

APPENDICES

APPENDIX A. PROBABILITY-OF-OCCURRENCE ANALYSIS TABLES.

APPENDIX B. LYNX ANALYSIS UNIT AND LINKAGES FIGURES.

APPENDIX C. BLM BOUNDARY MANAGEMENT PLAN FIGURE AND SUPPORTING TEXT.

APPENDIX D. AVALANCHE PATHS ALONG SH 110A: FIGURE AND TABLE.

Appendix A. Probability-of-Occurrence Analysis.

Table A1. Probability-of-Occurrence Analysis of Special Status Plant Species.						
Species	Status	Habitat Requirements	Suitable Habitat Present?	Documented Occurrence?	Probability of Occurrence	
Probability of Occurrence of Federally Listed Species.						
<i>Astragalus humilis</i> Mancos milkvetch	Endangered	Exfoliating Point Lookout Sandstone; rock ledges in pinyon-juniper woodlands. Elev. 5,500-5,850 ft. ¹	No	No	None	
<i>Astragalus tortipes</i> Sleeping Ute milkvetch	Candidate	Mixed desert scrub communities, on lower slopes of ridges and knolls, in gravels derived from volcanic intrusion in Mancos Shale. Elev. 5,400-5,700 ft. ¹ .	No	No	None	
<i>Pediocactus knowltonii</i> Knowlton's cactus	Endangered	Alluvial deposits that form rolling gravelly hills covered with pinyon-juniper and sagebrush. Elev. 6,400 ft. ¹	No	No	None	
<i>Sclerocactus mesae-verdae</i> Mesa Verde cactus	Threatened	Sparsely vegetated shale or adobe clay badlands derived from Mancos and Fruitland formations. Elev. 4,000-5,000 ft. ¹	No	No	None	
Probability of Occurrence of BLM Sensitive Species						
<i>Astragalus cronquistii</i> Cronquist milkvetch	G2/S2	Sandy and gravelly ridges on red sandstone. Also on Moncos Shale and on substrates derived from Morrison Formation in the eastern part of its range. Elev. 4,800-5,800 ft. ¹	No	No	None	
<i>Astragalus naturitensis</i> Naturita milkvetch	G3/S2S3	Sandstone mesas, ledges, crevices, and slopes in pinyon-juniper woodlands. Elev. 5,000-7,000. ¹	No	No	None	
<i>Erigeron kachinensis</i> Kachina daisy	G2/S1	Saline soils in alcoves and seeps in canyon walls. Elev. 4,800-5,600 ft. ¹	No	No	None	

Table A1 (cont'd). Probability-of-Occurrence Analysis of Special Status Plant Species.					
Species	Status	Habitat Requirements	Suitable Habitat Present?	Documented Occurrence?	Probability of Occurrence
<i>Eriogonum clavellatum</i> Comb Wash buckwheat	G3/S1	Local on shales in the Four Corners Area. ²	No	No	None
<i>Ipomopsis polyantha</i> var. <i>polyantha</i> Pagosa trumpet gilia	G1/S1 Forest Service Sensitive	Fine-textured soils derived from the Mancos shale, or in ponderosa pine, pinyon-juniper, or scrub oak communities. Elev. 6,800-7,200 ft. ¹	No	No	None
<i>Lesquerella pruinosa</i> Pagosa bladderpod	G2/S2 Forest Service Sensitive	Fine-textured soils derived from Mancos Formation shale. Barren areas surrounded by montane grasslands, open ponderosa pine stands with scrub oak, Douglas fir, or Engelmann spruce communities. Elev. 6,800-8,300 ft. ¹	No	No	None
Probability of Occurrence of Species of Concern					
<i>Adiantum capillus-veneris</i> Southern maiden hair	Forest Service Sensitive	Dripping cliffs and seeps, especially on sandstone or calcareous rocks or in highly mineralized soil. Elev. 4,800-7,800 ft. ¹	No	No	None
<i>Astragalus proximus</i> Aztec milkvetch	Forest Service Sensitive	Mesas, bluffs, and low hills in sandy, often alkaline, clay soils derived from Lewis or Mancos Shale. Grows among junipers or sagebrush. Elev. 5,400-7,300 ft. ¹	No	No	None
<i>Botrychium echo</i> Reflected moonwort	Forest Service Sensitive	Gravelly soils, rocky hillsides, grassy slopes, and meadows. Elev. 9,500 - 11,000 ft. ¹	Yes	No	Medium

Table A1 (cont'd). Probability-of-Occurrence Analysis of Special Status Plant Species.					
Species	Status	Habitat Requirements	Suitable Habitat Present?	Documented Occurrence?	Probability of Occurrence
<i>Botrychium pallidum</i> Pale moonwort	Forest Service Sensitive	Open, exposed hillsides, burned or cleared areas, old mining sites. Elev. 9,800 - 10,600 ft. ¹	Yes	No	Medium
<i>Epipactis gigantea</i> Giant helleborine	Forest Service Sensitive	Seeps on sandstone cliffs and hillsides; springs, sometimes hot springs. Elev. 4,800-8,000 ¹	No	No	None
<i>Eriophorum altaicum</i> var. <i>neogaeum</i> Altai cottongrass	Forest Service Sensitive	Fens. Elev. 9,500 - 14,000 ft. ¹	Yes	No	Medium
<i>Machaeranthera coloradoensis</i> Colorado tansy aster	Forest Service Sensitive	Gravelly Areas in mountain parks, slopes, and rock outcrops up to dry tundra Elev. 8,500 - 12,500 ft. ¹	Yes	No	Medium
<i>Salix arizonica</i> Arizona willow	Forest Service Sensitive	Sedge meadow and wetland drainage ways in subalpine coniferous forests. Elev. 10,000-11,200 ft. ³	Yes*	No	Low
<p>1 Spackman et al. 1997. 2 Weber and Wittmann 1996 3 New Mexico Rare Plant Technical Council. 1999. * Species is not known from the San Juan NF, but it occurs on the adjacent Rio Grande NF east of Wolf Creek Pass.</p>					

Table A2. Probability of Occurrence of Special Status Fish & Wildlife Species in the Project Area.					
Species	Status¹	Habitat Requirements²	Suitable Habitat Present?	Documented Occurrence?	Probability of Occurrence
Federally Listed Threatened, Endangered, and Candidate Species.					
<i>Mammals</i>					
Black-footed ferret <i>Mustela nigripes</i>	FE, SE	Open grasslands in association with prairie dog colonies.	No	No	None
Canada Lynx <i>Lynx canadensis</i>	FT, SE	Mature spruce/fir forests in association with snowshoe hare habitat.	Yes	Yes	High
<i>Birds</i>					
Bald Eagle <i>Haliaeetus leucocephalus</i>	FT, ST	Large bodies of water (e.g. rivers, lakes, reservoirs) for feeding, mature trees for roosts. Winter below 8,000 feet.	Potential roost trees.	No. Below Animas River but not in project area.	Low
Mexican spotted owl <i>Strix occidentalis lucida</i>	FT, ST	Steep canyons with exposed cliffs surrounded by dense, mature ponderosa pine/mixed conifer forest.	No	No	None
Southwestern willow flycatcher <i>Empidonax traillii extimus</i>	FE, SE	Foothill and montane riparian thickets (mostly willows) below 10,000 feet.	Marginal -small patches along creek	No	Low
Whooping crane <i>Grus americana</i>	FE, SE	Mudflats around reservoirs and in agricultural areas.	No	No	None
<i>Amphibians</i>					
Boreal Toad <i>Bufo boreas boreas</i>	FC ³ , SE, R2	Lakes, marshes, ponds, and bogs, with shallow water for breeding; moist upland forests, meadows, or riparian areas outside of breeding season.	Yes	No	Low
<i>Fish</i>					
Bonytail <i>Gila elegans</i>	FE, SE	Large, fast-flowing waterways of the lower Colorado River.	No	No	None

Table A2 (cont'd). Probability of Occurrence of Special Status Fish & Wildlife Species in the Project Area.					
Species	Status¹	Habitat Requirements²	Suitable Habitat Present?	Documented Occurrence?	Probability of Occurrence
Colorado Pikeminnow <i>Ptychocheilus lucius</i>	FE, ST	Swift flowing portions of the lower San Juan and Colorado Rivers with quite, warm backwaters.	No	No	None
Humpback chub <i>Gila cypha</i>	FE, ST	Deep, fast-moving, turbid waters of the lower Colorado River.	No	No	None
Razorback Sucker <i>Xyrauchen texanus</i>	FE, SE	Deep, clear to turbid waters of the lower San Juan and Colorado Rivers over mud, sand, or gravel.	No	No	None
<i>Invertebrates</i>					
Uncompahgre fritillary butterfly <i>Boloria acrocnema</i>	FE	Alpine habitats with large patches of Snow willow, on northeast-facing slopes, at elevations above 12,000 feet.	Snow willow present but patch size small.	No	Low
BLM Sensitive Species					
<i>Mammals</i>					
Allen's big-eared bat <i>Idionycteris phyllotis</i>	BLM, R2	Mixed forests, pinyon-juniper woodlands, lowland riparian, and shrublands. Elevations up to 9,800 feet. Roosts in caves and mines.	No; species not known to use spruce-fir habitat.	No	None
Big free-tailed bat <i>Nyctinomops macrostis</i>	BLM	Lowland riparian, desert shrub, and montane forest. Elevations up to 9,200 feet. Roosts in crevices of cliffs.	No, elevation too high.	No. No breeding records in CO.	None
Fringed myotis <i>Myotis thysanodes</i>	BLM	Ponderosa pine woodlands, and shrublands. Elevations up to 7,500 feet. Roosts in caves, mines and buildings.	No	No	None
Spotted bat <i>Euderma maculatum</i>	BLM, R2	Ponderosa pine, pinyon-juniper woodlands, and shrub desert. Elevations up to 10,600 feet. Roosts in crevices of rocky cliffs.	No	No, only known from northwest CO.	None

Table A2 (cont'd). Probability of Occurrence of Special Status Fish & Wildlife Species in the Project Area.					
Species	Status¹	Habitat Requirements²	Suitable Habitat Present?	Documented Occurrence?	Probability of Occurrence
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	BLM, R2	Semidesert shrublands, pinyon-juniper woodlands, and open montane forests. Elevations up to 9,500 feet. Roosts in caves and abandoned mines.	Yes, but elevation may be too high.	Not in San Juan Resource Area, but occurs in San Juan and Uncompahgre National Forests.	Low - Medium
<i>Birds</i>					
Black tern <i>Chlidonias niger</i>	BLM, R2	Marshes, sloughs, and wet meadows associated with reservoirs and lakes.	No	No	None
Ferruginous hawk <i>Buteo regalis</i>	BLM, SC, R2	Grasslands, sagebrush flats, desert scrub, low foothills, and fringes of pinyon-juniper habitat.	No	No	None
Gunnison sage grouse <i>Centrocercus minimus</i>	BLM, SC	Sagebrush shrublands.	No	No	None
Northern goshawk <i>Accipiter gentilis</i>	BLM, R2	Coniferous, mixed coniferous, and riparian (aspen stringers) forests.	Yes, foraging	On the San Juan Resource Area	Moderate - High
White-faced ibis <i>Plegadis chihi</i>	BLM, R2	Wet meadows, marsh edges, and reservoir shorelines.	No	No	None
<i>Reptiles</i>					
Desert spiny lizard <i>Sceloporus magister</i>	BLM, SC	Shrub covered dirt banks and sparsely vegetated rocky areas near streams and arroyos.	No	No	None
Texas horned lizard <i>Phrynosoma comutum</i>	BLM, SC, R2	Plains grassland.	No	No	None
<i>Fish</i>					
Bluehead sucker <i>Catostomus discobolus</i>	BLM, SC	Occupies large rivers and mountain streams. Habitats range from cold, clear mountain streams to warm, turbid streams.	No	No. Found in lower reaches of the Animas River at elevations below the project area.	None

Table A2 (cont'd). Probability of Occurrence of Special Status Fish & Wildlife Species in the Project Area.					
Species	Status¹	Habitat Requirements²	Suitable Habitat Present?	Documented Occurrence?	Probability of Occurrence
Flannelmouth sucker <i>Catostomus latipinnis</i>	BLM, SC	Inhabits moderate to large rivers, seldom in small creeks. Typical of pools and deeper runs.	No	No. Found in lower reaches of the Animas River.	None
Roundtail chub <i>Gila robusta</i>	BLM, SC	Inhabits cool to warm water mid-elevation streams and rivers.	No	No. Found in lower reaches of the Animas River.	None
Colorado River cutthroat trout <i>Oncorhynchus clarki pleuriticus</i>	BLM, SC, R2	Requires cool, clear water streams with pools and well-vegetated streambanks. Occurs also in lakes.	Potential habitat is present in the Upper Animas R.	No. Never found in Cement Creek Basin. Occurs in upper Colorado River.	None
Colorado State Threatened and Endangered Species					
<i>Mammals</i>					
Gray wolf <i>Canis lupus</i> ⁴	SE, FE	Any place with an adequate supply of ungulate prey and free from human persecution. Large home ranges.	No; home ranges would overlap developed areas.	No; no confirmed reports in CO since 1935.	None
Grizzly bear <i>Ursus arctos</i> ⁴	SE, FT	Habitat generalist; from prairie grasslands to alpine tundra.	Potential habitat present.	No; no confirmed reports in CO since 1979.	None
Kit Fox <i>Vulpes macrotis</i>	SE	Semidesert shrubland and margins of pinyon-juniper woodlands.	No	No	None
Preble's meadow jumping mouse <i>Zapus hudsonius preblei</i> ⁴	ST, FT	Tall grass habitats near water.	No	No	None
River otter <i>Lontra canadensis</i>	SE	Riparian habitats; requires permanent water with an abundant food source.	No	Occurs in Animas drainage but not in project area.	None
Wolverine <i>Gulo gulo</i>	SE, R2	From low-elevation, forested drainage bottoms to high-elevation, sparsely timbered cirque basins.	Yes	Unconfirmed report in San Juan Resource Area.	Moderate - High

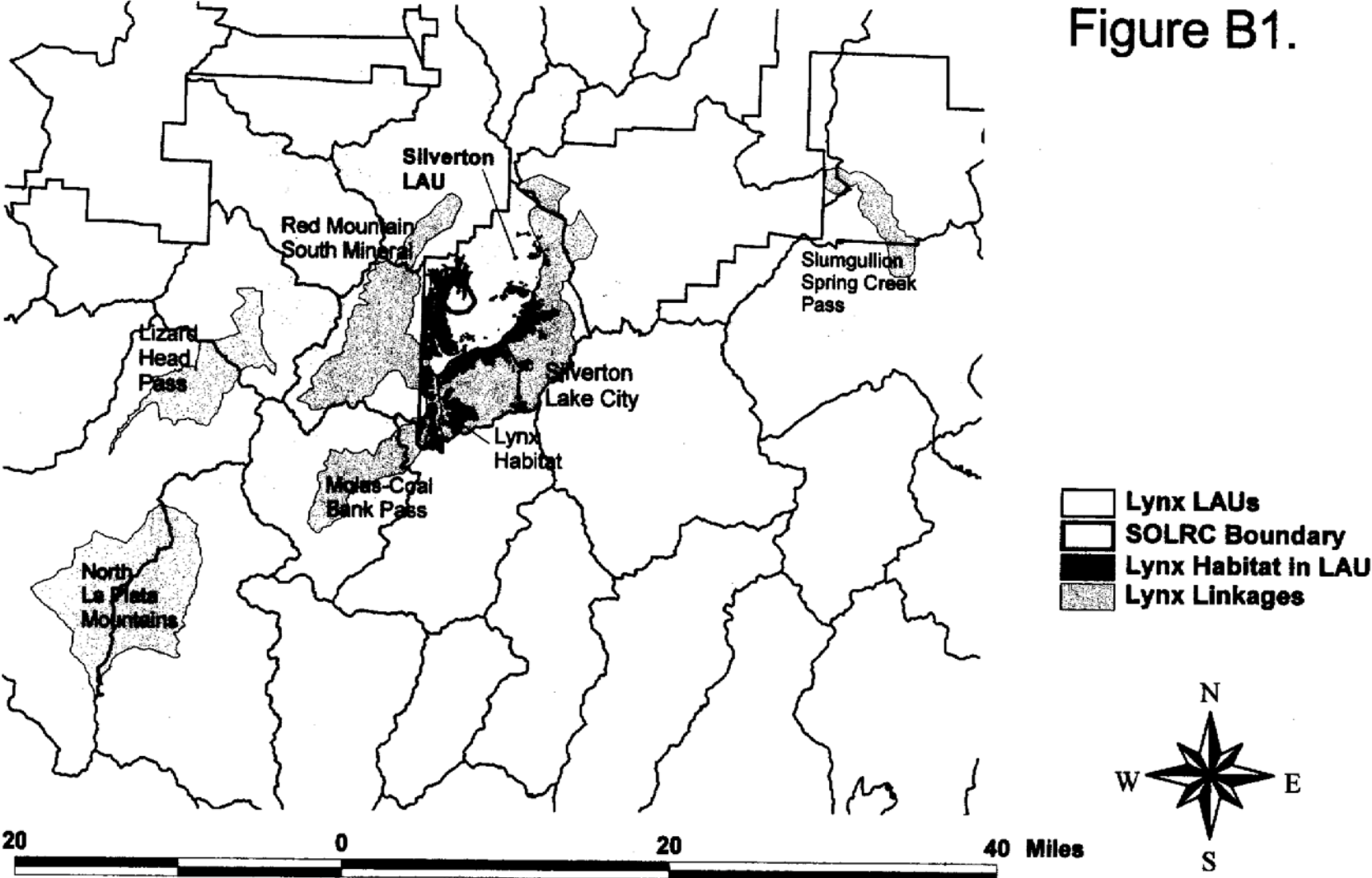
Table A2 (cont'd). Probability of Occurrence of Special Status Fish & Wildlife Species in the Project Area.					
Species	Status¹	Habitat Requirements²	Suitable Habitat Present?	Documented Occurrence?	Probability of Occurrence
<i>Birds</i>					
Burrowing owl <i>Athene cunicularia</i>	ST	Grasslands; usually in or near prairie dog towns.	No	No	None
Least tern <i>Sterna antillarum</i> ⁴	SE, FE	Nest on bare sandy shorelines of islands in reservoirs.	No	No	None
Lesser prairie-chicken <i>Tympanuchus pallidicinctus</i>	ST	Sandsage and sandsage-bluestem grasslands.	No	No	None
Piping plover <i>Charadrius melodus circumcinctus</i> ⁴	ST, FT	Mudflats and shorelines of reservoirs and lakes.	No	No	None
Plains sharp-tailed grouse <i>Tympanuchus phasianellus jamesii</i>	SE	Shrublands and grasslands	No	No	None
<i>Fish</i>					
Arkansas darter <i>Etheostoma cragini</i>	ST	Spring-fed creeks with cool, clear water and herbaceous vegetation.	No	No. Not found in the San Juan or Colorado Basins.	None
Brassy minnow <i>Hybognathus hankinsoni</i>	ST	Small, clear, sluggish weedy creeks or small rivers with organic sediment.	No	No. Not found in the San Juan or Colorado Basins.	None
Common shiner <i>Luxilus cornutus</i>	ST	Creeks and small to medium rivers. Clear cool water, moderate current, and gravel substrate.	No	No. Not found in the San Juan or Colorado Basins.	None
Greenback cutthroat trout <i>Oncorhynchus clarki stomias</i>	FT, ST	Cold, clear, gravely headwater streams and mountain lakes. Arkansas and South Platte Rivers.	No	No. Not found in the San Juan or Colorado Basins.	None

Table A2 (cont'd). Probability of Occurrence of Special Status Fish & Wildlife Species in the Project Area.					
Species	Status¹	Habitat Requirements²	Suitable Habitat Present?	Documented Occurrence?	Probability of Occurrence
Lake chub <i>Couesius plumbeus</i>	SE	Gravel-bottom pools and runs of streams and along rocky lake margins.	No	No. Not found in the San Juan or Colorado Basins.	None
Northern redbelly dace <i>Phoxinus eos</i>	SE	Boggy lakes, ponds, beaver ponds, and pools of headwaters.	No	No. Not found in the San Juan or Colorado Basins.	None
Plains minnow <i>Hybognathus placitus</i>	SE	Slow water and side pools of silty streams. Sand beds in large streams and rivers.	No	No. Not found in the San Juan or Colorado Basins.	None
Rio Grande sucker <i>Catostomus plebeius</i>	SE	Pools, runs, and riffles in small to large streams.	No	No. Not found in the San Juan or Colorado Basins.	None
Southern redbelly dace <i>Phoxinus erythrogaster</i>	SE	Headwaters and upland creeks, generally with clear water.	No	No. Not found in the San Juan or Colorado Basins.	None
Suckermouth minnow <i>Phenacobius mirabilis</i>	SE	Runs and riffles of creeks and small to medium rivers with substrate ranging from sand to boulders.	No	No. Not found in the San Juan or Colorado Basins.	None
<p>¹ FE = federally endangered, FT = federally threatened, FC = federal candidate for listing; BLM = BLM sensitive; SE = state endangered, ST = state threatened, SC = state special concern (not a statutory category); R2 = Forest Service Region 2 sensitive.</p> <p>² Hammerson 1982; Andrews and Righter 1992; Fitzgerald et al. 1994; NatureServe Explorer 2001; CDOW 2002a.</p> <p>³ The southern Rocky Mountain population (Colorado, Wyoming, and New Mexico) of boreal toads is a candidate for listing under the ESA.</p> <p>⁴ These species also have federal status. They are addressed in the state listed species section because they do not occur on the San Juan National Forest/BLM RA.</p>					

Appendix B. Lynx Analysis Unit and Linkages figures.

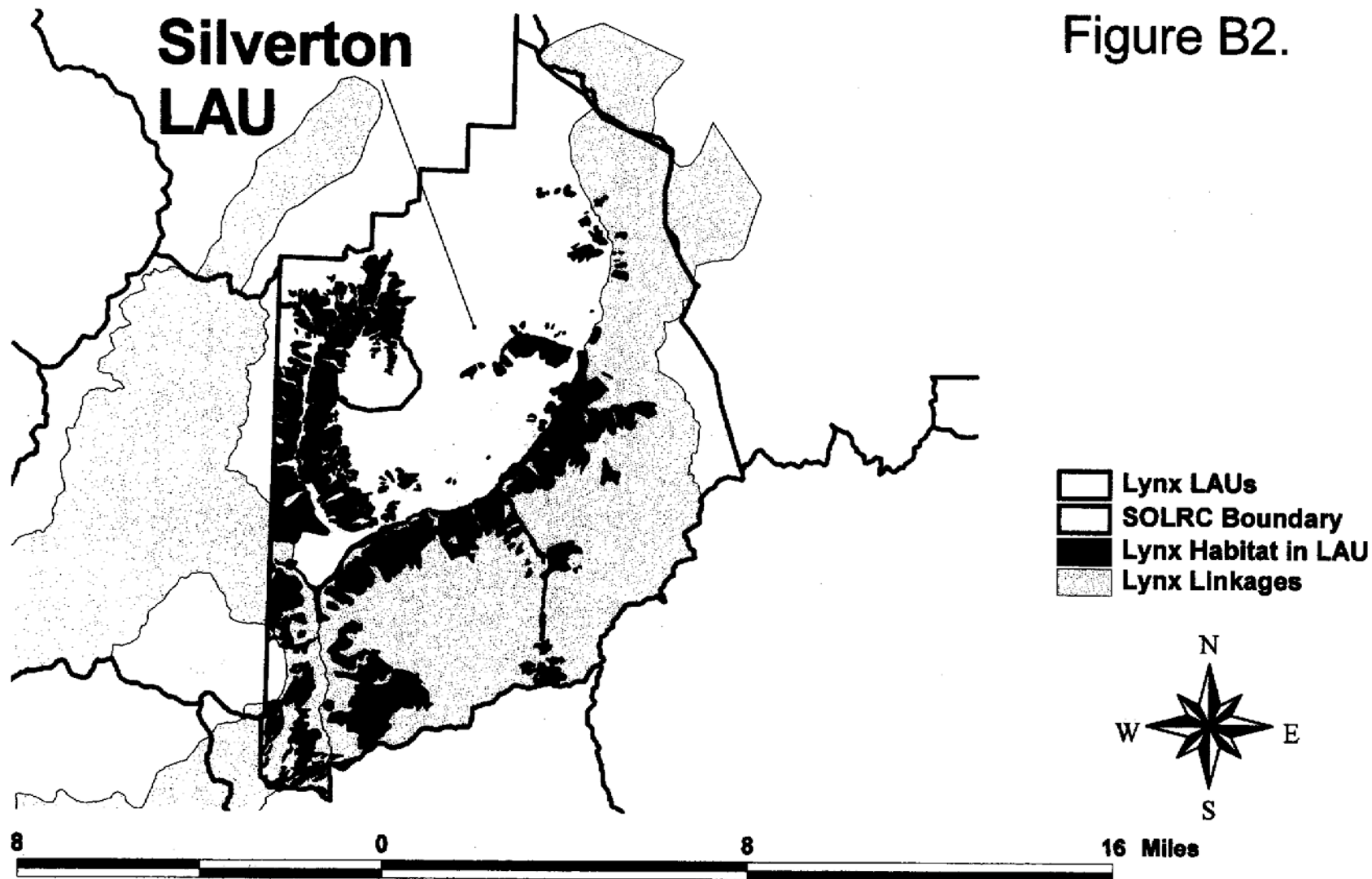
Lynx LAUs and Linkages in the Silverton Area

Figure B1.



Silverton Lynx Analysis Unit

Figure B2.



Appendix C. BLM Boundary Management Plan Figure and Supporting Text.

BOUNDARY MAP OF SOLRC RESTRICTED ACCESS AREA

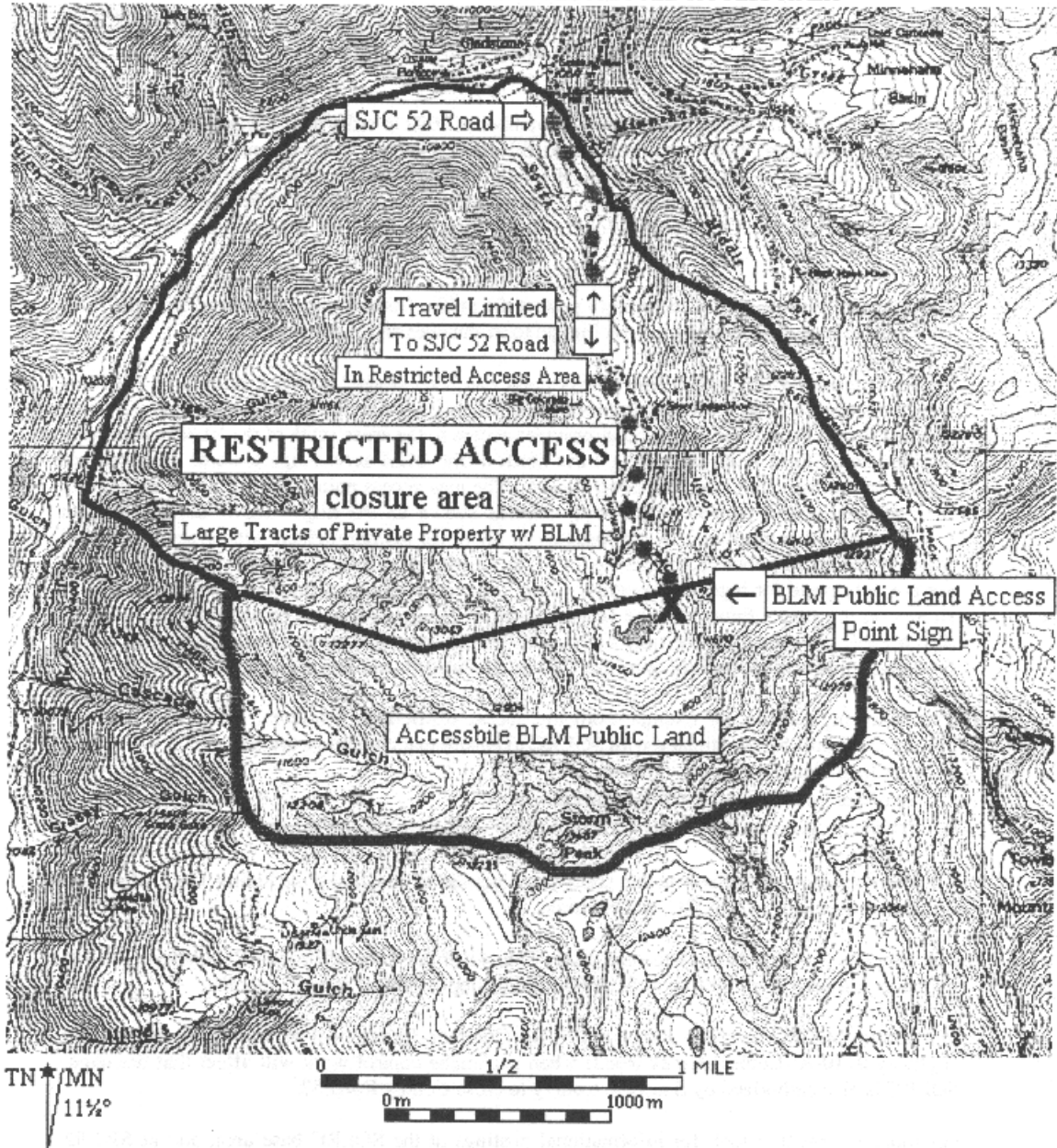


Figure C1. BLM Boundary Management Plan.

***ACCESS TO PORTION OF BLM LANDS UNDER AVALANCHE STUDY PERMIT
TEMPORARILY RESTRICTED***

November 9, 2002....Effective Saturday November 9, 2002 in order to protect the public from the snow and avalanche study occurring at the Silverton Outdoor Learning and Recreation Center (SOLRC), access to certain areas of BLM public land and private land (controlled by SOLRC) will be restricted for the winter season. The area shown on the map will be closed to all public access in the Cement Creek and Colorado Basin areas northwest of Silverton through June 15, 2003.

The seasonal closure area is required to protect the public from dangers associated with the snow and avalanche study including but not limited to avalanches and explosives.

However, a new BLM public land access point has been created within a portion of the study area. This access point is located approximately 1.7 miles down San Juan County road 52, south towards Storm Peak. The access point provides access to the areas south of the BLM access point sign towards Storm Peak only. The areas north of the BLM access sign towards Gladstone as shown on the map are closed to public access. The new access point does **not** allow access into the restricted access portion of the study area as shown on the map. Travel along San Juan County road 52 is restricted to the roadway at all times (as highlighted with green dots) until reaching the BLM public land access point. The BLM public land access point and SJC 52 road are the only route for ingress and egress within the restricted access portion of the study area as shown on the map. Entry into the accessible BLM public land areas on the northern flank of Storm Peak (as shown on the map outlined in green) is limited to San Juan County 52 Road. Frequent temporary closures of San Juan County 52 Road should be expected.

The following entities are exempt from the access restrictions (however, their entry into the closure area must be coordinated with SOLRC to ensure that conditions are safe):

- San Juan County Sheriff's officers;
- San Juan County Search and Rescue operations;
- Private property owners in the act of accessing their property in the area;
- CDOT;
- Other entities authorized under special-use permit to the BLM, including Core Mountain Enterprises, dba as SOLRC, and Helitrax.

The temporary closure is implemented under Title 43 of the Code of Federal Regulations 8364.1. Violators are subject to fines up to \$100,000 and/or imprisonment of to 12 months.

In addition, SOLRC has been authorized by the Colorado Department of Transportation to close Highway #110-A (Cement Creek Road) when avalanche control work will affect that drainage. SOLRC is also authorized by San Juan County to close County Road 52.

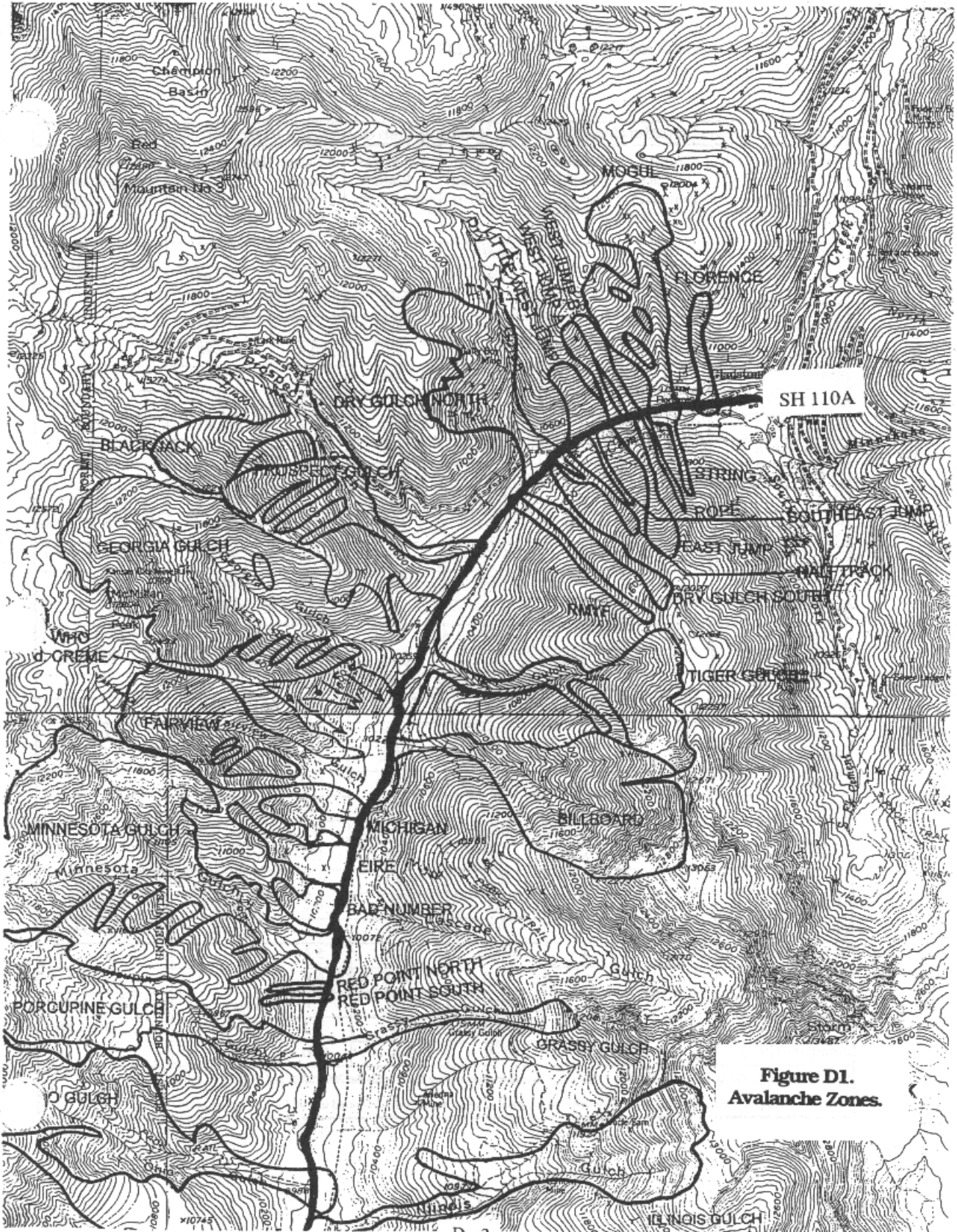
For more information look for informational postings at the SOLRC base area, and at SJC 52 road, or contact SOLRC 387-5706.

Appendix D. Avalanche Paths adjacent to SH 110A: Figure and Table.

Figure D1 depicts known avalanche paths adjacent to SH 110A. Those on the east side of the highway originate from the SOLRC project area.

Table D1 summarizes data on the avalanche paths along SH 110A that originate from or are adjacent to the SOLRC project area. Data in the table includes the following: proximity of the path to the project area, the average frequency that the avalanche path will hit the road, the length of road potentially affected by a slide, the average avalanche hazard index, the date that specific avalanche paths ran to the road, and the measurement of debris that covered the road.

Data Source: CDOT Region Five Avalanche Atlas



**Figure D1.
Avalanche Zones.**

Table D1. Avalanche paths along SH 110A originating from or adjacent to the SOLRC boundary.							
Avalanche Path	Inside SOLRC Boundary	Outside SOLRC Boundary	Average Activity on Road/Year	Length of Road affected (ft)	Average Hazard Index	Date on Road	Debris Flow Measurement (ft; depth by length)
String ¹	x		-	-	-	-	-
Rope	x		0.04	400	0		
East Jump	x		0.04	300	0.3	Feb-93	4 x 50
Southeast Jump	x		0.03	100	0.1		
Half Track	x		0.03	350	0		
Dry Gulch South	x		0.2	400	0.7	Jan-88	7 x 100
RMYF	x		0.2	200	0.2	Feb-93	3 x 40
Tiger Gulch	x		0.4	350	0.7		
Billboard	x		0.12	500	4.7	Feb-95	4 x 400
Grassy Gulch	x		0.3	200	0.1		
Florence		x	0.04	400	-		
Mogul		x	0.23	600	4.3	Feb-85,93	18 x 400
West Jump B ²		x	0.36	350	0.3	Feb-85,93	25 x 250, 15 x 800
West Jump A ²		x	0.25	250	0.1	Feb-85,93	12 x 70, 15 x 800
Little West Jump ²		x	0.05	800	-	Feb-85	15 x 800
Dry Gulch North		x	0.14	700	1	Feb-93	6 x 350
Dump North		x	0.05	300	0.4	Feb-93, Jan-97	4 x 40, 6 x 200
Dump South		x	0.1	500	0.4	Feb-93, Jan-97	6 x 50, 2 x 20
Prospect Gulch		x	0.01	200	0.1		
Black Jack		x	0.01	200	0.1		
Stump		x	0.03	300	0.4	Feb-93	3 x 60
Georgia Gulch		x	0.03	1,200	6.7		
Crème		x	0.03	400	0.2		
Who		x	0.03	600	0.1		
Stones		x	0.03	500	0.1		
Beatles		x	0.03	150	0.2		
Fairview		x	0.2	1,000	6.9	Jan-74	12 x 200
Michigan		x	0.1	250	0.8	Jan-71	6 x 100
Eire		x	0.2	450	0.8	Feb-93	12 x 400
Bad Number		x	0.1	250	5.4		
Minnesota Gulch		x	0.05	950	6.1		
Red Point North		x	0.15	100	1.2	Feb-93, 96	4 x 30, 5 x 60
Red Point South		x	0.1	250	1.2	Feb-93, 96	6 x 250, 5 x 60
Porcupine Gulch		x	0.02	400	0.01		

¹ No data exists for the String avalanche path. This chute has been skied during the current the 2001/2002 and 2002/2003 permits.

² Both West Jump A and B and Little West Jump released together. Debris measurement reported is total for all three chutes.