RECEIVED
APR 19 1993
DIVISION OF
OIL GAS & MINING

CHAPTER IX

VEGETATION

5/1/95

Most of the information in this volume is not included in the Castle Gate MRP. We need to keep it, though.

Paul Baker

TABLE OF CONTENTS

VEGETATION INFORMATION 1

RECLAMATION PLAN 2
341. Revegetation. 2
341.100. A detailed SCHEDULE and TIMETABLE 2
341.210. SPECIES and AMOUNTS PER ACRE 3
341.220. METHODS 9
341.230. MULCHING TECHNIQUES 9
341.240. IRRIGATION 10
341.250. MEASURES 10
342. Fish and Wildlife 10
342.100. ENHANCEMENT MEASURES 10
342.200. Where FISH AND WILDLIFE HABITAT 11
342.210. Their proven NUTRITIONAL VALUE 11
342.220. Their use as COVER 11
342.230. Their ability to SUPPORT AND ENHANCE 11

PERFORMANCE STANDARDS 12
351. General Requirements. 12
352. Contemporaneous Reclamation. 12
353. Revegetation: General Requirements. 12
353.100. The VEGETATIVE COVER 12
353.110. DIVERSE, EFFECTIVE, and PERMANENT 12
353.120. Comprised of SPECIES NATIVE 12
353.130. AT LEAST EQUAL IN EXTENT 13
353.140. CAPABLE OF STABILIZING 13
353.200. The reestablished plan SPECIES 13
353.210. Be COMPATIBLE 13
353.220. Have the SAME SEASONAL 13
353.230. Be capable of SELF-REGENERATION 13
353.240. Be COMPATIBLE 13
353.250. Meet the requirements 13
353.300. The Division may grant 14
354. Revegetation: Timing. 14
355. Revegetation: Mulching and Other 15
356. Revegetation: Standards for Success. 15
356.100. SUCCESS of revegetation 15
356.110. STANDARDS FOR SUCCESS 15
356.120. Standards for success 15
356.200. Standards for success 15
356.210. For areas developed 15
356.230. For areas to be developed 15
356.231. MINIMUM STOCKING AND PLANTING 15

356.232. Trees and SHRUBS 15
356.233. Vegetative ground cover 16
356.250. For areas PREVIOUSLY DISTURBED 16
357. Revegetation: Extended Responsibility Period. 16
357.100. The period of extended 16
357.200. Vegetation parameters 16
357.220. In areas of 26.0 17
357.300. The Division may approve 17
358. Protection of Fish, Wildlife, and Related Environmental Values. 17
358.400. The operator conducting 17
358.500. Each operator will 17
358.530. FENCE, COVER, or use other 18

R645-301-300-320-321

Natural Resources; Oil, Gas and Mining; Coal.
Coal Mine Permitting: Permit Application Requirements.
Biology
Environmental Description
VEGETATION INFORMATION

The baseline vegetation inventory conducted by Mariah Associates is included as appendix A to this chapter.

The revegetation plan for the permit area is presented in this chapter by repeating and then addressing the relevant regulations specified by the Utah Division of Oil, Gas, and Mining.

341. Revegetation.

Each application will contain a reclamation PLAN FOR FINAL REVEGETATION of all lands disturbed by coal mining and reclamation operations, except water areas and the surface of roads approved as part of the postmining land use, as required in R645-301-**353** through R645-301-**357**, showing how the applicant will comply with the biological protection performance standards of the State Program.

The purpose of the revegetation plan is to ensure the re-establishment of the postmining land use. As discussed in Chapter 4, the postmining lands uses for the permit area are grazing and wildlife.

341.100. A detailed SCHEDULE and TIMETABLE for the completion of each major step in the revegetation plan;

The following timetable for revegetation is forecast for the permit area:

Location	Year
Hardscrabble Canyon	***2008***
Sowbelly Canyon	***1993***
Crandall Canyon	***2018***
Castle Gate	***2018***

The following schedule for revegetation is forecast to be typical for the permit area:

perform regrading and create microtopographic features

prepare seedbed

fertilize, if scheduled at this time

seed by drill, hydroseeder, or broadcast

mulch, if scheduled at this time

fertilize, if scheduled at this time

perform husbandry practices as appropriate

perform monitoring activities

request release from bond

341.210. SPECIES and AMOUNTS PER ACRE of seeds and/or seedlings to be used. If fish and wildlife habitat will be a postmining land use, the criteria of R645-301-342.300 apply.

As specified by regulation and further addressed below, two types of revegetation will be conducted on the permit area: revegetation of PREVIOUSLY MINED AREAS (including highwall and cut slope areas), and revegetation of areas mined or disturbed by mining-related activities since May 1978 (SMCRA AREAS). The locations of previously mined areas are shown Maps 3.2-1, 3.3-1, 3.4-1, 3.5-1, 3.6-1, and 3.7-1. Special areas for wildlife in both SMCRA and PREVIOUSLY MINED AREAS will also be planted in accordance with the mixtures and techniques specified below.

The species mixture for PREVIOUSLY MINED AREAS is modelled upon a mixture used successfully by the UDOGM to revegetate local abandoned mined lands. This mixture is given in Species List #1. This mixture will also be used to revegetate drill holes and sites of less than one acre.

SMCRA AREAS will be revegetated with the mixture presented in Species List #2 and #3, where appropriate. North-facing slopes will receive transplants.

Wildlife areas will be revegetated, where appropriate, with the mixtures presented in Species Lists #1 and #3. Shrubs for wildlife may be planted from seed or by transplanting.

When the species shown in the Species Lists are not available for planting, substitution of an equivalent native species will be made and reported to UDOGM.

SPECIES LIST #1

SPECIES	# pls/acre	
Agropyron smithii *Western wheatgrass*	3	
Agropyron spicatum *Bluebunch wheatgrass*	1	
Amelanchier utahensis *Utah Serviceberry*	1	
Artemisia ludoviciana *Louisiana sagebrush*	.1	
Artemisia tridentata vaseyana *Mountain big sagebrush*	.2	
Aster glaucodes *Blueleaf Aster*	.5	
Atriplex canescens *Fourwing saltbush*		1.5
Ceratoides lanata *Winterfat*	1.5	
Cercocarpus ledifolius *Curl-leaf mountain mahogany*	1	
Chrysothamnus nauseosus albicaulis *Whitestem rubber rabbitbrush*	.5	
Elymus cinereus *Basin wildrye*	2	
*Elymus salina** *Salina wildrye*	2	
Linum lewisii *False flax*	1	
Melilotus officinalis *Yellow sweetclover*		.5
Oryzopsis hymenoides *Indian Ricegrass*	2	
Penstemon palmeri *Palmer Penstemon*	.2	
Petalostemum purpureum *Purple prairie clover*		.5

mix continued on next page

Poa ampla		*.2*
Bluegrass		
Rhus trilobata		*1.5*
Skunkbrush		
Sporobolus cryptandrus		*.1*
Sand dropseed		
	Total Seed	*17.3*

** When unavailable, this species will be replaced by Agropyron dasystachyum (Thickspike wheatgrass)*

SPECIES LIST # 2

SPECIES	*# pls/acre*	
Agropyron smithii *Western wheatgrass*	*3*	
Agropyron spicatum *Bluebunch wheatgrass*	*2*	
Agropyron trachycaulum *Slender wheatgrass*		*2*
*Amelanchier sp.** *Serviceberry*	*1*	
Artemisia ludoviciana *Loiusiana sagebrush*	*.1*	
Artemisia tridentata vaseyana *Mountain big sagebrush*	*.1*	
Bromus marginatus *Mountain brome*	*4*	
Cercocarpus ledifolius *Curl-leaf mountain mahogany*	*1*	
Chrysothamnus nauseosus *Rubber rabbitbrush*	*1*	
Linum lewisii *False flax*	*1*	
Melilotus officinalis *Yellow sweetclover*		*.5*
Penstemon sp. *Penstemon*	*.3*	
*Poa sp.** *Bluegrass*	*.3*	
Purshia tridentata *Bitterbrush*	*3*	
Symphoricarpos oreophilus *Mountain snowberry*	*1*	
Total Seed	*20.3*	

** species selected will be found in the region*

SPECIES LIST # 3

SPECIES	# pls/acre	
Achillea millefolium Yarrow	.5	
Agropyron riparium Streambank wheatgrass		3
Agropyron trachycaulum Thickspike wheatgrass		3
Bromus marginatus Mountain brome	4	
Elymus cinereus Great Basin wildrye	3	
Geranium sp.* Geranium	1	
Lupinus sp.* Lupine	2	
Melilotus officinalis Yellow sweetclover		1
Petalostemum purpureum Purple prairie clover		.5
Poa sp.* Bluegrass	.2	
Total Seed	18.2	

TRANSPLANTS		
Amelanchier sp.* Serviceberry	50	
Cornus stolonifera Red-osier dogwood		100
Populus sp.* Cottonwood	100	

mix continued on next page

Prunus virginiana		***50***
Chokecherry		
Rosa sp.*		***100***
Rose		
Salix sp.*		***500***
Willows		
	Total Seedlings	***900***

**** species selected will be found in the region***

341.220. METHODS to be used in PLANTING and SEEDING;

Fertilizer, if needed, will be broadcast prior to seeding, applied with the hydroseeder, or broadcast following plant establishment, depending on the condition of the growth medium and the success of establishment. Seed and fertilizer will not be mixed together in the hydroseeding slurry.

Seed will be applied with a drill, either of the standard or Brillion type, by hydroseeder, or by broadcasting. When applied by hydroseeder or by broadcasting, seed amounts will be double those recommended in the planting lists. Where a drill is to be used, a broadcast seeder will be attached to the drill or broadcast methods will be used to ensure separate shallow seeding of small seeds and fluffy or trashy seeds.

341.230. MULCHING TECHNIQUES, including TYPE of MULCH and RATE of application;

Following seeding, seeded areas will be mulched, or other soil stabilizing practices will be used, to ensure the establishment of vegetation in accordance with performance standards.

Tub mulching followed by crimping will be used where areas are accessible to such equipment. Native hay or straw mulch will be applied at a rate of no less than two tons per acre. Crimping will occur along the contour.

Where tub mulching is not practical, or where hydroseeding is the method of seed application, hydromulching with wood fiber, paper fiber, or a wood/paper fiber mixture at a rate of 2000 per acre will follow seeding. Tackifier will be included with the mulch.

Where synthetic mulches promise superior performance, such mulches may be used in place of hay, straw, or fiber mulches. Synthetic mulches will be approved prior to use by UDOGM.

Areas inaccessible to hydromulching will be mulched with straw or other appropriate material and tacked with nylon netting. Fiber matting or geosynthetics may be used in place of mulch and nylon net in such inaccessible areas.

341.240. IRRIGATION, if appropriate, and pest and disease control measures, if any; and

No irrigation is planned. However, transplants will be watered on a case-by-case basis to minimize drought kill. No pest or disease control measures are anticipated to be necessary. Should such control become necessary, a plan will be developed in consultation with Carbon County Weed and Pest and reported in the annual report. Approval for pest and disease control measures will be obtained from UDOGM prior to implementation of the program.

341.250. MEASURES proposed to be used TO DETERMINE the SUCCESS of REVEGETATION as required in R645-301-356.

Revegetation success measures are discussed below in the section entitled "Performance Standards".

342. Fish and Wildlife.

Each application will contain a FISH and WILDLIFE PLAN for the RECLAMATION and postmining phase of operation consistent with R645-301-330, the performance standards of R645-301-358, and include the following:

342.100. ENHANCEMENT MEASURES that will be used during the reclamation and postmining phase of operations TO DEVELOP aquatic and TERRESTRIAL HABITAT. Such measures may include restoration of streams and other wetlands, retention of ponds and impoundments, establishment of vegetation for wildlife food and cover, and the replacement of perches and nest boxes. Where the plan does not include enhancement measures, a statement will be given explaining why enhancement is not practicable.

Wildlife enhancement will be created by the development of micro-topographic features such as swales and rises created during regrading; by the establishment of rockpiles, where rocks become available during regrading; and by the use of the species specified above. Regrading activities and habitat construction for each reclaimed area are presented in Chapter 3.

Where natural materials are available for the creation of snags and roosts, such snags and roosts will be constructed. Wetland areas will be created wherever topography and hydrology lend themselves to their creation.

342.200. Where FISH AND WILDLIFE HABITAT is to be a postmining land use, the PLANT SPECIES to be used on reclaimed areas will be selected on the basis of the following criteria:

342.210. Their proven NUTRITIONAL VALUE for fish or wildlife.

342.220. Their use as COVER for fish or wildlife; and

342.230. Their ability to SUPPORT AND ENHANCE fish or wildlife HABITAT after the release of performance bonds. The selected plants will be grouped and distributed in a manner which optimizes edge effect, cover, and other benefits to fish and wildlife.

The species mixtures specified in this chapter meet the requirements of 342.200 through 230.

Natural Resources; Oil, Gas and Mining; Coal.
Coal Mine Permitting: Permit Application Requirements.
Biology
Environmental Description
PERFORMANCE STANDARDS

351. General Requirements.

All coal mining and reclamation operations will be carried out according to plans provided under R645-301-330 through R645-301-340.

The activities specified in this chapter will be conducted in accordance with this general requirement.

352. Contemporaneous Reclamation.

Revegetation on all land that is disturbed by coal mining and reclamation operations, will occur as CONTEMPORANEOUSLY AS PRACTICABLE with mining operations, except when such mining operations are conducted in accordance with a variance for combined surface and underground coal mining and reclamation activities issued under R645-302-280. The Division may establish schedules that define contemporaneous reclamation.

Revegetation activities will occur as contemporaneously as possible with the mining operation.

353. Revegetation: General Requirements.

The permittee will ESTABLISH on regraded areas and on all other disturbed areas, except water areas and surface areas of roads that are approved as part of the postmining land use, a VEGETATIVE COVER that is in accordance with the approved permit and reclamation plan.

Vegetative cover will be established in accordance with UDOGM regulations and the plan presented in this chapter.

353.100. The VEGETATIVE COVER will be:

353.110. DIVERSE, EFFECTIVE, and PERMANENT;

353.120. Comprised of SPECIES NATIVE to the area, OR of INTRODUCED SPECIES WHERE DESIRABLE AND

NECESSARY to achieve the approved postmining land use and approved by the Division;

353.130. AT LEAST EQUAL IN EXTENT OF COVER TO THE NATURAL VEGETATION of the area; and

353.140. CAPABLE OF STABILIZING THE SOIL surface from erosion.

353.200. The reestablished plan SPECIES WILL:

353.210. Be COMPATIBLE with the approved POSTMINING LAND USE;

353.220. Have the SAME SEASONAL CHARACTERISTICS of growth as the original vegetation;

353.230. Be capable of SELF-REGENERATION and plant SUCCESSION;

353.240. Be COMPATIBLE with the plant and animal SPECIES OF THE AREA; and

353.250. Meet the requirements of applicable Utah and federal SEED, POISONOUS and NOXIOUS PLANT; and INTRODUCED SPECIES laws or regulations.

The species presented in Species Lists #2 and #3 will meet the requirements of 353.100-250 above for SMCRA areas. Revegetation of previously mined areas will meet the regulatory standard for such areas.

The Motyka Index wil be used as the index of comparison for diversity, seasonal characteristics, permanence, and utility for the postmining land use between reclaimed and reference areas. The following life-form categories will be used:

Non-weedy Shrub Cover
Weedy Shrub Cover
Native Perennial Grass Cover
Introduced Perennial Grass Cover
Non-weedy Forb Cover
Weedy Forbs and Grass Cover

Weeds are those species identified as weeds by the Carbon County Weed and Pest at the time the comparison between the reclaimed and reference areas is being made.

Absolute cover will be used to compute the Motyka index. The index standard for comparison between the reclimaed and reference areas will be the percent similarity calculated between samples within the reference area, or 70 percent, whichever is less, unless otherwise approved by UDOGM.

353.300. The Division may grant EXCEPTION to the requirements of R645-301-353.220 and R645-301-353.230 when the species are NECESSARY to achieve a QUICK-GROWING, TEMPORARY, STABILIZING COVER, and MEASURES TO ESTABLISH PERMANENT VEGETATION are included in the approved permit and reclamation plan.

No exceptions are requested.

354. Revegetation: Timing.

Disturbed areas will be PLANTED DURING THE FIRST NORMAL PERIOD FOR FAVORABLE PLANTING CONDITIONS after replacement of the plant-growth medium. The normal period for favorable planting is that planting time generally ACCEPTED LOCALLY for the type of plant materials selected.

Planting will typically occur after 15 October and before ground freeze-up. When necessary, spring planting will occur after 15 March but before 15 May. Drainages will be planted in mid-April, when possible. Unusual favorable meteorological conditions or compliance requirements may result in planting efforts at times different from those specified.

355. Revegetation: Mulching and Other Soil Stabilizing Practices.

Suitable MULCH AND OTHER soil stabilizing PRACTICES will be used on all areas that have been regraded and covered by topsoil or topsoil substitutes. The Division MAY WAIVE this requirement if seasonal, soil, or slope factors result in a condition WHERE mulch and other soil stabilizing practices are NOT NECESSARY to control erosion and to promptly establish an effective vegetative cover.

Mulching will be conducted in accordance with the plan specified in this chapter. Soil stabilization will occur in accordance with the plan specified in Chapter 8.

356. Revegetation: Standards for Success.

356.100. SUCCESS of revegetation will be JUDGED ON the EFFECTIVENESS of the vegetation FOR the approved postmining LAND USE, the extent of COVER compared TO the extent of COVER of the reference area or other approved success standard, and the general requirements of R645-301-353.

356.110. STANDARDS FOR SUCCESS, statistically valid sampling techniques for measuring success, and approved methods are identified in the Division's "Vegetation Information Guidelines, APPENDIX A."

356.120. Standards for success will include criteria representative of unmined lands in the area being reclaimed to evaluate the appropriate vegetation parameters of GROUND COVER, PRODUCTION, or STOCKING. Ground cover, production, or stocking will be considered equal to the approved success standard when they are not less than 90 percent of the success standard. The sampling techniques for measuring success will use a 90-percent statistical confidence interval (i,e., one-sided test with a 0.10 alpha error).

356.200. Standards for success will be applied in accordance with the approved postmining land use and, at a minimum, the following conditions:

356.210. For areas developed for use as GRAZING LAND OR PASTURE LAND, the ground COVER AND PRODUCTION of living plants on the revegetated area will be AT LEAST EQUAL to that of a reference area or such other success standards approved by the Division.

356.230. For areas to be developed FOR FISH AND WILDLIFE HABITAT, recreation, shelter belts, or forest products, SUCCESS of vegetation will be determined on the basis of TREE AND SHRUB STOCKING AND VEGETATIVE GROUND COVER. Such parameters are described as follows:

356.231. MINIMUM STOCKING AND PLANTING ARRANGEMENTS will be specified by the Division on the basis of local and regional conditions and after consultation with and approval by Utah agencies responsible for the administration of forestry and wildlife programs. Consultation and approval may be on a program-wide basis or on a permit-specific basis.

356.232. Trees and SHRUBS that will be used in determining the success of stocking and the adequacy of plant arrangement will have UTILITY FOR THE APPROVED POSTMINING LAND USE. At the time of bond release, such trees and shrubs will be healthy, and at least 80 percent will have been in place for at least 60 percent of the applicable minimum period of responsibility. No trees and shrubs in place for less than two growing seasons will be counted in determining stocking adequacy.

356.233. Vegetative ground cover will not be less than that required to achieve the approved postmining land use.

Revegetation success for SMCRA AREAS will be measured in accordance with 356.100 through 233 as stated above. Reference areas for SMCRA areas such as Crandall Canyon are identified in the specific sections giving the reclamation plans for those areas.

356.250. For areas PREVIOUSLY DISTURBED BY MINING that were not reclaimed to the requirements of R645-200 through R645-203 and R645-301 through R645-302 and that are remined or otherwise redisturbed by coal mining and reclamation operations, at a minimum, the vegetative ground cover will be not less than the ground cover existing before redisturbance and WILL BE ADEQUATE TO CONTROL EROSION.

Revegetation success for PREVIOUSLY MINED AREAS will be measured in accordance with 356.250 as stated above. The AML Reference area shown on Map 9-6 will be used to evaluate previosuly mined areas. Revegetation will be evaluated in acordance with 356.100 through 210 as stated above.

While some erosion is natural as part of a functioning hydrogeomorphologic system, erosion will be controlled if it becomes, or threatens to become, disruptive of the postmining land use or inconsistent with erosional activities typical of the local area. Suitable measures of erosion will be established in consultation with the Division of Oil, Gas and Mining, and such measures will be employed upon approval by that agency. Until suitable measures of erosion are established, areas of active erosion and their remediation will be evaluated with the agency on a case-by-case basis.

357. Revegetation: Extended Responsibility Period.

357.100. The period of extended responsibility or successful vegetation will begin after the last year of augmented seeding, fertilization, irrigation, or other work, excluding husbandry practices that are approved by the Division in accordance with paragraph R645-301-357-300.

The period of extended responsibility, also called the "bonding period" will begin as required by 357.100 as stated above. Initiation of the bonding period for a revegetated area will be reported in the annual report.

357.200. Vegetation parameters identified in R645-301-356.200 will EQUAL OR EXCEED the approved SUCCESS STANDARD during the growing seasons for the LAST TWO YEARS OF THE RESPONSIBILITY PERIOD. The period of extended responsibility will continue for five or ten years based on precipitation data reported pursuant to R645-301-724.411, as follows:

357.220. In areas of 26.0 INCHES OR LESS average annual precipitation, the period of RESPONSIBILITY will continue for a period of not less than TEN FULL YEARS.

Prior to seeking bond release, SMCRA AREAS will be shown to meet the requirements of 357.200 and 357.220 as stated above. PREVIOUSLY MINED AREAS will be shown to meet the standards of 356.250 as stated above.

357.300. The Division may approve selective HUSBANDRY practices, such as WEED AND BRUSH CONTROL, FENCING, and WATER DEVELOPMENTS or other practices once they have been incorporated into the Utah program, in accordance with 30 CFR 732.17 as being normal husbandry practices, excluding augmented seeding, fertilization, or irrigation, without extending the period of responsibility for revegetation success and bond liability, if such practices can be expected to continue as part of the postmining land use or if discontinuance of the practices after the liability period expires will not reduce the probability of permanent revegetation success. Approved practices will be NORMAL CONSERVATION PRACTICES WITHIN THE REGION for unmined lands having land uses similar to the approved postmining land use of the disturbed area, including such practices as DISEASE, PEST, and VERMIN CONTROL; and any PRUNING, RESEEDING and/or TRANSPLANTING specifically necessitated by such actions.

Conservation practices normal to the area, including weed and brush control, fencing, water development and interseeding may be used to help ensure success on revegetated areas. Pruning, reseeding, and/or transplanting will be used in accordance with the requirements of 357.300 as stated above.

358. Protection of Fish, Wildlife, and Related Environmental Values.

The operator will, to the extent possible using the best technology currently available, MINIMIZE DISTURBANCES AND ADVERSE IMPACTS on fish, wildlife, and related environmental values and will ACHIEVE ENHANCEMENT of such resources WHERE PRACTICABLE.

358.400. The operator conducting coal mining and reclamation operations will AVOID DISTURBANCES to, ENHANCE WHERE PRACTICABLE, RESTORE, OR REPLACE, WETLANDS AND RIPARIAN vegetation along rivers and streams and bordering ponds and lakes. Coal mining and reclamation operations will AVOID DISTURBANCES to, ENHANCE WHERE PRACTICABLE, OR RESTORE, HABITATS OF UNUSUALLY HIGH VALUE for fish and wildlife.

The techniques specified in this chapter will be employed to meet the requirements of 358.400 as stated above.

358.500. Each operator will, to the extent possible using the best technology currently available:

358.530. FENCE, COVER, or use other appropriate methods to exclude wildlife from PONDS which contain HAZARDOUS concentrations of toxic-forming materials.

Fencing or covering will be used where necessary to exclude wildlife from ponds that contain hazardous concentrations of toxic-forming materials.

Appendix A

Mariah Associates Baseline Inventory

9.0 INTRODUCTION

This chapter is composed of two major sections. The first is the vegetation resources information including; data analysis, reference area development, species lists and cover mapping. The second section discusses the general reclamation plan, site specific alternatives, methods and techniques and evaluation methods for reclamation success.

9.1 VEGETATION RESOURCE INFORMATION

This section includes the results of the vegetational community analysis of all lands owned, operated or leased for underground coal mining by Price River Coal Company or the associated holding-corporation; Blackhawk Coal Company, conducted by Mariah Associates consulting firm of Laramie, Wyoming, during the period of April, 1981, through November of 1981. This study allowed for the generation of a cover map for the entire described property, the establishment of reference areas and the compilation of the list of plant species found to occur on these lands.

The Mariah study has been internally indexed by the consultant. The major sections have been listed in the general chapter index. Page numbering has been re-arranged to be sequential within the chapter.

Raw data compiled for this study is included in Appendix 9-B.

VEGETATION DATA REPORT

FOR

PRICE RIVER COAL COMPANY'S MINE AREA

HELPER, UTAH

Prepared For

Price River Coal Company

Helper, Utah

BY

Mariah Associates

Laramie, Wyoming

November, 1981

cc6.Chapter9

TABLE OF CONTENTS

9.1-1 INTRODUCTION

9.1-2 METHODS

2.1 MAPPING
2.2 SELECT REFERENCE AREAS
2.3 VEGETATION SPECIES COMPOSITION
2.4 SELECTION OF SAMPLE POINTS
2.5 VEGETATION COVER
2.6 SHRUB DENSITY AND HEIGHTS
2.7 TREE DENSITY AND BASAL AREA DATA
2.8 SOIL CONSERVATION SERVICE (SCS) PRODUCTIVITY ESTIMATES
2.9 PHOTOGRAPHS
2.10 PERSONS CONTACTED
2.11 DATA ANALYSIS AND REPORTING

9.1.3 RESULTS AND DISCUSSIONS

3.1 VEGETATION TYPES

3.1.1 Grass Sage
3.1.2 Mixed Brush
3.1.3 Pinyon-Juniper
3.1.4 Riparian Bottom
3.1.5 Conifer
3.1.6 Saltbush
3.1.7 Disturbed

3.2 THREATENED AND ENDANGERED SPECIES
3.3 VEGETATION ON REFERENCE AREAS AND POTENTIALLY AFFECTED VEGETATION TYPES

3.3.1 Sample Adequacy
3.3.2 Affected Areas and Corresponding Reference Areas
3.3.3 Data Presentation

3.3.3.1 Sowbelly grass-sage reference area
3.3.3.2 Willow Creek grass-sage reference area
3.3.3.3 Barn Canyon grass-sage reference area
3.3.3.4 Barn Canyon grass-sage affected
3.3.3.5 Sowbelly mixed brush reference area
3.3.3.6 Castle Gate mixed brush reference area
3.3.3.7 Barn Canyon mixed brush affected
3.3.3.8 Dry Canyon mixed brush reference area
3.3.3.9 Barn Canyon pinyon-juniper affected
3.3.3.10 Crandall pinyon-juniper reference area

3.3.3.11 Castle Gate riparian reference area
3.3.3.12 Crandall riparian reference area
3.3.3.13 Barn Canyon conifer affected
3.3.3.14 Crandall conifer reference area

9.1-4 SUMMARY

9.1-5 LITERATURE CITED

9.1-1 INTRODUCTION

Mariah Associates conducted vegetation studies during the 1981 growing season on Castle Gate Coal Company's Mine Plan Area around Helper, Carbon County, Utah. The mine plan area consisted of approximately 42 square miles in all or parts of Sections 35 - 36, T12S R8E; 25-36 T12S R9E; 26-35 T12S R10E; 2 T13S R8E; 1-6, 8-12, 14, 16, 17, T13S R9E; 1-6, 8-12, 15-18, 20-22, 28-30, T13S R10E (see Exhibit 9-1).

Castle Gate Coal Company (CGCC) has several facilities currently in operation within the mine plan area for which reference areas were established. In addition, vegetation baseline studies for an area in Barn Canyon that may be disturbed by future activities were conducted. The objectives of the study were to:

* Establish reference areas for vegetation types that had been present prior to mining to serve as benchmarks for evaluating reclamation success.
* Measure selected parameters that would provide information on existing vegetation conditions on reference areas and the potentially affected area in Barn Canyon.
* Identify any threatened or endangered plant species protected by federal and state laws.

Vegetation parameters measured were species composition, cover, frequency, shrub density, shrub height, tree density, and basal area. Estimates of vegetation productivity were obtained from the Soil Conservation Service.

The methods used for the study area are described in this report.

Results are summarized in tabular form and discussed in the text of the report. Vegetation types, reference areas, and sample site locations are shown on Exhibit 9-1. Computer listings of all field and analyzed data are presented for each area sampled (Appendix B). Lists of vegetation species encountered on each of the vegetation types are also included (Appendix A).

9.1-2 METHODS

The study was patterned after Utah Division of Oil, Gas, and Mining (UDOGM) Preliminary Guidelines for Vegetation Studies on Coal Mines (June 6, 1980 revision). Specific study requirements and techniques were defined during consultations with personnel from UDOGM (Mary Ann Wright, Reclamation Biologist and Administrator of Abandoned Mine Reclamation; Susan Linner, Reclamation Biologist; Lynn Kunzler, Reclamation Biologist), and Office of Surface Mining (OSM) (Larry Larson, Vegetation Specialist). Wyoming Department of Environmental Quality (WDEQ) Guideline #2 "Vegetation", January, 1981, was used for supplemental information on data analysis techniques.

A field reconnaissance was performed in June, 1981, to determine the boundaries of the mine plan area, the number of vegetation types and identify potential reference areas. Disturbed areas associated with this underground mine include portals, loadout, waste disposal, and other surface facilities such as tanks, equipment, roads, and materials storage. Most disturbed areas are located in the bottom of canyons. An area in Barn Canyon may be used for a waste disposal site in the future.

Vegetation studies necessary to meet regulatory requirements were preparation of a vegetation cover map for the mine plan area, selection of reference areas for vegetation types that existed in the disturbed areas prior to mining, selection of reference areas for vegetation types that occur in the affected area of Barn Canyon, and sampling of the affected area and the reference sites to describe vegetation species composition and cover. This reference area approach does not require sampling of vegetation production until studies to ascertain success of reclamation are conducted. Estimates of vegetation production for the various reference areas as well as the affected area in Barn Canyon were obtained from the Soil Conservation Service (SCS).

The following procedures were used to provide vegetation data for the project:

* Map and describe all major vegetation communities within the mine plan area.
* Ascertain vegetation types that occurred in disturbed areas prior to mining activity and select reference areas to represent the various types.
* Ascertain vegetation types that occur in the Barn Canyon affected area, select sampling points in the affected area, and select reference areas to represent the affected area vegetation types.
* Ascertain species composition and prepare voucher collection.
* Estimate vegetation cover.
* Estimate shrub density and shrub heights.
* Estimate tree density and basal area.
* Obtain estimates of productivity from the SCS.
* Photograph all vegetation types.

All procedures are explained below:

2.1 MAPPING

A thorough reconnaissance was conducted in June, 1981, to identify plant communities within the permit area for a preliminary vegetation map. The distribution of vegetation types on the mine permit area were delineated on clear acetate sheets overlying black and white aerial photographs. Type delinations were then transferred to a topographic base map at a scale of 1 in. = 1000 ft. Accurate transfer of type delineations was accomplished by aligning topographic and manmade features common to both the aerial photograph and the topographic base map with the aid of zoom transfer equipment. The vegetation map was ground-thruthed at numerous points in and near the disturbed, affected, and reference areas. The final topographic base map with all vegetation type delineations was expanded to scale of 1 in. = 400 ft. for all disturbed and affected areas and a 1 in. = 100 ft. map was prepared for the Crandall Canyon Leach Field (the scale of all maps was approved or specifically requested by UDOGM personnel, Lynn Kunzler, Reclamation, Biologist). Locations of each reference area on the mine permit area were plotted on the topographic maps. Sample site locations in the Barn Canyon affected area were also plotted on the vegetation map. Mapping units on the mine plan area were: grassland-sagebrush (grass-sage), pinyon-juniper, riparian bottom, mixed brush, conifer, saltbush, pre-1977 mining disturbances, post-1977 mining disturbances, (including areas disturbed by mining prior to 1977 that were subsequently used for mining activity) and other disturbances.

Total acreages of all disturbed areas within the mine plan area, the acreage of the vegetation to be disturbed in Crandall Canyon, and the acreage of potentially affected areas in Barn Canyon were estimated by standard polar planimeter techniques. Each measurable unit was planimetered until three independent measurements were within 10 percent of one another. These three measurements were then averaged to obtain an acreage estimate for the unit. Their individual estimates for all units of a specific type were then summed to provided an estimate of the acreage within each type. Percent of each vegetation type in disturbed areas was estimated where the exact location of vegetation type boundaries prior to disturbance could not be determined. This estimate was based on relative distribution of vegetation types on nearby undisturbed areas with similar topography, similar slope, aspect, and soil characteristics.

2.2 SELECT REFERENCE AREAS

Vegetation types that occurred in the disturbed areas prior to mining activity were ascertained by examination or undisturbed areas immediately above, below, and surrounding the disturbed sites as well as other similar sites nearby that have not been disturbed. Aerial photos taken prior to disturbance were also used to help identify predisturbance vegetation types.

The primary goal of vegetation studies is to establish valid reference areas which must be utilized to measure the success of vegetation for the purpose of bond release (UDOGM 1980). Reference areas, approximately 2 to 3 acres in size, were selected for each of

the major vegetation types that have been disturbed as well as those types that occur in the potentially affected area in Barn Canyon. Reference areas were selected on the basis of similarity of species composition, cover, productivity, geology, soils, slope, and aspect with representative vegetation types on the disturbed and affected areas. Reference sites were established in areas not to be disturbed by project activities. Location of the reference sites were marked by steel rods in the field and plotted on the vegetation maps.

On August 14, 1981, UDOGM personnel (Kunzler, Linner, and Wright) toured the proposed reference areas for the sites presently disturbed by mining, except for the grass-sage reference area near Barn Canyon, which was added later. Reference areas for the potentially affected types in Barn Canyon, which were not examined by UDOGM personnel because they were selected subsequent to the tour, were selected with an interative process on the basis of a t-test comparison of vegetative cover to demonstrate equality of the affected and reference areas. The t-test comparison is the least subjective method used to evaluate potential reference areas (bonham et al. 1980:52). The reference area selection process involved comparison of vegetative cover data from each potentially affected type in Barn Canyon with data from corresponding reference areas for disturbed sites that had been established for the type. If the t-test comparison indicated that vegetative cover on the affected area and proposed reference area were significantly different, another reference area was selected, sampled, and the data compared to the affected area vegetative cover data. This

process was repeated for each type until no significant difference between the affected area and proposed reference area could be demonstrated. Such an approach assured that proposed reference areas would be equivalent for the potentially affected types in Barn Canyon.

2.3 VEGETATION SPECIES COMPOSITION

Reconnaissance-type surveys were conducted within each major vegetation type on the project site to obtain a complete listing of vegetation species for the study area. Specific species composition surveys were conducted by a plant taxonomist during two field trips scheduled to take advantage of different phrenological periods in 1981. During the survey, the botanist listed all plants observed during a thorough reconnaissance of each vegetation type. A plant voucher collection was prepared for all plants identified during the study. For each plant collected, date, habitat, elevation, and associated species were recorded. Questionable plant species were taken to the Rocky Mountain Herbarium, Laramie, Wyoming for positive identification. Specific searches for threatened, endangered, noxious weeds, and selenium indicator plant species were conducted in appropriate habitats during the species composition study. Any additional species observed during the vegetation cover sampling were recorded and added to the species list of the appropriate vegetation type.

2.4 SELECTION OF SAMPLE POINTS

All sample points for vegetation cover, shrub, and tree data were randomly selected. On the reference areas, a table of random numbers

was used to identify the starting point of each transect as follows: A random number indicated the number of paces across one side of the reference area and a second number indicated the number of paces perpendicular to that side to the point within the reference area. A third random number was used to select transect direction. Sample points for the Barn Canyon affected area were selected by overlying a grid (interval = 0.4 in.) on the 1 in. = 400 ft. vegetation map and using a random numbers table to identify grid coordinates for each point. Each point was then located in the field by pacing from recognizable landmarks. Transect direction was randomly selected in the same manner as on the reference areas. These techniques ensured the position of each transect was unbiased.

2.5 VEGETATION COVER

Cover data were obtained at 50 points spaced at 1 m intervals along a transect at each randomly selected sample point. A linear point-frequency frame (Mueller-Dombois and Ellenbert 1974) was used to accurately measure vertical hits on vegetation, litter, and bare ground. Crown or shoot over was measured by counting only the first interception of the pin with a plant part. Overhead canopy cover was determined by recording the plant species hit when the vertical line of the pin was projected upward above the frame. Where crowns overlap in layered vegetation, the uppermost layer was considered the primary vegetation hit and subsequent hits on lower vegetation were recorded separately.

Data derived by the technique described above provided an index for vegetative, litter-rock, and bare ground cover by identifying the frequency with which each of these components of total cover was encountered along a given transect. Frequency of occurrence of plant species encountered along each transect was also determined by this technique to provide information regarding the relative distribution of all vegetative species encountered within each sample unit.

All cover data were collected during July 7-10, September 27, and October 7-10, 1981. Data were recorded on field forms developed for computer input. A mininmum of 15 transects were sampled in each type of reference area prior to sample adequacy calculations. If necessary, additional cover transects were sampled in each area until the desired level (± 10% x @ 90% confidence) was achieved. The number of cover transects in each sampling area is shown in Table 9.3.

2.6 SHRUB DENSITY AND HEIGHTS

Shrub density and height were estimated along the same transects used for cover data. The height, number, and species of shrubs whose stems arose within 50 cm of either side of the 49 m long transect were recorded. Shrub heights were measured and recorded by the following classes: 1-10 cm, 11-30 cm, 31-50 cm, 51-100 cm, 1-2 cm, 2-4 cm, and over 4 m. On certain reference areas, it was more efficient to conduct an absolute count of the shrubs within the area of known size. The decision to use an absolute count or shrub density transect was based on the effects of distribution and density of the shrubs on efficiency of total counts relative to sampling. Desired confidence level for shrub density was ± 20% x @ 80%.

2.7 TREE DENSITY AND BASAL AREA DATA

The point-quarter technique (Smith 1974) was used to collect tree density and basal area data within tree covered types on the study area. At each sample point, imaginary grid lines were used to divide the area into four quarters. The tree nearest to the point in each quarter was recorded by species, circumference at breast height (in) for those larger than 1 in. diameter, and distance from the point (ft) on a standard field data form. On certain areas, an absolute count or photo count of trees was conducted instead of point-quarter sampling for density estimates. Absolute counts involved recording the basal area and number of trees of each species within the reference area of known size. Density of trees on the pinyon-juniper areas was determined by counting individual trees within an area of known size on aerial photos with the aid of a magnifying stereoscope. The relative abundance of each species and figures for basal area calculations in the pinyon-juniper area were provided by the point-quarter samples.

2.8 SOIL CONSERVATION SERVICE (SCS) PRODUCTIVITY ESTIMATES

Productivity estimates for the various areas were obtained from the local SCS range conservationist (George Cook) who examined each site.

2.9 PHOTOGRAPHS

All vegetation types were photographed to provide visual documentation of characteristics.

2.10 PERSONS CONTACTED

A list of people contacted for information during the vegetation study is given in Table 9.1.

2.11 DATA ANALYSIS AND REPORTING

A comprehensive data base management and analysis system on a CYBER 730 computer was used to process vegetation data collected during this study. Data were input via keypunched cards that had been double punched and verified for accuracy. All field data were printed out on computer sheets in legible form and in the appropriate format. Cover data were analyzed first by transect, then all data were summarized to provide results by vegetation type. Data are reported for percent cover of vegetation, litter and rock, and bare ground. Vegetation cover data are reported by vegetative species and life form. Sample adequacy and species diversity calculations are shown for each vegetation type or sample area at the bottom of each print-out. This procedure ensures the careful, accurate documentation of very data analysis step from field collection and recording through summary data analysis thereby providing the logical, legible format of data with which any results and conclusion stated in this report can be easily verified. Formulas for all methods and calculations are given in Table 9.2.

TABLE 9.1 List of People Contracted for Information During the Vegetation Study on Price River Coal Company's Mine Plan Area, 1981.

Mr. Thomas Behling
Carbon County Agriculture Extension Agent
Price, Utah

Mr. George Cook
Range Conservationist
Soil Conversation Service
Price, Utah

Mr. Lynn Kunzler
Reclamation Biologist
Utah Division of Oil, Gas, and Mining
Salt Lake City, Utah

Mr. Larry Larson
Vegetation Specialist
Office of Surface Mining
Denver, Colorado

Mariach Associates
165 North 5th St.
Laramie, Wyoming 82070

Ms. Susan Lineer
Reclamation Biologist
Utah Division of Oil, Gas, and Mining
Salt Lake City, Utah

Mr. Gary D. Moreau
District Conservationist
Soil Conservation Service
Price, Utah

Ms. Mary Ann Wright
Administrator of Abandoned Mine Reclamation
Utah Division of Oil, Gas, and Mining
Salt Lake City, Utah

TABLE 9.2 Methods and Formulae Used for Vegetation Data Analysis

---

Percent Cover = $\frac{h}{pn} \times 100$

where: p = number of times the species was hit
n = number of transects sampled
p = number of possible hits on each transect

Percent Frequency = $\frac{T}{N} \times 100$

where: T = number of transects containing the species
n = number of transects sample

Shrub Density/ha = N x (204.08)

where: N = the number of shrubs counted on the transect
204.08 = coversion factor for density per transect area (49 m^2) to density per hectare (100,000 m^2)

For reference areas on which all shrubs or trees were counted, the number of shrubs or trees was divided by size of the area (determined by pacing in the field or measuring on aerial photos) to obtain the density estimate.

Total Tree Density/ha - $\frac{43,560}{\left(\frac{PT}{D}\right)}$ 2 x (2.47)

where: 43,560 ft.
2.47 = ac/ha
PT = sum of the point to tree in distances in ft.
D = total number of distances measured

Individual species densities are then calculated:

Density for Species x = total density x $\frac{x}{T}$

where: x = number of trees of species x in sample
T = total number of trees of all species in the sample

Basal Area (cm^2) = $(CBH \times 0.404)^2$

where: = 3.1416
CBH = circumference at breast height in inches
.404 = conversion factor to calculate radius in cm from circumference.

Mean (x) = $\frac{x}{n}$

where: x = sum of values for variable under consideration
n = number of transects or observations sample

Standard Deviation (s) $\frac{x - xi}{n - 1}$

where: x = mean
x_i = value of variable for sample point i
n = number of sample points

Sample Size adequacy (Wyoming Department of Environmental Quality Guideline #2):

$$N_{min} = \geq 2 \frac{(s\ z)^2}{(d\ x)^2}$$

where: M_{min} = minimum number of samples
s = sample standard deviation
z = z statistic (see table below)
d = amount of reduction to detect (see table below)
$\bar{x}$ = sample mean

z = Statistic and d Table

	z	d
Cover	1.28	0.1
Productivity, grasslands	1.28	0.1
Productivity, shrublands	0.84	0.2
Tree and Shrub Density	0.84	0.2

Confidence Level Achieved: $z_i = \frac{n(d\ x)^2}{s^2}$

where: n = number of sample points
z_i = calculated z value used in z table for identifying confidence level achieved (other variables defined in sample size adequacy).

Species Diversity Index (H) = $P_i \log_e P_i$

where: P_i = decimal fraction of total individuals belonging to the ith species.

Equality of Affected and Reference Areas: t-test Comparison
Ho: reference area j = affected area i

Ha: reference area j = affected area i

$$t_e = x_j - x_i$$

$$sp^2 n_j + n_i$$

$$n_j n_i$$

where: t_3 = estimated t-value which is compared to tabular t-value

x_2 = mean

s^2 = variance

n = sample size

i = affected area data

j = reference area data

$$sp^2 = m_j + m_i$$

$$n_j + n_i - 2$$

$$m = (n - 1)\ s^2$$

Similarity index: (Bonham et al. 1980:81):

$$s = \frac{2w}{a + b}$$

where: a = similarity between potential reference area and the inventory unit

a = number of species in area a

b = number of species in area b

2 = number of species in common for a and b

Reference: Pielou (1966), Snedecor and Cochran (1967), et al. 1980, Larson 1980, Wyoming Department of Environmental Quality (1981).

9.1-3 RESULTS AND DISCUSSION

Coal mining has been conducted in the Mine Plan Area for over 100 years. Old abandoned mines and the associated refuse disposal, transportation facilities, villages, and houses for the work force are scattered throughout many of the canyons in and near the mine area. Major highways (U.S. 6 and Utah 33) and railroad routes pass through the area. There are also a Utah Power and Light Company Electric Generation Station and a municipal water treatment plant along the Price River in or near the Mine Plan Area. As a result of human activity, most of the land along the Price River and many of the canyon bottoms within the river area have been disturbed to the native species usually found in the various vegetation types, numerous weeds and cultivated plants that have escaped or have been abandoned are found in the Mine Plan Area. Land not presently devoted to uses such as mining and transportation, is used primarily for unmanaged livestock grazing. Mule deer (Odocoileus hemionus) and elk (Cervus Elaphus) are the large native herbivores that occur in the area while smaller herbivores such as ground squirrels (Spermophilus spp.), chipmunks (Eutamias spp.) and rabbits (Sylvilagus and Lepus spp.) are abundant in several areas.

3.1 VEGETATION TYPES

Vegetation types of the entire Mine Plan Area are depicted on a vegetation cover map, Exhibit 9.1.1 Areas presently disturbed or which may be disturbed by future mining are also shown on the larger scale maps (not included but available on request). Acreages of vegetation types, disturbed areas, and potential disturbance in the Mine Plan Area are shown in Table 9.3.

The five major vegetation types on the Mine Plan Area are grass-sage, mixed brush, conifer, pinyon-juniper, and riparian bottom (Plates 9.3.1 - 9.3.5, respectively). A very small area of saltbush type occurs on the southern edge of the Mine Plan Area. Since not all disturbed areas were associated with mining and some of the mining disturbance was prior to the effective date of 8-3-77, disturbed sites of the Mine Plan Area were identified according to the following criteria: pre-1977 mining disturbance, post-1977 mining disturbance, (including areas disturbed by mining prior to 1977 that were used to subsequent mining activity) and other disturbance. A description of the major types is presented in this section. Quantitative data for specific reference and affected areas are presented in Section 3.3 and Appendix B.

TABLE 9.3 Acreages of Disturbed and Potentially Disturbed Sites in The In Plan Area

AREA		ACRES
D1 - Disturbed by mining prior to 1977		400
D2 - Disturbed by mining after 1977		140
Ds - Other disturbance		600
	TOTAL DISTURBED	1,140
Crandall Canyon Area (already included in D2 above):		
Leach Field Area:		
Grass-sage	1.9 (37)	
Mixed brush	2.6 (51)	
Conifer	0.6 (12)	
SUBTOTAL	5.1	
Shaft Site and Associated Facilities:		
Mixed brush	5.5 (48)	
Confier	0.5 (4)	
Riparian Bottom	5.5 (48)	
SUBTOTAL	11.5	
Total in Crandall Canyon		16.6

1 / Percent of type in the area

3.1.1 Grass Sage

The grass-sage vegetation type (Plate 9.3.1) occurs on steep dry slopes as well as along some of the lower drainages in the Mine Plan Area. Relative cover provided by Artemisia sup. or the graminoid components varies depending on site characteristics. Artemisia is dominant in areas such as along the barks of Willow Creek and share dominance on sites such as those found on the slopes of Sowbelly Canyon but grasses are often dominant on knolls or the tops of small ridges within the type. The area covered by the grass-sage type in the vicinity of the Castle Gate Preparation Plant appears to have been burned many years ago; a few weathered and charred pinyon or juniper stumps are scattered throughout slopes in that area. The upper end of the small grass-sage area in the vicinity of the proposed leach field in Crandall Canyon is covered with almost pure grass but sagebrush becomes, more prevalent in the lower end.

The list of vegetative species occurring on the grass-sage type within the mine plan area is presented in Appendix A. No endangered or threatened plant species (Federal Register, December 15, 1980) was observed in this type. Two noxious weeds (Utah Noxious Weed Act 1958), (Cardaria chalepenis and Centaurea repens, and one selenium indicator, Stanleya pinnata, were found in this type. Twenty-four species listed as weeds by Holmgren and Anderson (1971) were found in this type. Neither of the noxious weeds was abundant or widespread enough to have been encountered along vegetation cover transects in the grass-sage type. Stanleya pinnata was encountered once in the Sowbelly grass-sage

reference area; it accounted for 0.1 percent of the cover in the area. It was not encountered along transects on any of the other grass-sage areas that were sampled. Bromus tectorum, Chenopodium albium, and Salsola kali were the most widespread common weeds on the grass-sage areas.

3.1.2 Mixed Brush

Mixed brush type (Plate 9.3.2) generally occurs in relatively moist sites such as the bottoms of gulches and small depressions in the upland area; however, it is found on a wide range of slopes/aspects combinations throughout the study area. Composition of the mixed brush type is highly variable, ranging from dryer sites dominated by Artemisia tridentata, Pinus edulis, Juniperus osteosperma or even Populus tremuloides. The most common species throughout mixed brush type are Quercus gambelii, Symphoricarpos occidentalis, and Artemisia tridentata.

The list of vegetative species occurring within the mixed brush type is presented in Appendix A. No endangered or threatened plant species (Federal Register, December 15, 1980) was observed in this type. Three noxious weeds (Utah Noxious Weed Act 1985), Cardaria chalepensis, Cardeus nutans, and Convolulus arvensis were found in this type; however, none was widespread or abundant even to have been encountered on vegetation cover transects in the type. No selenium indicator species was found in the mixed brush type. Twenty-two species listed as weeds by Holmgrem and Anderson (1971) were found in this type. Bromus toctorum was encountered on all mixed brush in which

cover transects were run and Kochia scoparia was encountered on cover transects in the Sowbelly mixed brush reference area.

3.1.3 Pinyon-Juniper

Pinyon-juniper vegetation (Plate 3.3) is found on slopes that are the steep, rocky and dry in the northern and central portions of the Mine Plan Area as well as on the more level but equally dry sites below the cliffs in the southern portions of the area. Dominant species in this open, wooded type are Pinus edulus and Juniperus osteosperma. Other common species are Cercocarpus ledifolius, Quercs gambelii, Artemisia tridentata, Chrysothamnus app., and Agrophyron spp. The steepness of the slopes on which this type occurs in much of the mine area precludes grazing by cattle.

The list of species in the pinyon-juniper type is presented in Appendix A. No endangered or threatened species (Federal Register, December 15, 1980) or noxious weed (Utah Noxious Weed Act 1958) was observed in this type. Two selenium indicators, Astragalus falvus and stanleya pinnata, were found in the pinyon-juniper type; however, they were not widespread or abundant enough to have been encountered on the cover transects. Five species listed as weeds by Holmgren and Andersen (1971) were found in this type.

3.1.4 Riparian Bottom

The riparian bottom type (Plate 3.4) is limited to the streambanks along the Price River and a couple of sites in the bottom of Crandall Canyon. Distinguishing characteristics of this type are the presence

of deciduous trees (primarily Populus angustifolia) or relatively open, grass-covered flats in canyon bottoms. Riparian bottoms have been disturbed in the past by overgrazing, human occupation, and periodic flooding and weedy species such as Cynoglossum officinale, Braums tectorum, Salsola kali, and Convolvulus arvense are common. Senescent Populus angustifolia trees are numerous along Crandall Canyon and seedlings are abundant but there are relatively few saplings.

The list of species occurring in the riparian bottom type is found in Appendix A. No endangered or threatened species (Federal Register, December 15, 1980) or selenium indicator species was found on this type. Two noxious weeds (Utah Noxious Weed Act 1958), Cirsium arvense and Convolvulus arvensis, occur in the riparian type. Convolvulus arvensis was 3.3 percent of the cover on the Castle Gate riparian area. Cirsium sp. was 0.2 percent of the cover in the Crandall riparian area. Twenty-three species listed as weeds by Holmgren and Andersen (1971) were found in the type. Eight weed species were encountered on transects in the Castle Gate riparian area and four were encountered on transects in the Crandall riparian area.

3.1.5 Conifer

The conifer type (Plate 3.5) is found on the higher elevations, northerly facing slopes, and across some of the drainages in the mine Plan Area. The type is often dominated by Pseudotsuga menziesii; however, Juniperus osteospermun, Pinus ponderosa, Abies concolor, or Abies lasiocarpa may be more abundant on certain sites. Composition of

the understory is influenced by canopy coverage, therefore it varies as the density of trees in the conifer type varies throughout the study area. Relatively dense standards of conifer have relatively little understory of perennial grasses, forbs, and shrubs such as Symphoricarpos occidentalis and Berberis repens. Open stands have relatively more grasses as well as shrubs of the mixed brush type.

The list of vegetative species found in the conifer type is presented in Appendix A. No endangered or threatened species (Federal Register, December 15, 1980) or selenium indicator species was found in this type. One noxious weed (Utah Noxious Weed Act 1985), Onopordum acanthium, was found in this type; however, it was widespread or abundant enough to have been encountered on the vegetation cover transects. Eleven species listed as weeds by Holmgren and Andersen (1971) were found in this type. The most abundant weeds in the conifer type was Cerastium sp. which was 0.3 percent of the cover on the Crandall conifer area and Taraxacum officinale which was 0.1 percent of the cover in the Crandall area.

3.1.6 Saltbush

An extremely small amount of the saltbush vegetation type (5 acres) occurs on the southern edge of the Mine Plan Area. This type occurs on a clay hillside which is sparsely vegetated by Atriplex cavesens and Sarcobatus verniculatus as well as other species adopted to the harsh growing conditions. No affected sites or reference areas occur within this area so quantitative studies were not conducted in this minor type.

3.1.7 Disturbed

Sites for mine facilities and associated disturbance, highways, railroads, and other human disturbances are included in this type. Disturbed sites were identified according to whether they were pre-1977 mining disturbance, post-1977 mining disturbance (including areas disturbed by mining prior to 1977 that were subsequently used for mining activity), or disturbed by other activities. Most disturbed sites are in such condition that vegetation growth is limited, if it is allowed at all. Although isolated patches of species usually associated with the various natural vegetation types occur within and on the edges of adjacent disturbed areas, most species growing in those sites are primarily succession species and are considered weeds: Salsola kali, Kochia scoporia, and Convolvulus arvenses. Chrysothamnus nauseosus, a shrub species that invades disturbed sites, commonly grown on the edges of disturbed areas.

3.2 THREATENED AND ENDANGERED SPECIES

No threatened or endangered plant species (Federal Register, December 15, 1980) was found on the area.

No threatened or endangered plant species presently listed is known to occur in Carbon County; however, the occurrence of Eriogonum corymbosum var. davidsei and Eriogonum lancifolium, two species recommended for endangered listing, was reported by Welsh and Thone (1979). Eriogonum corymbosum var. Davidsei occurs in a desert shrub community near Price. It occurs at approximately 5,500 feet elevation in clay soil on a steep hillside on the Mancos Shale Formation.

Eriogonum lancifolium is also found on the Mancos Shale Formation and usually occurs in association with scattered juniper in salt desert shrub communities between 4,900-5,700 feet. It is found on gray clay soils. Neither of these species is known to occur on the Mine Plan Area.

3.3 VEGETATION OF REFERENCE AREAS AND POTENTIALLY AFFECTED VEGETATION TYPES

3.3.1 Sample Adequacy

Sample adequacy was calculated for all vegetative cover, shrub density, and tree density data gathered on the Mine Plan Area. All data met or exceeded the desired confidence level except for shrub density on the Barn Canyon pinyon-juniper affected area (Table 9.4). Desired confidence level for this data was 80 percent and the confidence level achieved was 79.4 percent (Table 9.4). One additional shrub transect would have been sufficient to exceed the desired confidence level; however, a snowstorm hit the Study Area on the last day of the field trip and, given the weather conditions, it was not practical to attempt additional sampling in the area.

3.3.2 Affected Areas and Corresponding Reference Areas

The list of affected areas and corresponding reference areas is given in Table 9.5. A comparison of vegetation data from the types in Barn Canyon that may be affected and the equivalent reference areas is provided in Table 9.6. Since the other affected areas were already disturbed, there are no baseline vegetation data for statistical

comparison with reference area data. Although the reference area selection for the disturbed areas was more subjective than for the Barn Canyon types, the reference areas chosen are typically what would have been present in the disturbed sites due to the similarity of slope, aspect, and elevation as well as the proximity to areas they represent. Reference areas for the disturbed sites provide the basis for reclamation success standards; however, final reclamation success criteria will also have to take other factors, such as actual vegetation cover prior to mining disturbance (e.g., there was previously a village on this site of the Castle Gate Preparation Plant) as well as dates of disturbance into consideration.

Vegetative cover on all reference areas was not significantly different (t=.05) from their corresponding affected area in Barn Canyon (Table 9.6). All vegetative species similarity indices were 50 percent or greater.

TABLE 9.4 Statistical Adequacy of Vegetation Data for the Castle Gate Coal Company's Mine Area, 1981 (Revised March, 1988)

Sampling Area	Vegetation Cover			Shrub Density			Tree Density		
	N_{min}	n	CLA	N_{min}	n	CLA	N_{min}	n	CLA
REFERENCE AREAS:									
Sowbelly Grass Sage	11	15	92.8	2	15	99.6	NA.....		
Sowbelly Mixed Brush	14	15	91.0	2	15	98.8	NA.....		
Castle Gate Riparian	13	15	91.6	24	28	8.21	.....AC.....		
Castle Gate Mixed Brush	7	15	96.6	6	15	91.0	NA.....		
Crandall Riparian	23	24	90.3	..	AC	....	.....AC.....		
Crandall Conifer	6	15	97.4	3	15	96.5	22	28	83.1
Crandall Pinyon-Juniper	1	15	100.0	8	15	87.7	.....PC.....		
Barn Canyon Grass-Sage	4	15	99.5	8	15	88.1	NA.....		
Dry Canyon Mixed Brush	3	15	99.7	3	15	97.7	NA.....		

N_{min} = minimum sample size to meet desired confidence levels
n = Sample Size Collected
CLA = Confidence Level Achieved
AC = Absolute Count
NA = Not Applicable
PC = Photo Count

TABLE 9.5 List of Affected Areas and Corresponding Reference Areas, Price River Coal Company
Reference Area locations, see Exhibit 9.1 in Exhibits.

Affected Area	Reference Area
Sowbelly and Hardscrabble Mines	Sowbelly Mixed Brush and Sowbelly Grass-Sage
Castle Gate Prep Plant (See Map 3.4-3)	Castle Gate Mixed Brush, Castle Gate Riparian Bottom, Barn Canyon Grass-Sage
Crandall Canyon Shift Site	Castle Gate Mixed Brush, Crandall Conifer, Crandall Riparian Bottom
Crandall Canyon Leach Field	Barn Canyon Grass-Sage, Castle Gate Mixed Brush Crandall Conifer

TABLE 9.6 Comparison of Vegetation Data from Affected Areas in Barn Canyon and Corresponding Reference Areas, 1981

Table 9.6 Removed - Mid-Term Review

TABLE 9.7 Summary Shrub Density and Height Data for Reference and Affected Areas on Price River Coal Company's Mine Plan Area, 1981.

Sampling Areas	Percent Frequency - Height Classes(1) A	B	C	D	E	F	G	Height (cm) $\bar{x}$	s	Total Counted	Density (#/ha) $\bar{x}$	
REFERENCE AREAS:												
Sowbelly Grass-Sage	26.3	67.4	3.7	1.7	0.6	0.3	0.0	19.4	21.7	648	8,816.3	1832.2
Barn Canyon Grass-Sage	25.3	12.9	25.3	26.4	10.1	0.0	0.0	48.9	42.9	178	2,421.8	1120.1
Sowbelly Mixed Brush	12.2	29.5	17.2	18.0	17.0	4.9	1.2	71.7	79.9	760	10,340.1	2528.7
Castle Gate Mixed Brush	13.5	23.0	27.4	28.0	5.7	2.4	0.0	53.1	52.6	453	6,163.3	2539.9
Castle Gate Riparian	6.4	14.9	23.1	19.1	15.9	19.6	1.1	113.9	107.4	377	2,747.8	2246.3
Crandall Riparian	8.2	31.7	26.5	20.7	8.2	4.0	0.6	59.6	67.7	328	404.9	-
Crandall Confier	52.5	31.4	13.3	2.5	0.1	0.1	0.0	16.6	18.4	952	12,952.4	3914.9

1 Height classes:

Code	Range (cm)	Mid-Point (cm)
A	0-10	5
B	11-30	20
C	31-50	40
D	51-100	75
E	101-200	150
F	201-400	300
G	Over 400	

TABLE 9.8 Summary Tree Density Data for Reference Areas on Castle Gate Coal Company's Mine Plan Area, 1988

Vegetation Type	Density (#/ha)	Mean Basal Area (cm2)
REFERENCE:		
Castle Gate Riparian	147.0	969.9
Crandall Riparian	202.0	600.9
Crandall Conifer	961.6	369.0

TABLE 9.9 Productivity Estimates for Reference and Affected Areas on Castle Gate Coal Company's Mine Plan Area, 1988

Sampling Area	Productivity lbs./acre 1 /
REFERENCE:	
Sowbelly Grass-Sage	900
Barn Canyon Grass-Sage	1162
Sowbelly Mixed Brush	1200 - 1300
Castle Gate Mixed Brush	650 - 700
Crandall Pinyon-Juniper	400
Castle Gate Riparian	2500 - 3000
Crandall Riparian	2500 - 3000
Crandall Conifer	200 - 300

1 / Estimates provided by Soil Conservation Service, Price, Utah (Appendix A)

3.3.3 Data Presentation

Shrub density data are in Table 9.7, tree density data are in Table 9.8, and productivity estimates are in Table 9.9. A brief description of the location of a summary of vegetation data on each of the areas sampled during the study are presented below. Complete vegetation data for each area are given in Appendix B.

3.3.3.1 Sowbelly grass-sage reference area. The Sowbelly grass-sage reference area is located in Sowbelly Canyon in SW1/4 Section 4, T13S, R9E. To be comparable to the slope and aspect of the disturbed sites, this reference is comprised of two parts, one on a southwest aspect and the other on a northeast aspect. Vegetative cover on the Sowbelly grass-sage reference area was 39 percent, litter-rock was 44 percent, and bare ground was 16 percent. Forty-seven percent of the vegetation cover was *Agropyron* spp. and 28 percent was *Artemisia Tridentata*, which were also species encountered on the cover transects in the Sowbelly Grass-sage reference area, which had a species diversity index of 1.373. *Artemisa tridentata* accounted for 96 percent of the 8,816 mean shrubs per ha on this reference area (Table 9.7). Mean height of all shrubs was 19 cm. Production on the area was estimated to be 900 lbs. per acre (Table 9.9).

3.3.3.2 Willow Creek grass-sage reference area. (Removed 1989 Renewal.)

3.3.3.3 Barn Canyon grass-sage reference area. The Barn Canyon

grass-sage reference is located in the NW1/4 Section 36, T12S, R9E. Vegetative cover was 53 percent, litter-rock was 46 percent, and bare ground was 1 percent. Agropyron spp. provided 45 percent of the vegetation cover, Bromus tectorum provided 20 percent, Atriples canescens provided 6 percent, and Artemisia tridentata provided 5 percent. Bromus tectorum was the species encountered with the highest frequency (93 percent) while Agropyron intermedium and other agropyron spp. were the only other species that occurred with over 75 percent frequency. Seventeen species were encountered along the transects in the Barn Canyon grass-sage reference area, which had a species diversity indes of 2.250. Sixty-two percent of the 2,422 mean shrubs per ha were Artemisia tridentata and 23 percent were Artiplex canescens. Mean height of all shrubs was 48 cm (Table 9.7).

3.3.3.4 Barn Canyon grass-sage affected. The grass-sage covered 21 percent of the 193 acres of potential disturbance in Barn Canyon (Table 9.3) (Sections 25 and 36, T12S, R9E, Exhibit 9). Vegetation cover on the grass-sage affected area was 54 percent, litter-rock was 35 percent, and bare ground was 11 percent. Fifty-three percent of the vegetative cover was Agropyron intermedium, and other Agropyron sp. while 17 percent was Artemisia tridentata accounted for 73 percent of the 4,449 mean shrubs per ha and Atriplex canescens accounted for 12 percent (Table 9.7). Mean shrub height was 48 cm.

3.3.3.5 Sowbelly mixed brush reference area. The Sowbelly mixed brush reference area is located in the bottom of Sowbelly Canyon in the SW1/4 Section 4, T13S, R9E. Vegetative cover was 48 percent, litter-rock was 38 percent, and bare ground was 14 percent. Fifty-nine percent of the vegetation cover was Quercus gambelii, 11 percent was Artemisia tridentata, and 14 percent was Agrophyron intermedium and other Agropyron species. Quercus gambelii occurred with 100 percent frequency and Artemisia tridentata occurred with 87 percent; all other species occurred with less than 50 percent frequency. Twenty-four species were encountered on the transect in the Sowbelly mixed brush reference area, which had a species diversity index of 1.940. Shrub density on this area was 10,340 per ha (Table 9.7). Forty-nine percent of the shrubs were Quercus gambelli, 30 percent was Artemisia tridentata, and 12 percent were Symphoricarpos occidentalis. Mean height of all shrubs was 72 cm. Estimated production on the Sowbelly mixed brush reference area was 1,200 to 1,300 lbs. per acre (Table 9.9).

3.3.3.6 Castle Gate mixed brush reference area. The Castle Gate mixed brush reference area is located on a westerly-facing slope in the SW1/4 Section 36, T12S, R9E. Vegetation cover was 41 percent, litter-rock was 35 percent, and bare ground was 24 percent. Fifty-one percent of the vegetation cover was Agrophyron sp., 26 percent was Artemisia tridentata, and 9 percent was Amelanchier utahensis. Agropyron sp., occurred with 100 percent frequency, Artemisia tridentata occurred with 87 percent frequency, and all

other species occurred with less than 50 percent frequency. Twelve species were encountered on the cover transects in the Castle Gate mixed brush reference area. Species diversity was 1.484. Seventy-six percent of the 6,163 shrubs per ha (Table 9.7 was Artemisia tridentata and 10 percent were Striplex canescens. Mean shrub height was 53 cm. Production on the Castle Gate mixed brush reference area was approximately 650 - 700 lbs. per acre (Table 9.8).

3.3.3.7 Barn Canyon mixed brush affected. Approximately 14 percent of the 193 acres of potential disturbance in Barn Canyon (Table 9.3) (Sections 25 and 36, T12S, R9E) is classed as mixed brush. Vegetative cover on the mixed brush type in this area was 64 percent, litter-rock was 34 percent, and bare ground was 2 percent. Shrubs and trees were 70 percent of the vegetative cover with Acre grandidentatum and Quercus gambelii (73 percent), and Berberis repens (73 percent). Thirty-two species were encountered on the transects within the mixed brush affected area. Species diversity was 2,682. The most abundant shrubs were Symphoricarpos occidentalis, Acer grandidentatum, and Quercus gambelli which respectively accounted for 30, 30, and 24 percent of the 11,823 shrubs per ha on this type. Mean height of the shrub was 204 cm.

3.3.3.8 Dry Canyon mixed brush reference area. (Removed 1989 Renewal.)

3.3.3.9 Barn Canyon pinyon-juniper affected. The pinyon-

juniper type covered approximately 44 percent of the 193 acres of potential disturbance in Barn Canyon (Table 9.3) (Sections 25 and 26, T12S, R9E). Vegetative cover was 57 percent, litter-rock was 32 percent, and bare ground was 11 percent. Fifty-six percent of the vegetative cover was Agropyron sp., 14 percent was Juniperus osteosperma, 13 percent was Pinus edulis, and 9 percent was Cercocarpus ledifolius. These same species also had the highest frequency of occurrence among the transects (100, 80, 80, and 67 percent respectively). Seventeen species were encountered on the cover transects in the Barn Canyon pinyon-juniper type, which had a species diversity index of 1.599. Mean shrub density on this type was 2,980 (Table 9.7) with Cercocarpus ledifiolius, Artemisia tridentata, Quercus gambelii, and Pinus edulis the most abundant (27, 22, 20, and 11 percent respectively). Mean height of all shrubs in the pinyon-juniper affected type was 165 cm. Estimated tree density in this type was 177 per ha and mean basal area for all trees was 590 cm^2(Table 9.8). Fifty-one percent of the trees were Pinus edulis and 34 percent were Juniperus osteosperma.

3.3.3.10 Crandall pinyon-juniper reference area. The pinyon-juniper reference area is located in the NE1/4 Section 29, T12S, R9E in Crandall Canyon. Vegetative cover on this area was 53 percent, litter-rock was 37 percent, and bare ground was 10 percent. Agropyron intermedium, Agropyron smithii, and other Agropyron sp. were 35 percent of the vegetative cover, Pinus edulis was 18 percent. Agropyron sp. occurred with 100 percent frequency,

Cercocarpos ledifolius and Juniperus osteosperma each occurred with 67 percent frequency, and Pinus edulis occurred with 53 percent frequency. Thirteen species were encountered on the cover transects in the pinyon-juniper reference area. The species diversity index was 1.985. Cercocarpos ledifolius and Quercus gambelii were the most abundant (43 and 39 percent, respectively) of the 2,653 mean shrubs per ha on the reference area (Table 9.7). Mean height of all shrubs was 166 cm. Tree density on the pinyon-juniper reference area was 202 trees per ha and mean basal area for all trees was 601 cm^2(Table 9.8). Forty-seven percent of the trees were Juniperus osteosperma, 26 percent were Pinus edulis, and 22 percent were Cercocarpus ledifolius.

3.3.3.11 Castle Gate riparian reference area. The Castle Gate riparian reference area is located along the Price River in the SW1/4 Section 26, T12S, R9E. Vegetative cover was 56 percent, litter-rock was 20 percent, and bare ground was 23 percent. Thirty-six percent of the vegetative cover was provided by 21 species of forbes, but the most cover of all species was provided by Bromus tectorum (18 percent) followed by Populus angustifolia (15 percent). Bromus tectorum occurred with 87 percent frequency, Clematis lingusticifolia occurred with 73 percent, Quercus gambelii occurred with 53 percent, and all of the other 38 species encountered on the cover transects occurred with less than 50 percent frequency. The Castle Gate riparian reference area had the highest species diversity of all areas sampled (2.958). Forty-six percent of the

2,748 mean shrubs per ha on this type (Table 9.7) were Rosa sp., 19 percent were Quercus gambelii, and 11 percent were Rhus trilobata. Mean shrub height was 114 cm. Tree density in the Castle Gate riparian reference area was 42 per ha and mean basal area was 1,292 cm^2(Table 9.8). Populus angustifolia was the only tree species in the area. Production on the area was 2500 to 3000 lbs. per acre (Table 9.9).

3.3.3.13 Barn Canyon conifer affected. The conifer type covered approximately 21 percent of the 193 acres of potential disturbance in Barn Canyon (Table 9.3) (Sections 25 and 36, T12S, R9E). Vegetative cover was 73 percent, litter-rock was 24 percent, and bare ground was 3 percent. Twenty-six percent of the vegetative cover was Agropyron sp., 16 percent was Juniperus osteosperma, 15 percent was Pseudotsuga menziesii, and 13 percent was Quercus gambelii. Species which occurred with the highest frequency among the transects were Agropyron sp. (100 percent), Juniperus osteosperma (100 percent), Pseudotsuga menziesii (87 percent), Quercus gambelii (60 percent), Abies lasoiocarpa (53 percent), and Pinus edulis (53 percent). Twenty-four species were encountered along the cover transects in the conifer affected area. The species diversity index of this type was 2.317. Approximately 59 percent of the 4,286 shrubs per ha on this type (Table 9.7) were Quercus gambelii while Symphoricarpos occidentalis and Cercocarpos montanus each provided an additional 11 percent. Mean height of all shrubs was 121 cm. Tree density in the conifer affected type was 256 per

ha and mean basal area was 524 cm^2(Table 9.8). The most abundant trees were Juniperus osteosperma, Pseudotsuga menziesii, Pinus edulis, and Abies lasiocarpa.

3.3.3.14 Crandall conifer reference area. The conifer reference area is located in Crandall Canyon in the SW1/4 Section 28, T12S, R9E. Vegetative cover was 74 percent, litter-rock was 30 percent, and bare ground was 6 percent. Pseudotsuga menziesii provided 65 percent of the vegetative cover and Pinus ponderosa provided 14 percent. These two species occurred with 100 and 80 percent frequency, respectively; other frequently occurring species were Symphoricarpos occidentalis (80 percent) and perennial grasses (60 percent). Twenty-three species were encountered along the cover transects in the conifer reference area. The species diversity index for this area was 1.379. Fifty-one percent of the 12,952 shrubs per ha on this area (Table 9.7) were Berberis repens, 35 percent were Symphoricarpos occidentails, and 13 percent were Quercus gambelii. Mean shrub height was 17 cm. Tree density in the conifer reference area was 962 trees per ha and man basal area was 359 cm^2(Table 9.8). Pseudotsuga menziesii, Pinus ponderosa, and Juniperus osteosperma were the most abundant trees. Production in the conifer reference area was approximately 200 to 300 lbs. per acre (Table 9.9).

9.1-4 SUMMARY

The vegetation baseline study for Price River Coal Company's Mine Plan Area near Helper, Utah was conducted during the 1981

growing season by Mariah Associates. Vegetation on the entire Mine Plan Area was mapped. Reference areas were selected and sampled for vegetation types that had occurred on sites that are presently occupied by surface facilities and other disturbance associated with the mine. Baseline vegetation studies were also conducted in an area in Barn Canyon that may be disturbed in the future.

The five major natural vegetation types in the Mine Plan Area were conifer, grassland-sagebrush, mixed brush, pinyon-juniper, and riparian bottom. Disturbance on the area was mapped and identified as either pre-1977 mining disturbance, post-1977 mining disturbance (including areas disturbed by mining prior to 1977 that were also subsequently used for mining activity), or other disturbance. Approximately 400 acres were identified as pre-1977 mining disturbance, 140 acres were post-1977 mining disturbance, and 600 acres were identified as other disturbance. Vegetative cover on the 10 reference areas ranged from 30 percent to 74 percent, shrub density ranged from 405 per ha to 17,782 per ha, and species diversity ranged from 1.373 to 1.958. No threatened or endangered plants were encountered during the study.

9.1-5 LITERATURE CITED

Bonham, C.D., C.C. Larson, and A. Morrison. 1980. A survey of techniques for measurement of herbaceous and shrub production, cover, and diversity on coal lands in the west. Report to Office of Surface Mining Region V from Uniscale Corp., Loveland, Colorado. 79 pp.

Holmgrem, A.H. and B.A. Andersen. 1971. Weeds of Utah. Agricultural Experiment Station Special Report 21, Utah State Univer., Logan. 115 pp.

Larson, C.C. 1980. A statistical evaluation of revegetation success on coal lands in the west. Office of Surface Mining. Denver, Colorado. 18 pp.

Meueller-Dombois, D. and H. Ellenberg. 1974. Aims and methods of vegetation ecology. John Wiley and Sons, New York. 547 pp.

Pielou, E.D., 1966. The measurement of diversity in different types of biological collections. J. Theoretical Biol. 13:131-144.

Smith, R.L. 1974. Ecology and Field Biology. Harper and Row, New York. 850 pp.

Snedecor, G.W. and W.G. Cochran. 1967. Statistical methods. The Iowa State University Press, Ames, Iowa. 593 pp.

Utah Division of Oil, Gas, and Mining. 1980. Preliminary guidelines for vegetation studies on coal mines. June 6, 1980 revision; photocopy.

Welsh, S.L. and K.H. Thorne, 1979. Illustrated manual of proposed endangered and threatened plants of Utah. U.S. Fish and Wildlife Service, Denver, Colorado. 318 pp.

Wyoming Department of Environmental Quality. 1981. Guideline No. 2. Vegetation. Wyoming DEQ, Land Quality Division, Cheyenne, Wyoming. Photocopy.

Appendix B

Raw Vegetation Data

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER, UTAH

SOWBELLY GRASS-SAGE
REFERENCE SITE
JULY 1981

TRANSECT NUMBER - 1

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT					1						1	1	1																		1												1		1					
ASTRA									1															1																									1	
AGROP										1							1		1																				1											
PG																																									1				1						
BG				1			1																1										1			1		1						1						
LR		1	1		1				1	1						1	1	1		1	1		1		1	1		1	1	1			1	1				1	1			1			1	1	1	1		1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	9	30	0	0	0	0	0	39

TRANSECT NUMBER - 2

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP					1		1												1								1								1															1
ASTRA						1										1	1	1					1																	1										
ARTRT															1				1														1	1		1	1	1						1			1		1
OUGA												1	1	1																																				
BG																				1																											1			
LR		1	1	1	1							1	1									1	1	1		1	1	1		1	1	1	1										1		1	1	1		1		1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
OUGA	0	0	1	3	0	0	0	4
ARTRT	0	23	0	0	0	0	0	32

TRANSECT NUMBER - 3

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ASTRA		1									1																											1	1											
ARTRT			1												1																																			
AGROP								1												1	1		1	1	1		1														1		1					1			
PG												1						1																																
BG													1							1				1										1											1				1	1	1
LR	1			1	1	1	1		1					1	1		1		1		1							1		1	1	1		1	1	1			1	1		1			1	1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	11	14	0	0	0	0	0	25
CHVIV	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 4

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP								1												1						1																								1		
ARTRT												1													1												1						1	1							
ASTRA															1				1	1						1										1													1			
BG			1	1						1														1				1											1			1					1				
LR	1	1			1	1		1	1				1		1	1	1	1				1	1							1	1	1	1	1	1	1				1	1				1	1			1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	10	25	1	0	0	0	0	36
TECA	0	0	1	0	0	0	0	1

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT	1																																																	
AGROP						1				1		1							1				1																				1							
ERIOG															1												1	1			1	1	1	1		1						1							1	
ASTRA																		1							1		1																								
PG																																															1				
BG																																																		1	
LR		1	1	1	1		1	1	1		1		1	1		1	1			1	1	1							1	1						1		1	1	1		1	1	1		1	1				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	17	26	0	0	0	0	0	43
CHVIV	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 6

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT			1	1	1	1																																													
STPI2	1																															1																	1			
ASTRA		1									1										1		1			1				1																						
AGROP																						1																														
PG								1	1			1								1	1				1														1	1			1									
LR						1				1		1	1	1	1	1	1									1		1	1	1		1	1	1		1								1	1			1		1	1	1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	8	28	8	2	0	0	0	46

TRANSECT NUMBER - 7

VEG SPECIES — HIT NUMBER 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP			1									1		1							1											1						1												
ARTRT				1	1				1						1																				1	1						1	1						1	1
QUGA																							1	1																										
PF																										1																								
ASTRA																												1											1											
BG	1					1	1				1		1					1									1				1		1												1			1		
LR		1						1		1						1	1		1	1		1			1				1	1				1			1			1	1			1		1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	4	34	9	0	0	0	0	47
CHVIV	0	1	0	0	0	0	0	1
QUGA	0	0	0	0	0	2	0	2

TRANSECT NUMBER - 8

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT	1											1																			1				1					1										
ASTRA		1								1																1				1																				
AGROP			1	1					1						1					1	1							1									1												1	
BG					1	1	1				1		1	1		1	1	1				1	1	1	1							1	1								1			1				1		
LR								1											1								1		1					1		1		1	1			1	1		1	1	1			1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	19	40	0	0	0	0	0	59

TRANSECT NUMBER - 9

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT		1										1													1																			1						
ARFR						1																																												

PIED																		1																																
AGROP																						1						1					1		1			1				1					1			1
YUCCA																																		1																
BG														1						1			1				1		1										1										1	
LR	1		1	1	1		1	1	1	1	1		1		1	1	1		1		1			1		1				1	1	1				1	1			1	1		1		1	1		1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	21	22	0	0	0	0	0	43
PIED	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 10

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP		1	1	1	1								1	1		1				1	1						1					1												1	1		1			
ARTRT						1																																		1						1			1	
ASTRA										1																																								
PIED																										1																								
YUCCA																															1																			
BG	1						1		1						1			1				1			1			1					1			1						1								
LR								1			1	1					1		1				1	1					1	1				1	1		1	1	1		1		1					1		1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	16	33	3	0	0	0	0	52
PIED	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 11

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP	1	1								1																									1		1					1			1				1	
ARTRT			1		1																		1					1								1														
PG									1					1	1										1		1																							
BG												1					1	1				1										1						1	1											

LR 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	15	40	1	0	0	0	0	56

TRANSECT NUMBER - 12

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT	1																							1				1								1										1		1		
AGROP				1					1							1	1				1	1			1	1				1					1		1	1		1		1	1		1		1			
ASTRA										1																																								
BG						1		1							1								1				1																						1	
LR		1	1		1		1				1	1	1	1				1	1	1									1		1	1	1	1					1		1			1						1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	6	25	0	0	0	0	0	31

TRANSECT NUMBER - 13

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP	1	1			1	1	1	1	1	1		1						1								1	1								1											1		1		
ARTRT														1							1																													
ASTRA																												1																						1
OUGA																													1	1	1	1				1														
BG				1												1																					1					1	1							
LR			1								1		1		1		1		1	1		1	1	1	1								1	1				1	1	1	1			1	1		1		1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	7	20	0	0	0	0	0	27
QUGA	0	3	0	6	2	0	0	11
JUOS	0	2	0	0	0	0	0	2

TRANSECT NUMBER - 14

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP		1													1						1						1		1		1			1		1			1				1				1		1	
ARTRT						1						1					1			1		1			1						1								1								1		1	
ASTRA											1																																							
BG				1	1									1					1			1												1								1								
LR		1					1	1	1	1			1			1		1							1	1			1		1				1		1			1		1	1	1				1	1	1

SHRUB HEIGHT AND DENSITY

HEIGHT CLASSES

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	8	36	0	0	0	0	0	44

TRANSECT NUMBER - 15

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP		1	1			1							1					1					1			1								1			1													
ARTRT											1																1																				1			
ASTRA																1															1																		1		
BG							1		1	1			1	1		1			1					1	1		1	1			1			1	1		1	1											1		
LR	1			1	1			1									1			1	1		1					1			1		1	1		1			1			1	1	1	1	1			1	1

SHRUB HEIGHT AND DENSITY

HEIGHT CLASSES

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	10	33	0	0	0	0	0	43

PRICE RIVER COAL COMPANY
HELPER, UTAH

WILLOW CREEK GRASS-SAGE
REFERENCE SITE
SEPTEMBER 1981

TRANSECT NUMBER - 1

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ARTRT			1				1	1						1	1	1						1		1		1																								
BRTET									1										1	1																														
PF																													1																					
SAKA																															1																			
ORHY																																1	1																	
ATCA																																				1														
AGSM																																					1				1						1			
CHVIV																																																	1		
BG	1	1				1	1				1	1	1	1																	1	1					1		1				1	1				1		
LR					1												1	1				1		1		1	1	1		1									1		1		1	1						1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	1	5	10	38	2	0	0	56
ATCA	0	0	2	1	0	0	0	3
CHVIV	2	2	0	0	0	0	0	4

TRANSECT NUMBER - 2

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGSM	1																																																	
ARTRT								1		1					1	1						1														1		1	1		1				1	1		1		
PG									1																					1																				
AGROP																				1																														
SOLID																									1																									
ATCA																																	1																	
BRTET																																															1			
BG						1		1								1			1						1		1						1	1		1							1						1	
LR		1	1	1		1						1	1	1						1	1			1	1				1	1	1	1		1	1						1				1					1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	7	31	42	10	0	0	0	90
ATCA	0	2	0	2	0	0	0	4
QUGA	0	2	2	2	1	0	0	7
CHVIV	0	1	0	0	0	0	0	1
AMUTU	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 3

HIT NUMBER

VEG SPECIES / CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP					1				1																																										
PG							1																1																												
ARTRT											1			1										1	1		1						1	1			1									1		1			
STIPA																	1																																		
JUDS																																				1															
ORHY																																							1												
PF																																									1										
BG								1										1								1			1	1						1						1								
LR	1	1	1	1		1					1	1		1	1		1		1	1	1	1											1	1							1		1		1	1	1		1		1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	3	9	24	4	0	0	0	40
CHVIV	1	4	1	0	0	0	0	6
ATCA	0	0	3	0	0	0	0	3

TRANSECT NUMBER - 4

HIT NUMBER

VEG SPECIES / CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT		1	1						1				1			1	1					1	1							1					1			1	1			1	1							1
PG																		1																																	
BRTET																								1	1			1														1									
STIPA																																																	1		
BG	1			1	1							1		1	1					1						1	1		1			1	1	1		1	1							1			1		1	
LR						1	1	1		1	1								1	1											1									1						1				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	2	23	59	22	2	0	0	108

TRANSECT NUMBER - 5

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PG					1																						1																								1	
ARTRT						1		1	1			1				1						1									1		1		1				1										
AGROP																	1																																	
ASTRA																					1																													
BG			1									1		1	1	1			1									1			1			1			1							1		1				
LR		1		1	1			1			1									1	1			1	1	1			1	1		1	1		1	1	1		1		1		1	1						1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	1	9	33	10	0	0	0	53
CHVIV	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 6

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ARTRT						1			1	1			1			1		1								1			1						1								1			1			
BRTET																								1																										
PG																																	1											1						
AGSM																																			1															
ATCA																														1																				
BOGR																																									1		1	1						
BG	1	1	1		1			1			1	1			1		1		1			1								1																	1		1	
LR				1			1							1						1	1		1		1	1		1	1			1	1		1			1			1	1								1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	17	88	16	1	0	0	122
ATCA	0	2	3	0	0	0	0	5
CHVIV	0	2	0	0	0	0	0	2

TRANSECT NUMBER - 7

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT	1				1						1			1	1		1			1	1					1				1			1		1			1											
ORHY							1																																									1			
AGSM																	1																	1				1											
PG																																1								1										
PF																																																		1	
BG						1		1	1			1			1					1			1	1	1			1								1		1		1			1	1					
LR		1	1	1							1									1							1		1				1		1						1		1	1					1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	8	63	29	23	1	0	0	124
ATCA	0	0	2	0	0	0	0	2
CHVIV	1	8	0	0	0	0	0	9

TRANSECT NUMBER - 8

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
BRTET	1	1												1																																				
ARTRT				1	1	1					1	1			1	1	1		1	1		1										1														1				
PG																										1											1								1		1			
ATCA																												1																1						
BG							1	1	1					1				1							1	1		1	1											1		1			1			1	
LR			1								1										1		1	1							1	1	1	1		1	1		1		1	1						1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	1	10	35	47	1	0	0	94
RHTRT	0	0	0	1	0	0	0	1
CHVIV	1	2	0	0	0	0	0	3
ATCA	0	0	0	2	0	0	0	2

TRANSECT NUMBER - 9

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGSM	1			1												1									1			1	1					1					1					1	1				1
EPVI											1																																							
ARTRT															1																																			
ATCA																		1	1																															
BG		1	1		1												1							1									1	1		1	1	1		1										
LR						1	1	1	1		1	1	1	1							1	1	1			1	1				1	1	1						1		1	1	1	1			1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	5	14	6	0	0	0	25
EPVI	0	0	0	2	0	0	0	2
ATCA	0	0	2	4	0	0	0	6
CHVIV	0	1	0	0	0	0	0	1
OUGA	0	1	0	1	0	0	0	2

TRANSECT NUMBER - 10

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ARTRT	1																			1										1						1	1													
AGROP			1							1																																								
AGSM											1		1														1																						1	
PG															1						1																					1								
BRTET																															1																			
CHNAN																																1																		
BG				1				1								1		1				1				1															1	1	1	1						
LR		1			1	1	1					1		1	1			1					1	1	1			1	1	1			1	1	1			1	1						1	1	1		1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							
ARTRT	12	61	40	8	0	0	0	121
CHVIV	2	5	0	0	0	0	0	7

TRANSECT NUMBER - 13

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PG					1																										1														1					
ARTRT						1					1	1				1		1		1					1		1							1			1	1					1							
ORHY							1																																												
AGSM										1																												1									1				
AGROP																	1																																		
BRTET																					1																														
BG	1							1					1	1													1									1			1					1							1
LR		1	1	1					1						1				1			1	1	1	1				1	1		1		1					1	1						1	1			1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							
ARTRT	1	17	29	47	0	0	0	94
ATCA	0	0	1	0	0	0	0	1

TRANSECT NUMBER - 14

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ARTRT		1														1		1	1			1	1									1	1				1	1		1								1			
AGROP									1																																										
BRTET										1																																1								
SOLID																				1																															
AGSM																										1																				1				
PF																														1																				
PG																																	1		1															
BG					1	1	1					1			1		1									1				1	1	1	1	1						1								1	
LR	1			1	1				1			1		1	1					1				1								1	1						1	1						1	1		1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	6	61	10	10	0	0	0	87
CHVIV	1	3	0	0	0	0	0	4

TRANSECT NUMBER - 15

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGSM	1																																																	
ARTRT			1									1					1			1	1			1	1		1			1						1	1	1	1						1		1	
AGROP									1																																									
BRTET										1																																								
CHNAN																															1																			
BG				1	1	1							1			1			1					1					1	1			1			1	1	1					1			1		1	
LR		1		1				1						1	1						1				1								1										1		1	1		1			1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CHNAN	0	0	1	2	0	0	0	3
ARTRT	8	10	14	11	3	0	0	46
CHVIV	2	2	0	0	0	0	0	4
QUGA	0	0	0	2	0	0	0	2
ATCA	0	0	1	0	0	0	0	1

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER, UTAH

BARN CANYON GRASS-SAGE
REFERENCE SITE
OCTOBER 1981

TRANSECT NUMBER - 1

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ARLUL	1																																																	
BRTET			1						1																																	1	1								
AGINI						1					1				1			1	1												1	1			1	1	1	1	1	1	1							1	
AGSP3										1																																			1						
RIBES																				1	1																														
ARTRT																						1																													
BRIN																																													1						
BG																																														1	1		1		
LR		1		1	1		1	1				1	1	1		1	1			1	1	1				1	1	1	1			1	1													1			1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	-4M	OVER 4M	TOTAL
ARTRT	0	4	2	1	0	0	0	7
RIBES	0	0	0	3	0	0	0	3

TRANSECT NUMBER - 2

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP	1																											1								1		1			1									
ARTRT			1	1										1	1			1	1																															
AGINI					1																				1	1							1											1			1	1	1	
BRTET						1																						1			1			1			1		1		1									
RIBES																1	1																																	
ARLUL																																1																		
LR		1					1	1	1	1	1	1								1	1	1	1	1						1				1		1	1						1			1	1		1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	-4M	OVER 4M	TOTAL

ARTRT	11	0	1	2	2	0	16
RIBES	0	0	0	0	2	0	0	2

TRANSECT NUMBER - 3

HIT NUMBER

VEG SPECIES	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	5
CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
ARTRT	1									1																					1		1		1						1	1	
PG					1															1										1	1	1	1									
AGINI													1	1	1				1	1	1					1																
AF																		1																								
BRTET																																									1
BG											1					1									1																	
LR		1	1		1	1	1	1	1						1						1		1			1		1			1	1	1	1	1	1	1	1		1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							
ARTRT	2	3	7	8	1	0	0	21

TRANSECT NUMBER - 4

HIT NUMBER

VEG SPECIES	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	5
CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	
AGROP		1	1																1									1	1	1	1											
AGINI					1				1	1								1																								
ARTRT										1			1												1	1																
BRTET														1	1	1																		1	1							
AGSP3																			1	1							1	1												1		
ARLUL																					1																					
PG																														1												
ATCA																																				1	1				
XASA																																									1
LR	1				1	1	1				1	1				1					1				1	1	1	1	1	1	1				1				1	1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							

ARTRT	5	1	4	3	1	0	0	14
ATCA	3	0	1	0	0	0	0	4

TRANSECT NUMBER - 5

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP	1	1	1													1	1	1								1				1																				
BRTET								1	1		1																							1	1				1	1				1			1			1
AGSP3																								1																											
ARLUL																																														1					
BRIN																																																	1		
LR				1	1	1	1			1		1	1	1	1			1	1	1		1	1	1		1	1		1	1		1	1			1	1			1	1	1	1			1		1			1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ATCA	0	3	0	1	1	0	0	5
ARTRT	5	3	0	6	0	0	0	14

TRANSECT NUMBER - 6

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
BRIN	1																				1																															
AGROP		1						1	1	1	1	1								1			1			1																									
BRTET			1														1																	1	1	1		1		1	1										
AGINI																			1						1	1																									1
ATCA																						1																													
ARLUL																														1	1	1										1									
LR				1	1	1						1	1	1	1	1											1	1	1	1						1		1		1		1	1	1	1	1	1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ATCA	0	0	1	1	0	0	0	2
ARTRT	11	0	3	0	0	0	0	14

TRANSECT NUMBER - 7

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP		1									1															1	1																								
AGSP3			1	1					1																																								1	1	
BRTET					1					1																					1																				
PF						1																											1					1												
AMUTU												1	1	1	1																																				
ARTRT																							1																												
BRIN																											1																								
STIPA																												1					1											1						
ARLUL																													1						1															
AGINI																																				1					1	1	1			1				
LR		1						1	1							1	1	1	1	1	1		1									1					1		1	1	1	1	1				1			1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	0	5	0	1	0	0	6
ATCA	0	0	3	0	0	0	0	3
AMUTU	0	0	6	0	1	0	0	7

TRANSECT NUMBER - 8

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGSP3	1						1	1															1																												
AGROP		1	1																												1											1	1	1	1	1	1	1			
AGINI												1																																							
ATCA													1																																						
PF														1																																					
BRTET																								1	1	1	1							1		1															
BRIN																																			1																
LR				1	1	1			1	1	1				1	1	1	1	1	1	1							1	1	1	1	1				1	1	1	1	1	1								1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	[illegible]	OVER 4M	TOTAL

ATCA	0	0	1	1	0	0	0	2
ARTRT	5	1	0	0	0	0	0	6

TRANSECT NUMBER - 9

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP								1	1						1	1									1	1						1					1	1				1	1							
AGSP3			1																																												1	1		
ARTRT				1																																														
ATCA					1		1				1																																							
OPPO						1																																												
STIPA										1																													1											
BRTET																	1			1																														
BRIN																		1	1																					1										
AGINI																											1																						1	
LR	1	1										1	1	1							1	1	1	1				1	1	1	1		1	1	1	1					1			1	1			1		1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							
ATCA	0	1	1	3	0	0	0	5
ARTRT	0	0	1	0	0	0	0	1

TRANSECT NUMBER - 10

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT	1																																																	
AGROP		1																						1						1	1		1				1			1	1		1	1	1					
PF						1											1								1																									
STIPA							1									1																																		
BRIN								1	1			1																																						
ATCA											1			1																																				
AGSP3																										1								1	1	1														
LR			1	1	1					1			1		1			1	1	1	1	1	1				1	1	1			1						1	1			1				1	1	1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	1	0	1	0	0	0	2
ATCA	0	0	1	1	0	0	0	2

TRANSECT NUMBER - 11

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP	1					1	1		1												1																													
BRTET		1								1									1	1						1	1								1															
ATCA								1			1	1	1									1																		1										
STIPA																	1									1				1																				
BRIN																																	1			1													
OPPD																																												1						
ARLUL																																													1					
RIBES																																																1	1	
BG																							1																											
LR			1	1	1									1	1		1	1							1	1				1		1			1		1	1		1	1	1	1			1	1	1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ATCA	0	0	5	1	0	0	0	6
RIBES	0	0	0	0	3	0	0	3

TRANSECT NUMBER - 12

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP			1	1	1	1	1							1											1	1																					1			
ATCA									1	1		1	1			1																						1	1	1									
BRTET											1				1													1														1	1	1		1				
PF																			1																		1														
BRIN																					1																													
AGSP3																						1	1																											
AGINI																															1																			
BG																																									1									
LR	1	1	1													1	1		1								1	1	1		1	1	1	1	1	1										1	1	1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ATCA	0	0	3	4	1	0	0	8

TRANSECT NUMBER - 13

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP								1										1		1	1							1	1																			1			1	
AGINI							1												1																																	
BRIN									1																																										
STIPA												1																										1													
AGSP3													1													1													1												
BRTET														1																			1	1	1	1		1						1	1					
PF																																1																				
LR	1	1	1	1	1	1				1	1				1	1	1		1			1	1	1				1	1	1					1	1				1	1				1		1				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	3	6	0	0	0	0	0	9

TRANSECT NUMBER - 14

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP				1														1										1								1																
BRIN					1	1																																														
BRTET							1	1				1				1																													1	1				1		
AGINI													1																								1															
PF																	1																																			
RIBES																											1	1		1					1	1	1															
CHNAN																																										1									
LR	1	1	1						1	1	1			1		1				1	1	1	1	1	1	1		1	1			1			1	1					1	1				1	1	1		1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
RIBES	0	0	0	4	2	0	0	6
CHNAN	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 15

HIT NUMBER

VEG SPECIES / CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP													1											1	1																										1
RIBES					1				1	1																1	1	1																							
AGINI						1	1								1	1																																			
BRTET																					1												1								1	1	1						1	1	1	
AGSP3																																1																			
PF																																			1				1												
ATCA																																		1					1												
LR	1	1	1		1			1			1			1			1	1	1	1	1							1			1	1						1			1	1	1				1	1		1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
RIBES	0	0	0	2	2	0	0	4
ATCA	0	0	0	4	0	0	0	4
EPHED	0	0	0	1	0	0	0	1

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER, UTAH

BARN CANYON GRASS-SAGE
AFFECTED AREA
OCTOBER 1981

TRANSECT NUMBER - 1

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGIN1	1	1	1	1	1	1		1		1							1												1		1			1											1					
ARTRT													1																								1			1								1	1		
AMUTU																				1																												1				
AF																							1																													
PG																																						1														
BG							1						1			1					1								1		1									1			1									
LR									1		1			1	1			1				1			1	1	1	1	1				1		1	1			1				1	1				1	1	1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	3	13	10	0	0	0	0	26
AMUTU	0	0	0	5	7	0	0	12
SYOC	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 2

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGIN1		1			1		1			1	1													1				1								1	1		1							1					
ARTRT			1			1		1					1		1										1	1			1				1								1									1	
AMUTU																														1										1				1						
BG																				1	1							1		1											1		1							
LR	1			1					1			1			1	1	1	1			1				1			1			1			1	1									1		1	1	1		1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
AMUTU	0	1	1	1	9	0	0	12
ARTRT	4	7	16	3	0	0	0	30
ATCA	0	0	0	1	0	0	0	1

TRANSECT NUMBER - 3

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT			1				1							1		1		1									1						1	1				1	1	1						1	1		
AGINI						1														1			1	1						1	1					1						1	1	1	1					
EPHED												1																																							
BG				1												1		1																			1												1		1
LR		1				1	1			1	1	1		1	1						1		1			1	1		1			1	1						1										1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	3	8	27	2	0	0	0	40
AMUTU	0	0	0	1	1	0	0	2
EPHED	0	0	1	0	0	0	0	1
ATCA	0	0	0	1	0	0	0	1

TRANSECT NUMBER - 4

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGINI	1						1	1			1			1	1		1																																	
ARTRT						1				1																																									
AMUTU																	1																																			
SAKA																				1	1		1	1	1	1	1			1							1			1		1		1					1			
CHAL																																	1	1									1								
ATCA																																																	1			
BG																			1										1	1			1	1				1			1	1									
LR		1	1	1	1						1			1	1					1								1	1								1									1	1			1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	4	7	0	0	0	0	11
CHVIV	1	0	2	0	0	0	0	3
EPHED	0	0	1	0	0	0	0	1

AMUTU	0	0	0	0	1	0	0	1
ATCA	0	0	1	1	0	0	0	2

TRANSECT NUMBER - 5

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
SAKA	1	1		1	1	1					1	1	1		1	1	1	1	1										1	1													1	1	1	1	1		1	1
ARTRT			1																																																
AGINI								1	1																	1						1	1	1					1											
ATCA																																																	1		
BG														1							1	1	1	1				1	1					1	1	1			1	1										
LR							1			1										1						1					1										1	1									

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	10	1	0	0	0	0	11
ATCA	0	10	0	3	0	0	0	13

TRANSECT NUMBER - 6

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGINI	1	1					1		1	1	1	1	1	1	1		1		1	1		1		1	1	1			1						1	1	1					1	1	1		1	1	1		
MOSS						1																								1										1										
ATCA																																															1				
BG																													1		1		1						1											
LR			1	1	1			1							1		1		1								1					1	1					1	1	1									1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	0	0	0	1	0	0	0	1
ARTRT	10	2	3	1	1	0	0	17
CHVIV	0	0	1	0	0	0	0	1
ATCA	0	0	1	0	0	0	0	1

TRANSECT NUMBER - 7

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGINI	1		1	1			1	1	1	1	1		1				1	1	1	1			1	1				1	1	1			1			1						1				1	1		1	
ARTRT					1	1						1									1				1	1													1		1				1					
CEMOM																																											1							
BG		1												1																								1												
LR															1	1						1					1				1	1		1	1		1			1				1				1		1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	3	0	13	8	0	0	0	24
SYOC	0	0	2	0	2	0	0	4
RIBES	0	0	0	1	1	0	0	2
CHVIV	0	0	1	0	0	0	0	1
CEMOM	0	0	0	0	2	0	0	2

TRANSECT NUMBER - 8

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
RIBES	1																																																	
AGINI		1		1				1	1		1	1					1			1		1		1		1					1			1						1									1	1
ARTRT			1											1		1													1	1									1											
ANTEN																					1						1																							
BG						1							1					1	1																													1		
LR					1		1			1					1								1		1			1				1	1		1	1	1	1			1	1	1	1	1	1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
RIBES	0	0	0	1	0	0	0	1
ARTRT	8	3	21	1	1	0	0	34
CEMOM	0	0	2	1	3	0	0	6

TRANSECT NUMBER - 9

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGINI						1								1				1										1	1																			1	1			
AGROP							1			1										1		1		1				1	1		1	1				1										1					
ARTRT								1								1		1	1				1																								1				1	
MOSS																					1														1		1															
BG				1					1			1	1														1										1							1	1							
LR		1	1		1	1									1		1													1				1					1	1			1					1	1	1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	1	7	14	16	1	0	0	39
RIBES	0	0	0	1	0	0	0	1
CHVIV	0	0	1	0	0	0	0	1
ATCA	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 10

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP	1	1				1		1			1																																								
ARTRT				1					1							1	1																					1				1								1		
AGINI																		1	1	1	1	1	1				1	1		1		1				1	1														
BERE																																									1					1					
BG					1																			1	1									1		1								1	1			1			
LR			1				1			1			1	1	1	1	1			1									1			1		1																		1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	1	5	9	25	2	0	0	42
ATCA	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 11

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGINI	1		1	1			1	1			1	1			1	1	1										1	1				1			1								1	1	1					
ATCA													1									1																1		1										
ARTRT																																				1														
AGROP																																														1				
BG		1								1									1					1									1								1									
LR					1	1			1					1				1		1	1		1		1	1			1	1	1			1			1		1			1					1	1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							
ARTRT	1	7	17	1	0	0	0	26
ATCA	0	0	10	2	0	0	0	12

TRANSECT NUMBER - 12

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGINI		1	1											1			1																														1			
MOSS								1																																										
AGROP						1				1						1			1			1			1			1													1								1	1
BRTET																		1		1	1									1		1	1		1															
ATCA																																							1											
BG																										1								1		1								1						
LR	1			1	1		1		1		1	1	1		1								1	1			1		1		1						1	1		1		1	1		1	1		1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							
ATCA	0	2	3	4	0	0	0	9
EPHED	10	0	0	2	1	0	0	13
ARTRT	0	0	3	0	0	0	0	3

TRANSECT NUMBER - 13

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
BRTET	1				1		1	1															1								1				1				1											
AGROP				1																																												1		
ATCA						1																							1		1												1							
AGINI													1		1									1		1			1														1							
ARTRT														1																			1											1						
RIBES																																									1									
ACGR																																													1					
LR		1	1						1	1	1	1				1	1	1	1	1		1		1	1						1		1	1		1	1	1	1					1	1		1	1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	0	5	4	3	0	0	12
ATCA	0	0	3	5	0	0	0	8
RIBES	0	0	0	2	1	0	0	3

TRANSECT NUMBER - 14

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGINI	1			1																																															
BRTET		1					1		1			1	1	1						1		1	1			1	1			1	1			1		1	1			1		1			1				1		
AGROP					1														1					1																		1					1			
PG																														1	1			1			1													
ARTRT																																																	1	
LR			1			1		1		1	1				1	1	1	1			1				1			1				1	1			1				1			1	1	1		1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ATCA	0	0	1	2	1	0	0	4
EPHED	0	0	0	0	1	0	0	1
ARTRT	6	7	0	0	0	0	0	13

TRANSECT NUMBER - 15

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
MOSS	1																																																	
AGROP			1	1																																													1	
ATCA															1	1									1																										
AGINI																	1	1	1					1					1	1		1	1								1									
PG																				1	1	1						1							1			1	1				1		1	1				
ARTRT																																					1				1	1								
BG																																	1			1														
LR		1			1	1	1	1	1	1	1	1	1	1									1			1	1								1					1				1			1		1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ATCA	0	0	1	3	0	0	0	4
ARTRT	10	1	3	4	0	0	0	18
EPHED	0	0	1	0	0	0	0	1

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER, UTAH

SOWBELLY MIXED BRUSH
REFERENCE SITE
JULY 1981

TRANSECT NUMBER - 1

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
STCO3	1	1																																																
SYOC					1	1																																												
AGINI							1	1												1									1	1	1																			
PF									1	1																																								
ARLUL																1																																		
QUGA																												1					1	1				1		1	1		1	1	1		1	1	
ASTRA																																1																		
BG						1					1	1	1	1	1								1		1		1						1					1				1							
LR			1															1				1		1	1		1				1	1				1	1			1						1				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	4	8	0	12	4	0	0	28
ARTRT	1	10	0	0	0	0	0	11
SYOC	0	2	0	0	0	0	0	2
CHVIV	0	3	0	0	0	0	0	3

TRANSECT NUMBER - 2

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA	1	1	1	1		1									1																								1											
AGINI														1																																				
PG																									1						1																			
ARTRT																								1				1																						
SYOC																														1																	1			
ACGF																																									1			1				1		
BG									1				1														1																							
LR					1		1	1		1	1	1					1	1	1	1	1	1	1			1	1			1		1	1	1	1	1	1		1	1		1	1		1	1	1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	1	10	7	2	4	0	0	24
ARTRT	5	8	0	0	0	0	0	13
CEMOM	0	1	0	0	1	0	0	2
SYOC	9	7	0	0	0	0	0	16
ACGR	3	1	0	0	0	0	0	4

TRANSECT NUMBER - 3

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA					1	1				1	1	1	1	1																																				1
ASTPA														1																																					
ARTRT																						1							1			1	1																		
PG																												1																								
BG																		1	1						1	1														1									1			
LR	1	1	1	1			1	1							1	1			1	1			1	1		1	1			1		1					1	1	1	1	1	1		1	1		1	1	1	1		1	1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	1	5	4	6	1	0	17
SYOC	4	3	0	0	0	0	0	7
ARTRT	10	15	1	0	0	0	0	26
CHVIV	1	0	1	0	0	0	0	2

TRANSECT NUMBER - 4

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA	1				1	1	1																																				1				1			1		1
ARTRT												1								1																																
BERE													1																																							
LUPIN																				1																																
SYOC																					1																															
KOSC																			1																																	
ACGR																		1	1	1																																
AGINI																															1								1										1		
BG											1					1	1												1																							
LR		1	1					1	1	1		1						1	1								1	1																								1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	6	2	6	2	3	1	20
AMUTU	0	0	0	1	0	0	0	1
SYOC	1	2	9	0	0	0	0	12
ARTRT	2	4	9	2	0	0	0	17
BERE	19	0	0	0	0	0	0	19
ACGR	0	0	0	0	0	1	0	1

TRANSECT NUMBER - 5

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA		1					1					1	1	1											1	1			1		1		1				1	1	1												
ASTRA					1																																														
ARTRT																	1										1												1				1	1							
AGINI																								1																		1								
LUPIN																																															1				
JUOS																																																	1	1	
BG																			1										1				1								1			1			1	1	1		
LR	1		1		1	1		1	1	1	1				1	1			1	1		1	1			1	1						1		1															

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	3	11	11	0	0	25
ARTRT	2	3	3	3	0	0	0	11
SYOC	1	0	1	0	0	0	0	2

TRANSECT NUMBER - 6

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PIPD																																															1	1				
QUGA																																			1		1												1	1
AGINI						1																1																												
ARTRT								1																																										

ARTRT							1															1		1																										
ERIOG																1																																		
PIED																	1																																	
APLUL																														1																				
AMUTU																																					1													
SYOC																																									1		1							1
BG		1						1	1	1	1			1							1				1	1																								
LR	1		1	1	1							1	1		1			1	1	1			1				1	1			1	1	1	1		1			1	1		1		1	1					

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	1	11	4	1	0	0	0	17
CHVIV	0	2	2	0	0	0	0	4
QUGA	0	13	5	1	7	2	0	28
SYOC	4	8	2	C	0	0	0	14
AMUTU	0	0	1	0	0	0	0	1
PRVID	3	3	0	0	0	C	0	6

TRANSECT NUMBER - 7

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
QUGA																															1			1	1	1	1	1	1	1		1								
AGINI	1				1																						1					1																		
ARTRT			1	1		1																																												
AGTR										1																																	1							
JUOS											1	1	1	1	1																																			
PG																																													1					
PIED																		1	1																															
SYOC																				1																														
BG		1														1							1										1								1						1	1		
LR							1	1	1								1				1	1		1	1	1		1	1	1														1		1			1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	4	13	0	0	17
ARTRT	5	15	10	5	1	0	0	36
SYOC	0	3	0	0	C	0	0	3

TRANSECT NUMBER - 8

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
AGINI	1											1													
QUGA		1			1													1	1	1	1	1	1	1	
ARTRT			1												1										
ASTRA																	1								
BG				1			1		1							1									1
LR						1		1		1	1		1	1											

VEG SPECIES CODE	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGINI									1		1													1	
QUGA		1	1	1		1										1	1	1	1	1	1	1			
ARTRT																							1		
ASTRA																									
BG												1	1												
LR	1				1		1	1		1				1	1										1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	1	2	5	21	6	0	35
ARTRT	0	10	2	0	1	0	0	13
SYOC	6	0	2	1	0	0	0	9

TRANSECT NUMBER - 9

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
QUGA	1					1					1	1									1				
AGROP			1	1				1	1						1										
SYOC					1																				
JUDS																			1	1					1
ARLUL																									
BG													1				1								
LR		1					1			1				1		1		1				1	1	1	

VEG SPECIES CODE	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
QUGA		1												1	1	1	1						1		1
AGROP										1								1	1		1	1			
SYOC																									
JUDS																									
ARLUL									1																
BG			1	1		1		1			1	1	1												
LR	1				1		1													1				1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	12	17	4	0	0	33
SYOC	0	0	1	0	0	0	0	1
ARTRT	0	2	0	0	0	0	0	2

TRANSECT NUMBER - 10

TRANSECT NUMBER - 1C

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP	1								1																										1														1	1
ARTRT					1																																						1							
QUGA												1						1					1			1			1	1				1	1			1	1	1										
JUOS													1	1	1					1	1																													
ARLUL																																															1				
BG										1																							1									1							
LR		1	1		1	1	1	1			1					1	1	1		1				1	1		1	1			1			1			1	1	1				1		1		1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	1	9	3	2	0	0	0	15
QUGA	0	0	1	12	8	4	0	25

TRANSECT NUMBER - 11

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
QUGA	1																			1	1	1				1	1				1	1			1					1	1			1	1		1		1	1
BRTET			1					1	1																																										
ARTRT										1																																									
ACMIM															1																																				
PENST																			1																								1							
SYOC																	1																							1										
ROSA																									1																			1						
AMUTU																													1																						
BG							1											1																		1			1											
LR		1		1	1	1					1	1	1	1			1	1			1					1				1			1				1				1				1			1		1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	12	5	2	4	11	3	37
ARTRT	2	5	1	0	0	0	0	8
CHVIV	0	2	0	0	0	0	0	2
SYOC	2	8	0	0	0	0	0	10
ROSA	0	3	2	3	0	0	0	8
AMUTU	0	2	0	0	1	0	0	3

TRANSECT NUMBER - 12

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
SYOC		1													1																																			
QUGA					1						1	1	1			1	1						1	1	1	1	1				1	1	1	1	1	1	1			1	1	1		1	1	1	1	1	
ARTRT							1																																											
AGROP																					1																													
BG	1		1						1																																									
LR				1		1		1		1					1					1	1		1	1						1	1	1							1	1			1						1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	3	1	2	5	5	5	21
ARTRT	0	4	0	0	1	0	0	5
BERE	4	0	0	0	0	0	0	4
SYOC	1	8	1	0	0	0	0	10
CHVIV	0	0	2	0	0	0	0	2
ROSA	0	5	2	1	0	0	0	8

TRANSECT NUMBER - 13

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA		1						1					1	1																																					
AGROP			1																	1			1																											
ARTRT																		1							1								1	1										1						
PG																												1																							
STCO3																															1																			
ARLUL																																					1				1									
LUPIN																																1																		
PENST																																															1	1		
KOSC																																																	1	
BG	1				1			1		1																1				1						1	1	1						1						
LR			1		1				1		1				1	1	1	1			1	1		1			1		1	1		1		1					1			1	1							

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	2	0	0	4	

QUGA	0	0	0	2	2	0	0	4
ARTRT	0	2	14	8	1	0	0	25
SYOC	0	1	1	0	0	0	0	2
CHVIV	0	1	2	0	0	0	0	3

TRANSECT NUMBER - 14

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA		1		1	1			1		1	1	1			1					1	1			1			1			1													1	1		1	1	1	
JUOS						1	1																			1																								
ARTRT																			1		1				1																									
AGROP																							1																											
BG	1																								1								1	1	1	1			1				1						
LR			1						1				1	1		1	1	1				1	1		1						1			1	1	1		1	1											

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							
QUGA	0	3	3	10	19	4	0	39
SYOC	0	1	0	0	0	0	0	1
ARTRT	0	1	0	5	1	0	0	7

TRANSECT NUMBER - 15

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA	1	1	1		1			1		1							1	1	1	1	1					1											1													
JUOS							1	1						1	1																																				
ARTRT																		1																	1		1			1		1	1		1				
AGROP																															1		1										1		1				
BG					1																				1															1				1				1	
LR									1		1	1			1	1										1	1		1	1	1	1		1	1		1		1										1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							
QUGA	0	0	4	4	12	0	0	20
A[illegible]	1	1	5	11	[illegible]	0	0	18

ARTRT	1	1	5	11	0	0	0	18
SYOC	0	1	0	0	0	0	0	1

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER, UTAH

CASTLE GATE MIXED BRUSH
REFERENCE SITE
JULY 1981

TRANSECT NUMBER - 1

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AMUTU							1												1	1	1																													
AGROP						1		1			1	1										1																	1										
ARTRT																									1	1	1										1						1					1		
ORHY																																													1					
BG	1	1		1	1				1	1				1	1	1	1						1	1					1					1			1	1			1			1	1				
LR			1																	1						1	1		1	1	1	1		1				1	1			1				1	1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
AMUTU	0	0	0	0	0	2	0	2
EPVI	0	0	0	1	0	0	0	1
ARTRT	4	5	5	13	0	0	0	27
CHNAN	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 2

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AMUTU			1	1																					1																						1	1	1	
ARTRT					1						1			1	1					1	1	1	1			1					1										1		1	1	1	1				
AGROP						1										1																																		
PIED																																	1			1														
BG	1							1		1											1				1			1	1		1			1			1	1					1							
LR		1					1		1			1	1				1	1	1					1			1						1			1	1				1							1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	8	18	15	3	0	0	44
AMUTU	0	1	0	0	0	1	0	2

CHNAN	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 3

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT			1							1	1																																							
AGROP				1								1	1					1			1				1				1							1											1			1
ORHY															1		1																																	
ATCA																							1			1											1						1							
AGSP3																								1																										
BG					1			1								1						1					1						1								1	1			1	1				
LR	1	1				1	1		1					1					1	1								1		1	1	1		1	1			1	1	1				1				1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	4	8	6	2	0	0	20
ATCA	0	1	7	2	1	0	0	11
CHNAN	0	0	0	1	0	0	0	1

TRANSECT NUMBER - 4

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGSP3		1																																																
AGROP						1					1	1							1				1						1	1				1																
ARTRT															1	1																1					1					1								
ORHY																	1																																	1
EPVI																											1	1																						
ATCA																																											1							
CHNAN																																																	1	
BG									1	1			1								1	1		1	1	1							1		1	1		1							1	1	1	1		
LR	1		1	1	1		1	1						1				1		1											1								1	1	1			1						

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

ARTRT	2	4	3	4	1	0	0	14
EPVI	0	0	0	0	1	0	0	1
CHNAN	0	0	2	2	0	0	0	4
ATCA	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 5

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP		1		1		1				1	1				1					1		1			1	1		1	1								1		1			1				1			1	
ARTRT																1																																			
ATCA																								1																				1			1				
BG													1	1								1			1	1										1															1	
LR	1		1		1		1	1	1							1			1	1		1		1	1			1		1					1	1		1			1			1			1	1		1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CHNAN	0	0	1	0	0	0	0	1
ATCA	1	0	4	1	0	0	0	6
ARTRT	12	2	1	2	0	0	0	17

TRANSECT NUMBER - 6

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP	1										1				1	1					1		1	1	1		1									1	1	1	1			1							1	1
ATCA																				1																															
BG				1		1	1	1						1										1				1								1										1	1				
LR		1	1		1					1		1		1				1	1				1								1	1	1	1	1	1	1		1				1	1				1	1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	0	1	0	0	0	0	1
ATCA	1	1	2	1	0	0	0	5
EPVI	0	0	1	0	0	0	0	1
CHVIV	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 7

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP	1	1			1	1		1		1	1	1		1							1	1	1			1	1			1					1	1			1									1	1
ORHY																		1																																
ARTRT																															1			1			1					1							
BG									1					1		1												1			1		1					1					1					1		
LR			1	1			1						1		1			1					1	1					1					1							1	1			1	1	1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CHVIV	1	8	0	0	0	0	0	9
AMUTU	0	0	0	0	0	1	0	1
CHNAN	0	2	0	1	0	0	0	3
ARTRT	2	2	3	3	1	0	0	11

TRANSECT NUMBER - 8

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP	1		1			1			1	1		1											1												1					1	1	1								
ORHY											1																																							
ARTRT																			1		1			1																1				1				1		
AMUTU																											1	1	1	1				1																
ATCA																																												1						
BG					1		1					1																					1			1				1			1		1	1		1
LR		1		1			1							1	1	1	1	1		1		1	1						1	1			1											1			1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	10	17	13	3	1	0	0	44
RHTRT	0	0	0	1	0	0	0	1
AMUTU	0	0	0	0	1	1	0	2
ATCA	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 9

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT		1		1		1								1	1	1		1																		1										1				1	1	1
AGROP																							1				1	1				1																		
JUOS																																																		1	
BG										1	1	1	1							1	1	1			1	1				1							1						1							
LR	1		1		1		1	1	1									1		1				1				1			1		1		1		1		1	1	1	1	1			1			1		1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	7	7	9	13	2	0	0	38
CHVIV	0	1	0	0	0	0	0	1
JUOS	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 10

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRT	1	1	1				1				1			1		1			1	1																						1						1			
AMUTU						1																	1																												
AGROP													1																												1			1			1			1	1
BG					1																1		1			1	1	1	1			1		1									1			1			1	
LR						1		1	1	1				1	1			1	1					1	1			1			1	1		1		1	1	1			1			1			1				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	3	7	6	12	0	0	0	28
AMUTU	0	1	1	2	1	0	0	5
CHNAN	0	0	1	1	0	0	0	2

TRANSECT NUMBER - 11

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP					1	1						1										1	1															1								1			1			1	1
ARTRT														1																										1											
BRTET																												1																							
CHVIV																																																1			
BG	1	1										1			1	1	1	1	1		1			1	1		1		1					1					1			1								1		
LR					1	1			1	1	1									1						1					1				1	1		1	1						1	1				1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CHNAN	0	0	1	2	0	0	0	3
ARTRT	2	4	2	0	0	0	0	9
PRVID	0	0	0	0	1	0	0	1
POAN	0	0	0	0	1	1	0	2
CHVIV	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 12

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP				1				1	1	1	1			1			1	1			1								1	1						1													1		1	1
CHNAN					1																																															
BRTET																					1		1	1			1					1																			1	
ATCA																																		1			1						1	1							
BG							1						1						1					1															1			1	1		1							
LR	1	1			1	1					1				1	1												1			1			1	1				1		1					1		1		1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CHNAN	0	1	0	0	0	0	0	1
ATCA	0	3	6	2	0	0	0	11
EPVI	0	0	1	0	0	0	0	1
ARTRT	0	0	0	1	0	0	0	1
CHVIV	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 13

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP		1	1										1				1								1										1								1							
ARTRT									1																						1				1							1	1					1	1	
EPVI																		1	1																																
CHNAN																												1									1													
ORHY																																																	1		
BG				1	1	1	1	1		1				1	1					1	1		1				1										1													
LR	1											1				1						1			1	1			1			1			1					1	1	1			1	1	1				1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	4	11	8	0	0	0	23
EPVI	0	0	0	0	1	0	0	1
CHNAN	0	1	0	1	1	0	0	3

TRANSECT NUMBER - 14

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP		1		1	1			1	1	1					1	1		1					1					1																						
ORHY														1																												1								
ARTRT																											1			1						1		1	1			1	1	1					1	
AGSP3																															1																			
BG	1						1						1				1								1								1	1		1							1		1		1		
LR				1		1					1			1					1	1	1		1			1			1	1		1						1							1		1			1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ATCA	0	2	1	5	0	0	0	8
ARTRT	15	3	5	11	0	0	0	34
JUOS	0	0	0	1	0	0	0	1
AMUTL	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 15

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP			1				1				1									1						1																								
BRTET						1																																												
AMUTU								1	1	1																								1	1	1	1			1			1						
ARTRT																					1											1	1																	
BG		1		1										1	1	1	1									1		1	1		1															1	1		1	
LR	1				1							1	1					1		1		1	1	1			1			1				1				1	1	1		1	1		1			1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	9	11	11	1	0	0	32
AMUTU	0	0	0	0	2	5	0	7
JUOS	0	0	0	0	2	0	0	2
ATCA	0	0	0	1	0	0	0	1

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER UTAH

BARN CANYON-MIXED BRUSH
AFFECTED AREA
OCTOBER-1981

TRANSECT NUMBER - 1

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
QUGA	1	1	1	1	1	1	1	1									1	1	1	1																																			
ACGR										1											1	1	1	1				1			1		1	1					1	1	1	1	1											
JUDS											1		1																																									
PG																	1										1																												
ORHY																													1																										
BERE																																												1	1									
BG												1																																										
LR														1	1									1	1	1							1			1	1	1	1						1			1	1	1	1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	1	1	0	15	17
ACGR	0	0	0	0	0	0	37	37
JUDS	0	0	0	1	0	0	1	2

TRANSECT NUMBER - 2

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
ACGR		1	1									1	1	1								1	1	1							1	1	1																						
JUDS								1	1																	1	1	1																											
AGROP												1					1																						1																
SYDC																			1																																			1
BERE																									1		1																												
ARLUL																												1																										
ABCO																																																					1	
RIBES																																						1	1															
QUGA																																	1	1	1	1																	
BG							1			1									1												1																				1			
LR		1			1	1					1					1	1				1					1				1	1					1																		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							
ACGR	0	0	0	0	1	5	26	32
JUOS	0	0	0	0	0	0	4	4
ARTRT	0	1	0	2	0	0	0	3
SYOC	1	1	23	0	0	0	0	25
ABCO	0	0	1	1	1	0	1	4
RIBES	0	0	0	0	4	0	0	4
QUGA	0	0	0	1	3	0	0	4

TRANSECT NUMBER - 3

HIT NUMBER

VEG SPECIES / CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ACGR		1									1				1																																			
AGROP						1		1								1																																		
AF									1																																									
JUOS																1	1	1																																
PSMEM																					1	1	1																											
ABCO																								1																										
QUGA																															1	1	1	1		1							1	1	1	1	1	1	1	
PIED																																					1													
BERE																																			1	1		1												
LR	1		1	1		1			1		1	1	1					1	1	1						1	1	1	1	1					1					1			1		1					

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							
ACGR	0	0	0	1	3	0	4	8
PSMEM	0	0	0	1	0	0	1	2
JUOS	0	0	0	0	1	0	1	2
SYOC	0	8	0	0	0	0	0	8
ABCO	0	0	0	0	0	0	1	1
QUGA	0	0	4	3	6	0	13	26
RIBES	0	0	0	2	0	0	0	2
PIED	0	0	0	0	0	0	1	1

TRANSECT NUMBER - 4

HIT NUMBER

VEG SPECIES / CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0

ARLUL	1											1																																						
ACGR		1	1	1	1																																										1			
QUGA						1	1	1	1	1																	1						1									1	1	1						
BERE																		1	1												1	1		1			1													
AGROP											1										1			1					1									1												
SYDC													1	1	1																														1					
RIBES																1																				1										1				
LR																	1			1		1	1		1	1		1		1					1				1	1	1							1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ACGR	0	0	0	0	21	5	0	26
QUGA	0	0	1	2	7	27	9	46
SYDC	0	1	5	30	0	0	0	36
RIBES	0	0	0	1	3	1	0	5
ARTRT	0	0	0	1	1	0	0	2

TRANSECT NUMBER - 5

VEG SPECIES CODE (HIT NUMBER)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
SYDC						1													1																1								1							
QUGA		1	1				1	1	1			1	1															1	1	1	1														1	1	1	1	1	1
DECA	1			1							1						1	1																				1	1			1								
ACGR																				1		1	1	1	1	1	1					1				1	1				1									
LR					1					1				1	1	1					1												1	1						1				1						

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	0	2	3	21	26
SYDC	0	1	35	0	0	0	0	36
ACGR	0	0	0	0	3	0	8	11

TRANSECT NUMBER - 6

HIT NUMBER

VEG SPECIES 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 5

CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
BERE	1							1	1																																											
MOSS					1																																														
PG						1				1																																									
BRTET							1																																												
ACGR											1	1	1	1	1	1	1	1	1																															
SYOC																				1													1			1	1	1	1			1			1	1		1			
AGINI																									1																										
PF																											1	1	1																						
QUGA																														1	1	1																			
CELEL																																				1															
LR			1	1			1															1	1		1														1			1	1				1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	0	0	26	15	5	0	0	46
ACGR	0	0	0	0	0	0	7	7
ARTRT	0	0	0	0	2	0	0	2
JUOS	0	0	0	0	0	0	1	1
QUGA	0	0	0	0	3	0	1	4
CELEL	0	0	0	0	0	0	2	2
RIBES	0	0	0	1	0	0	0	1

TRANSECT NUMBER - 7

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
BRTET	1	1	1															1		1				1	1		1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
BERE				1	1																																														1
QUGA						1	1	1	1	1	1																																								
RIBES												1																																							
SYOC													1																																						
ATCA																1																																			
AF																			1																																
JUOS																							1																												
POA																																																		1	
BG															1																																				
LR																1			1			1			1				1																							

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	16	0	6	8	0	30
RIBES	0	0	0	0	2	0	0	2
SYOC	0	0	0	0	3	0	0	3
AMUTI	0	0	0	0	2	0	0	2

AMUTU	0	0	0	0	2	0	0	2
ATCA	0	0	3	0	0	0	0	3
JUOS	0	0	0	0	0	0	1	1

TRANSECT NUMBER - 8

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PG	1																																																	
JUOS				1		1	1																																											
RIBES																																										1	1								
SYOC					1				1														1	1											1							1			1						
AGROP								1																																											
ACGR																													1	1																						
AGINI										1	1					1																																			
BRTET												1			1			1													1						1														
BERE																	1																			1															
ARTRT																				1	1												2												1	1		1	1		
DECA																											1				1																					
QUGA																													1																							
LR		1	1										1	1					1							1							1					1					1	1	1				1	1		1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	0	2	14	5	0	0	21
SYOC	0	3	13	0	1	0	0	17
JUOS	0	0	0	6	2	0	1	9
QUGA	0	0	1	1	1	0	5	8
ACGR	0	0	0	0	4	0	0	4
RIBES	0	0	0	3	0	0	0	3

TRANSECT NUMBER - 9

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
SALIX																																											1	1								
POA	1	1				1																																													
PF					1																																														
PG							1																																												
ACMIM								1																																											
POAN																	1	1				1	1			1	1							1	1	1		1	1	1					1		1		

CEMOM																		1																																
RIBES																							1																											
SYOC																								1						1																				
AF																												1														1								
MOSS																																	1																	
BG																																1													1					
LR			1	1					1	1	1	1	1	1	1				1	1							1		1		1						1	1								1		1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CEMOM	0	0	0	0	1	0	0	1
RIBES	0	0	0	0	1	0	0	1
SYOC	0	0	10	5	0	0	0	15
SALIX	0	0	0	0	0	5	0	5
PDAN	0	0	0	0	0	7	0	7

TRANSECT NUMPER - 10

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP																																			1											1				
PF		1	1																																															
PSMEM							1	1																																					1					
SYOC										1																		1			1																			
CEMOM													1																																					
QUGA																1		1		1		1	1	1																										
BERE																																												1						
AF																																															1		1	
LR	1			1	1	1			1		1	1		1	1		1		1		1				1	1	1		1	1		1	1	1		1	1	1	1	1	1	1	1					1		1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	0	9	15	0	0	0	0	24
CEMOM	0	0	0	0	0	0	1	1
PSMEM	0	0	1	2	0	0	0	3
QUGA	0	0	5	9	1	0	1	16
JUOS	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 11

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP			1																																															
ACGR						1	1	1	1	1																					1	1	1	1	1	1													
QRHY															1																											1								
QUGA																1	1																																	
BERE																				1					1																				1	1	1				
CHVIV																											1																							
AF																																										1								
BG	1	1																																																1
LR					1	1					1	1	1	1				1	1	1		1	1	1	1				1	1	1	1	1	1					1	1			1				1	1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ACGR	0	0	0	0	0	0	45	45
QUGA	0	0	0	0	19	0	0	19
CHVIV	0	0	2	0	0	0	0	2

TRANSECT NUMBER - 12

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PG			1	1	1																																													
SYOC						1	1						1	1	1		1			1	1										1	1												1					
BRTET												1																																						
GRSQ																						1														1														
POSA																							1																											
ACGR																			1	1	1													1	1	1					1	1	1	1		1			
BERE																														1																				
AF																																									1								
BG									1																																									
LR	1	1						1		1	1					1		1	1							1	1	1							1	1		1					1	1		1				1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	3	22	14	0	0	0	0	39
AMUTU	0	0	0	0	0	0	5	5
SALIX	0	0	0	0	0	7	0	7
ACGR	0	0	0	0	0	3	24	27

TRANSECT NUMBER - 13

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PG				1	1	1							1		1			1			1																						1			1					
AF							1					1																																			1	1				
SALIX								1							1						1																															
PF																							1							1	1	1	1																		
ACGR																								1		1																		1							
POPA																											1	1														1						1	1		
POAN																																				1	1														
BG	1	1																																																	
LR					1					1	1	1				1	1		1				1				1				1	1			1	1	1							1			1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	0	0	0	5	0	0	0	5
SALIX	0	0	0	0	13	0	0	13
ACGR	0	0	0	0	0	0	4	4
POAN	0	0	0	3	0	0	1	4
POSA	0	0	0	0	0	0	2	2

TRANSECT NUMBER - 14

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
SYOC		1	1	1																																													1			
ACGR					1	1	1	1	1																																			1	1	1					
PG															1			1	1																														1	1		
CEMOM																										1																										
BERE																												1																								
OLGA																													1	1	1	1	1	1	1	1	1															
LR	1									1	1	1	1			1	1			1	1	1	1	1	1		1															1	1	1	1	1	1				1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	0	0	0	11	0	0	0	11

ACGR	0	0	0	0	12	19	6	37
CEMOM	0	0	0	0	2	0	0	2
QUGA	0	0	0	0	0	15	0	15
RIBES	0	0	0	0	2	0	0	2

TRANSECT NUMBER - 15

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ACGR	1	1	1			1	1		1		1					1	1													1			1	1	1	1	1												
PF					1																																													
PG												1	1																															1				1			
ABLA																			1	1	1	1	1																												
JUOS																														1																					
POPA																															1																				
GRSO																																												1				1			
LR				1				1		1				1	1			1						1	1	1	1	1								1	1	1	1	1	1			1	1	1			1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ACGR	0	0	0	0	7	0	13	20

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER, UTAH

DRY CANYON-MIXED BRUSH
REFERENCE SITE
OCTOBER 1981

TRANSECT NUMBER -2

HIT NUMB

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA	1	1	1	1	1	1	1	1	1																																1	1	1	1	1	1				
PF										1																																								
ORHY											1																																							
PG																1											1																							
AF																			1											1						1														
SYOC																				1																												1		
ARTRT																					1										1										1									
AGINI																						1		1				1	1	1																				
JUOS																									1																							1		
AGSP3																																			1															
LR												1	1	1	1		1	1	1					1		1					1			1	1	1	1												

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	7	12	0	17	36
SYOC	0	0	5	0	0	0	0	5
ARTRT	0	3	2	0	0	0	0	5

TRANSECT NUMBER - 2

HIT NUMB

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
JUOS	1																																																		
QUGA		1	1		1															1			1	1		1	1	1	1	1	1	1	1																		
SYOC				1																	1	1																													
ARTRT						1					1								1																																
AGROP														1	1	1	1	1							1												1										1	1		
ANTEN																								1																											
AMUTU																																		1																
BG										1																												1												
LR							1	1	1			1	1					1	1	1	1											1				1	1			1	1									

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
RIBES	0	0	1	0	0	0	0	1
SYOC	0	2	5	0	0	0	0	8
ARTRT	0	1	4	1	0	0	0	6
QUGA	0	0	0	1	0	7	5	13
AMUTU	0	0	0	0	0	1	0	1

TRANSECT NUMBER - 3

VEG SPECIES CODE	HIT NUMBE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
QUGA	1	1											1				1	1			1		1			1	1	1	1	1	1	1	1	1																
AGROP								1	1					1																											1				1						
ARTRT												1						1						1																							1	1		
ORHY																1									1																										
AGSP3																																												1						
BG			1							1	1																																							
LR				1	1	1	1								1	1						1		1												1	1	1		1	1	1				1			1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	1	0	7	0	30	38
ARTRT	0	0	5	2	2	0	0	9
SYOC	0	0	1	0	0	0	0	1
AMUTU	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 4

VEG SPECIES CODE	HIT NUMBE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
QUGA											1	1	1	1	1	1	1	1	1	1	1	1	1																			1	1	1	1				1	1	1
AGROP																									1									1			1														
LR	1	1	1	1	1	1	1	1	1	1														1		1	1									1	1		1	1	1					1	1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	0	0	6	17	23
ARTRT	0	0	3	3	1	0	0	7
SYOC	0	2	5	0	0	0	0	7

TRANSECT NUMBER - 5

VEG SPECIES CODE	HIT NUMBE 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA			1	1	1	1	1				1	1	1	1	1	1																									1	1	1	1	1	1	1	1	1	1
AGROP																	1			1	1		1	1			1							1																
DPPD																						1																												
ARTRT																																						1												
AGSP3																														1																				
LR	1	1								1	1								1	1						1	1				1	1		1	1		1	1		1	1	1								

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	0	3	39	15	57
ARTRT	0	0	3	0	0	0	0	3

TRANSECT NUMBER - 6

VEG SPECIES CODE	HIT NUMBE 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA	1	1	1		1	1	1	1	1	1	1	1																1	1		1											1	1	1	1	1	1	1	1	1
JUOS																											1																								
RIBES					1																																														
ARTRT																									1										1	1	1													
AGROP																															1																			
BG																		1																1																
LR														1	1		1	1	1	1	1	1	1	1								1	1		1					1	1	1	1							

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	1	3	5	4	12	25
RIBES	0	0	0	1	1	0	0	2
JUDS	0	0	0	1	0	0	0	1
ARTRT	0	2	8	0	0	0	0	10
SYOC	0	0	1	0	0	0	0	1

TRANSECT NUMBER - 7

HIT NUMBF

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1																															
ARTRT																									1						1							1	1	1		1			1				1	1
AGROP																																												1		1			1	
LR					1	1	1														1	1	1		1	1	1	1		1	1	1	1	1				1		1		1		1	1				

SHRUB HEIGHT AND DENSITY

HEIGHT CLASSES

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	10	0	0	16	26
ARTRT	1	0	6	3	0	0	0	10
SYOC	0	0	1	0	0	0	0	1

TRANSECT NUMBER - 8

HIT NUMBF

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA							1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1																									
ARTRT		1																																																
ABLA						1																																											
SYOC																										1																							
ACGR																	1																																
PSMEM																		1		1	1																												
AGROP																																									1								
PIED																																																	1
BG	1																							1	1	1	1	1												1			1			1				
LR				1	1	1																1				1										1	1	1	1			1		1	1		1	1	

SHRUB HEIGHT AND DENSITY

[illegible] HEIGHT CLASSE[illegible]

SHRUB SPECIES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							
ARTRT	0	0	6	3	0	0	0	9
QUGA	0	0	0	0	9	0	11	20
ACGR	0	0	0	1	18	0	2	21
SYOC	0	5	1	0	0	0	0	6

TRANSECT NUMBER - 9

HIT NUMBE

VEG SPECIES	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
SYOC	1														1																														
QUGA		1	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1						1	1											
AGRDP																															1	1	1	1		1		1	1						
BG																																												1	
LR																1	1											1	1	1	1					1		1						1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
	HEIGHT CLASSES							
SYOC	0	0	0	0	1	0	0	1
QUGA	0	0	0	16	8	1	14	39
RIBES	0	0	0	1	0	0	0	1
ARTRT	0	0	0	1	0	0	0	1

TRANSECT NUMBER - 10

HIT NUMB

VEG SPECIES	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
QUGA				1	1				1	1	1	1	1	1	1	1	1	1	1	1				1	1	1		1	1	1															
AGRDP						1																																							
OPPO																							1																						
STIPA																													1																
AGSP3																															1	1	1	1					1			1			
BG																																													
LP	1	1	1				1	1																	1								1	1	1	1		1						1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	6	11	5	1	23
ATCA	0	0	0	1	0	0	0	1
ARTRT	0	0	3	0	0	0	0	3

TRANSECT NUMBER - 11

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP		1	1		1					1								1										1					1	1				1	1			1	1						
ARTRT				1			1		1		1	1									1					1					1		1								1									
QUGA																																						1						1					1		
RIBES																							1																												
AGSP3																																1	1	1										1						
BG	1					1																																														
LR								1					1	1	1	1	1		1			1	1	1			1	1		1	1	1	1			1															

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	0	4	9	0	0	0	13
QUGA	0	0	0	0	2	0	2	4
RIBES	0	0	0	1	0	0	0	1
SYOC	0	0	1	0	0	0	0	1

TRANSECT NUMBER - 12

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA	1																			1	1	1	1	1	1															1	1	1			1	1	1	1	1	1
AGROP		1		1	1													1								1	1										1													
AGSP3			1					1							1																1																			
BRTET											1																																							
AGINI																1																																		
ARTRT																												1										1												
ATCA																									1																									
PG																																										1								
AMUTU																																																	1	
LR									1	1		1	1		1	1		1												1	1		1	1	1							1		1				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	6	1	11	7	3	28
ARTRT	0	0	3	0	0	0	0	3
ATCA	0	0	1	0	0	0	0	1
SYOC	0	1	1	0	0	0	0	2
AMUTU	0	0	0	0	0	1	0	1

TRANSECT NUMBER - 13

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
QUGA																1	1	1										1	1		1	1							1	1						1	1	1				
PG	1																		1																																	
ARTRT						1	1					1																							1								1	1							1
AGROP										1			1														1						1	1					1						1						
SYOC																							1																												
AGSP3																															1																				
LR		1	1	1	1			1			1	1			1	1					1	1		1	1										1	1									1	1				1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	1	0	13	2	0	0	0	16
QUGA	0	0	6	5	5	0	5	21
SYOC	0	0	0	5	1	0	0	6
AMUTU	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 14

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
QUGA										1	1	1	1									1	1	1	1	1		1																								1
AGSP3			1			1																																														
AGROP				1																																															
ARTRT														1	1																																				

ACGR																	1	1	1	1	1																													
ORHY																															1	1																		
PG																																	1	1			1													
PF																																			1			1												
AF																																							1						1					
AGINI																																											1							
LR	1	1			1		1	1	1							1						1								1						1						1		1						

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	0	8	2	0	0	0	10
QUGA	0	0	1	5	0	0	7	13
ACGR	0	0	0	0	0	0	6	6
JUOS	0	0	0	0	0	1	0	1
PSMEM	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 15

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
QUGA	1						1	1	1				1				1	1	1	1	1	1	1	1	1	1	1		1																	1	1	1	1	1
ORHY					1							1				1																																		
ARTRT										1					1																			1	1	1														
AGSP3																														1	1																			
OPPO																																	1																	
BG														1																																				
LR		1	1	1		1					1																					1					1	1	1	1	1	1	1	1	1					

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	0	2	3	2	0	0	7
QUGA	0	0	2	0	20	0	12	34

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER, UTAH

BARN CANYON PINYON-JUNIPER
AFFECTED AREA
OCT/1981

TRANSECT NUMBER - 1

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ARLUL	1																																																	
SYOC											1																																							
PG												1																																							
AGROP														1	1		1	1	1	1	1	1	1					1	1	1		1			1		1	1									1				
AGINI																															1								1		1			1					1		
PIED																																			1																
QUGA																																					1														
ARTRT																																												1			1		1		
BG																									1																											
LR		1	1	1	1	1	1	1	1	1					1												1	1							1					1	1	1			1						1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
RIBES	0	0	0	0	2	0	0	2
JUOS	0	0	0	0	1	0	0	1
ACGR	0	0	0	1	1	1	0	3
ARTRT	0	1	12	9	0	0	0	22
SYOC	0	6	0	0	0	0	0	6
PIED	0	0	0	0	0	0	1	1
QUGA	0	0	0	0	6	0	0	6

TRANSECT NUMBER - 2

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGINI			1																																																
AGROP				1																		1				1			1			1	1		1	1	1	1		1	1		1				1	1	1
ABCO					1	1	1	1																																										
RIBES										1																																								
AGSM																		1																																
JUOS																			1	1		1									1																			
ACGR																					1																													
PG																							1																											
BG											1	1													1		1		1				1								1									

LR	1	1								1			1	1						1			1				1						1					1					1		1	1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	0	1	4	9	1	0	0	15
SYOC	0	3	2	0	0	0	0	5
ABCO	0	0	0	0	0	0	1	1
RIBES	0	0	0	1	0	0	0	1
CEMOM	0	0	0	3	1	0	0	4
PIED	0	0	0	0	0	0	1	1
JUOS	0	0	0	0	0	0	2	2
ACGR	0	0	0	0	0	0	4	4

TRANSECT NUMBER - 3

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PIED		1	1	1	1									1																																	1			
AGROP																						1	1			1		1	1				1			1			1	1	1			1					1	
JUOS													1							1							1																		1	1				
AGINI																1																																		
BG	1							1									1	1	1																								1							
LR						1	1		1	1	1	1			1						1			1	1					1	1	1		1	1		1	1				1						1		1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
PIED	0	2	0	1	1	0	1	5
CELEL	0	0	0	0	1	1	0	2

TRANSECT NUMBER - 4

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP	1				1		1			1	1		1	1																	1			1				1	1			1				1				1
CELEL																1					1	1	1										1																	
JUOS																	1												1	1																	1			

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PIED																												1							1	1														
BG		1				1				1		1			1																						1											1		
LR			1	1					1									1	1	1				1	1	1	1					1								1	1		1	1	1				1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	0	0	0	2	0	3	5

TRANSECT NUMBER - 5

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
JUOS			1											1	1																																			
AGROP				1		1				1		1						1	1													1					1						1			1	1			
QUGA								1	1																																									
PIED																					1	1	1											1	1															
CELEL																													1											1	1				1				1	
BG					1											1																												1						
LR	1	1					1				1		1				1			1				1	1	1	1	1		1	1		1			1		1	1			1						1		1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
JUOS	0	0	0	0	1	0	0	1
QUGA	0	0	0	5	3	0	0	8
CELEL	0	0	0	0	1	0	3	4

TRANSECT NUMBER - 6

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PIED		1			1														1	1																														
AGROP			1								1	1			1						1			1			1	1					1		1						1	1						1		
CELEL														1		1																											1	1	1	1				
JUOS																														1	1																			
BG																						1							1									1	1								1		1	1
LR	1			1		1	1	1	1	1			1				1	1					1		1	1						1		1		1	1			1										

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	0	11	0	0	1	2	14

TRANSECT NUMBER - 7

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP			1																		1																		1				1	1					1	1	1	
JUOS						1											1						1	1		1	1	1																							
OUGA								1																																								1				
PIED									1	1	1			1	1																																					
CELEL																						1																														
PSMEM																																			1	1		1						1							
BG																														1										1											1	
LR	1	1		1	1		1						1				1	1	1									1		1	1	1	1	1								1	1		1				1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
OUGA	5	5	0	2	0	0	1	13
CELEL	0	0	0	0	0	0	1	1

TRANSECT NUMBER - 8

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP	1		1			1	1	1	1	1			1			1			1			1			1	1			1	1	1			1								1	1			1	1		1	1	
PIED											1																																									1
QUGA																																																	1	1	1	
BG					1									1						1						1												1	1				1									
LR		1		1											1			1	1		1	1				1							1	1	1	1	1								1				1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
JUOS	0	0	1	0	0	0	0	1
CELEL	0	0	1	0	0	0	1	2
QUGA	0	0	0	0	4	0	1	5

TRANSECT NUMBER - 9

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP	1	1				1	1				1			1	1					1													1			1	1	1	1					1			1	1	1	1	
PIED				1																		1	1	1																												
JUOS																										1	1																									
BG																													1	1																						
LR					1	1			1	1		1	1			1	1	1	1						1			1			1	1	1	1					1	1	1	1	1		1	1					1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ARTRT	7	4	0	0	0	0	0	11

TRANSECT NUMBER - 10

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PIED	1																1	1											1									1	1	1												1
AGROP		1	1	1	1							1	1	1		1								1	1	1			1				1	1	1			1		1					1						
POA							1																																												
JUOS								1	1	1	1																																								
ORHY																																			1																
CELEL																																																		1	
BG															1																	1														1						
LR																			1	1	1	1	1				1			1	1	1	1								1			1		1	1					

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

JUDS	0	0	0	0	2	2	1	5
PIED	0	1	0	0	0	1	3	5
CELEL	0	0	0	1	2	1	0	4

TRANSECT NUMBER - 11

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
JUDS	1	1																																															1			
AGROP				1		1	1					1	1				1	1								1	1					1				1							1				1		1		1
CELEL																1						1	1	1	1	1																									
PIED																																					1	1	1	1				1	1	1					
POA																																										1									
BG									1					1																	1	1											1								
LR			1		1			1		1	1					1					1							1	1	1	1			1																	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
JUDS	0	0	0	0	0	3	0	3
CELEL	0	0	0	0	2	4	1	7
PIED	0	1	0	0	1	1	3	6

TRANSECT NUMBER - 12

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ORHY		1																																																		
AGROP			1	1	1		1	1			1								1	1					1		1	1			1		1									1	1	1				1			
JUDS												1	1	1	1	1	1									1	1								1	1	1	1	1												
POA																								1		1																			1						
CELEL																																1			1	1															
BG	1								1	1																																									
LR						1															1	1	1								1										1				1	1		1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

JUDS	0	0	0	0	0	0	2	2
CELEL	0	0	0	0	5	5	1	11

TRANSECT NUMBER - 13

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP	1	1	1	1	1									1									1				1	1				1									1					1	1	1	1	1	1
DRHY									1				1																																							
POA															1	1				1																																
CELEL																														1																						
BG						1		1		1	1	1					1	1			1		1		1											1				1				1		1				1	1
LR							1													1					1			1				1	1		1		1	1	1		1	1		1				1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	5	5	1	0	11
CELEL	0	0	1	0	0	1	0	2

TRANSECT NUMBER - 14

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP	1	1								1											1	1			1	1															1							1			
CELEL						1	1	1		1													1	1	1							1	1																		
JUDS												1	1			1																																			
PIED														1	1																			1	1	1	1														
AGINI																															1												1		1					
BG																										1	1													1		1					1	1		1
LR			1	1	1											1	1								1	1										1		1		1	1								1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	0	0	1	2	2	1	6
JUDS	0	0	0	0	0	0	1	1

PIED	0	0	0	0	0	0	3	3

TRANSECT NUMBER - 15

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP	1			1				1	1	1			1						1			1					1	1	1	1		1	1								1	1			1	1				
AGINI							1																								1																			
PIED											1	1							1	1																																
JUOS																																			1	1	1	1									1	1	1	1
CELEL																																							1											
BG		1	1		1																	1	1	1	1								1	1									1	1						
LR						1								1	1	1	1																														1				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	0	0	0	0	2	0	2
PIED	0	0	0	0	0	0	3	3
JUOS	0	0	0	0	0	1	1	2

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER, UTAH

CRANDALL PINYON-JUNIPER
REFERENCE SITE
OCTOBER 1981

TRANSECT NUMBER - 1

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
QUGA	1																																																	
AGINI			1	1	1	1							1	1									1																											
CELEL										1	1	1	1								1	1											1	1	1	1														
AGROP																												1			1		1										1	1				1	1	1
PIED																													1	1																					
BG																																							1												
LR		1					1	1							1	1	1	1	1	1				1	1	1				1		1					1	1	1	1			1	1	1				

SHRUB HEIGHT AND DENSITY

HEIGHT CLASSES

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	4	0	0	0	0	4
CELEL	0	0	0	0	0	0	6	6

TRANSECT NUMBER - 2

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP													1					1	1	1	1	1	1	1																										
AGINI		1															1																																	
DRHY						1																																												
CELEL							1	1	1	1		1															1								1	1	1	1											
JUOS																												1	1	1																				
PIED																																							1	1	1									
AF																																																		1
BG			1								1																																1						
LR		1		1	1									1	1		1							1	1							1	1	1	1							1		1	1	1	1	1	1

SHRUB HEIGHT AND DENSITY

HEIGHT CLASSES

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

CELEL	0	0	0	10	0	0	4	14

TRANSECT NUMBER - 3

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGINI	1												1																																					
AGROP		1													1																					1	1							1						1	
PIED						1	1	1	1	1	1	1																																							
CELEL																		1	1	1																															
JUOS																													1	1	1	1	1										1	1	1	1					
BG			1																		1	1		1	1		1	1													1										
LR				1	1											1							1			1			1							1	1		1	1		1	1							1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	0	0	0	0	0	8	8

TRANSECT NUMBER - 4

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP	1				1					1	1												1		1	1	1	1			1							1					1								
AGINI									1																																										
CHVIV															1																																				
QUGA																						1	1	1				1	1																						
AGSM																									1																										
PHLOX																								1																											
PIED																																1		1	1	1	1	1	1	1										
BG					1							1							1	1		1																													
LR		1	1	1			1	1						1		1	1	1	1	1		1														1			1		1	1									

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	9	0	0	0	0	9

TRANSECT NUMBER - 5

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP	1	1				1		1	1						1		1			1					1	1				1		1									1								
DRHY							1																																											
AGSM																1						1																												
AGINI																		1	1																															
CELEL																								1																					1	1	1			
JUOS																																1						1	1	1	1								
BG											1																	1	1				1	1	1							1						
LR			1	1	1					1	1	1	1	1									1				1	1								1							1			1			1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	1	0	0	0	0	0	1
PIED	0	0	0	11	0	0	0	11

TRANSECT NUMBER - 6

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
CELEL	1																																																		
AGROP		1	1					1					1																																						
QUGA															1	1	1	1	1	1																															
JUOS																					1	1	1	1	1	1	1	1	1	1																					
PIED																															1	1	1	1	1	1	1	1	1												
BG															1															1																	1	1	1	1		
LR				1	1	1	1		1	1	1	1																			1	1		1	1							1	1	1						1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	0	6	2	2	10

TRANSECT NUMBER - 7

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
JUOS								1	1	1	1	1											1	1	1															1	1	1								
AGROP														1												1				1			1		1	1													
CELEL															1			1																																
PSMEM																																												1	1	1	1	1	1	
BG	1				1																								1																					
LR		1	1	1		1	1								1	1		1	1	1	1	1					1	1			1		1			1	1	1				1	1	1						

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	0	7	0	0	4	0	11

TRANSECT NUMBER - 8

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
QUGA			1	1	1			1				1				1	1	1	1							1	1	1	1	1	1	1																		
AGROP									1				1		1																																				
PSMEM																																										1	1	1	1	1	1	1	1	1
BG							1				1			1			1					1																			1									1
LR	1	1				1				1									1	1		1	1	1	1	1								1	1	1	1	1												

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	13	10	0	11	34

TRANSECT NUMBER - 9

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
										1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	5
AGINI				1																																														
CELEL								1	1	1																																								
AGROP													1	1	1	1																											1	1	1						
PIED																											1	1	1	1	1	1	1	1	1	1											1	1	1		
BG											1								1			1			1											1	1				1	1					1				
LR	1	1	1		1	1	1									1	1	1		1	1		1	1														1	1						1				1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CHNAN	0	0	6	1	0	0	0	7
CELEL	0	1	0	0	0	0	3	4
CHVIV	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 10

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
										1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	5
AGROP				1																																		1												
CELEL										1	1	1																																						
JUOS								1	1																																									
AGINI														1	1					1	1																														
PIED																						1	1	1	1	1														1	1	1	1	1	1	1	1				
ORHY																														1																				
BG	1	1	1			1	1																																										1	
LR					1										1	1	1	1									1	1	1	1		1	1	1	1	1	1	1									1	1		1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	0	0	0	0	0	3	3
CHVIV	0	6	0	0	0	0	0	6

TRANSECT NUMBER - 11

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP						1			1			1	1													1	1	1	1			1	1	1		1	1	1	1											
AGINI			1	1		1																																												
POA																								1	1																									
JUOS																																													1	1	1	1	1	
BG		1																																																
LR					1			1	1		1	1			1	1	1	1	1	1	1	1	1					1	1				1					1	1	1	1	1	1						

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CHVIV	0	11	0	0	0	0	0	11
CELEL	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 12

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ORHY													1	1																																				
CELEL																1	1	1																1	1	1												1	1	1
AGROP																			1	1	1																				1			1						
QUGA																								1	1		1	1	1																					
JUOS																										1																	1	1	1	1	1			
BG								1		1																													1	1										
LR	1	1	1	1	1	1	1		1		1	1									1	1						1	1	1	1	1									1	1								

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	0	0	0	0	0	4	4
QUGA	0	0	0	0	5	4	0	9

TRANSECT NUMBER - 13

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

```
AGROP                 1 1       1                                   1         1                             1 1 1 1
CELEL                     1 1 1       1 1 1                           1 1 1
JUDS                                          1 1 1                                   1 1 1 1
BG                                      1                   1 1 1               1
LR              1 1 1                     1             1 1   1 1 1             1 1 1         1 1 1 1 1 1 1 1 1
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	C	5	5	0	C	0	3	13

TRANSECT NUMBER - 14

```
                                                         HIT NUMBER
VEG SPECIES                       1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 5
  CODE          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0
-------------------------------------------------------------------------------------------------------------------
  AGROP               1 1                 1 1 1
  AGINI                                           1 1 1
  PIED                                                            1 1 1 1 1 1 1 1 1 1 1                   1 1 1 1 1
  BG                1       1 1                 1                                                     1   1
  LR            1 1       1     1 1 1         1 1       1 1 1 1 1                       1 1 1   1   1 1 1
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	10	0	0	0	3	2	15

TRANSECT NUMBER - 15

```
                                                         HIT NUMBER
VEG SPECIES                       1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 5
  CODE          1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0
-------------------------------------------------------------------------------------------------------------------
  DRHY                          1                     1               1
  AGROP                     1 1                         1   1                   1
  JUDS                                1 1 1 1 1
  AGINI                                                           1                                     1 1 1
  QUGA                                                                                1 1 1 1 1 1 1
  POA                                                                                                       1 1 1
  BG                1 1                             1     1
  LR            1 1     1 1       1 1 1 1                       1 1 1         1 1 1                   1 1 1
```

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	0	0	0	0	0	3	3
QUGA	0	0	1	3	6	0	0	10

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER, UTAH

CASTLE GATE RIPARIAN
REFERENCE SITE
JULY 1981

TRANSECT NUMBER - 1

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ASTER	1																																																	
BRTET			1			1																																												
ORHY				1																											1	1																		
SAKA											1																						1																	
SMRAA															1			1							1							1																			
CLLI2																			1								1																1	1		1				
OUGA																										1	1	1	1			1																		
GLLE																																																	1	
BG								1	1		1									1		1	1												1			1	1				1	1					
LR					1		1			1			1	1		1	1		1			1							1	1			1		1										1	1	1				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

NO SHRUB SPECIES ENCOUNTERED ON TRANSECT

TRANSECT NUMBER - 2

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
SAKA			1	1				1						1																																				
BRTET						1							1										1	1									1																	
COAR2							1	1																																									1	
CLLI2																	1				1				1									1																
IVAX																			1																															
POAN																												1	1																					
COSTS																																1	1	1	1														
AMUTU																																				1													
BG		1							1	1	1	1				1	1									1	1			1	1						1		1	1									
LR	1														1					1						1	1								1		1							1	1	1		1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
VIBUR	0	0	0	0	0	2	0	2
AMUTU	0	0	0	0	0	1	0	1

TRANSECT NUMBER - 3

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
SOLID																															1																				
CLLI2	1					1										1	1	1																																	
SALIX																															1																				
GLLE		1			1																																															
AMUTU																																									1										
ROSA			1																																																	
APANP				1			1																																													
QUGA																																															1	1		1		
POAN											1				1	1				1																				1			1	1	1						
RHRA																																																	1			
POA											1																														1										
RHTRT																																																			1	
IVAX																										1			1																							
BRTET																												1				1	1						1												
BG													1								1	1	1	1	1		1	1							1	1	1											1				
LR								1	1					1																								1														

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ROSA	0	0	1	0	0	0	0	1
AMUTU	0	0	0	0	1	0	0	1
QUGA	0	0	0	0	0	1	0	1
ACGR	0	0	0	3	0	0	0	3

TRANSECT NUMBER - 4

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
CLLI2	1																																																		
IVAX																															1																				
SOLID		1					1																																												

DESCU																																			1														
POAN			1	1	1					1	1	1		1	1	1	1	1																																
AGROP																																											1							
PG									1																																									
CHENO																																															1			
ASTER													1																																					
RHTRT																			1	1	1	1	1																											
QUGA																								1	1	1																								
BRTET																												1			1		1									1			1					
BG																											1		1	1				1			1	1		1	1					1		1	1	1
LR						1		1																											1				1					1						

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ROSA	0	1	0	0	0	0	0	1
SALIX	0	0	0	0	1	0	0	1
RHTRT	0	0	0	1	0	1	0	2
QUGA	0	0	0	3	0	0	2	5

TRANSECT NUMBER - 5

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
GRSO						1								1																																				
IVAX								1																																										
BRTET												1	1				1								1			1							1	1					1		1							
ORHY																1																																		
COAR2																													1	1		1		1			1		1			1				1				1
STCO3																																												1			1		1	
CHENO																																																1		
BG		1	1	1	1				1	1	1				1			1	1		1	1	1	1			1				1		1												1					
LR	1						1													1						1												1		1										

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CHNAN	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 6

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
STCO3	1				1		1			1	1																																							
AF																																													1					
BRTET					1								1																						1	1															
AGROP												1						1	1			1				1																									
SMRAA																				1																															
CLLI2																													1		1	1												1	1						
ASTER																														1																					
POAN																												1	1	1	1									1	1										
SAKA																																	1	1	1				1											
BG						1		1	1												1	1		1								1	1																		
LR			1	1										1	1	1	1			1		1																									1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ROSA	2	9	0	0	0	0	0	11

TRANSECT NUMBER - 7

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
CLLI2				1	1	1									1	1																												1						
BRTET							1		1	1	1																			1		1	1			1		1												
QUGA																	1	1	1																											1	1	1		
AGROP																				1																						1									
STCO3																								1																											
LAOC																											1																								
SIAL																																			1																
BG	1	1	1					1					1				1					1	1		1				1					1										1	1						
LR												1		1												1		1		1		1						1		1				1	1		1				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ROSA	3	16	0	0	0	0	0	19
QUGA	0	0	0	0	0	7	2	9

TRANSECT NUMBER - 8

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
SAKA			1		1												1		1																															
LAOC				1																																														
BRTET																				1																														
CDAR2																							1	1		1		1				1 1	1			1		1			1	1						1	1
BG				1				1	1	1	1	1	1	1	1			1				1			1		1		1	1	1				1	1	1		1		1	1			1	1	1		
LR		1					1									1					1																						1					1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
NO SHRUB SPECIES ENCOUNTERED ON TRANSECT								

TRANSECT NUMBER - 9

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
DRHY		1																																																	
APANP																																		1				1												
BRTET			1	1		1				1		1	1																																					
AF							1	1								1																																		
SIAL														1		1		1																																
ASTER																					1												1	1														1		
CLLI2																									1																				1					
POAN																			1	1	1		1	1													1		1	1	1	1								
GLLE																													1			1																		
BG												1						1						1	1																				1	1	1	1		1
LR		1				1				1													1	1		1												1										1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ROSA	0	1	3	2	0	0	0	6

TRANSECT NUMBER - 10

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
RHTRT	1	1	1																																																				
RICEC																																																					1	1			
POAN				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																															1		
CLLI2																									1					1																								1		
SMRAA																																1	1																								
ACGR																																		1																1						
QUGA																																			1													1		1					
BG																														1								1	1	1	1															
LR																								1		1	1	1									1																1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
RHTRT	0	0	0	0	0	5	0	5
QUGA	0	0	0	4	3	0	0	7
ACGR	0	0	0	0	0	1	0	1
RICEC	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 11

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
POAN	1	1	1	1	1					1	1																																												
CLLI2							1																												1	1																				
ULPA																						1	1																																		
ASTER																																					1	1	1		1		1	1											
ROSA																																																					1	1	1	1	1
BG							1	1	1			1	1	1	1	1		1		1	1					1	1	1		1																										
LR																	1		1					1					1		1	1	1	1	1																		1		1		1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SALIX	0	0	0	0	0	1	0	1
ROSA	0	2	5	4	0	0	0	11

TRANSECT NUMBER - 12

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
RHTRT			1	1	1	1	1	1	1																																										
BRTET																																																			
CHNAN											1		1																					1	1	1	1			1		1	1								
CLLI2												1		1																																						
HOJUJ																																																			
AGROP																																									1										
ROSA																			1	1	1		1																				1								
QUGA																						1			1																											
SALIX																										1				1	1	1																				
APANP																																	1																			
OXLI																																		1																		
BG	1																										1																									
LR		1								1					1	1	1				1					1							1	1	1				1					1	1	1	1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
RHTRT	0	0	0	0	5	2	0	7
CHNAN	0	1	1	1	6	0	0	9
ROSA	0	0	4	5	2	0	0	11
QUGA	0	0	0	0	1	1	0	2
SALIX	0	0	0	0	2	1	0	3

TRANSECT NUMBER - 13

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
MEAL	1		1	1	1		1		1		1		1		1		1			1			1		1																										
BRTET																											1																				1				
KOSC																																										1									
RUCR																																											1								
AGROP																																													1						
RHTRT																																																1			
ACGLG																																																	1		
BG						1										1		1							1		1	1	1	1		1	1	1	1	1	1	1	1	1		1		1						
LR		1						1		1		1		1			1		1												1																				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
RHTRT	0	0	0	0	0	1	0	1
ACGLG	0	0	0	0	0	1	0	1

TRANSECT NUMBER - 14

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
BRTET	1				1		1			1	1	1			1		1					1													1				1										
PF																																							1											
MEAL				1													1																																		
SAKA																																															1				
ASTRA						1																																													
QUGA																																												1	1						
HOJUJ								1																																											
ROSA																																																1			
AF													1																																						
CHNAN																		1	1																																
APANP																					1																														
SALIX																																1	1		1	1	1	1											1	1	
BG									1																			1	1															1	1							
LR		1	1											1							1			1			1	1					1						1						1	1	1			1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CHNAN	0	0	3	3	0	0	0	6
SALIX	0	0	0	0	0	4	0	4
QUGA	0	0	0	0	0	1	0	1
ROSA	1	1	6	3	1	0	0	12

TRANSECT NUMBER - 15

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
BRTET	1		1	1		1		1	1	1																		1																							
RHTRT																																																		1	
AF		1																																																	
SALIX												1							1	1	1	1														1	1			1	1										
ASTER														1																																					
ORHY																							1																													

OUGA																													1		1	1																	
CLLI2																														1																			
CHNAN																																									1	1						
BG																									1	1	1														1					1	1		
LR			1		1		1				1		1		1	1	1	1						1					1					1			1			1	1				1	1			1	

- -

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SALIX	0	0	0	0	3	6	0	9
ROSA	0	0	1	2	1	0	0	4
QUGA	0	0	0	0	0	2	0	2
CHNAN	0	0	0	1	2	0	0	3

TRANSECT NUMBER - 16

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

HIT NUMBER

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ROSA	1	2	5	0	0	0	0	8

TRANSECT NUMBER - 17

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

HIT NUMBER

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SALIX	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 18

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ROSA	0	1	2	0	0	0	0	3

TRANSECT NUMBER - 19

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ROSA	1	0	3	0	0	0	0	4
SYOC	0	1	1	0	0	0	0	2
AMUTU	0	0	0	0	0	1	0	1
COSTS	0	0	2	2	0	1	0	5

TRANSECT NUMBER - 20

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
ROSA	0	3	3	0	0	0	0	6
ACGR	0	0	1	0	0	0	0	1

TRANSECT NUMBER - 21

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	1	0	0	0	1
SALIX	0	0	0	0	0	3	0	3
ROSA	0	6	15	3	0	0	0	24
RHTRT	0	0	0	3	2	0	0	5

TRANSECT NUMBER - 22

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CHNAN	0	0	0	0	3	0	0	3

RHTRT	2	0	1	0	0	2	0	5
ROSA	0	3	5	3	3	0	0	14
QUGA	0	0	0	0	0	4	0	4
SALIX	0	0	0	0	0	3	0	3

TRANSECT NUMBER - 23

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CHNAN	0	0	0	0	0	1	0	1
CHVIV	0	0	0	1	0	0	0	1
ROSA	0	0	0	1	0	0	0	1
AMUTL	0	0	0	1	4	0	0	5

TRANSECT NUMBER - 24

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CHVIV	0	1	1	0	0	0	0	2
ROSA	0	0	2	5	0	0	0	7
RHTRT	0	0	1	3	4	1	0	9
QUGA	0	0	0	3	7	0	0	10
AMUTU	0	0	0	0	0	2	0	2

TRANSECT NUMBER - 25

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	2	1	2	3	0	3	0	11
RHTRT	0	0	0	2	0	0	0	2
CHVIV	0	1	2	0	0	0	0	3

TRANSECT NUMBER - 26

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SALIX	0	0	0	0	2	2	0	4
ROSA	0	0	3	3	1	0	0	7
RHTRT	0	0	0	2	2	0	0	4
QUGA	0	0	0	0	0	2	0	2

TRANSECT NUMBER - 27

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	0	0	6	0	6
RHTRT	0	0	0	0	0	1	0	1
RICEC	0	0	0	2	0	0	0	2
ACGR	0	0	0	2	0	1	0	3
SYOC	0	1	0	0	0	0	0	1
AMUTU	0	0	0	0	0	1	0	1

TRANSECT NUMBER - 26

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

SHRUB DATA ONLY COLLECTED ON THIS TRANSECT

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	7	0	2	2	0	11
ROSA	12	4	7	0	0	0	0	23

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER, UTAH

CRANDALL RIPARIAN
REFERENCE SITE
JULY 1981

TRANSECT NUMBER - 1

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PIPO					1																																													
POA									1																1	1	1					1	1																	
PG										1																					1																			
PF											1																																							
STCO3																													1																					
BG								1				1	1					1				1	1											1	1	1			1	1	1								
LR	1	1	1		1	1	1							1	1	1		1	1	1			1				1	1						1	1					1	1	1	1	1	1	1	1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 2

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PIPO								1	1	1	1	1	1	1	1																																			
CELEL																									1																									
POAN																															1																			
HODU5																																	1																	
ASTER																																		1															
POA																																						1	1	1	1			1					
STCO3																																															1	1			
BG	1						1														1					1			1				1			1	1	1	1					1	1	1				
LR		1	1	1	1	1										1	1	1	1	1	1	1	1			1		1	1		1																		1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 3

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PG	1																																																	
POA		1	1			1	1	1	1							1																																		
SYOC					1																																														
POAN																									1	1	1																						1			
ARLUL																													1																						
BG													1	1	1			1	1	1	1												1				1	1	1		1	1	1				1	1	1	1
LR					1						1	1	1									1				1	1	1	1	1	1		1	1	1				1						1	1					

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
				HEIGHT CLASSES				

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 4

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP																																																	1			
SYOC		1																																1																	
POA						1		1				1				1									1																	1					1				
PSMEM															1																																				
STIPA																	1			1																																
CYOF																							1					1	1			1			1								1	1		1					
ASTER																																	1																		
CIRSI																																						1													
POAN																																							1												
ACLA5																																											1								
BG	1			1			1		1	1																																						1			
LR			1		1							1	1				1				1		1	1		1	1		1			1			1	1				1									1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
				HEIGHT CLASSES				

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 5

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
POA	1																																																	
BRTET									1					1					1	1			1			1										1													
CYOF																	1												1					1															
ASTER																					1	1								1																			
SIAL																									1																									
SALIX																																												1						
BG			1	1	1	1		1		1	1	1	1																					1							1	1				1	1	1	
LR		1					1									1	1		1							1					1	1	1	1			1	1	1	1	1			1		1			1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 6

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
POAN						1	1	1	1	1								1	1	1																														
ACGR											1																																							
BRTET																																			1	1	1	1	1		1	1	1	1		1				
POA																																	1																		
DESCU																																								1										
SYOC																		1																																	
PF																	1																																	
ASTER																					1																													
CYOF																												1																1						
CHNAN																																1																		
BG	1			1	1																			1	1	1			1				1										1	1	1	1				
LR		1	1									1	1	1	1							1	1				1	1			1																			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 7

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
CYFR																																						1												
AGAL		1																																																
POAN																																											1	1	1	1	1	1	1	1
BRTET								1	1	1		1		1					1	1	1	1	1	1	1	1																								
ASTER												1																																						
CYOF																	1																	1			1													
SIAL																											1																								
AGROP																													1																						
JUNCU																															1																				
POA																																1	1			1					1		1							
BG			1			1												1										1							1				1												
LR				1	1		1	1							1		1													1												1		1						

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 8

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
BRTET	1		1									1						1	1	1							1		1	1																					
CYOF		1					1		1	1		1			1								1					1					1										1	1		1		1		
ASTER						1																1																													
POA																					1			1																											
POAN																															1		1	1	1	1			1	1	1	1	1							
JUOS																																																	1		
BG														1																																					
LR					1	1			1							1		1			1		1			1					1							1	1							1				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 9

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
POAN																															1	1	1														1	1		1	1	1
POA	1							1				1				1																																				
CIRSI		1																																																		
CYOF						1											1						1				1	1																								
SYOC								1												1																																
ACGR										1																																										
STIPA														1																																						
JUOS																		1								1																										
ASTER																			1																1																	
BG																																	1	1	1								1	1							
LR			1	1	1				1			1					1					1	1						1	1	1	1					1	1	1	1	1					1					

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 10

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
CYOF	1																																																			
BRTET						1																																														
ROSA								1																																												
POAN									1	1	1	1													1	1																										
PIPO																			1	1	1	1	1	1			1																									
ANTEN																																															1					
POA																													1				1	1		1		1														
BG						1								1									1			1	1	1	1		1		1																			
LR		1	1	1			1						1			1	1	1											1	1	1	1		1	1					1		1			1				1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 11

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ASTER		1																														1																			
OUGA				1																																															
STIPA					1																																														
PIPO																							1	1	1	1	1																									
POAN																																										1	1	1	1	1	1				
JUOS																																																	1	1	1
BG						1					1					1	1	1	1	1															1															
LR	1		1					1	1	1		1	1	1	1	1						1							1	1		1	1	1	1		1	1	1	1	1							1			1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 12

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
SYOC				1																																															
POA					1																											1																			
RICEC										1																																									
JUOS																							1																												
POAN																								1	1	1								1	1	1	1										1	1	1	1	
ACGR																																						1	1	1											
PSMEM																																									1	1	1	1	1	1					
BG	1							1					1						1																																
LR			1	1			1		1	1				1	1	1	1	1			1	1	1	1	1							1			1	1	1	1	1											

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 13

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PG																																									1									
CYOF					1								1																																					
POAN						1	1	1	1	1													1																					1	1	1	1	1	1	1
JUDS											1																																							
POA																									1																									
PSMEM																										1		1																						
AGROP																														1																				
ASTER																																		1																
BG																					1		1						1				1										1	1						
LR	1	1	1	1									1		1	1	1	1	1		1		1	1	1						1			1		1	1	1	1				1	1						

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 14

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
POAN	1	1								1	1						1	1	1	1	1																													
PSMEM																																		1	1	1	1										1	1	1	
POA																											1														1	1									
CYOF																															1																				
ACGR																																											1	1							
BG				1	1	1							1			1							1		1				1			1										1									
LR							1	1	1	1				1	1		1						1		1			1	1			1		1	1					1					1	1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 15

HIT NUMBER

VEG SPECIES / CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
POAN		1		1		1	1	1	1																																		1	1	1	1	1	1	1	1		
POA										1	1																																									
PIPO														1	1	1	1	1	1	1																															
ACGR																								1																												
ASTER																																		1	1																	
BG		1																					1										1					1	1									1	1	1		
LR					1		1						1	1							1			1	1	1	1	1	1	1	1	1				1			1													

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES — HEIGHT CLASSES

CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 16

HIT NUMBER

VEG SPECIES / CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PSMEM																																															1	1		1	1	1
BRTET	1	1	1																											1																						
POAN							1												1																																	
RUIDS											1																																								
ROSA													1																																						
ASTER														1		1		1																	1			1													
SYOC																								1	1																				1						
POA																											1	1		1																						
CYOF																																													1						
BG					1	1			1							1													1	1		1	1																		
LR							1		1		1		1			1					1	1	1			1	1	1					1	1							1	1	1							1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 17

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
OUGA	1	1	1	1	1																																													
POA										1		1		1																																				
SYOC						1																																												
HODU5							1																																											
POAV																1																																		
ARLUL																	1																																	
POAN																											1	1		1	1	1	1												1	1	1	1	1	1	
BG														1		1						1	1		1	1				1								1				1		1						
LR								1	1		1							1	1	1				1								1	1	1	1		1	1	1	1		1							

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 16

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
SYOC																					1																														
POAN	1		1												1	1	1															1	1	1	1		1							1	1	1	1	1	1	1
RICEC		1																													1																			
ASTER																												1																						
ARLUL										1																																								
ANTEN																	1																																	
CYOF																		1																																
PIPO																			1																															
PSMEM																								1																										
JUOS																									1																									
BG				1	1	1	1	1			1	1	1									1	1																											
LR									1											1						1	1	1		1	1				1		1		1		1	1	1						

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
RUIDS	0	0	3	1	0	0	0	4
COSTS	0	0	0	0	1	0	0	1
BEOCO	0	0	0	0	0	1	0	1
JUCOS	0	1	0	1	0	0	0	2
AMUTU	0	5	1	0	0	0	0	6

TRANSECT NUMBER - 19

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
POAN	1	1	1	1	1			1	1	1	1																																1	1	1	1					
ACGLG																																																		1	
CYOF												1																																			1				
PF													1																																						
ROSA															1	1																																			
ASTER																													1			1																			
POA																															1																				
PENST																																				1															
PSMEM																																					1	1	1	1	1										
BG														1			1	1	1	1	1		1	1	1	1																									
LR							1	1														1						1		1	1			1	1	1											1	1	1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	19	2	0	2	12	2	37
ROSA	0	8	11	7	1	0	0	27
SYOC	12	45	53	30	3	0	0	143
BERE	15	3	0	0	0	0	0	18
RICEC	0	3	8	13	7	0	0	31

TRANSECT NUMBER - 20

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

QUGA	1																																																	
ACGLG		1																																																
PDAN						1	1																							1	1																			
PSMEM								1	1	1	1	1	1																																					
POA															1																																			
AGROP																1																																		
CYOF																																		1																
ASTER																																										1	1							
BG			1																		1					1		1							1				1								1		1	
LR				1	1									1			1	1	1	1		1	1	1	1		1		1			1	1			1	1	1		1	1			1	1	1		1		1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	4	3	4	1	0	0	12
HODU5	0	0	2	12	12	0	0	26
CHNAN	0	15	3	0	0	0	0	18
ARTRT	0	1	1	0	0	0	0	2

TRANSECT NUMBER - 21

HIT NUMBER

VEG SPECIES										1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	5
CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
BRTET	1		1	1		1	1																																											1
POA									1																		1																							
PDAN												1	1	1									1					1	1	1	1	1	1	1	1	1														
ASTER																																												1						
CYOF																																																1		
BG															1	1								1																1	1	1							1	
LR		1			1			1		1	1						1	1	1	1	1	1			1	1											1	1	1				1		1	1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 22

HIT NUMBER

VEG SPECIES										1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	5

CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ASTER	1			1																																										1					
POA		1			1			1		1																																									
CYOF						1	1		1		1	1		1					1		1										1			1												1				
BRTET													1											1	1	1	1		1							1		1	1	1	1			1						
ACLA5																												1																							
BG																				1													1	1	1											1	1	1	1	1
LR			1												1	1	1	1				1								1				1	1						1										

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	HEIGHT CLASSES 51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 23

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
POA			1								1																														1		1						1		
CYOF						1									1																							1	1											
ASTER										1																																								
SOLID													1	1																																				
SYOC																						1																												
PSMEM																																															1	1	1	
BG	1	1		1	1				1			1				1	1	1	1						1								1	1			1												
LR							1	1												1	1	1	1	1		1	1	1	1		1	1	1	1								1	1	1	1				1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	HEIGHT CLASSES 51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

TRANSECT NUMBER - 24

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
POA		1							1	1																																								1		

```
   SYOC            1 1
   ASTER                        1
   PIPO                             1 1 1 1 1 1 1 1 1 1
   POAN                                                            1   1 1 1 1 1 1            1
   CYOF                                                                                1 1 1
   SOLID                                                                                                      1
   BG                             1                       1 1 1   1   1              1       1     1 1 1
   LR            1     1 1 1                            1       1                  1                     1 1 1
```

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES				HEIGHT CLASSES				
CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

SHRUB DATA NOT COLLECTED ON TRANSECT

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER, UTAH

BARN CANYON-CONIFER
AFFECTED AREA
OCTOBER 1981

TRANSECT NUMBER - 1

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PSMEM	1				1				1																																											
CELEL			1																																																	
JUOS							1	1																																												
PIED										1																																										
AGROP											1			1	1			1												1					1																	
QUGA												1									1	1	1	1	1				1				1				1	1	1	1	1	1	1	1	1	1						
ABLA																										1			1																								
SYOC																																1													1	1			1			
BG																			1																																		
LR				1	1											1								1			1				1		1											1			1	1		1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	0	0	0	1	0	0	1
SYOC	0	0	9	2	0	0	0	11
QUGA	0	0	0	1	8	7	7	23

TRANSECT NUMBER - 2

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ORHY		1																																																		
SYOC			1												1				1																																	
PIPO						1																																														
JUOS							1																																				1	1	1							
AGROP								1												1					1																1	1	1						1	1	1
ABLA											1										1			1																												
OUGA													1	1																																	1					
PSMEM																													1	1	1	1	1	1																		
AF																																			1																	
LR				1				1	1	1		1				1	1						1	1	1	1	1	1								1	1	1				1	1					1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	0	4	8	0	0	0	0	12
QUGA	0	0	0	1	2	0	1	4
ABLA	0	0	0	1	3	0	0	4
ABCO	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 3

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP	1	1																		1		1																		1				1						
ABLA			1	1																																															
JUOS					1					1	1		1	1																							1														
PSMEM						1	1	1	1							1	1							1			1	1	1	1	1									1	1	1	1			1		1	1	1
QUGA																		1	1																																
LR													1			1						1				1	1					1	1	1	1	1	1		1						1		1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	2	0	1	3	6
CELEL	0	0	1	0	0	0	1	2
PSMEM	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 4

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP			1	1												1				1	1	1	1					1		1				1					1										
CELEL					1							1	1	1			1																																	
PSMEM						1	1	1	1																																										
JUOS										1												1	1	1	1						1														1	1					
PIED																											1																								
QUGA																															1					1	1													
ABLA																																			1				1	1	1									
BG	1	1																1	1																										1	1					
LR											1				1														1			1		1														1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	0	0	0	1	0	3	4
QUGA	0	0	0	0	3	0	1	4

TRANSECT NUMBER - 5

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP	1															1	1	1		1																		1					1	1							
QUGA			1	1	1	1	1					1	1						1			1	1		1	1	1	1			1	1								1							1	1	1	
JUOS									1																				1																		1	1		
SEMU2														1	1																																					
POA																							1																													
PSMEM																																																1				
LR		1							1	1																		1	1	1	1	1	1			1	1	1												1	1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	7	1	23	6	3	40

TRANSECT NUMBER - 6

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ORHY	1			1																																																
PG					1				1																																										
JUOS						1											1	1															1																			
AGROP							1					1	1																																		1	1				
PSMEM								1						1	1	1													1	1																						
PIED											1																										1	1													1	
QUGA																			1	1	1		1	1			1	1	1					1	1	1																
AF																									1																											
BG																																												1								
LR		1	1								1						1				1						1	1												1	1					1	1	1	1	1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	25	6	0	0	31

TRANSECT NUMBER - 7

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PSMEM	1	1	1										1	1	1	1	1	1																				1	1	1										
ORHY				1																																															
QUGA									1										1				1														1						1	1		1						
PG											1	1									1																															
AGROP																						1		1																												
JUOS																			1	1	1				1	1	1																		1							
CELEL																														1	1																					
PIED																																																			1
BG																		1														1										1									
LR					1	1	1	1		1											1					1		1																	1	1	1	1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	0	10	18	0	2	30
CELEL	0	0	1	0	0	0	1	2

TRANSECT NUMBER - 8

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
JUOS	1	1	1	1					1	1	1																																							
PSMEM						1	1	1																																										
ABLA												1																			1	1	1	1	1	1														
ORHY															1																																				
AGROP																						1	1		1	1																									
SEMU2																								1																											
CELEL																		1	1																																
SYOC																													1																						

BERE																															1							1	1							1		1		
BG																1	1		1																															
LR					1								1	1				1		1	1								1			1	1	1	1	1	1										1		1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CEMOM	0	0	0	1	0	0	0	1
RIBES	0	0	0	1	0	0	0	1
CELEL	0	0	0	1	0	0	0	1
ABLA	0	0	0	1	1	0	0	2
SYOC	0	0	2	0	0	0	0	2
JUOS	0	0	0	0	1	0	0	1

TRANSECT NUMBER - 9

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGROP	1	1	1																	1																														
PG							1																																											
ABLA									1	1	1	1	1	1	1	1	1	1					1	1																							1	1	1	1
QUGA																													1														1	1	1					
JUOS																														1			1	1	1							1								
PSMEM																																				1	1	1	1	1										
BG																												1																						
LR				1	1	1		1											1		1	1			1	1	1				1	1									1					1				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	0	2	0	6	0	0	8

TRANSECT NUMBER - 1C

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ABCO			1	1																																														
AGROP					1															1	1			1	1	1					1	1	1	1	1	1							1	1				1		

JUOS						1		1	1	1	1																																							
PSMEM														1	1																																			
CELEL																													1																				1	1
PIED																																					1	1												
QUGA																																													1	1	1			
BG																			1																															
LR	1	1					1					1	1			1	1	1				1	1				1	1		1									1	1	1	1								

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
RIBES	0	0	0	1	0	0	0	1
CELEL	0	0	0	1	1	0	0	2
QUGA	10	0	0	2	0	0	1	13

TRANSECT NUMBER - 11

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PIED	1	1	1	1	1	1													1																															
JUOS							1	1	1	1	1	1															1											1												
AGROP													1			1	1																						1	1	1						1			
CEMOM														1																		1	1		1															
MOSS																		1																																
AGINI																					1	1																												
ANTEN																																																	1	
CELEL																							1	1	1	1																								
ACGR																												1	1																					
RIBES																														1	1																			
PF																																												1	1	1		1		
BG																																				1														
LR															1					1														1			1					1	1							1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CEMOM	0	0	0	7	1	0	0	8
CELEL	0	0	0	0	0	0	1	1
ACGR	0	0	0	0	1	0	0	1
RIBES	0	0	0	1	0	0	0	1

TRANSECT NUMBER - 12

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
CELEL	1																																																	
AGROP						1					1	1											1		1								1	1	1					1	1				1				
ABLA							1	1	1											1	1																													
ORHY													1																																					
PG																	1															1	1																	
MOSS																		1	1										1	1																				
JUOS																					1																													
AF																								1																										
PIED																										1	1							1			1	1	1										
PSMEM																																															1	1	1	1
LR		1	1	1	1								1	1	1										1			1			1											1			1	1				

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
CELEL	0	0	0	0	1	0	1	2
JUOS	0	0	0	1	3	0	0	4
RIBES	8	2	0	0	0	0	0	10

TRANSECT NUMBER - 13

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP	1	1	1					1							1	1		1	1	1	1	1	1		1	1				1	1	1		1		1	1		1	1	1	1	1						1		1
ANTEN					1																																														
PIED									1	1	1	1	1																																						
JUOS																	1															1										1	1	1	1	1					
XASA																																		1																	
BG																											1																								
LR					1		1	1																1				1	1										1									1		1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
JUOS	0	0	0	1	0	0	0	1
QUGA	9	0	0	13	0	0	0	22

TRANSECT NUMBER - 14

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
ANTEN	1			1																																														
AGROP		1					1				1				1																1	1				1	1	1	1			1	1	1			1	1		
ABCO						1																																												
JUOS								1	1	1		1						1	1	1	1	1	1	1																	1								1	
MOSS													1			1										1	1					1																		
RIBES																		1																																
CEMOM																												1	1	1																				
ABLA																																													1					
PSMEM																																																	1	
BG																																	1																	
LR			1											1													1							1	1							1					1			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
JUOS	0	0	0	1	0	0	0	1
RIBES	0	0	0	0	1	0	0	1
CEMOM	0	0	0	8	0	0	0	8
QUGA	0	0	0	0	3	0	0	3

TRANSECT NUMBER - 15

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
AGROP	1	1	1	1	1	1				1	1	1		1		1						1				1																								
AGINI								1																																										
PG									1																1																										
CEMOM										1						1				1																															
JUOS																					1						1	1	1					1																	
RIBES																															1	1	1	1																	
PSMEM																																			1	1	1	1	1			1	1	1	1	1	1	1	1	1
BG																				1										1																					
LR														1					1				1	1																			1	1							

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

CEMON	0	0	1	17	0	0	0	18
JUDS	0	0	0	0	3	0	0	3
RIBES	0	0	0	12	0	0	0	12
SYOC	0	0	10	0	0	0	0	10
QUOK	0	0	0	0	0	1	0	1

COVER AND SHRUB HEIGHT AND DENSITY DATA SHEET

PRICE RIVER COAL COMPANY
HELPER, UTAH

Cran
Con

CRANDALL CONIFER
REFERENCE SITE
JULY 1981

TRANSECT NUMBER - 1

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PSMEM		1	1	1	1	1			1	1																1	1	1	1	1	1	1	1			1						1	1	1	1	1	1	1		
BERE																																						1		1											
JUOS											1																																	1							
CERAS													1																																							
PIPO																		1	1	1				1	1											1			1													
QUGA																																																				1
LR		1						1	1				1		1	1	1	1				1	1	1											1						1	1									

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
BERE	31	11	0	0	0	0	0	42
SYOC	4	9	2	1	0	0	0	16
QUGA	3	12	10	0	0	0	0	25
RUIDS	0	0	1	0	0	0	0	1
ROSA	0	0	1	0	0	0	0	1

TRANSECT NUMBER - 2

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PSMEM	1	1	1	1		1	1	1	1	1	1	1	1		1	1					1	1				1	1		1				1	1	1	1	1	1			1	1	1	1	1	1	1		1
PG																	1																																		
QUGA																		1																																	
BERE																				1																													1		
JUOS																							1	1	1			1				1																			
BG																															1										1									
LR							1							1					1										1	1														1							

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL

BERE	48	6	0	0	0	0	0	54
SYOC	0	3	0	0	0	0	0	3
QUGA	0	2	4	3	0	0	0	9
SYOC	0	5	1	0	0	0	0	6

TRANSECT NUMBER - 3

HIT NUMBER

VEG SPECIES	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	5
CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
SYOC		1																						1				1												
ACLA5																																		1						
PIPO			1	1	1																																			
ARLUL													1																											
CERAS										1																														
PSMEM											1					1	1	1					1		1	1	1					1	1	1	1	1	1	1	1	1	1	1
AGROP												1																												
BERE																			1																					
VIAMM																															1									
LR	1					1	1	1	1					1	1			1			1							1	1	1	1	1							1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	11	10	8	2	0	0	0	31
BERE	9	2	0	0	0	0	0	11
QUGA	0	2	0	0	0	0	0	2

TRANSECT NUMBER - 4

HIT NUMBER

VEG SPECIES	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	5
CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
PSMEM	1	1	1	1	1								1	1	1	1	1	1	1	1	1	1	1	1																
SYOC							1	1			1	1														1					1							1			
ACLA5																									1								1								
TADF																											1													
PF																																1								
PIPO																																		1			1	1	1	1
POTEN																														1										
BG																												1	1	1	1			1				1		
LG						1			1	1																	1	1											1	1	1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
BERE	4	0	0	0	0	0	0	4
SYOC	5	9	21	3	0	0	0	38

TRANSECT NUMBER - 5

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PIPO	1	1	1	1	1	1	1	1	1	1	1	1	1																													1	1	1	1						
SYOC															1																																					
PSMEM																	1			1			1	1	1				1		1	1	1	1	1	1	1	1	1	1			1	1							1	
PG																		1									1																									
LR																1				1			1			1	1			1													1							1	1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	0	7	7	5	0	0	0	19
BERE	75	4	0	0	0	0	0	79
QUGA	0	6	1	0	0	0	0	7
RHTRT	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 6

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
POA																																																			1	
SYOC		1																																																	
PSMEM			1	1	1	1	1		1	1		1	1			1	1			1							1		1																						
PIPO								1																							1	1	1	1	1	1	1													
JUOS															1																																					
ARLUL																					1	1																														
ASTER																								1																												
PG																									1					1																	1					
QUGA																																													1							
BG																1			1							1																						1	1			

LR	1										1							1					1				1	1											1	1	1		1	1	1					1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	0	12	3	1	0	0	0	16
QUGA	0	15	12	0	0	0	0	27
BERE	23	1	0	0	0	0	0	24

TRANSECT NUMBER - 7

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
QUGA																																						1												
ASTER	1																																																	
FRVI			1																																															
PG						1																																												
RUIDS							1																																											
PIPO								1	1										1	1																									1	1		1		1
SYOC										1					1		1				1				1						1																1		1	
POA																																										1	1							
PSMEM											1	1	1					1																																
BROMU																																1																		
PG																						1																												
BG																											1																							
LR		1		1	1									1		1							1	1		1		1	1	1			1	1	1	1	1		1	1	1			1						

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
BERE	15	0	0	0	0	0	0	15
SYOC	0	15	12	1	0	0	0	28
RUIDS	0	0	2	0	0	0	0	2
QUGA	0	7	2	0	0	0	0	9

TRANSECT NUMBER - 8

HIT NUMBER

VEG SPECIES

CODE [illegible]

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ABCO																																							1	1	1	1								
PIPO	1									1	1	1	1	1	1																																			
ANTEN						1																																												
PG									1																																									
PSMEM																											1				1	1			1	1	1	1					1	1	1	1	1	1		1
FRVI																1																																		
BROMU																							1																											
VIANM																										1																								
BERE																														1																				
BG																				1	1	1																												
LR		1	1	1	1		1	1									1	1	1					1	1			1	1				1	1															1	

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
BERE	41	7	0	0	0	0	0	48
SYOC	3	12	7	2	0	0	0	24

TRANSECT NUMBER - 9

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PSMEM	1	1	1	1	1	1	1	1	1		1		1												1	1	1	1	1	1	1	1	1			1	1				1	1	1	1	1	1	1		1	1
PIPO														1	1	1	1	1	1															1	1															
PG																				1																														
SYOC																							1																											
BG																								1																										
LR										1		1									1	1																1	1	1								1		

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	7	14	2	0	0	0	0	23
BERE	43	0	0	0	0	0	0	43
QUGA	0	1	0	0	0	0	0	1
ROSA	0	1	0	0	0	0	0	1

TRANSECT NUMBER - 10

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
PSMEM		1				1		1	1	1	1	1	1	1			1	1	1					1	1	1	1		1	1				1			1						1	1	1	1	1						
PG					1																																																		
JUOS																														1	1																								
SYOC																																					1					1			1										
PIPO																							1	1	1																															
BG			1																		1	1											1	1	1																					
LR				1			1								1	1				1			1														1								1											1

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	0	14	3	0	0	0	0	17
SYOC	0	17	6	0	0	0	0	23
ROSA	0	1	0	0	0	0	0	1
BERE	20	0	0	0	0	0	0	20
AMUTU	0	1	0	0	0	C	0	1

TRANSECT NUMBER - 11

HIT NUMBER

VEG SPECIES CODE	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
PSMEM																	1	1												1				1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
SYOC			1					1			1				1																																							
PIPO							1																																															
QUGA									1																																													
PG																	1																1																						
ARLUL																											1				1																							
PIPO																																				1																		
BG																					1		1				1						1																						
LR	1	1		1	1	1					1			1	1	1			1						1														1	1														

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
QUGA	1	14	1	4	1	C	0	21
SYOC	2	9	2	1	0	0	0	14
BERE	20	0	0	0	0	C	0	20
AMUTU	1	4	0	0	0	0	0	5

TRANSECT NUMBER - 14

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PSMEM	1	1	1	1							1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ACGR					1																																													
SYOC								1												1																															
BG							1																																											
LR						1		1		1																						1																			

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	5	24	5	1	0	0	0	35
BERE	11	0	0	0	0	0	0	11
AMUTU	0	0	0	0	0	1	0	1

TRANSECT NUMBER - 15

VEG SPECIES CODE	HIT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PSMEM						1	1					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1			
SYOC		1						1																																										
PG				1																																															
ANTEN					1																																														
ACLA5											1																																							
PIPO																																																	1	1
BG			1						1																																									
LR	1									1																																1								

SHRUB HEIGHT AND DENSITY

SHRUB SPECIES CODE	HEIGHT CLASSES 0-10CM	11-30CM	31-50CM	51-100CM	1-2M	2-4M	OVER 4M	TOTAL
SYOC	3	11	2	0	0	0	0	16
BERE	67	0	0	0	0	0	0	67
QUGA	0	2	1	0	0	0	0	3

VEGETATION COVER, FREQUENCY, AND SPECIES DIVERSITY ESTIMATES

PRICE RIVER COAL COMPANY
HELPER, UTAH

SOWBELLY GRASS-SAGE
REFERENCE SITE
JULY 1981

TRANSECT 1

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	4	8.0	66.7
	PG	PERENNIAL GRASS	2	4.0	33.3
		SUBTOTAL	6	12.0	100.0
FORB	ASTRA	ASTRAGALUS SP.	3	6.0	100.0
		SUBTOTAL	3	6.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	7	14.0	100.0
		SUBTOTAL	7	14.0	100.0
		TOTAL	16	32.0	
BARE GROUND			7	14.0	
LITTER-ROCK			27	54.0	
VEGETATION, LITTER-ROCK			43	86.0	

TRANSECT 2

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	6	12.0	100.0
		SUBTOTAL	6	12.0	100.0
FORB	ASTRA	ASTRAGALUS SP.	6	12.0	100.0
		SUBTOTAL	6	12.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	10	20.0	100.0
		SUBTOTAL	10	20.0	100.0
TREE	QUGA	QUERCUS GAMBELII	3	6.0	100.0

		SUBTOTAL	3	6.0	100.0
		TOTAL	25	50.0	
BARE GROUND			2	4.0	
LITTER-ROCK			23	46.0	
VEGETATION, LITTER-ROCK			48	96.0	

TRANSECT 3

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	10	20.0	83.3
	PG	PERENNIAL GRASS	2	4.0	16.7
		SUBTOTAL	12	24.0	100.0
FORB	ASTRA	ASTRAGALUS SP.	4	8.0	100.0
		SUBTOTAL	4	8.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	2	4.0	100.0
		SUBTOTAL	2	4.0	100.0
		TOTAL	18	36.0	
BARE GROUND			8	16.0	
LITTER-ROCK			24	48.0	
VEGETATION, LITTER-ROCK			42	84.0	

TRANSECT 4

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	4	8.0	100.0
		SUBTOTAL	4	8.0	100.0
FORB	ASTRA	ASTRAGALUS SP.	6	12.0	100.0
		SUBTOTAL	6	12.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	5	10.0	100.0
		SUBTOTAL	5	10.0	100.0

		TOTAL	15	30.0
BARE GROUND			8	16.0
LITTER-ROCK			27	54.0
VEGETATION, LITTER-ROCK			42	84.0

TRANSECT 5

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	13	26.0	92.9
	PG	PERENNIAL GRASS	1	2.0	7.1
		SUBTOTAL	14	28.0	100.0
FORB	ASTRA	ASTRAGALUS SP.	4	8.0	80.0
	ERIOG	ERIOGONUM SP.	1	2.0	20.0
		SUBTOTAL	5	10.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	3	6.0	100.0
		SUBTOTAL	3	6.0	100.0
		TOTAL	22	44.0	
BARE GROUND			2	4.0	
LITTER-ROCK			26	52.0	
VEGETATION, LITTER-ROCK			48	96.0	

TRANSECT 6

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	4	8.0	100.0
		SUBTOTAL	4	8.0	100.0
FORB	ASTRA	ASTRAGALUS SP.	7	14.0	87.5
	STPI2	STANLEYA PINNATA	1	2.0	12.5
		SUBTOTAL	8	16.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	6	12.0	100.0
		SUBTOTAL	6	12.0	100.0

		TOTAL	18	36.0
BARE GROUND			8	16.0
LITTER-ROCK			24	48.0
VEGETATION, LITTER-ROCK			42	84.0

TRANSECT 7

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	6	12.0	100.0
		SUBTOTAL	6	12.0	100.0
FORB	ASTRA	ASTRAGALUS SP.	2	4.0	66.7
	PF	PERENNIAL FORB	1	2.0	33.3
		SUBTOTAL	3	6.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	10	20.0	100.0
		SUBTOTAL	10	20.0	100.0
TREE	QUGA	QUERCUS GAMBELII	2	4.0	100.0
		SUBTOTAL	2	4.0	100.0
		TOTAL	21	42.0	
BARE GROUND			11	22.0	
LITTER-ROCK			18	36.0	
VEGETATION, LITTER-ROCK			39	78.0	

TRANSECT 8

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	9	18.0	100.0
		SUBTOTAL	9	18.0	100.0
FORB	ASTRA	ASTRAGALUS SP.	4	8.0	100.0
		SUBTOTAL	4	8.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	5	10.0	100.0
		SUBTOTAL	5	10.0	100.0

			TOTAL	18	36.0
BARE GROUND				18	36.0
LITTER-ROCK				14	28.0
VEGETATION, LITTER-ROCK				32	64.0

TRANSECT 9

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	8	16.0	100.0
		SUBTOTAL	8	16.0	100.0
SUB-SHRUB	ARFR	ARTEMISIA FRIGIDA	1	2.0	100.0
		SUBTOTAL	1	2.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	4	8.0	100.0
		SUBTOTAL	4	8.0	100.0
TREE	PIED	PINUS EDULIS	1	2.0	100.0
		SUBTOTAL	1	2.0	100.0
SUCCULENT	YUCCA	YUCCA SP.	1	2.0	100.0
		SUBTOTAL	1	2.0	100.0
		TOTAL	15	30.0	
BARE GROUND			7	14.0	
LITTER-ROCK			28	56.0	
VEGETATION, LITTER-ROCK			43	86.0	

TRANSECT 10

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	14	28.0	100.0
		SUBTOTAL	14	28.0	100.0
FORB	ASTRA	ASTRAGALUS SP.	1	2.0	100.0
		SUBTOTAL	1	2.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	4	8.0	100.0

		SUBTOTAL	4	8.0	100.0
TREE	PIED	PINUS EDULIS	1	2.0	100.0
		SUBTOTAL	1	2.0	100.0
SUCCULENT	YUCCA	YUCCA SP.	1	2.0	100.0
		SUBTOTAL	1	2.0	100.0
		TOTAL	21	42.0	
BARE GROUND			11	22.0	
LITTER-ROCK			18	36.0	
VEGETATION, LITTER-ROCK			39	78.0	

TRANSECT 11

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	8	16.0	61.5
	PG	PERENNIAL GRASS	5	10.0	38.5
		SUBTOTAL	13	26.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	5	10.0	100.0
		SUBTOTAL	5	10.0	100.0
		TOTAL	18	36.0	
BARE GROUND			7	14.0	
LITTER-ROCK			25	50.0	
VEGETATION, LITTER-ROCK			43	86.0	

TRANSECT 12

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	17	34.0	100.0
		SUBTOTAL	17	34.0	100.0
FORB	ASTRA	ASTRAGALUS SP.	1	2.0	100.0
		SUBTOTAL	1	2.0	100.0

SHRUB	ARTRT	ARTEMISIA TRIDENTATA		6	12.0	100.0
			SUBTOTAL	6	12.0	100.0
			TOTAL	24	48.0	
BARE GROUND				6	12.0	
LITTER-ROCK				20	40.0	
VEGETATION, LITTER-ROCK				44	88.0	

TRANSECT 13

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME		# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.		15	30.0	100.0
			SUBTOTAL	15	30.0	100.0
FORB	ASTRA	ASTRAGALUS SP.		2	4.0	100.0
			SUBTOTAL	2	4.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA		2	4.0	100.0
			SUBTOTAL	2	4.0	100.0
TREE	QUGA	QUERCUS GAMBELII		5	10.0	100.0
			SUBTOTAL	5	10.0	100.0
			TOTAL	24	48.0	
BARE GROUND				5	10.0	
LITTER-ROCK				21	42.0	
VEGETATION, LITTER-ROCK				45	90.0	

TRANSECT 14

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME		# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.		12	24.0	100.0
			SUBTOTAL	12	24.0	100.0
FORB	ASTRA	ASTRAGALUS SP.		1	2.0	100.0
			SUBTOTAL	1	2.0	100.0

SHRUB	ARTRT	ARTEMISIA TRIDENTATA	10	20.0	100.0
		SUBTOTAL	10	20.0	100.0
		TOTAL	23	46.0	
BARE GROUND			7	14.0	
LITTER-ROCK			20	40.0	
VEGETATION, LITTER-ROCK			43	86.0	

TRANSECT 15

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	8	16.0	100.0
		SUBTOTAL	8	16.0	100.0
FORB	ASTRA	ASTRAGALUS SP.	3	6.0	100.0
		SUBTOTAL	3	6.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	3	6.0	100.0
		SUBTOTAL	3	6.0	100.0
		TOTAL	14	28.0	
BARE GROUND			17	34.0	
LITTER-ROCK			19	38.0	
VEGETATION, LITTER-ROCK			33	66.0	

SUMMARY - ALL COVER TRANSECTS

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	N	# OF HITS	PERCENT COVER ALL CLASSES MEAN	S.D.	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	15	138	18.4	8.4	93.2
	PG	PERENNIAL GRASS	15	10	1.3	2.8	6.8
		SUBTOTAL	15	148	19.7	8.5	100.0

FORB	ASTRA	ASTRAGALUS SP.	15	44	5.9	4.4	93.6
	ERIOG	ERIOGONUM SP.	15	1	.1	.5	2.1
	PF	PERENNIAL FORB	15	1	.1	.5	2.1
	STPI2	STANLEYA PINNATA	15	1	.1	.5	2.1
		SUBTOTAL	15	47	6.3	4.8	100.0
0							
SUB-SHRUB	ARFR	ARTEMISIA FRIGIDA	15	1	.1	.5	100.0
		SUBTOTAL	15	1	.1	.5	100.0
0							
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	15	82	10.9	5.5	100.0
		SUBTOTAL	15	82	10.9	5.5	100.0
0							
TREE	PIED	PINUS EDULIS	15	2	.3	.7	16.7
	QUGA	QUERCUS GAMBELII	15	10	1.3	3.0	83.3
		SUBTOTAL	15	12	1.6	2.9	100.0
0							
SUCCULENT	YUCCA	YUCCA SP.	15	2	.3	.7	100.0
		SUBTOTAL	15	2	.3	.7	100.0
0							
		TOTAL	15	292	38.9	7.3	
BARE GROUND			15	124	16.5	9.1	
LITTER-ROCK			15	334	44.5	8.2	
VEGETATION, LITTER-ROCK			15	626	83.5	9.1	

VEGETATION SPECIES FREQUENCY

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	TOTAL NUMBER OF TRANSECTS	NUMBER OF TRANSECTS CONTAINING SPECIES	PERCENT FREQUENCY
GRASS	AGROP	AGROPYRON SP.	15	15	100.0
	PG	PERENNIAL GRASS	15	4	26.7
		SUBTOTAL	15	15	100.0
FORB	ASTRA	ASTRAGALUS SP.	15	13	86.7
	ERIOG	ERIOGONUM SP.	15	1	6.7
	PF	PERENNIAL FORB	15	1	6.7

	STPI2	STANLEYA PINNATA	15	1	6.7
		SUBTOTAL	15	13	86.7
SUB-SHRUB	ARFR	ARTEMISIA FRIGIDA	15	1	6.7
		SUBTOTAL	15	1	6.7
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	15	15	100.0
		SUBTOTAL	15	15	100.0
TREE	PIED	PINUS EDULIS	15	2	13.3
	QUGA	QUERCUS GAMBELII	15	3	20.0
		SUBTOTAL	15	5	33.3
SUCCULENT	YUCCA	YUCCA SP.	15	2	13.3
		SUBTOTAL	15	2	13.3
		TOTAL	15	15	100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - 1.373
VARIANCE - .024
MAXIMUM INDEX - 2.398
EVENNESS - .573
NO OF SPECIES - 11

****

**** EVALUATION OF SAMPLING ADEQUACY ****

DESIRED CONFIDENCE LEVEL = 90.0 PERCENT

SAMPLE SIZE = 15

MEAN VEGETATION PERCENT COVER = 38.9
SAMPLE STANDARD DEVIATION = 7.3
MINIMUM SAMPLE SIZE TO PROVIDE DESIRED CONFIDENCE LEVEL = 11
Z STATISTIC = 1.46
CONFIDENCE LEVEL OBTAINED = 92.8 PERCENT

MEAN VEGETATION, LITTER-ROCK PERCENT COVER = 83.5
SAMPLE STANDARD DEVIATION = 9.1
MINIMUM SAMPLE SIZE TO PROVIDE DESIRED CONFIDENCE LEVEL = 4

Z STATISTIC = 2.52
CONFIDENCE LEVEL OBTAINED = 99.4 PERCENT

****

VEGETATION COVER, FREQUENCY, AND SPECIES DIVERSITY ESTIMATES

PRICE RIVER COAL COMPANY
HELPER, UTAH

WILLOW CREEK GRASS-SAGE
REFERENCE SITE
SEPTEMBER 1981

TRANSECT 1

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGSM	AGROPYRON SMITHII	3	6.0	37.5
	BRTET	BROMUS TECTORUM	3	6.0	37.5
	ORHY	ORYZOPSIS HYMENOIDES	2	4.0	25.0
		SUBTOTAL	8	16.0	100.0
FORB	PF	PERENNIAL FORB	1	2.0	50.0
	SAKA	SALSOLA KALI	1	2.0	50.0
		SUBTOTAL	2	4.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	9	18.0	81.8
	ATCA	ATRIPLEX CANESCENS	1	2.0	9.1
	CHVIV	CHRYSOTHAMNUS VISCIDIFLORUS	1	2.0	9.1
		SUBTOTAL	11	22.0	100.0
		TOTAL	21	42.0	
BARE GROUND			15	30.0	
LITTER-ROCK			14	28.0	
VEGETATION, LITTER-ROCK			35	70.0	

TRANSECT 2

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGSM	AGROPYRON SMITHII	1	2.0	20.0
	AGROP	AGROPYRON SP.	1	2.0	20.0
	BRTET	BROMUS TECTORUM	1	2.0	20.0
	PG	PERENNIAL GRASS	2	4.0	40.0
		SUBTOTAL	5	10.0	100.0
FORB	SOLID	SOLIDAGO SP.	1	2.0	100.0
		SUBTOTAL	1	2.0	100.0

SHRUB	ARTRT	ARTEMISIA TRIDENTATA	12	24.0	92.3
	ATCA	ATRIPLEX CANESCENS	1	2.0	7.7
		SUBTOTAL	13	26.0	100.0
		TOTAL	19	38.0	
BARE GROUND			11	22.0	
LITTER-ROCK			20	40.0	
VEGETATION, LITTER-ROCK			39	78.0	

TRANSECT 3

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	2	4.0	33.3
	ORHY	ORYZOPSIS HYMENOIDES	1	2.0	16.7
	PG	PERENNIAL GRASS	2	4.0	33.3
	STIPA	STIPA SP.	1	2.0	16.7
		SUBTOTAL	6	12.0	100.0
FORB	PF	PERENNIAL FORB	1	2.0	100.0
		SUBTOTAL	1	2.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	10	20.0	100.0
		SUBTOTAL	10	20.0	100.0
TREE	JUOS	JUNIPERUS OSTEOSPERMA	1	2.0	100.0
		SUBTOTAL	1	2.0	100.0
		TOTAL	18	36.0	
BARE GROUND			8	16.0	
LITTER-ROCK			24	48.0	
VEGETATION, LITTER-ROCK			42	84.0	

TRANSECT 4

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	BRTET	BROMUS TECTORUM	4	8.0	57.1
	PG	PERENNIAL GRASS	2	4.0	28.6
	STIPA	STIPA SP.	1	2.0	14.3

		SUBTOTAL	7	14.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	15	30.0	100.0
		SUBTOTAL	15	30.0	100.0
		TOTAL	22	44.0	
BARE GROUND			18	36.0	
LITTER-ROCK			10	20.0	
VEGETATION, LITTER-ROCK			32	64.0	

TRANSECT 5

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGROP	AGROPYRON SP.	1	2.0	25.0
	PG	PERENNIAL GRASS	3	6.0	75.0
		SUBTOTAL	4	8.0	100.0
FORB	ASTRA	ASTRAGALUS SP.	1	2.0	100.0
		SUBTOTAL	1	2.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	10	20.0	100.0
		SUBTOTAL	10	20.0	100.0
		TOTAL	15	30.0	
BARE GROUND			12	24.0	
LITTER-ROCK			23	46.0	
VEGETATION, LITTER-ROCK			38	76.0	

TRANSECT 6

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGSM	AGROPYRON SMITHII	1	2.0	14.3
	BOGR	BOUTELOUA GRACILIS	3	6.0	42.9
	BRTET	BROMUS TECTORUM	1	2.0	14.3
	PG	PERENNIAL GRASS	2	4.0	28.6
		SUBTOTAL	7	14.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	12	24.0	92.3

	ATCA	ATRIPLEX CANESCENS	1	2.0	7.7
		SUBTOTAL	13	26.0	100.0
		TOTAL	20	40.0	
BARE GROUND			14	28.0	
LITTER-ROCK			16	32.0	
VEGETATION, LITTER-ROCK			36	72.0	

TRANSECT 7

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGSM	AGROPYRON SMITHII	3	6.0	42.9
	ORHY	ORYZOPSIS HYMENOIDES	2	4.0	28.6
	PG	PERENNIAL GRASS	2	4.0	28.6
		SUBTOTAL	7	14.0	100.0
FORB	PF	PERENNIAL FORB	1	2.0	100.0
		SUBTOTAL	1	2.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	13	26.0	100.0
		SUBTOTAL	13	26.0	100.0
		TOTAL	21	42.0	
BARE GROUND			16	32.0	
LITTER-ROCK			13	26.0	
VEGETATION, LITTER-ROCK			34	68.0	

TRANSECT 8

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	BRTET	BROMUS TECTORUM	3	6.0	42.9
	PG	PERENNIAL GRASS	4	8.0	57.1
		SUBTOTAL	7	14.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	13	26.0	86.7
	ATCA	ATRIPLEX CANESCENS	2	4.0	13.3
		SUBTOTAL	15	30.0	100.0

		TOTAL	22	44.0
BARE GROUND			13	26.0
LITTER-ROCK			15	30.0
VEGETATION, LITTER-ROCK			37	74.0

TRANSECT 9

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGSM	AGROPYRON SMITHII	11	22.0	100.0
		SUBTOTAL	11	22.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	1	2.0	25.0
	ATCA	ATRIPLEX CANESCENS	2	4.0	50.0
	EPVI	EPHEDRA VIRIDUS	1	2.0	25.0
		SUBTOTAL	4	8.0	100.0
		TOTAL	15	30.0	
BARE GROUND			11	22.0	
LITTER-ROCK			24	48.0	
VEGETATION, LITTER-ROCK			39	78.0	

TRANSECT 10

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGSM	AGROPYRON SMITHII	4	8.0	40.0
	AGROP	AGROPYRON SP.	2	4.0	20.0
	BRTET	BROMUS TECTORUM	1	2.0	10.0
	PG	PERENNIAL GRASS	3	6.0	30.0
		SUBTOTAL	10	20.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	5	10.0	83.3
	CHNAN	CHRYSOTHAMNUS NAUSEOSUS	1	2.0	16.7
		SUBTOTAL	6	12.0	100.0
		TOTAL	16	32.0	
BARE GROUND			10	20.0	
LITTER-ROCK			24	48.0	

VEGETATION, LITTER-ROCK	40	80.0

TRANSECT 11

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGSM	AGROPYRON SMITHII	1	2.0	16.7
	BRTET	BROMUS TECTORUM	5	10.0	83.3
		SUBTOTAL	6	12.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	19	38.0	100.0
		SUBTOTAL	19	38.0	100.0
		TOTAL	25	50.0	
BARE GROUND			15	30.0	
LITTER-ROCK			10	20.0	
VEGETATION, LITTER-ROCK			35	70.0	

TRANSECT 12

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGSM	AGROPYRON SMITHII	3	6.0	42.9
	BOGR	BOUTELOUA GRACILIS	3	6.0	42.9
	BRTET	BROMUS TECTORUM	1	2.0	14.3
		SUBTOTAL	7	14.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	13	26.0	100.0
		SUBTOTAL	13	26.0	100.0
		TOTAL	20	40.0	
BARE GROUND			20	40.0	
LITTER-ROCK			10	20.0	
VEGETATION, LITTER-ROCK			30	60.0	

TRANSECT 13

	PERCENT COVER	PERCENT COVER

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	ALL CLASSES	WITHIN LIFE FORM
GRASS	AGSM	AGROPYRON SMITHII	3	6.0	33.3
	AGROP	AGROPYRON SP.	1	2.0	11.1
	BRTET	BROMUS TECTORUM	1	2.0	11.1
	ORHY	ORYZOPSIS HYMENOIDES	1	2.0	11.1
	PG	PERENNIAL GRASS	3	6.0	33.3
		SUBTOTAL	9	18.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	13	26.0	100.0
		SUBTOTAL	13	26.0	100.0
		TOTAL	22	44.0	
BARE GROUND			9	18.0	
LITTER-ROCK			19	38.0	
VEGETATION, LITTER-ROCK			41	82.0	

TRANSECT 14

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	PERCENT COVER ALL CLASSES	PERCENT COVER WITHIN LIFE FORM
GRASS	AGSM	AGROPYRON SMITHII	2	4.0	28.6
	AGROP	AGROPYRON SP.	1	2.0	14.3
	BRTET	BROMUS TECTORUM	2	4.0	28.6
	PG	PERENNIAL GRASS	2	4.0	28.6
		SUBTOTAL	7	14.0	100.0
FORB	PF	PERENNIAL FORB	1	2.0	50.0
	SOLID	SOLIDAGO SP.	1	2.0	50.0
		SUBTOTAL	2	4.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	12	24.0	100.0
		SUBTOTAL	12	24.0	100.0
		TOTAL	21	42.0	
BARE GROUND			14	28.0	
LITTER-ROCK			15	30.0	
VEGETATION, LITTER-ROCK			36	72.0	

TRANSECT 15

PERCENT COVER PERCENT COVER

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	# OF HITS	ALL CLASSES	WITHIN LIFE FORM
GRASS	AGSM	AGROPYRON SMITHII	2	4.0	50.0
	AGROP	AGROPYRON SP.	1	2.0	25.0
	BRTET	BROMUS TECTORUM	1	2.0	25.0
		SUBTOTAL	4	8.0	100.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	15	30.0	93.8
	CHNAN	CHRYSOTHAMNUS NAUSEOSUS	1	2.0	6.3
		SUBTOTAL	16	32.0	100.0
		TOTAL	20	40.0	
BARE GROUND			16	32.0	
LITTER-ROCK			14	28.0	
VEGETATION, LITTER-ROCK			34	68.0	

SUMMARY - ALL COVER TRANSECTS

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	N	# OF HITS	PERCENT COVER ALL CLASSES MEAN	S.D.	PERCENT COVER WITHIN LIFE FORM
GRASS	AGSM	AGROPYRON SMITHII	15	34	4.5	5.5	32.4
	AGROP	AGROPYRON SP.	15	9	1.2	1.5	8.6
	BOGR	BOUTELOUA GRACILIS	15	6	.8	2.1	5.7
	BRTET	BROMUS TECTORUM	15	23	3.1	3.1	21.9
	ORHY	ORYZOPSIS HYMENOIDES	15	6	.8	1.5	5.7
	PG	PERENNIAL GRASS	15	25	3.3	2.7	23.8
	STIPA	STIPA SP.	15	2	.3	.7	1.9
		SUBTOTAL	15	105	14.0	3.9	100.0
0							
FORB	ASTRA	ASTRAGALUS SP.	15	1	.1	.5	12.5
	PF	PERENNIAL FORB	15	4	.5	.9	50.0
	SAKA	SALSOLA KALI	15	1	.1	.5	12.5
	SOLID	SOLIDAGO SP.	15	2	.3	.7	25.0
		SUBTOTAL	15	8	1.1	1.5	100.0
0							
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	15	172	22.9	8.5	94.0
	ATCA	ATRIPLEX CANESCENS	15	7	.9	1.5	3.8
	CHNAN	CHRYSOTHAMNUS NAUSEOSUS	15	2	.3	.7	1.1
	CHVIV	CHRYSOTHAMNUS VISCIDIFLORUS	15	1	.1	.5	.5
	EPVI	EPHEDRA VIRIDUS	15	1	.1	.5	.5

		SUBTOTAL	15	183	24.4	7.5	100.0
TREE	JUOS	JUNIPERUS OSTEOSPERMA	15	1	.1	.5	100.0
		SUBTOTAL	15	1	.1	.5	100.0
		TOTAL	15	297	39.6	5.6	
BARE GROUND			15	202	26.9	6.7	
LITTER-ROCK			15	251	33.5	10.5	
VEGETATION, LITTER-ROCK			15	548	73.1	6.7	

VEGETATION SPECIES FREQUENCY

LIFE FORM	SPECIES CODE	SCIENTIFIC NAME	TOTAL NUMBER OF TRANSECTS	NUMBER OF TRANSECTS CONTAINING SPECIES	PERCENT FREQUENCY
GRASS	AGSM	AGROPYRON SMITHII	15	11	73.3
	AGROP	AGROPYRON SP.	15	7	46.7
	BOGR	BOUTELOUA GRACILIS	15	2	13.3
	BRTET	BROMUS TECTORUM	15	11	73.3
	ORHY	ORYZOPSIS HYMENOIDES	15	4	26.7
	PG	PERENNIAL GRASS	15	10	66.7
	STIPA	STIPA SP.	15	2	13.3
		SUBTOTAL	15	15	100.0
FORB	ASTRA	ASTRAGALUS SP.	15	1	6.7
	PF	PERENNIAL FORB	15	4	26.7
	SAKA	SALSOLA KALI	15	1	6.7
	SOLID	SOLIDAGO SP.	15	2	13.3
		SUBTOTAL	15	6	40.0
SHRUB	ARTRT	ARTEMISIA TRIDENTATA	15	15	100.0
	ATCA	ATRIPLEX CANESCENS	15	5	33.3
	CHNAN	CHRYSOTHAMNUS NAUSEOSUS	15	2	13.3
	CHVIV	CHRYSOTHAMNUS VISCIDIFLORUS	15	1	6.7
	EPVI	EPHEDRA VIRIDUS	15	1	6.7
		SUBTOTAL	15	15	100.0
TREE	JUOS	JUNIPERUS OSTEOSPERMA	15	1	6.7
		SUBTOTAL	15	1	6.7

TOTAL	15	15	100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - 1.578
VARIANCE - .047
MAXIMUM INDEX - 2.833
EVENNESS - .557
NO OF SPECIES - 17

****

**** EVALUATION OF SAMPLING ADEQUACY ****

DESIRED CONFIDENCE LEVEL = 90.0 PERCENT

SAMPLE SIZE = 15

MEAN VEGETATION PERCENT COVER = 39.6
SAMPLE STANDARD DEVIATION = 5.6
MINIMUM SAMPLE SIZE TO PROVIDE DESIRED CONFIDENCE LEVEL = 7
Z STATISTIC = 1.93
CONFIDENCE LEVEL OBTAINED = 97.4 PERCENT

MEAN VEGETATION, LITTER-ROCK PERCENT COVER = 73.1
SAMPLE STANDARD DEVIATION = 6.7
MINIMUM SAMPLE SIZE TO PROVIDE DESIRED CONFIDENCE LEVEL = 3
Z STATISTIC = 2.98
CONFIDENCE LEVEL OBTAINED = 99.9 PERCENT

****