

# Southern Nevada Water Authority

## Ground Water Development Project

Terrestrial Biological Findings Report  
For Sensitive Plants and Wildlife  
In The Great Basin  
And 13.6 Mile Segment In The  
Mojave Desert



Prepared For:

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A total of 195 Mojave yucca were observed on the five (5) staging areas. Staging Areas MP 138 and MP 147 had the most Mojave yuccas with 71 and 111 stems respectively. Cactus and yucca densities found on the staging areas track those along the proposed corridor. Yucca numbers were distinctly lower on the other three (3) staging areas with three (3) stems on Staging Area MP 141, eight (8) stems on Staging Area MP 144, and two (2) stems on Staging Area MP 150.

**6.1.3 Coyote Spring Valley Groundwater Exploratory Area**

No vegetation sampling triangles were conducted in Coyote Spring Valley. Groundwater exploratory area development and the associated environmental compliance, reports, surveys, etc, have been conducted by contractors for Coyotes Springs Investments.

**6.2 Delamar Valley**

The Delamar Valley portion of the project is the start of a transitional zone from Mojave Desert to Great Basin with representative components from each biotic community present in the vegetation structure of the area. The only sensitive plant (NNHP Watch List) species found in Delamar Valley was bashful four o'clock. Three (3) active red-tailed hawk nests were also observed along the proposed Main Pipeline (MP) alignment, one (1) in 2005 and two (2) in 2006. One (1) nest was along the proposed main pipeline corridor and the other two (2) were along the proposed Alternate Pipeline/Main Powerline (DPPL) corridor. Please see Table 5.

**Table 5 - Status of Sensitive Species Observed in Delamar Valley**

Species	USFWS	BLM	FS	NV	NHP	NNPS
<i>Mirabilis pudica</i>	Fed Species of Concern				Watch	Removed
Red-tailed Hawk (nest)	Migratory Bird Treaty Act					-

**6.2.1 Proposed Corridor - Main Pipeline**

**6.2.1.1 Bashful Four O'Clock (*Mirabilis pudica*)**

One population of bashful four o'clock totaling over 2,100 plants was identified along the currently proposed Main Pipeline alignment. The mapped population (Figure 3, Map 1 in Appendix F) shows a center point and the population extended for a mile either direction of this point, between mileposts MP 123 and MP 125. This population extended beyond the boundaries of the alignment. It occurred on flat ground in sandy, silty soils in Mojave Mid-Elevation Mixed Desert Scrub. No cryptogamic soils were associated with this population. Tables 44-45 in Appendix H provide detailed plant population numbers by project milepost and by valley within the project area as well as consolidated plant and population numbers along the pipeline alternatives by valley.

**6.2.1.2 Raptor Nests**

One (1) raptor nest, a red-tailed hawk nest with 2-3 eyas, was identified along the Main Pipeline approximately 2,700 feet south of MP 103 in Delamar Valley (See Figure 3, Map 3 in Appendix F). No other raptor nests were identified along the Main Pipeline in Delamar Valley.

**6.2.1.3 Cactus and Yucca**

A total of 2,065 cacti representing four (4) species were observed within the 300 foot inventory corridor of this approximately 25.8 mile portion of the Main Pipeline. Additionally, three (3) banana yuccas and 4,456 Joshua trees were tallied within the proposed project corridor. Table 6

summarizes the cactus and yucca data for the proposed Main Pipeline corridor in Delamar Valley. Table 58 in Appendix I provides a detailed overview by Species and by Height and Density. Total cactus and yucca numbers were tallied by 0.5 mile segments and stem densities were calculated based on total numbers of cacti and yucca observed per linear project mile. Tables 59-64 in Appendix I provide a detailed overview of species by half mile Survey Segment by Species and by Height and Density.

**Table 6 -Total Cactus and Yucca on the Proposed Main Pipeline Corridor in Delamar Valley**

Species	Total Stems	Stems /Mile	Clonal Clumps/Mile	Total Stems <3 feet	Total Stems 3-10 feet	Total Stems 10+ Feet	Stems /Acre	Clonal Clumps/Acre
<i>Coryphantha vivipara</i>	13	1	0	13	0	0	0.01	0
<i>Cylindropuntia echinocarpa</i>	1,388	54	0	1,388	0	0	1	0
<i>Echinocereus engelmannii</i>	3	0.12	0	3	0	0	0.003	0
<i>Opuntia polyacantha var. erinacea</i>	661	26	0	661	0	0	1	0
<i>Yucca baccata</i>	3	0.12	0	3	0	0	0.003	0
<i>Yucca brevifolia</i>	4,456	173	2	2,104	1,546	806	5	0.05
<b>Totals</b>	<b>6,524</b>	<b>253</b>	<b>2</b>	<b>4,172</b>	<b>1,546</b>	<b>806</b>	<b>7</b>	<b>0.05</b>

For the most part, cactus species distributions in Delamar Valley were stratified elevationally and by substrate. Beehive cactus (13) and hedgehog cactus (3) remained within the 4,600-4,750 foot elevational band on more gravelly soils. Silver cholla was the most abundant cactus with 1,388 stems tallied within the Main Pipeline corridor. Silver cholla was found in slightly wider elevational bands from 4,600-4,950 feet on sandier substrates. Silver cholla was concentrated in the northern half of the project area in this valley with relatively even numbers from halfmile to halfmile. The exception was grizzlybear pricklypear with 661 stems which was scattered throughout the Main Pipeline corridor, but absent from only three (3) miles of the 25.8 mile corridor between MP 122 and MP 125. Grizzlybear pricklypear numbers were highest just north of Delamar Dry Lake on more silty saline soils.

Overall stem density for both cactus and yucca over the 25.8 mile Main Pipeline corridor in Delamar Valley was 253 stems/mile.

**Table 7 – Yucca Stems and/or Clonal Clumps Average Per Mile in Delamar Valley on the Proposed Main Pipeline Corridor**

Species	Average # Stems/Mile	Average # Clumps/Mile	Average # Stems <3 Ft/Mile	Average # Stems 3-10 Ft/Mile	Average # Stems +10 Ft/Mile	Average # Stems/Acre	Average # Clumps/Acre
Joshua Tree	173	1.67	82	60	31	5	0.05
Banana Yucca	0.12	0.00	0.12	0	0.00	0.003	0.00
<b>Totals</b>	<b>173</b>	<b>2</b>	<b>82</b>	<b>60</b>	<b>31</b>	<b>5</b>	<b>0</b>

Joshua trees and banana yucca prefer a higher elevational gradient and these species would be expected in significantly greater numbers with an increase in elevation. Banana yuccas prefer a much higher elevation habitat than Joshua tree and with only three (3) banana yuccas observed, the Main Pipeline corridor is at the lower elevational fringe for the species at 4,600-4,950 feet. Joshua tree numbers were much greater with a total of 4,456 stems. Densities for Joshua trees ranged between 0 and 26.90 stems/acre and 0 and 489 stems/mile with an average of 5 stems/acre and 173 stems/mile respectively over the Main Pipeline proposed corridor (Table 7). The highest Joshua tree densities were found in the northern seven (7) miles of the project area between mileposts MP 102 and MP 109. Stem densities by height were nearly even to two times as great between 0-3 foot and 3-10 foot high Joshua trees. Stem densities of Joshua trees greater than 10 feet were approximately 1/2 to 1/3 the densities of the 0-3 foot and 3-10 foot high Joshua tree totals. See Tables 63-64 in Appendix I.

## 6.2.2 Delamar Valley Facilities/Staging Areas

\*Please note that the siting of Staging Areas and Facilities are still preliminary at this writing. Supplemental information will be provided as the locations of the Staging Areas and Facilities are finalized.

No sensitive plant or wildlife species were observed on the nine (9) staging areas or one (1) facility associated with the Delamar Valley portion of the proposed Main Pipeline corridor.

### 6.2.2.1 Cactus and Yucca

Total cactus numbers were highest on Staging Areas MP 105, MP 114, and MP 128 with 21, 13, and 27 stems respectively. Silver cholla (50) and grizzlybear pricklypear (34) were dominant with only one (1) hedgehog cactus observed on Staging Area MP 128. In general, cactus numbers were higher on staging areas/facilities at higher elevations.

Yucca numbers on the staging areas followed a similar trend as cacti with numbers being higher on staging areas at higher elevations. A total of 209 Joshua trees were observed on six (6) of the ten staging areas/facilities. Staging areas MP 105, MP 108, and MP 128 had the most Joshua trees with 74, 46, and 64 stems respectively. This cactus and yucca densities observed on the facilities and staging areas track with those observed along the proposed corridor, with more stems of all species present at higher elevations and on more well-drained alluvial gravels and sands. In terms of height distribution, more Joshua trees were in the 0-3 foot range on the six (6) staging areas with 159 total stems as compared to the 3-10 foot range (112 stems) and 10+ foot range with 37 total stems.

## 6.2.3 Delamar Valley Alternate Pipeline Corridor/Main Power Line Corridor

The Delamar Valley Alternate Pipeline/Main Power Line Corridor continues north from milepost MP 13 following the existing power corridor along North Pole Line Road for 13.3 miles where it rejoins the Main Pipeline corridor at US 93 at the south end of Dry Lake Valley. No sensitive plants or wildlife were found along the Alternate Pipe/Main Power Line corridor.

### 6.2.3.1 Raptor Nests

The first red-tailed hawk nest was observed approximately 0.25 miles south of milepost DPPL 8. The nest was in a Joshua tree and two (2) eyas were observed in the nest. An observation of an additional red-tail hawk nest was made on the proposed corridor at about 0.6 miles southeast of Alternate Pipe/Main Power Mile 7 on sampling triangle (DMAR-LT-5). Two (2) eyas were observed in this nest and the adults were highly agitated. No other raptor nests were observed along the Alternate Pipeline/Main Power Line Corridor. (See Figure 3, Map 2 in Appendix F).

### 6.2.3.2 Cactus and Yucca

A total of 5,431 cacti representing four (4) species were observed within the 300 foot inventory corridor of the approximately 13.04 mile portion of the Alternate Pipeline/Main Power Line corridor in Delamar Valley. In addition, 38,798 banana yuccas and 9,465 Joshua trees were tallied within the proposed project corridor. Table 8 summarizes the cactus and yucca data. Table 65 in Appendix I provides a detailed overview by Species and by Height and Density. Total cactus and yucca numbers were tallied by 0.5 mile segments and stem densities were calculated based on total numbers of cacti and yucca observed per linear project mile. Tables 66-71 in Appendix I provide a detailed overview of species by half mile Survey Segment by Species and by Height and Density.

**Table 8 -Total Cactus and Yucca in Delamar Valley on the Alternate Pipeline/Main Power Line Corridor**

Species	Total Stems	Stems /Mile	Clonal Clumps/Mile	Total Stems <3 feet	Total Stems 3-10 feet	Total Stems 10+ Feet	Stems /Acre	Clonal Clumps/Acre
<i>Coryphantha vivipara</i>	12	1	0	12	0	0	0.03	0
<i>Cylindropuntia echinocarpa</i>	5,236	402	0	5,236	0	0	11.04	0
<i>Echinocereus engelmannii</i>	4	0	0	4	0	0	0.01	0
<i>Opuntia polyacantha var. erinacea</i>	179	14	0	179	0	0	0.38	0
<i>Yucca baccata</i>	38,798	2975	393	38,798	0	0	81.82	11
<i>Yucca brevifolia</i>	9,465	726	0	2,318	5,402	1,745	19.96	0.00
<b>Totals</b>	<b>53,694</b>	<b>4,118</b>	<b>393</b>	<b>46,547</b>	<b>5,402</b>	<b>1,745</b>	<b>113</b>	<b>10.82</b>

The Alternate Pipeline/Main Power Line corridor follows an existing power corridor that transverses a large west trending bajada that rises from 4,850 feet to 5,400 feet. Cactus densities were generally greater on the well-drained alluvial soils at the crest of the bajada. Silver cholla was the most abundant cactus with 5,236 stems tallied within the Alternate Pipeline/Main Power corridor followed by grizzlybear prickly pear with 179 stems. Silver cholla were found in a slightly wider elevational band from 4,600-5,400 feet on sandier alluvial substrates and as with the cacti and yucca along the Main Pipeline corridor, silver cholla were concentrated in the northern half of the project area with relatively even numbers from halfmile to halfmile. The exception was significant concentration of silver cholla between DPPL 1 and DPPL 2 where 857 total stems were observed. Grizzlybear pricklypear was scattered throughout the Alternate Pipeline/Main Power Line corridor fairly evenly with a slight concentration stems between DPPL 6 and DPPL 8. Only 12 beehive cactus and four (4) hedgehog cactus were observed within this portion of the route. Overall stem density for both cactus and yucca over the 13.04 mile Alternate Pipeline/Main Power Line corridor in Delamar Valley was 4,118 stems/mile.

**Table 9 – Yucca Stems and/or Clonal Clumps Average Per Mile on the Delamar Valley on the Alternate Pipeline/Main Powerline Corridor**

Species	Average # Stems/Mile	Average # Clumps/Mile	Average # Stems <3 Ft/Mile	Average # Stems 3-10 Ft/Mile	Average # Stems +10 Ft/Mile	Average # Stems/Acre	Average # Clumps/Acre
Joshua Tree	726	0.00	178	414	134	20	0.00
Banana Yucca	2975	393	2975	0	0.00	82	11
<b>Totals</b>	<b>3701</b>	<b>393</b>	<b>3153</b>	<b>414</b>	<b>134</b>	<b>102</b>	<b>11</b>

As was stated under the Main Pipeline corridor evaluation, Joshua trees and banana yucca prefer a higher elevational gradient. Total stem counts for Joshua trees were very high along the Alternate Pipeline/Main Power Line corridor with a total of 9,465 stems tallied. Densities for Joshua trees ranged between 0 and 39.66 stems/acre and 5 and 1,239 stems/mile with an average of 20 stems/acre and 726 stems/mile respectively over the Alternate Pipeline/Main Power Line proposed corridor. The highest Joshua tree densities were found in a six (6) mile segment between mileposts DPPL 2 and DPPL 8. Stem densities by height were nearly two times greater between 0-3 foot (2,318 stems) and 3-10 foot (5,408 stems) Joshua trees (Table 9). Stem densities of Joshua trees greater than 10 feet were lower with 1,745 stems.

Banana yucca numbers along this stretch of the alignment were considerable. A total of 38,798 stems were tallied along seven miles of the 13.04 Alternate Pipeline/Main Power Line corridor. The highest densities were found within a three (3) mile stretch between DPPL 5 and DPPL 7 where 26,942 stems were tallied. See Tables 70-71 in Appendix I.

## 6.2.4 Delamar Valley Groundwater Exploratory Area

Twelve (6 large, 6 small) vegetation sampling triangles were evaluated in groundwater exploratory area in Delamar Valley. Each sampling triangle is labeled for easy field reference. The labeling consists of three components; 1) initials that designate the valley or geographical area where the triangle is located (e.g. Delamar Valley is DMAR); 2) small triangle or large triangle (e.g. ST or LT); 3) and a specific number for each triangle within a specific valley or geographical area (i.e. 1, 2, 3 etc). Therefore, DMAR ST-1 is a small triangle located in Delamar Valley with a numerical identifier of 1. Please see Figure 14 in Appendix J for the locations and labels of the sampling triangles.

### 6.2.4.1 Bashful Four O'Clock (*Mirabilis pudica*)

Six (6) populations totaling 27 plants were identified during the vegetation sampling surveys of Delamar Valley Groundwater Exploratory Area (See Figure 14, Map 1 in Appendix J). Five (5) of these populations totaling 23 individuals were clustered at the extreme south end of Delamar Valley on a small (3 mile) triangle (DMAR ST-1) at the base of the Delamar Mountains. One (1) population with four (4) individuals was observed on DMAR ST-6 another small three (3) mile triangle just north of Delamar Lake between just north of Alamo Canyon Road. All of these populations were located on a slight slope on sandy, gravelly soils in Mojave Mid-Elevation Mixed Desert Scrub. No cryptogamic soils were associated with these populations. Table 46 in Appendix H provides detailed plant population numbers by triangle and by valley.

The bashful four o'clock appeared to prefer sandy soils in Mojave Mid-Elevation Mixed Desert Scrub habitat. As a part of this vegetation sampling survey the potential for occurrence of particular species was also documented. There were two (2) additional areas with habitat characteristics that indicate a potential for bashful four o'clock. The first area is located east of Delamar Dry Lake from the lake edge to the foothills of the Delamar Mountains in an area covered by a large (4.5 mile) sampling triangle DMAR LT-1. This area had high potential for bashful four o'clock. The second area is on the east side of Delamar Valley at the base of the Delamar Mountains west to the alignment and from the valleys southern tip to Grassy Springs. This area had low to moderate potential for bashful four o'clock. (See Figure 14, Map 1-3 in Appendix J).

## 6.3 Dry Lake Valley

Dry Lake Valley represents the main transition between the Mojave Desert and Great Basin biomes within the project area. The far southeast end of the valley retains components of the Mojavean vegetation community and at the midpoint of the valley the Great Basin vegetation communities are completely dominant. Four (4) sensitive plant species, Eastwood's milkweed, Parish's phacelia (*Phacelia parishii*), Blaine's fishhook cactus, and depressed rayless tansy aster were observed along the Main Pipeline corridor as well as on the groundwater exploratory area sampling triangles. A burrowing owl was also observed in this valley (Table 10).

Table 10 - Status of Sensitive Species Observed in Dry Lake Valley

Species	USFWS	BLM	FS	NV	NHP	NNPS
Western Burrowing Owl	Fed Sp. Concern	Sensitive		Protected	At Risk	-
<i>Asclepias eastwoodiana</i>	Fed Sp. Concern	Sensitive	Sensitive		At Risk	Watch
<i>Phacelia parishii</i>	Fed Sp. Concern	Sensitive			At Risk	Watch
<i>Sclerocactus blainei</i>	Fed Sp. Concern	Sensitive		Harvest Reg.	At Risk	Watch
<i>Astragalus calycosus monophyllidius</i>					At Risk	Watch
<i>Xanthisma grindelioides depressa</i>					Watch	Removed

### 6.3.1 Dry Lake Valley - Proposed Corridor

#### 6.3.1.1 Western Burrowing Owl (*Athene cunicularia*)

The Dry Lake burrowing owl was recorded along the proposed corridor between Dry Lake and the hills known as Robbers Roost between MP 86 and MP 87 (See Figure 4, Map 1 in Appendix F). This was an active burrow with whitewash, cow scat, feathers, and prey items at the mouth of the burrow. An owl flushed upon approach. No other owls were observed.

#### 6.3.1.2 Eastwood's Milkweed (*Asclepias eastwoodiana*)

Three (3) populations of Eastwood's milkweed totaling 1,801 individuals were located along the currently proposed Main Pipeline alignment (See Figure 4, Maps 1 and 4 in Appendix F). The populations range in size from three (3) to 1,794 individuals. The first, AE001, and by far the largest population was found near milepost MP 72 approximately 1.2 miles northwest of Bullfrog Reservoir. This population totaled 1,794 individuals and covered at least 94 acres. The habitat and population continued beyond the alignment boundaries. The second population, AE002 totaled four (4) individuals and was located approximately 0.5 miles west of the alignment at milepost MP 74, about 0.75 miles southwest of Bullfrog Reservoir. The third population AE003 totaled three (3) individuals and was approximately 0.63 miles west of the Main Pipeline alignment between mileposts MP 85 and MP 86. Due to realignment of the pipeline in 2006, AE002 and AE003 are no longer within the proposed Main Pipeline corridor, but it is important to note the location of these populations for further project changes and that suitable habitat for Eastwood's milkweed exists in the area. The preferred habitat for this species in this area is on outwash sands from Coyote Wash and a cursory examination of this substrate indicated there may be a pumice component. Eastwood's milkweed was restricted to these substrates in the three (3) locations in which it was observed. It was located in habitat that is best described as Inter-Mountain Basins Semi-Desert Shrub Steppe. Tables 44-45 in Appendix H provide detailed plant population numbers by project milepost and by valley within the project area as well as consolidated plant and population numbers along the pipeline alternatives by valley.

#### 6.3.1.3 Parish's Phacelia (*Phacelia parishii*)

No Parish's phacelias were observed and no habitat exists along the proposed Main Pipeline corridor in Dry Lake Valley. However, the Dry Lake playa and the playa margins provide optimal habitat for Parish's phacelia. To confirm this, during the corridor inventories in 2005 the proposed alignment corridor was much closer to suitable habitat than it is currently, so Wildland International field teams made an effort to investigate areas that likely had Parish's phacelia.

On the western margin of Dry Lake, about 2/3 of the way up the playa, a population totaling well over 5,000 individual plants was located in a livestock watering area (See Figure 16, Map 1 in

Appendix F). The habitat in this area was Inter-Mountain Basins Playa and Inter-Mountain Basins Mixed Salt Desert Scrub with heavy powdery lake bottom silts (ReGap). During efforts to arrange vehicles for walking along the 2005 proposed corridor Wildland International teams used the playa for access. During this effort several likely locations on the playa were investigated and two (2) additional locations were found. One (1) population was large and contained approximately 2,500+ plants and was located in the far southwestern corner of the playa margin and the other location contained 25 plants in a small island of suitable habitat in the playa bed.

Given the distribution of this plant at the far northwestern corner and the far southwestern corners of the Dry Lake playa and points in between, it is highly probable the populations at the Dry Lake playa extends along the entire western margin of the playa and contain tens of thousands of plants.

This species seems to prefer habitat that has, at a minimum, subsurface moisture. The habitat tends to be open, often barren salt-crusted silty clay soils near lake edges, playas and valley bottoms, sometimes near seepage areas. This species was not found in association with cryptogamic soils.

Tables 44-45 in Appendix H provide detailed plant population numbers by project milepost and by valley within the project area as well as consolidated plant and population numbers along the pipeline alternatives by valley.

#### **6.3.1.4 Blaine's Fishhook Cactus (*Sclerocactus blainei*)**

Blaine's fishhook cactus occurs at eleven locations along the currently proposed Main Pipeline alignment in Dry Lake Valley. The populations are concentrated in two (2) distinct areas between mileposts MP 73 and MP 78 north of the Ely Springs Ranch and mileposts MP 86 and MP 88 (See Figure 4, Maps 1-4 in Appendix F). These two (2) populations are approximately 8.6 miles apart. The northern concentration of Blaine's fishhook cactus contains nine (9) cacti scattered over approximately five (5) miles of the Main Pipeline corridor. Most of these locations had only a single cactus present, but two locations had two (2) cacti together or a short distance apart. The southern concentration of Blaine's fishhook cactus near Robbers Roost Hills was more wide spread and contained only four (4) individual cacti at as many locations. In addition, three (3) cacti were observed off the proposed Main Pipeline corridor. As was mentioned previously, a portion of this alignment was shifted to the east between the 2005 and 2006 botanical survey seasons. Therefore two (2) of the individuals recorded in 2005 are now approximately 0.5 miles west of the current alignment and one (1) individual is 0.3 miles to the east of the current alignment.

Blaine's fishhook cactus appears to have a very localized distribution and is sparsely scattered within this area. These cacti were only found in a narrow band on the east side of Dry Lake Valley between the elevations of 4,662 and 4,764 feet. No Blaine's fishhook cacti were found on the west side of Dry Lake Valley and none were observed along the 26 vegetation sampling triangles which covered a wide geographical area on both sides of the valley.

This species seems to prefer habitat with a gravelly substrate having a silt component of varying degrees. Although there were no clearly specific or obvious discriminating habitat features at any

of the cactus locations identified. Occasionally, cryptogamic soils are present. ReGap data indicates and field data confirms that these cacti were in Inter-Mountain Basins Mixed Salt Desert Scrub habitat.

Most of the bottom areas of Dry Lake Valley have the characteristics to be potential habitat for Blaine's fishhook cactus. The upper portions of east side of the valley had moderate potential, the valley bottom had moderate to high potential, and the west side of the valley had low to moderate potential for Blaine's fishhook cactus. This species may be restricted to only a few valleys in east-central Nevada such as Dry Lake, Coal, Patterson, and Garden Valleys.

Tables 44-45 in Appendix H provide detailed plant population numbers by project milepost and by valley within the project area as well as consolidated plant and population numbers along the pipeline alternatives by valley.

### **6.3.1.5 Noteworthy Observations**

#### **General Wildlife**

At least two (2) pair of short-eared owls were observed at and north of Ely Springs Ranch. Nesting locations were never found. The owls were flushed twice, once during corridor inventories and again during vegetation sampling surveys. Owlets were never observed, but the pairs were seen hunting on a regular basis within 2-3 miles of the Ely Springs Ranch.

Pronghorn antelope were present during most the surveys conducted. Numbers ranged from single individuals to herds of up to 15 animals. Many more antelope calves were observed in 2006 than 2005. One herd had six (6) new calves. Pronghorn antelope were most prevalent in the northern half of Dry Lake Valley.

Wild horses were also present in Dry Lake Valley. Most of the wild horses observed were seen in the far northeastern portion of the valley. Single animals and a herd of nine (9) horses were seen regularly.

### **6.3.1.6 Cactus and Yucca**

Cactus and yucca in Dry Lake Valley will be discussed in two sections, the Valley proper and the section of the Main Pipeline along US 93 where it crosses Dry Lake Valley.

A total of 3,732 cacti representing six species were observed within the 300 foot inventory corridor of the 34.2 mile valley portion of the Main Pipeline corridor. In addition, 1,454 Joshua trees were tallied within the proposed project corridor. Table 11 summarizes the cactus and yucca data on the valley proper portion of the proposed Main Pipeline corridor. Table 72 in Appendix I provides a detailed overview by Species and by Height and Density. Total cactus and yucca numbers were tallied by 0.5 mile segments and stem densities were calculated based on total numbers of cacti and yucca observed per linear project mile. Tables 73-79 in Appendix I provide a detailed overview of species by half mile Survey Segment by Species and by Height and Density.

**Table 11 -Total Cactus and Yucca on the Valley Proper Portion of the Proposed Main Pipeline Corridor Through Dry Lake Valley**

Species	Total Stems	Stems /Mile	Clonal Clumps/Mile	Total Stems <3 feet	Total Stems 3-10 feet	Total Stems 10+ Feet	Stems /Acre	Clonal Clumps/Acre
<i>Coryphantha vivipara</i>	13	0	0	13	0	0	0.01	0
<i>Cylindropuntia echinocarpa</i>	3,230	94	0	2,589	641	0	2.60	0
<i>Echinocereus engelmannii</i>	2	0	0	2	0	0	0.00	0
<i>Opuntia polyacantha var. ornata</i>	472	14	0	472	0	0	0.38	0
<i>Opuntia polyacantha var. hystricina</i>	2	0.06	0	2	0	0	0.00	0
<i>Sclerocactus blainei</i>	13	0.38	0	13	0	0	0.01	0
<i>Yucca brevifolia</i>	1,454	224	0	834	511	109	6.15	0.00
<b>Totals</b>	<b>5,186</b>	<b>333</b>	<b>0</b>	<b>3,925</b>	<b>1,152</b>	<b>109</b>	<b>9</b>	<b>0.00</b>

Silver cholla was the most abundant cactus with 3,230 stems tallied within the valley portions of Main Pipeline corridor followed by grizzlybear prickly pear with 472 stems. Silver cholla were found concentrated at a higher elevational band of 4,650-4,950 feet on sandier alluvial substrates where the corridor rises on both the southern and northern ends of the valley. Extremely high density pockets of silver cholla were found between mileposts MP 66 and MP 67 (1441 stems) on the north end of the valley and mileposts MP 96 and MP 97 (549 stems) on the southern end of the valley. Aside from these pockets of high density stems, silver cholla numbers remained fairly even although low in number (20-40 stems) until numbers dropped off as elevation decreased and subsequent alkaline silty soils were encountered. The vast remainder of the valley at lower elevations, approximately 20 miles, had no silver cholla or only 1-3 stems in isolated half mile segments. This was undoubtedly due to siltier, more alkaline soils.

Grizzlybear pricklypear was scattered throughout the Main Pipeline corridor fairly evenly with a slight concentration of stems between mileposts MP 69 and MP 71. This species is apparently more saline tolerant than other species of cacti and although not numerous is persistent through a range of habitats and substrates.

Other species were minor in occurrence with 13 beehive cactus, two (2) hedgehog cactus, and two (2) of the porcupine pricklypear cactus (*Opuntia polyacantha hystricina*).

Overall stem density for both cactus and yucca over the 34.2 miles of the valley portion of the Main Pipeline corridor in Dry Lake Valley was 333 stems/mile.

**Table 12 – Yucca Stems and/or Clonal Clumps Average Per Mile on the Valley Proper Portion of the Main Pipeline Through Dry Lake Valley**

Species	Average # Stems/Mile	Average # Clumps/Mile	Average # Stems <3 Ft/Mile	Average # Stems 3-10 Ft/Mile	Average # Stems +10 Ft/Mile	Average # Stems/Acre	Average # Clumps/Acre
Joshua Tree	224	0.00	128	79	17	6	0.00
<b>Totals</b>	<b>224</b>	<b>0</b>	<b>128</b>	<b>79</b>	<b>17</b>	<b>6</b>	<b>0</b>

Joshua trees in Dry Lake Valley extended north from US 93 for approximately 6.5 miles to around MP 93. This is the northern extent of Joshua trees in Dry Lake Valley and the project area and unofficially signifies the northern terminus of what would be considered Mojavean vegetation influence. This stand of Joshua trees is an extension of the Joshua Tree Woodland that was so prominent on the large west trending bajada extending from the Delamar Mountains in Delamar Valley. Stem counts for Joshua trees along the valley portion Main Pipeline were still fairly high with a total of 1,454 stems tallied. Stem densities for Joshua tree, when calculated over the entire 34.2 miles in Dry Lake Valley are misleading since this species only occurred within the first 6.5

miles of the valley. A more accurate figure would be to use the 6.5 miles to calculate stems/mile and stems/acre. Given that weighted parameter, densities for Joshua trees ranged between 0 and 21.67 stems/acre and 0 and 492 stems/mile with an average of 6 stems/acre and 224 stems/mile respectively over the Main Pipeline proposed corridor (Table 12). If the original unweighted project mileage had been used Joshua tree density figures would be a fraction of the above numbers. The highest Joshua tree densities were found in a two (2) mile segment between mileposts MP 96 and MP 98. Stem densities by height were nearly two times greater between 0-3 foot (834 stems) and 3-10 foot (511) Joshua trees. Stem densities of Joshua trees greater than 10 feet were lower with 109 stems, the majority of which were concentrated near US 93. See Table 79 in Appendix I.

No banana yuccas were present in the Dry Lake Valley portion of the proposed Main Pipeline corridor.

Cactus and yucca counts along US 93 were much more dense than through the length of Dry Lake Valley. This section is being discussed separately because it represents a distinct component of the project area and cactus and yucca numbers are significantly higher. Table 80 in Appendix I provides a detailed overview by Species and by Height and Density. Total cactus and yucca numbers were tallied by 0.5 mile segments and stem densities were calculated based on total numbers of cacti and yucca observed per linear project mile. Tables 81-85 in Appendix I provide a detailed overview of species by half mile Survey Segment by Species and by Height and Density.

**Table 13 -Total Cactus and Yucca on the US 93 Portion of the Main Pipeline Corridor Through Dry Lake Valley**

Species	Total Stems	Stems /Mile	Clonal Clumps/Mile	Total Stems <3 feet	Total Stems 3-10 feet	Total Stems 10+ Feet	Stems /Acre	Clonal Clumps/Acre
<i>Coryphantha vivipara</i>	3	1	0	3	0	0	0	0
<i>Cylindropuntia echinocarpa</i>	2,914	857	0	1,464	1,450	0	24	0
<i>Echinocereus engelmannii</i>	1	0	0	1	0	0	0	0
<i>Opuntia polyacantha var. ennacea</i>	48	14	0	48	0	0	0	0
<i>Yucca brevifolia</i>	1,449	426	0	694	603	152	12	0.00
<b>Totals</b>	<b>4,415</b>	<b>1,299</b>	<b>0</b>	<b>2,210</b>	<b>2,053</b>	<b>152</b>	<b>36</b>	<b>0.00</b>

Silver cholla numbers in this portion of the project area were extremely high with densities at 857 stems/mile and 23 stems/acre. Nearly half of the silver chollas in this area are over three (3) feet in height. There were also a large number of dead cacti over three (3) feet in height in this section as well. This area seems to have very suitable habitat for silver cholla with recruitment and replacement at almost a 1:1 ratio. A small number of hedgehog cactus (1) and beehive cactus (3) were present and 48 grizzlybear pricklypear stems was distributed throughout the segment of proposed Main Pipeline corridor with a slight concentration of stems between MP 98 and MP 99.

Joshua tree numbers were also high along this segment of the proposed corridor with 1,449 stems tallied over 3.4 miles. Densities for Joshua trees ranged between 1.76 and 17.60 stems/acre and 302 and 595 stems/mile with an average of 12 stems/acre and 426 stems/mile respectively over the Main Pipeline proposed corridor (Table 13).

**Table 14 – Yucca Stems and/or Clonal Clumps Average Per Mile on the US 93 Portion of the Main Pipeline Corridor Through Dry Lake Valley**

Species	Average # Stems/Mile	Average # Clumps/Mile	Average # Stems <3 Ft/Mile	Average # Stems 3-10 Ft/Mile	Average # Stems +10 Ft/Mile	Average # Stems/Acre	Average # Clumps/Acre
Joshua Tree	426	0.00	204	177	45	12	0.00
Totals	426	0	204	177	45	12	0

The highest Joshua tree densities were found in a one (1) mile segment between mileposts MP 99 and MP 100. Stem densities by height were nearly equal between 0-3 foot (694 stems) and 3-10 foot (603 stems) Joshua trees (Table 14). Stem densities of Joshua trees greater than 10 feet were lower with 152 stems, the majority of which were spread relatively evenly over the last 2.5 miles of the proposed corridor.

### 6.3.1 Dry Lake Valley Facilities/Staging Areas

\*Please note that the siting of Staging Areas and Facilities are still preliminary at this writing. Supplemental information will be provided as the locations of the Staging Areas and Facilities are finalized.

No sensitive plant or wildlife species were observed on the 12 staging areas or three (3) facilities associated with the Dry Lake Valley portion of the proposed Main Pipeline corridor.

#### 6.3.1.1 Cactus and Yucca

The 34.2 miles of corridor in Dry Lake Valley and 3.4 miles in Dry Lake/US 93 contained 12 staging areas and two (2) facilities. The facilities were composed of a five (5) acre regulating tank site and a 10 acre electrical substation.

Total cactus numbers were highest on the 10 acre Dry Lake Electrical Substation (DLS MP 98), the five (5) acre Dry Lake regulating tank site (DLRT MP 98), Staging Area MP 98, and the five (5) Staging Areas MP 67 with 131, 86, 50 and 41 stems respectively. Silver cholla (295) and grizzlybear pricklypear (35) were dominant with only four (4) beehive cactus and two (2) hedgehog cactus observed on DLRT MP 98 and DLS MP 98. In general, cactus numbers were again higher on staging areas/facilities at higher elevations. Most of the tallied cacti were on the facilities near US 93.

Yucca numbers on the staging areas followed a similar trend with cacti with numbers being higher on staging areas at higher elevations. A total of 381 Joshua trees were observed on six (6) of the 14 staging areas. The 10 acre Dry Lake electrical substation with the closely adjacent three (3) acre Staging Area MP 98 had the highest Joshua tree numbers with 282 and 54 stems respectively. The Dry Lake regulating tank site (DLRT MP 98) had 41 Joshua tree stems. In terms of height distribution, more Joshua trees were in the 3-10 foot range on the six (6) staging areas with 189 total stems as compared to the 0-3 foot range (129) and 10+ foot range with 75 total stems. Most of the over 10 foot stems (66) were on the Dry Lake electrical substation site.

### 6.3.2 Dry Lake Valley Groundwater Exploratory Area

Twenty-six vegetation sampling triangles were evaluated in the groundwater exploratory area in Dry Lake Valley. Fourteen (7 large and 7 small) vegetation sampling triangles were evaluated in on the east side of the valley (See Figure 15 in Appendix J) and twelve (6 large, 6 small) vegetation sampling triangles were evaluated on the west side of the valley (See Figure 16 in Appendix J).

**6.3.2.1 Eastwood's Milkweed (*Asclepias eastwoodiana*)**

Six (6) populations totaling 62 individuals were observed during the vegetation sampling surveys of the groundwater exploratory area (See Figure 15, Map 2 in Appendix J). All six (6) populations were observed along one leg of the large sampling triangles DLE LT-2 in sandy loam substrates. These populations ranged in size from one (1) to 43 individuals. Potential habitat with the appropriate substrates extends for at least a mile in either direction along the lower margins of a moderately sized bajada extending west from the Robber's Roost Hills. The habitat in this area was designated as Inter-Mountain Basins Semi-Desert Grasslands in ReGap, but we have designated it as Inter-Mountain Basins Semi-Desert Shrub Steppe because the associated component species seem to fit that description more accurately. Tables 46 in Appendix H provides detailed plant population numbers by sampling triangle and by valley within the project area.

**6.3.2.2 Depressed Rayless Tansy Aster (*Xanthisma grindelloides depressa*)**

Three (3) populations of rayless tansy aster were observed on two (2) vegetation sampling triangles (DLE LT-7 and DLE ST-7) at the northwest edge of the West Range in the far northeastern portion of Dry Lake Valley (See Figure 15, Map 4 in Appendix J). There were a total of 570 plants and all populations were found between the base of the West Range foothills and Fairfield Wash. These were found in Great Basin Xeric Mixed Sagebrush Shrubland on calcareous gravels with a sublayer of silty sands. Tables 46 in Appendix H provides detailed plant population numbers by sampling triangle and by valley within the project area.

**6.3.2.3 One-leaflet Torrey Milkvetch (*Astragalus calycosus monophyllidius*)**

Five (5) populations of one-leaflet Torrey milkvetch were observed on two vegetation sampling triangles (DLE LT-7 and DLE-ST-7) in the same vicinity as the depressed rayless tansy aster, at the northwest edge of the West Range in the far northeastern portion of Dry Lake Valley (See Figure 15, Map 4 in Appendix J). There were over 421 plants and four of the five populations were found between the base of the West Range foothills and Fairfield Wash. The fifth was observed just northwest of Fairfield Wash. These were found in Great Basin Xeric Mixed Sagebrush Shrubland on calcareous gravels with a sublayer of silty sands. Tables 46 in Appendix H provides detailed plant population numbers by sampling triangle and by valley within the project area.

**6.3.2.4 Parish's Phacelia (*Physaria pendula*)**

A single population of Parish's phacelia was found on a small vegetation sampling triangle (DLW ST-2) at the western margin of the Dry Lake playa (See Figure 16, Map 1 in Appendix J). This site is approximately 1.5 miles due north of an offsite population of Parish's phacelia found near a livestock watering area in 2005 and described earlier in the Dry Lake Valley discussion. Over 5,000 plants were observed in a small lens just off the main playa. Almost any area along the western edge of the Dry Lake playa would be considered high potential habitat for this species. Tables 46 in Appendix H provides detailed plant population numbers by sampling triangle and by valley within the project area.

species observed in the field, such as black sagebrush and Utah juniper that were present would more likely indicate these areas were found in a mosaic of Great Basin Xeric Mixed Sagebrush Shrubland and Great Basin Pinyon-Juniper Woodland in open areas on calcareous gravels with a sublayer of silty sands. Table 46 in Appendix H provides detailed plant population numbers by sampling triangle and by valley within the project area.

#### 6.4.3.3 Eastwood's Milkweed (*Asclepias eastwoodiana*)

On sampling triangle MS ST-3 a milkweed was observed in 2006 that was past bloom and was thought to be Eastwood's milkweed or possibly a new taxa. This milkweed was observed at six (6) locations totaling 37 plants (See Figure 17, Map 2 in Appendix J). This is approximately 2.5 miles east of milepost MP 52 on the USGS Grass Mountain Quadrangle at Township 5 N, Range 65 E, Section 30. A specimen was collected (which was only in fruit) and was reviewed without a conclusive determination of whether it was Eastwood's milkweed. A return visit was made in 2007 to collect the plant in flower and it was determined by Jim Andre and Glenn Clifton that the plant was indeed Eastwood's milkweed. The habitat at this location is drastically different from the previous locations where Eastwood's milkweed was observed in Dry Lake Valley. The Dry Lake Valley population was in light-colored sands with a potential pumice component in open shrub-mixed grasslands. The Muleshoe Valley population was in deep, fine-textured, chocolate-colored sands in Great Basin Pinyon-Juniper Woodland. This is a new location record for a species. Table 46 in Appendix H provides detailed plant population numbers by sampling triangle and by valley within the project area.

## 6.5 Cave Valley

Cave Valley is an isolated terminal valley nestled between the southern reaches of the Egan Range to the west and the Schell Creek Range to the east. As a terminal valley it forms an alkaline basin with deep silts and hardpans with the majority of the valley floor characterized as a mosaic of Inter-Mountain Basins Big Sagebrush Shrubland, Inter-Mountain Basins Mixed Salt Desert Scrub, and Inter-Mountain Basins Greasewood Flat. The margins of the valley rise fairly steeply and are covered in the calcareous alluvial gravels shed from the limestone substrates of the Egan and Schell Creek Ranges. Habitat on these slopes is consistently Great Basin Xeric Mixed Sagebrush Shrubland. This combination of habitats provides a unique mix for specific plant habitats. Four (4) sensitive plant species, Parish's phacelia, Welsh's cryptantha, one-leaflet Torrey milkvetch, and depressed rayless tansy aster were found in Cave Valley. The Parish's phacelia populations were new records for this species. Pygmy rabbit was also observed along the proposed Cave Lateral Pipeline. Please see Table 17.

**Table 17 - Status of Sensitive Species Observed in Cave Valley**

Species	USFWS	BLM	FS	NV	NHP	NNPS
Pygmy Rabbit	Fed Sp. Concern	Sensitive			At Risk	-
<i>Cryptantha welshii</i>	Fed Sp. Concern	Sensitive			At Risk	Watch
<i>Phacelia parishii</i>	Fed Sp. Concern	Sensitive			At Risk	Watch
<i>Astragalus calycosus monophyllidius</i>					At Risk	Watch
<i>Xanthisma grindelioides depressa</i>					Watch	Removed

### 6.5.1 Cave Valley Access – CLP 0 to CLP 4.8 (CLPS 0)

No sensitive plant or wildlife species were observed on the 4.6 mile Cave Valley access portion of the proposed Cave Lateral Pipeline (CLP) corridor that extends from the northern portion of Muleshoe Valley into central Cave Valley. When surveyed in April 2005 and May 2006 the area was a mixture of dense basin big sagebrush in the valley bottom mixed with more open pinyon-juniper woodland. In July of 2006, fire swept through this area burning approximately 50 percent of the route. The fires was centered at the intersection of Sidehill Pass Road and the road the follows Coyote Wash. Everything was consumed in this wildfire and a succession of new habitats will be present over the coming decades.

#### 6.5.1.1 Cactus and Yucca

A total of 142 cacti representing three (3) species were observed within the 300 foot inventory corridor of the 4.8 miles access corridor between the Muleshoe Valley and Cave Valley portions of the alignment. Table 18 summarizes the cactus data on the 4.8 mile Cave Valley Access. Table 91 in Appendix I provides a detailed overview by Species and by Height and Density. Total cactus numbers were tallied by 0.5 mile segments and stem densities were calculated based on total numbers of cacti observed per linear project mile. Tables 92-94 in Appendix I provide a detailed overview of species by half mile Survey Segment by Species and by Height and Density.

**Table 18 - Total Cactus on the 4.8 Mile Cave Valley Access**

Species	Total Stems	Stems /Mile	Clonal Clumps/Mile	Total Stems <3 feet	Total Stems 3-10 feet	Total Stems 10+ Feet	Stems /Acre	Clonal Clumps/Acre
<i>Coryphantha vivipara</i>	6	1.28	0	6	0	0	0.04	0
<i>Opuntia polyacantha var. erinacea</i>	128	27	0	128	0	0	1	0
<i>Pediocactus sp.</i>	8	2	0	8	0	0	0.05	0
<b>Totals</b>	<b>142</b>	<b>30</b>	<b>0</b>	<b>142</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0.00</b>

Grizzlybear pricklypear was the most abundant cactus with 128 stems tallied within the Cave Valley Access corridor followed distantly by the *Pediocactus sp.* with eight (8) stems and beehive cactus with six (6) stems. A high density pocket of grizzlybear pricklypear was found between mileposts CLP 2.5 and CLP 3.5 (66 stems) in more open ground and more well-drained soils.

Overall stem density for cactus over the 4.8 miles of the valley portion of the Cave Valley Access corridor was 30 stems/mile. No yuccas were observed on the 4.8 mile section of Cave Valley Access.

### 6.5.2 Cave Valley Access Facilities/Staging Areas

\*Please note that the siting of Staging Areas and Facilities are still preliminary at this writing. Supplemental information will be provided as the locations of the Staging Areas and Facilities are finalized.

The 3.6 miles of the Cave Valley Access portion of the Cave Lateral Pipeline corridor between Muleshoe and Cave Valley contained one (1) staging area and one (1) facility (Cave Lateral Regulating Tank). No sensitive plant or wildlife species were observed on either facility.

#### 6.5.2.1 Cactus and Yucca

Staging area CLP3 along the proposed Cave Lateral Pipeline contained one (1) beehive cactus and five (5) grizzlybear pricklypear. The Cave Regulating Tank CRT3 and associated staging had four (4) grizzlybear pricklypear. No yuccas were observed facilities or staging areas along Cave Valley Access.

### 6.5.3 Cave Lateral Pipeline – CLP 4.8 (CLPS 0) to CLP 15.7

#### 6.5.3.1 Pygmy Rabbit (*Brachylagus idahoensis*)

Pygmy rabbits were observed at two (2) locations along the proposed Cave Lateral Pipeline corridor (See Figure 6, Map 1 in Appendix F). These locations were in close proximity to each other. Both observations were made just below Sidehill Spring and 0.2 miles south of milepost CLP 8, just as the proposed corridor crosses the Cave Valley access road. There is a large patch of basin big sagebrush in this general area. At one of these locations three (3) pygmy rabbits were observed and at the other four (4) pygmy rabbits were observed. Doubtless these rabbits were all part of the same family unit. It's possible that one or two of the rabbits were counted twice in the heavy brush. The general habitat in the area was a mosaic of Inter-Mountain Basins Big Sagebrush Shrubland and Inter-Mountain Basins Mixed Salt Desert Scrub in silty soils with some gravel.

#### 6.5.3.2 Welsh's Cryptantha (*Cryptantha welshii*)

One (1) population totaling 45+ Welsh's cryptantha was identified within the currently proposed alignment for the Cave Lateral Pipeline (See Figure 6, Map 1 in Appendix F). This population was found along the east side of Cave Valley at the base of the Schell Creek Range. It is approximately 0.1 miles north of Staging Area CLP 7 and 0.12 miles south of milepost CLP 7. This area contained light-colored, deep sands and gravels with the dominant vegetation being big sagebrush and Green's rabbitbrush. ReGap data indicates and field data confirms that the habitat is Inter-Mountain Basin Big Sagebrush Shrubland. Tables 44-45 in Appendix H provide detailed plant population numbers by project milepost and by valley within the project area as well as consolidated plant and population numbers along the pipeline alternatives by valley.

#### 6.5.3.3 Depressed Rayless Tansy Aster (*Xanthisma grindelioides depressa*)

One (1) population totaling over 100,000 plants was found less than 250 feet off the eastern edge of the alignment during the surveys of the groundwater exploratory areas in Cave Valley (See Figure 6, Map 1 in Appendix F). Because of its proximity to the alignment it will be mentioned here as well as under the Groundwater Exploratory Area discussion. This population was located at the base of the Schell Creek Range foothills approximately two (2) miles southwest of Sidehill Spring and 0.17 miles north of milepost CLP 6 near vegetation sampling triangle CV ST-2. It was found in Great Basin Xeric Mixed Sagebrush Shrubland (ReGap) on calcareous sands and gravels which is the typical habitat for depressed rayless tansy aster. Tables 44-45 in Appendix H provide detailed plant population numbers by project milepost and by valley within the project area as well as consolidated plant and population numbers along the pipeline alternatives by valley.

#### 6.5.3.4 Noteworthy Observations

##### General Wildlife

Pronghorn antelope were seen in east-central portion of Cave Valley on a regular basis, but only in singles or pairs. A single wild horse was observed in Cave Valley on several occasions also in the east-central portion of the Valley.

**6.5.3.5 Cactus and Yucca**

A total of 87 cacti representing three (3) species were observed within the 300 foot inventory corridor of the 11 miles of the valley portion of the proposed Cave Lateral corridor. Table 19 summarizes the cactus data on Cave Valley North section of the Cave Lateral. Table 95 in Appendix I provides a detailed overview by Species and by Height and Density. Total cactus numbers were tallied by 0.5 mile segments and stem densities were calculated based on total numbers of cacti observed per linear project mile. Tables 96-98 in Appendix I provide a detailed overview of species by half mile Survey Segment by Species and by Height and Density.

**Table 19 - Total Cactus on the 11 Mile Cave Lateral Pipeline in North Cave Valley**

Species	Total Stems	Stems /Mile	Clonal Clumps/Mile	Total Stems <3 feet	Total Stems 3-10 feet	Total Stems 10+ Feet	Stems /Acre	Clonal Clumps/Acre
<i>Coryphantha vivipara</i>	3	0.27	0	3	0	0	0	0
<i>Opuntia polyacantha var. erinacea</i>	29	3	0	29	0	0	0	0
<i>Pediocactus sp.</i>	55	5	0	55	0	0	0	0
<b>Totals</b>	<b>87</b>	<b>8</b>	<b>0</b>	<b>87</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.00</b>

The *Pediocactus sp.* was the most abundant cactus (55 stems) along Cave Valley North. All of the *Pediocactus sp.* were observed between CLP 4.8 (CLPS 0) and CLP 6.5 where there was finer calcareous gravel. North of CLP 6.5 the gravels became more coarse and grizzlybear pricklypear began to appear. Twenty-nine grizzlybear pricklypear were scattered throughout most of this alignment as it proceeded north but with slightly higher concentrations between CLP 14 and CLP 15. A small number of beehive cacti (3) were present along the alignment.

Overall stem density for cactus over the 11 miles of the valley portion of the Cave Lateral corridor in Cave Valley was 8 stems/mile.

No yuccas were observed on the 11 mile Cave Valley North section of the Cave Lateral.

**6.5.4 Cave Lateral Pipeline Facilities/Staging Areas**

\*Please note that the siting of Staging Areas and Facilities are still preliminary at this writing. Supplemental information will be provided as the locations of the Staging Areas and Facilities are finalized.

The 11 mile portion of the Cave Lateral Pipeline corridor within Cave Valley contained three (3) staging areas. No sensitive plant or wildlife species were observed on any of the staging areas.

**6.5.4.1 Cactus and Yucca**

Of the three (3) staging areas along the proposed Cave Lateral Pipeline in Cave Valley proper, only Staging Area CLP 13 had eight (8) grizzlybear pricklypear. No yuccas were observed facilities or staging areas along Cave Lateral Pipeline.

**6.5.5 Cave Valley South – CLPS 0 to CLPS 6.5**

**6.5.5.1 Depressed Rayless Tansy Aster (*Xanthisma grindelioides depressa*)**

A population of over 200 depressed rayless tansy asters was found during the surveys of the groundwater exploratory area in Cave Valley. Due to the populations close proximity to the alignment it will be discussed here (See Figure 6, Map 2 in Appendix F). This population was observed 0.1 miles south of milepost CLPS 6. The ReGap mapped data characterizes this area

as a mixture of Inter-Mountain Basins Big Sagebrush Shrubland and Great Basin Xeric Mixed Sagebrush Shrubland, however, the dominant species observed in the field such as black sagebrush as well as grasses such as squirreltail and needle grass, indicated that the habitat is Great Basin Xeric Mixed Sagebrush Shrubland. This population was in soils composed of calcareous gravels and rocky silty substrates. Tables 44-45 in Appendix H provide detailed plant population numbers by project milepost and by valley within the project area as well as consolidated plant and population numbers along the pipeline alternatives by valley.

**6.5.5.2 Cactus and Yucca**

A total of 167 cacti and yucca representing four (4) species were observed within the 300 foot inventory corridor of the 6.5 miles Cave Valley South portion of the corridor. Table 20 summarizes the cactus and yucca for the 6.5 miles of the Cave Valley South section of the Cave Valley Lateral. Table 99 in Appendix I provides a detailed overview by Species and by Height and Density. Total cactus and yucca numbers were tallied by 0.5 mile segments and stem densities were calculated based on total numbers of cacti and yucca observed per linear project mile. Tables 100-103 in Appendix I provide a detailed overview of species by half mile Survey Segment by Species and by Height and Density.

**Table 20 - Total Cactus and Yucca on the 6.5 Mile Cave Lateral Pipeline in South Cave Valley**

Species	Total Stems	Stems /Mile	Clonal Clumps/Mile	Total Stems <3 feet	Total Stems 3-10 feet	Total Stems 10+ Feet	Stems /Acre	Clonal Clumps/Acre
<i>Coryphantha vivipara</i>	13	2.00	0	13	0	0	0	0
<i>Opuntia polyacantha var. erinacea</i>	34	5	0	34	0	0	0	0
<i>Pediocactus sp.</i>	66	10	0	66	0	0	0	0
<i>Yucca harimaniae</i>	54	8	0	54	0	0	0	0
<b>Totals</b>	<b>167</b>	<b>26</b>	<b>0</b>	<b>167</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0.00</b>

The currently unidentified species of *Pediocactus* was the most abundant cactus species present (66 stems) along the Cave Valley South corridor. This species was scattered in relatively even numbers between the mileposts CLPS 1 and CLPS 5, but the first half mile of this corridor (CLPS 0 to CLPS 0.5) had the highest density of this species with 21 stems. There is a clear soil type change at this point with finer calcareous gravels in the first half mile of this alignment and becoming increasing courser gravels as the alignment proceeds south. From mileposts CLPS 0.5 to CLPS 5, the *Pediocactus* is scattered in relatively even numbers and after milepost CLPS 5 it becomes very scarce. This is likely due to the increasing size of the gravel substrate. Grizzlybear pricklypear had the next highest count with 34 individuals, however, these were only observed south of milepost CLPS 4 and the highest concentrations of them (20 stems) were south of milepost CLPS 6. Grizzlybear pricklypear apparently increased in numbers with the courser gravels. Beehive cactus was scattered in relatively even numbers throughout this corridor with a total of 13 stems.

**Table 21 – Yucca Stems and/or Clonal Clumps Average Per Mile on 6.5 Mile Cave Lateral Pipeline in South Cave Valley**

Species	Average # Stems/Mile	Average # Clumps/Mile	Average # Stems <3 Ft/Mile	Average # Stems 3-10 Ft/Mile	Average # Stems +10 Ft/Mile	Average # Stems/Acre	Average # Clumps/Acre
Harriman's Yucca	7.7	0	7.7	0	0.00	0	0
<b>Totals</b>	<b>7.7</b>	<b>0</b>	<b>7.7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Fifty-four Harriman's yucca were observed with one very high density area at milepost CLPS 4 having 52 stems (Table 21). The reason for such a large number of Harriman's yucca at one location is a bit of a mystery. It is an area that is slightly flatter, slightly higher in elevation and had an intermittent drainage through the population. None of these characteristics are entirely unique, however perhaps the combination of features is optimal for this yucca. It is also possible that there was simply a good seed source in this area.

### 6.5.6 Cave Valley South Facilities/Staging Areas

\*Please note that the siting of Staging Areas and Facilities are still preliminary at this writing. Supplemental information will be provided as the locations of the Staging Areas and Facilities are finalized.

Two (2) staging areas were located along the 6.5 miles of the proposed Cave South Lateral Pipeline corridor. No sensitive plants or wildlife were observed on the staging areas associated with the proposed Cave Lateral South Pipeline corridor.

#### 6.5.6.1 Cactus and Yucca

Staging Area CLPS 1 had no cactus and Staging Area CLPS 4 had one (1) *Pediocactus* species. No yuccas were found at either of these sites.

### 6.5.7 Cave Valley Groundwater Exploratory Area

Six (6) vegetative sampling triangles (three large and three small) were evaluated in Cave Valley.

#### 6.5.7.1 Pygmy Rabbit (*Brachylagus idahoensis*)

A single pygmy rabbit was observed in basin big sagebrush habitat on sampling triangle CV LT-3. It was located at the base of the Egan Range at the southern edge of the mouth of Sawmill Canyon in the USGS 7.5 minute Sidehill Spring quadrangle in Township 7 N, Range 63 E, Section 1 (See Figure 18, Map 3 in Appendix J). This observation was in Inter-Mountain Basins Big Sagebrush Shrubland in silty soils with some gravel.

#### 6.5.7.2 Welsh's Cryptantha (*Cryptantha welshii*)

Two (2) populations of Welsh's cryptantha were observed during vegetation sampling surveys of the groundwater exploratory area in Cave Valley near CV ST-2 and CV LT-2. The largest population was located on CV LT-2 and the population contained over 5,000 plants located along an access road northwest of the Cave Valley Depression in Township 7 North, Range 63 East, Section 13. The smaller population was located on CV ST-2 on the east side of the valley near the proposed Cave Lateral Pipeline corridor approximately 0.14 miles south of milepost CLP 7. This population consisted of 100 plants. ReGap data, both mapped and field verified, characterized this area as Inter-Mountain Basins Big Sagebrush Shrubland on sandy calcareous soils. Habitat here for Welsh' cryptantha mirrors the habitats where the species is found in the White River Valley which is the next valley to the west of Cave Valley (See Figure 18, Map 2 in Appendix J).

An area 0.25 miles west of milepost CLPS 1 near sampling triangle CV ST-3 also contained habitat features that indicated a low potential Welsh's cryptantha, however, no plants were observed (See Figure 18, Maps 1 in Appendix J). Table 46 in Appendix H provides detailed plant population numbers by sampling triangle and by valley within the project area.

### 6.5.7.3 Parish's Phacelia (*Phacelia parishii*)

Parish's phacelia was found on two (2) triangles in Cave Valley (See Figure 18, Maps 1-2 in Appendix J). Both populations although separated by several miles are part of a narrow habitat crescent on the eastern edge of the south-central part of the valley where the valley floor meets the west-trending bajadas.

The largest population of Parish's phacelia was located on sampling triangle CV ST-3 approximately 0.5 miles west of milepost CLPS 1 with over one (1) million individual plants. A second location totaling 1,000 plants was located nearby, just 0.55 miles northwest of milepost CLPS 1 on the same triangle and these plants were part of the same population. The habitat in this area extended far south beyond the edge of the triangle and there may be millions of more plants along the southern portion of Cave Valley in appropriate substrates. Both these areas had deep, punky saline silts and were fairly barren, but were surrounded by black greasewood and winterfat. ReGap data characterizes this area as Inter-Mountain Basins Greasewood Flat or Inter-Mountain Basins Mixed Salt Desert Scrub.

A Parish's phacelia population observed on CV-ST-2 containing 150 plants was found along the east side of Cave Valley at the base of the Schell Creek Range in the same habitat crescent. This location was approximately 0.9 miles northwest of milepost CLP 6 and approximately 0.7 miles west of Staging Area CLP 7. This area had hummocks and saline sandy soils and was fairly barren but was surrounded by black greasewood and winterfat. ReGap data characterizes the area as Inter-Mountain Basins Greasewood Flat and Inter-Mountain Basins Mixed Salt Desert Scrub. Table 46 in Appendix H provides detailed plant population numbers by sampling triangle and by valley within the project area.

### 6.5.7.4 One-leaflet Torrey Milkvetch (*Astragalus calycosus monophyllidius*)

No populations of one-leaflet Torrey milkvetch were observed in Cave Valley. However, one area on the east side of Cave Valley at the base of the Schell Creek Range approximately 0.9 miles northwest of milepost CLP 6 near sampling triangle CV ST-2 had characteristics that indicate a moderate potential for habitat for this species. One-leaflet Torrey milkvetch typically inhabits dry, stony or barren areas in sagebrush shrubland or pinyon-juniper woodland in low valleys or foothills. Either side of the alignment in this area had moderate potential for this plant (See Figure 18, Map 2 in Appendix J). Table 46 in Appendix H provides detailed plant population numbers by sampling triangle and by valley within the project area.

### 6.5.7.5 Shockley's Rockcress (*Arabis shockleyi*)

No populations of Shockley's rockcress were observed in Cave Valley. However, one area on the east side of Cave Valley near sampling triangle CV ST-2, had characteristics that indicate a moderate potential for habitat for this species. This area was located in the rocky outcrops at the base of the Schell Creek Range upslope from the pipeline corridor between mileposts CLP 6 and CLP 7. This species prefers sagebrush and pinyon-juniper woodlands on rocky and limestone soils (See Figure 18, Map 2 in Appendix J). Table 46 in Appendix H provides detailed plant population numbers by sampling triangle and by valley within the project area.

#### **6.5.7.6 Depressed Rayless Tansy Aster (*Xanthisma grindelioides depressa*)**

Four (4) populations of depressed rayless tansy aster totaling 101,000+ plants were found in Cave Valley during the vegetation sampling surveys of the groundwater exploratory area (See Figure 18, Maps 1 in Appendix J). These populations were clustered in two (2) locations within the valley. The largest population totaling over 100,000 plants was located in close proximity to the proposed Cave Lateral Pipeline corridor and was discussed above in the section dealing with the corridor. The remaining three (3) populations were located on sampling triangle CV ST-1 and totaled 1,001+ individuals and were clustered at the end of South Cave Lateral between mileposts CLPS 6 and CLPS 6.5, just east of the Silver King Mine road. One of these populations totaling over 200 individuals was near the alignment and was therefore discussed above under the Cave Valley South section. The remaining two (2) populations total 801 plants. The ReGap mapped data indicates this area is a mixture of Inter-Mountain Basins Big Sagebrush Shrubland and Great Basin Xeric Mixed Sagebrush Shrubland, however, the dominant species observed in the field such as black sagebrush and grasses such as squirreltail and needlegrass, indicated that the areas were located in Great Basin Xeric Mixed Sagebrush Shrubland. They were in soils composed of calcareous gravels and rocky silty substrates. Table 46 in Appendix H provides detailed plant population numbers by sampling triangle and by valley within the project area.

Potential habitat for depressed rayless tansy aster exists on the northwest edge of Cave Valley at the base of the Egan Range at the mouth of Sawmill Canyon. This habitat was walked as a part of sampling triangle CV LT-3 (See Figure 18, Map 3 in Appendix J). No plants were observed.

### **6.6 Lake Valley**

Lake Valley is a large valley with a pluvial lake at the deepest portion of the basin as well as existing surface water sources such as several springs and livestock wells. There are also depositional areas with alkaline flats and hardpan that retain standing water during periods of high precipitation. Portions of the valley are actively grazed and farmed. There is considerable surface disturbance. Persistent heavy grazing, concentration of livestock around watering areas, and possibly fire or mechanical treatment of the area have somewhat skewed vegetation community. The proposed Main Pipeline corridor crosses the central part of the valley through some of the hardpan and actively grazed areas before entering the Horse Corral Pass section of the project area. No sensitive plant or wildlife species were observed in the Lake valley portion of the Main Pipeline corridor.

#### **6.6.1 Proposed Corridor – Main Pipeline**

No sensitive plants or wildlife were observed along the alignment in Lake Valley.

##### **6.6.1.1 Noteworthy Observations**

###### **General Wildlife**

One (1) burrowing owl was observed in this area. It was approximately 1,000 feet south of the alignment near milepost MP 27, but considered "off the project". The owl was very vocal and while only one owl was observed, its behavior clearly indicated that it was nesting.