Tree/shrub species	2 Tree/shrub species
	3 Grass species	3 Grass species
	2 Forb species	2 Forb species

For a species to be counted as one of the species that constitute vegetation diversity it must exist in the actual plant community at a minimum of 5%.

The sampling methods to be used during reclamation will be specific to the requirements at the time of reclamation. Nonetheless, according to the currently approved UDOGM guidelines, these sampling methods would be used: sample adequacy, cover (line interception), density (belt transects or plots) and productivity (clipping and/or NRCS estimation). The Jaccard's Community Coefficient will be used to calculate acceptable plant similarity and diversity.

During the Fall of 1997, productivity for the disturbed area was determined by George Cook, a range conservationist for the NRCS. Mr. Cook determined the Pinyon/Utah Juniper area to be in good condition with 800 lbs/acre air dry weight production. The riparian area was determined to be in fair condition with 1500 lbs/acre of air day weight production. Should the NRCS determination of production be insufficient to satisfy the requirement for standards of success, SCM commits to sample productivity at a corresponding range site.

Range sites for reclamation comparison purposes were chosen by a qualified person contracted by SCM and in cooperation with the Division. Range sites in Fish Creek Canyon representing both the pinyon/juniper and riparian vegetation types were sampled for cover in September, 1998 (Appendix 3-1). These specific range sites correspond with the cover quantities sampled for the pinyon/juniper and riparian areas within the Dugout Mine disturbed area boundary. The cover data for each range site was submitted to the Division for evaluation and approved for reclamation comparison (Appendix 3-1). The designated range sites will be used as a reference area until final revegetative bond release has been issued. The location of the area to be used for range site comparison is designated on Plates 3-1 and 3-1D .

The sites for sampling were chosen (September, 1998) in cooperation with Paul Baker (UDOGM).

356.100 Success of Revegetation

The success standards for approval will be judged on the effectiveness of the vegetation for postmining land use and the standards outlined in Section 353.

Within the Utah Division of Oil, Gas and Mining Vegetation Guidelines (Revised February, 1992) three methods for sampling vegetation are discussed; reference areas, range sites and the baseline data method. Each method describes the requirements for its subsequent use, however the sampling of diversity was not discussed within any of these methods.

The baseline data method could not be used at the Dugout Canyon Mine site due to previous disturbance by mining. Likewise the reference areas method could not be used since reference areas were not approved by the Division. Therefore the range site method has been adopted for use at the Dugout Canyon Mine.

The range site number used for comparison of revegetation success is 033XY342UT, upland very steep shallow loam (Pinyon-Utah Juniper). The area sampled by Patricia Johnston in 1997 met the requirements of Method #2 - Range Sites of the UDOGM Vegetation Guidelines, February 1992. Legible copies of data sheets from the sampling are included in Appendix 3-1.

Sampling Techniques. SCM will comply with the standards for success, statistically valid sampling techniques for measuring success, and the approved methods outlined in the Division's "Vegetation Information Guidelines" for sampling.

Standards for Success. The standards for success will include criteria representative of unmined lands in the area of the permit and as discussed in Section 356.200.

356.200 Standards for Success

Standards of success will be applied in accordance with the approved postmining land use as described in this section.

Grazing Land or Pasture Land. The ground cover and production of living plants on the revegetated area will be at least equal to the specified success standards.

Cropland. There is no area designated as cropland within he permit area.

Fish and Wildlife Habitat. The success of revegetation for fish and wildlife habitat will be determined on the basis of tree and shrub stocking and vegetative ground cover. Minimum stocking and planting arrangements will be those approved by the Division on the basis of local and regional conditions. Cover success will not be less than that required to achieve the approved postmining land use.

Industrial, Commercial or Residential. The postmining land use for the permit area is not designated for industrial, commercial, or residential use.

Previously Disturbed Areas. Dugout Canyon contains the remains of earlier mining operations. The site was not reclaimed or revegetated following the earlier operations.

Due to the previous disturbance of the site, SCM will restore the vegetative ground cover to that of the surrounding area as discussed in Section 341.200 and the ground cover will be adequate to control erosion.

356.300 Siltation Structure Maintenance

Siltation structures will be maintained until removal is authorized by the Division and the disturbed areas have been stabilized and revegetated. Siltation structures will be removed

no sooner than two years after the last augmented seeding. For additional details on siltation structures, see Section 542 of this M&RP.

356.400 Removal of Siltation Structures

The land on which siltation structures are located will be revegetated in accordance with the reclamation plan discussed in Sections 353 through 357 of this M&RP.

357 Revegetation: Extended Responsibility Period

SCM will be responsible for the success of revegetation for a period of 10 years following seeding, fertilization, and irrigation (if deemed necessary) of the reclaimed mine area or upon Division bond release.

357.100 Extended Period Begins

The period of extended responsibility will begin the year after the disturbed area has been reseeded and fertilized.

357.200 Vegetative Parameters

Vegetation parameters will equal or exceed the approved success standard during the last 2 years of the responsibility period. The success standards are outlined in Section 356.

357.300 Husbandry Practices

SCM will comply with Division-approved husbandry practices which will be normal conservation practices within the region of the mine. These practices may include disease, pest, and vermin control; and any pruning, reseeding, and transplanting required.

358 Protection of Fish, Wildlife and Related Environmental Values

SCM will minimize disturbances and adverse impacts on fish, wildlife, and their related environments as outlined in Section 333.

The intermittent flow of streams within the lease area does not support a population of game fish; therefore, there are no fisheries within the disturbed area to protect. In addition, the streams in Pace and Rock Canyons have intermittent flow and do not support a population of game fish. See Chapter 7 of this M&RP for methods to protect water sources in the area.

Proposed surface disturbance associated with mining activities will be reviewed by the DWR and UDOGM in reference to wildlife exclusionary periods, see letter in Appendix 3-3 concerning mitigation for disturbance in 2004 - 2006.

358.100 Existence of Endangered or Threatened Species

Coal mining will not be conducted where it's operation might jeopardize the existence of any endangered or threatened species. The mining of coal will not result in the planned destruction or adverse modification of these species critical habitat, unless approved by appropriate agency(ies).

Any state or federally listed endangered or threatened specie will be reported to the Division upon its discovery. A ground nest survey for raptors and bird species of special interest was performed prior to site disturbance by a qualified person. A letter report of the ground nest survey is included in Appendix 3-3. Mining operations will proceed in accordance with Division stipulations. These stipulations also apply to reclamation operations at the Dugout Canyon Mine.

Lists of threatened, endangered, and sensitive species are included in Appendix 3-3. In addition, Appendix 3-3 contains 2003 and 2004 survey data for Mexican Spotted Owls and a letter from the DWR concerning installation of nesting boxes to satisfy mitigation requirements.

358.200 Bald and Golden Eagles

Coal mining and reclamation operations will be conducted in a manner protective of bald and golden eagles. SCM will promptly report any golden or bald eagle nests found within the permit boundaries and will proceed with operations in accordance with the Division's stipulations for protection of those nests. Refer to Section 333 for a discussion of methods of nest protection during potential subsidence.

358.300 Taking of Endangered or Threatened Species

SCM understands that there is no permission implied by these regulations for taking of endangered or threatened species, their nests, or eggs.

358.400 Replacement of Wetland and Riparian Vegetation

The Division will be consulted on the best technology to replace and enhance the riparian vegetation to be disturbed.

358.500 Manmade Wildlife Protection Measure

Electric Power Lines. All power lines within the Dugout Canyon Mine disturbed area will comply or be modified to be raptor safe and comply with the guidelines of REA Bulletin 61-10, "Power Line Contacts by Eagles and Other Large Birds". Refer to Plates 4-1 and 5-2 for power pole locations.

Potential Barriers. When possible, structures built by SCM in Dugout Canyon will be designed and built to provide corridors of passage to large mammals.

Pond Protection. Fences or other appropriate methods will be used to exclude wildlife from ponds containing hazardous or toxic materials. However, SCM does not intend to store hazardous or toxic materials in ponds.

REFERENCES:

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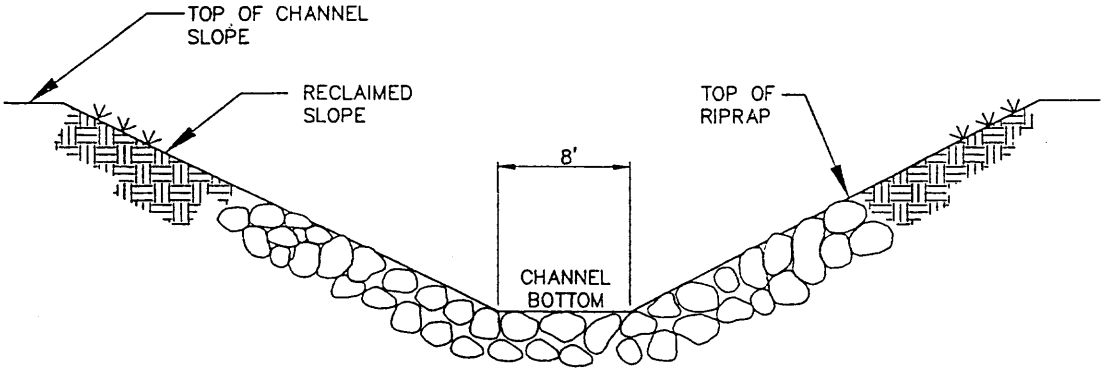

NOT TO SCALE

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UTAH DIVISION OIL, GAS AND MINING

FIG 3-1. RECLAMATION CHANNEL SLOPE DEFINITIONS

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