



## 3.13 Wild Horse and Burro Herd Management Areas

### 3.13.1 Affected Environment

#### 3.13.1.1 Overview

The majority of the wild horse herds within the ROWs, groundwater development areas, and water resources region of study consist of animals descended from released or escaped domestic horses including ranch, military, and draft animals. The location of the HMAs in relation to the overall region of study is shown in **Figure 3.13-1**. The Sulphur herd in western Utah is an exception to this generalization. This herd exhibits some genetic traits and bloodlines thought to be descendent from the Spanish Barb horses brought to America by Spanish explorers in the 1600s (BLM 2009). Through time these bloodlines have been mixed and diluted with escaped military, ranch, and farm horses. Wild burros do not occur in the HMAs crossed by the project ROWs and therefore, are not specifically addressed in this document.

Within the region of study, six HMAs are managed by the BLM Ely District in accordance with the Ely District ROD and Approved RMP (BLM 2008) and one HMA is managed by the BLM Las Vegas District. These HMAs are partially or wholly within the region of study. In the Utah portion of the region of study, eight HMAs are partially or wholly contained within the region of study (**Figure 3.13-1**).

The capacity of the habitat within each HMA to sustain a wild horse population includes consideration of adequate forage, water, space, and cover. Water must be available from natural public waters; water associated with private land cannot be used to determine suitability of the area for wild horses. The number of animals that an HMA can sustain on a long-term basis is termed the AML and is expressed as a range that reflects available habitat with a built-in buffer for herd increases between gathers (wild horse roundups). **Table 3.13-1** reflects AML ranges for the two HMAs that are affected by project related surface disturbances (BLM 2007). The primary factors of the affected environment in relation to wild horses include natural surface water features and forage production on public lands. Forage for horses typically consists of grasses, forbs, and tender shrubs.

#### 3.13.1.2 Right-of-way Areas

The Eagle HMA is contained within Lake, Spring, Hamlin, Patterson, Eagle, Rose, and Dry Lake valleys. The ROWs for the Proposed Action and alternatives cross this HMA only in Lake and Spring valleys. The majority of the Silver King HMA is located in Dry Lake Valley with lesser portions occurring in Cave, Patterson, Lake, Panaca, and Pahroc valleys. The ROWs for the Proposed Action and alternatives cross this HMA only in Dry Lake and Cave valleys.

**Table 3.13-1** identifies the acreage of the two HMAs (Eagle and Silver King) that intersect the project ROWs and their range of AMLs. These are the only HMAs that the ROW footprint intersects within the region of study. The footprint associated with the ROWs and ancillary facilities occupies less than 1 percent of the HMA areas within the region of study.

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#### QUICK REFERENCE

**AML** – Appropriate Management Level

**HMA** – Herd Management Area

**NEPA** – National Environmental Protection Act

**POD** – Plan of Development

**RMP** – Resource Management Plan

**ROD** – Record of Decision

**ROW** – Right-of-Way

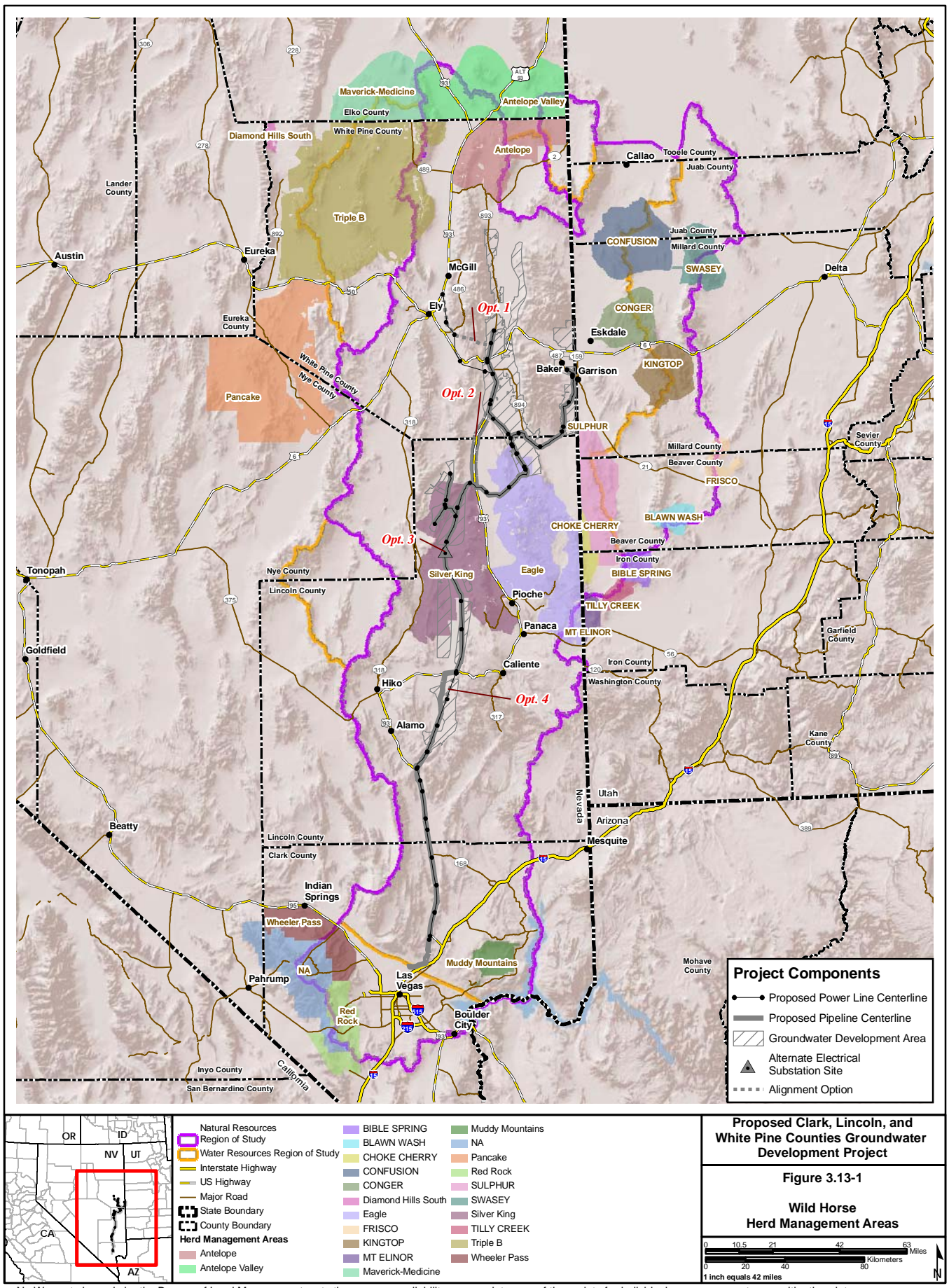
**SR** – State Route

**VQO** – Visual Quality Objectives

**VRM** – Visual Resource Management

**WMA** – Wilderness Management Area

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No Warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

**Table 3.13-1 Herd Management Areas Overlapping the Rights-of-way and Ancillary Facilities for the Proposed Action**

Nevada HMA Name	AML <sup>1</sup>	HMA Total Area <sup>2</sup>	Acreage of ROW and Ancillary Facilities within HMAs
Eagle	100-210	668,407	693
Silver King	60-128	605,631	2,322

<sup>1</sup>Appropriate management level; i.e., the wild horse/burro population (individuals) sustainable on a year-long basis.

<sup>2</sup>BLM acres (rounded to thousands).

Table 3.13-2 shows the overlap of facilities with HMAs for the Proposed Action.

**Table 3.13-2 Aboveground Facilities Within Each Herd Management Areas for the Proposed Action**

Facility	Basin	HMA Name	Acreage
Access Road	Cave Valley	Silver King	20
Access Road	Dry Lake Valley	Silver King	88
Access Road	Lake Valley	Eagle	26
Access Road	Spring Valley	Eagle	14
Electrical Substation Site - Secondary	Cave Valley	Silver King	1
Dry Lake Valley North Pressure Reducing Station	Dry Lake Valley	Silver King	7
Dry Lake Valley South Pressure Reducing Station	Dry Lake Valley	Silver King	7
Pumping Station Site	Lake Valley	Silver King	10
Regulating Tank Site	Dry Lake Valley	Silver King	5
Regulating Tank Site	Lake Valley	Silver King	5
Regulating Tank Site	Spring Valley	Eagle	5

### 3.13.1.3 Groundwater Development Areas

Groundwater development areas represent the area within the HMAs that would be utilized for pumping facilities (e.g., well pads, collector pipelines, electrical distribution lines). Eagle and Silver King HMAs would be affected by groundwater development. The exact location of well development facilities is undefined at this project stage, although well numbers and surface disturbance have been estimated. For the Proposed Action, the well locations would be optimized based on groundwater modeling and test results. Additional NEPA analysis (NEPA subsequent tiers) will be required to address specific well locations and collector pipelines.

The Silver King HMA contains approximately 8,000 acres of ET areas of cover types that make up ET areas, wetland/meadow and basin shrubland vegetation. Wetland/meadow vegetation consists of perennial grasses, sedges, and rushes that are typically spring-fed or sub-irrigated meadows. They tend to “green up” early in the spring and be highly palatable and productive sources of forage for wild horses. Basin shrubland vegetation consists of a variety of plant community types, but is dominated by greasewood, low saltbrush, big sagebrush, and other shrub species. In general, shrub species are high in protein and provide good forage throughout the winter when other sources of forage are dormant. For more information on wetland/meadow and basin shrubland vegetation types, see Vegetation Resources, Section 3.5.2.8. The Eagle HMA does not contain any ET areas.

Table 3.13-3 identifies the number and type of natural water sources within the HMAs overlapping the ROWs or groundwater development areas for the Proposed Action and alternatives.

**Table 3.13-3 Natural Water Sources within Herd Management Areas in Groundwater Development Areas for the Proposed Action and Alternatives**

HMA Name	Perennial Stream Mileage within HMA	Number of Springs within HMA
<b>Nevada</b>		
Eagle	20	208
Silver King	4	84

**3.13.1.4 Region of Study**

**Table 3.13-4** identifies the HMAs that intersect the region of study and the AMLs for each (BLM 2007). In Nevada, only Muddy Mountains and Silver King HMAs are totally within the region of study. In Utah, Choke Cherry, Confusion, Conger, Kingtop, and Sulphur HMAs are completely within the region of study.

**Table 3.13-4 Herd Management Areas Within or Overlapping the Region of Study**

HMA Name	AML (herd size)	HMA Total Area <sup>1</sup>	HMA Area within the Region of Study <sup>1</sup>	HMA Area within the Region of Study - Percentage of Total HMA Area
<b>Nevada</b>				
Antelope	150	393,070	247,506	63
Antelope Valley	259	496,360	167,389	34
Eagle	100-210	668,407	632,071	95
Maverick-Medicine	276	318,575	61,536	19
Muddy Mountains	0	78,582	78,582	100
Silver King	60-128	605,631	605,631	100
Triple B	250-518	1,225,000	910,217	74
<b>Utah</b>				
Bible Spring	60	53,506	2,206	4
Choke Cherry	30	47,539	47,539	100
Confusion	115	293,862	151,107	51
Conger	80	171,094	108,089	63
Kingtop	40	171,648	65,714	38
Mount Elinor	25	37,370	473	1
Sulphur	250	265,257	180,327	68
Tilly Creek	50	32,974	6,061	18

<sup>1</sup>BLM acres (rounded to thousands).

## 3.13.2 Environmental Consequences

### 3.13.2.1 Rights-of-way

#### Issues

- Reduction of HMA carrying capacity resulting from surface disturbance.
- Construction effects on foaling season.
- Effects on wild horse movement from moving and staging of pipeline equipment, including possible entanglement in temporary fencing.
- Loss of, or injury to, wild horses due to open trenches.
- Effects of construction noise on wild horses.
- Construction impacts to water sources.

#### Assumptions

The following assumptions were used to support the impact analysis for wild horse management:

- Current HMA AMLs are correct and reflect the desired population for the present and foreseeable future of the affected HMAs. These numbers will remain relatively unchanged (BLM 2008).
- Wild horse actual use of forage will be estimated by multiplying inventoried or estimated numbers of horses by the length of grazing period on their summer and winter ranges. Other sources may be used to determine the effect of wild horses on HMA resources (BLM 2008).
- Vegetation community disturbance calculations were based on the proposed construction and operational configurations (footprints) presented for each pipeline, power facility, and ancillary facility ROW in Chapter 2, Proposed Action and Alternatives A to E.
- Short-term impacts are defined as less than two years. Long-term impacts are defined as greater than 2 years.
- Construction disturbances, while temporary in nature, have been defined as “long-term” for all vegetation cover types due to existing vegetation structure and composition, long recovery time frames, and limiting revegetation factors (e.g., low precipitation rates, soil chemistry constraints, and low levels of soil moisture over most the year for most vegetation communities).
- In situations where the Las Vegas RMP does not specify management actions related to horse management, the actions described in the Ely RMP would be used.
- The ROW and groundwater development areas do not affect any wild horse HMAs in the southern part of the study area managed by the Southern Nevada BLM District.

#### Methodology for Analysis

Impact parameters were used as an indicator of impacts, as a means of quantifying impacts, and as a basis of comparison between alternatives or groups of alternatives. The water resources region of study is used for analysis of these impacts as water is the limiting factor for herd health. The Ely Final RMP established the AML for each HMA in the Ely District. The AML were established by taking into account the overall acreage, amount of browse, number and accessibility of water sources, and reproductive capacity of the herd (BLM 2008).

Impact parameters for wild horse management areas include the following:

- Acreage of HMAs potentially disturbed within the pipeline and power line ROW areas;
- Estimate of short- and long-term reduction of forage within HMAs based on short- and long-term displacement and drawdown effects (see **Appendix F3, Table F3.13-1**); and
- Potential habitat fragmentation that could affect normal wild horse movement patterns.

**3.13.2.2 Proposed Action and Alternatives A through C****Right-of-way Construction***Reduction of Carrying Capacity in Herd Management Areas*

Pipeline, power line, and ancillary facility construction would create surface disturbance only in Eagle and Silver King HMAs. The resulting loss of forage would total 693 acres (less than 1 percent of the available total forage in the HMA) and 2,322 acres (less than 2 percent of the available total), respectively (**Table 3.13-5** details the project footprint). The surface reclamation process is considered long term, as it is estimated to take up to 4 years to establish new vegetation (Hoover 2009). There is a risk that halogeton or other undesirable plant species could invade the ROW and reduce the amount of quality forage; however, this risk would be offset by applicant-committed protection measures (ACM A.1.82 through A.1.89), which address the control of noxious weeds.

**Table 3.13-5 Facility Footprints within Eagle and Silver King Herd Management Areas, Proposed Action, and Alternatives A through C (acres)**

<b>Eagle HMA</b>		
Pipeline Permanent ROW	Lake Valley	100
	Spring Valley	125
	<b>Total</b>	<b>225</b>
Pipeline Staging Area	Lake Valley	6
	Spring Valley	12
	<b>Total</b>	<b>18</b>
Pipeline Temporary ROW	Lake Valley	101
	Spring Valley	122
	<b>Total</b>	<b>223</b>
Power Line ROW	Lake Valley	100
	Spring Valley	122
	<b>Total</b>	<b>222</b>
Regulating Tank Site	Spring Valley	5
	<b>Total</b>	<b>5</b>
<b>Eagle HMA Total</b>		<b>693</b>
<b>Silver King HMA</b>		
Pipeline Permanent ROW	Cave Valley	191
	Dry Lake Valley	487
	Lake Valley	58
	<b>Total</b>	<b>736</b>
Pipeline Staging Area	Cave Valley	15
	Dry Lake Valley	39
	Lake Valley	6
	<b>Total</b>	<b>60</b>
Pipeline Temporary ROW	Cave Valley	191
	Dry Lake Valley	482
	Lake Valley	55
	<b>Total</b>	<b>728</b>

**Table 3.13-5 Facility Footprints within Eagle and Silver King Herd Management Areas, Proposed Action, and Alternatives A through C (acres) (Continued)**

Power Line ROW	Cave Valley	191
	Dry Lake Valley	486
	Lake Valley	58
	<b>Total</b>	<b>735</b>
Burrow Pit	Cave Valley	14
	Lake Valley	14
	<b>Total</b>	<b>28</b>
Pressure Reducing Station	Dry Lake Valley	<b>14</b>
Pumping Station Site	Lake Valley	<b>10</b>
Regulating Tank Site	Dry Lake Valley	5
	Lake Valley	5
	<b>Total</b>	<b>10</b>
Secondary Electrical Substation Site	Cave Valley	<b>1</b>
<b>Silver King HMA Total</b>		<b>2,322</b>
<b>Eagle and Silver King HMA Total</b>		<b>3,015</b>

Power line construction would require an approximately 50-foot by 50-foot clearing for each pole and a temporary access road for installation access. Per ACM A.1.20, crushing of vegetation would be preferred over blading for clearing ground for access roads. Installing facilities and clearing ROWs for roads could remove trees and shrubs that are important for browse or shelter. Mitigation measure ROW-WH-1 would preclude the removal of shrubs and trees except in situations where conflicts with pole positioning or ROW access cannot be resolved in another manner.

Conclusion. Surface disturbance in Eagle and Silver King HMAs in Cave, Dry Lake, Lake, and Spring valleys would impact less than 3 percent of the total acreage of the HMAs. The disturbance would be long term while vegetation is re-established; however, the carrying capacity of the HMA would not be affected.

Proposed mitigation measures:

**ROW-WH-1: Shrub/tree Removal.** In the Eagle and Silver King HMAs, where feasible, shrubs and trees within the power line ROW would be avoided during selection of power pole position and spur access road routes. Effectiveness: Reducing the loss of shrubs and trees would be moderately effective in maintaining forage and cover for wild horses and avoiding long term vegetation recovery periods. Effects on other resources: This measure would be beneficial to wildlife (e.g., big game, migratory birds, small mammals) by maintaining existing forage and cover.

Residual impacts include:

- Exposed ground and a reduction in the overall grazing area would occur until vegetation is re-established. The surface disturbance impacts to the HMAs would be less than 1 percent of the total HMA areas.

#### *Impacts Affecting Foaling Season*

Foaling season typically occurs between the months of April and July. The BLM Ely District typically does not allow construction activities within HMAs during foaling season (April to July) (Hansen 2009). Pre-construction consultation with the BLM is recommended to identify avoidance areas for construction activities between April and July.

Construction activities in a given spread represent a minor portion of a HMA (the portion of both the Eagle and Silver King HMAs occupied by the ROW is less than 1 percent) and typically would occupy a given area for approximately

6 to 12 months (SNWA 2011). The majority of the activity would be associated with preparation for excavating the pipeline trench (e.g., staking, creating construction access, clearing the ROW).

Conclusion. As a substantial portion of the HMAs are not disturbed by construction and wild horses tend to avoid areas with unusual activity, interaction between wild horses and the construction site is unlikely and short term. With appropriate pre-consultation with the BLM to avoid construction activities in HMAs during foaling season, impacts to foaling mares or foals themselves are unlikely.

Proposed mitigation measures:

**ROW-WH-2: Preconstruction Consultation.** Preconstruction consultation with the BLM shall occur to identify construction avoidance areas in HMAs between April and July. Effectiveness: Consultation would be highly effective in avoiding conflicts with wild horse foaling and other sensitive use areas. Effects on other resources: This measure would not affect other resources.

Residual impacts include:

None.

#### *Fences and Other Restrictions to Movement Patterns*

Staking, clearing, and grubbing of the pipeline ROW to remove large stumps and rocks would occur prior to installation of temporary construction access roads. A typical construction spread represents a minor portion of the HMAs crossed. According to the SNWA's POD construction schedule, a typical spread would occupy an area for 6 to 12 months, creating a short-term impact. The fragmentation caused by construction activities in the pipeline and power line ROWs could impact the horse's ability to follow typical migratory routes seasonally, move as forage in a given area is consumed and utilize normal water sources.

As stated in Chapter 2, there would be no permanent fencing or other access restrictions on the pipeline ROW. Temporary security and environmental exclusion fencing may be used on pipeline segments during construction; however, wild horses could navigate around these areas. Permanent security fencing surrounding aboveground facilities would consist of 6- to 8-foot-high chain link (or comparable material) and would be installed around permanent facilities where needed. For consistency with the BMPs set forth in the Ely ROD and approved RMP (BLM 2008), 12-inch x 1-inch flagging would be secured to new security fences every 16 feet to increase visibility and reduce the potential for horse injury (BLM 2008).

Temporary fencing may be placed in certain livestock high-use areas (such as the vicinity of water sources) for a period of more than 1 year to promote revegetation success (ROW-GRA-1). This same measure would apply to wild horse areas, as well as areas where seasonal livestock and wild horse use overlap.

Conclusion. During the 6- to 12-month period of construction, typical movement patterns of horses could be affected; however, this represents a small portion of either HMA. Permanent fencing would be restricted to permanent facilities and would be associated with a very small (<1 percent) area in Eagle and Silver King HMAs in Cave, Dry Lake, Lake, and Spring valleys. The impact of facility fencing would be long term. Temporary fencing would constitute a short-term impact as temporary fencing would be removed when the current trench spread is backfilled.

Proposed mitigation measures:

None.

Residual impacts include:

There would be a 6- to 12-month period when a minor portion of a HMA would be disturbed by activities within construction segments. This could temporarily adversely affect typical movement patterns of wild horses. Permanent facilities would be surrounded by permanent fencing; however, they would not restrict wild horse movement patterns. Despite fences being flagged, the potential for injury to wild horses does exist. Wild horses may be excluded by



temporary fencing around certain livestock high use areas to promote revegetation for a short-term period (ROW-GRA-1).

#### *Loss or Injuries from Open Trenches*

Open trenches during pipeline construction could result in low level impacts on wild horses involving injury or mortalities. Per ACM A.1.12, staging areas, nursery sites, and facility sites would be enclosed with temporary security fences to reduce the potential for loss or injury. Security fencing typically would be used in those areas identified as having high potential to interfere with wild horse or seasonal big game movement. These new fences would be marked with 12-inch x 1-inch flagging every 16 feet (BLM 2008). The fence would be removed once the trench has been back-filled and construction activities are complete in that area.

ACM A.1.17 states that a 4-foot high orange snow fencing (or similar) would be used to enclose construction areas in areas where security fences are not utilized. Any excavation deeper than 1 foot not enclosed with security fencing would have escape ramps placed on either end and every quarter mile to prevent wild horses or other animals from becoming trapped in an open trench (ACM A.1.42).

Conclusion. The risk for loss or injury of wild horses is short-term in nature and is adequately addressed by applicant committed measures.

Proposed mitigation measures:

None.

Residual impacts include:

None.

#### *Effects of Noise*

Noise effects would extend beyond the physical boundary of the construction site and likely would create a larger disturbance area. It is difficult to quantify the spatial extent involved with noise disturbances. In an effort to minimize noise disturbance, the applicant has committed to ACMs A.9.1 and A.9.2, including noise control devices on equipment. In addition, frequent inspection of equipment to ensure noise control devices are functioning properly will occur and conservative operation of equipment and machinery to minimize noise levels (ACMs A.9.1 and A.9.3) will be enforced.

Wild horses may be excluded by temporary fencing around certain livestock high-use areas to promote revegetation for a short-term period (ROW-GRA-1).

Conclusion. Noise effects associated with those construction activities would be short term. Noise effects would be minimized to the extent possible by applicant committed measures A9.1 – A.9.3.

Proposed mitigation measures:

None.

Residual impacts include:

- There would be an area around the construction activities where noise would cause wild horses to avoid the area.

#### *Impacts to Water Source Access*

Disturbance to wild horse movement and access to existing water sources could occur from construction activities; however, pre-construction consultation with the BLM would ensure that existing water sources would continue to be available or supplemental water sources would be supplied. If construction occurs within two miles of an existing water source, temporary supplemental stock water tanks would be placed in suitable locations away from the construction

sites (ACM A.5.71) to draw the horses away from the construction activities. The selection of suitable locations would be determined through consultation with the BLM and NDOW.

During construction, locations that would require supplemental water supplies have been identified. While construction is taking place in Lake and southern Spring valleys, two temporary water hauls would be established. One aluminum water trough in southeast Spring Valley and one in the foothills on the western side of Fortification Range would be provided and maintained. This would provide additional water sources for wild horses whose migration pattern may pass through the construction area in Eagle HMA. Similarly, a water trough would be provided and maintained in the Muleshoe Use Area as a supplemental source for wild horses in the Silver King HMA (ACMs A.5.72 and A.5.73).

Conclusion. ACMs and consultation with the BLM and NDOW would ensure that horses have adequate water supplies and would encourage horses to move away from active construction sites.

Proposed mitigation measures:

**ROW-WH-3: Existing Water Supplies.** Preconstruction consultation with the BLM shall occur to ensure that wild horses have access to existing water supplies or that temporary supplemental water is supplied until access to existing water supplies is restored. Effectiveness: Maintaining access to existing water supplies would be highly effective in avoiding stress to animals that must seek alternative water sources. Effects to other resources: This measure would be beneficial to wildlife that use the same water sources as wild horses.

Residual impacts include:

None.

### **Facility Maintenance**

Maintenance activities for operational facilities are unlikely to have additional impacts to HMA carrying capacities, as they would be conducted in areas already identified as being altered due to permanent disturbance. If maintenance or repair activities require additional ROWs, prior approval would be obtained from the BLM. A long-term reduction in forage could occur because of permanent aboveground facilities, including access roads in both Eagle and Silver King HMAs. The total disturbance of 164 acres (42 in Eagle and 122 in Silver King) is less than 1 percent of the total acreage of the ROW areas for both HMAs combined.

In addition to the impacts identified for construction of ROWs, the following impacts potentially could occur.

#### *Animal-vehicle Collisions*

A construction access road would be maintained on the pipeline ROW for facility maintenance access. In an effort to avoid animal-vehicle collisions and similar effects related to the operation of the pipeline, ACM A.2.1 would require that a maximum speed of 25 mph be maintained to allow adequate reaction time to avoid collisions with wild horses on or near roadways. In addition, signage to notify workers of the potential for wild horses in the area would be installed per direction from the Ely District ROD/FEIS (BLM 2008).

Conclusion. Signage to warn travelers that wild horses could be in the area and maintaining a speed of 25 mph or less per ACM A.2.1 would adequately protect wild horses from animal-vehicle collisions.

Proposed mitigation measures:

None.

Residual impacts include:

- There is potential for animal-vehicle collisions in the future, since pipeline and power line maintenance would be performed as long as the pipeline is in operation.

### 3.13.2.3 Alternative D

The ROWs for the main and lateral pipelines, power lines, access roads, and aboveground facilities would be located only in Clark and Lincoln counties. The footprint would consist of 225 miles of pipeline and 208 miles of power lines in those counties.

#### Right-of-way Construction

##### *Reduction of Carrying Capacity in Herd Management Areas*

Pipeline and power line construction would create surface disturbance in Eagle and Silver King HMAs. The resulting loss of forage would total 693 acres (less than 1 percent of the available total forage in the HMA) and 2,322 acres (less than 1 percent of the available total), respectively. The surface reclamation process is considered long term, as it is estimated to take up to four years to establish new vegetation (Hoover 2009). There is a risk that halogeton or other nuisance plant species could invade the ROW and reduce the amount of quality forage; however, this risk would be offset by ACMs A.1.82 through A.1.89, which address the control of noxious weeds.

Power line construction would require an approximately 50-ft by 50-ft clearing for each pole and a temporary access road for installation access. Per ACM A.1.20, crushing of vegetation would be preferred over blading for clearing ground for access roads. Installing facilities and clearing ROWs for roads could impact trees and shrubs that are important for browse or shelter. Mitigation measure ROW-WH-1 would preclude the removal of shrubs and trees except in situations where conflicts with pole positioning or ROW access cannot be resolved in another manner.

Construction. Surface disturbance in Eagle and Silver King HMAs in Cave, Dry Lake, Lake, and Spring valleys would impact less than 1 percent of the total acreage of the HMAs. The disturbance would be long term while vegetation is re-established; however, the carrying capacity of the HMA would not be affected.

Proposed mitigation measures:

**ROW-WH-1: Shrub/tree Removal.** Shrubs and trees within the power line ROW would be avoided during selection of power pole position and spur access road routes, where feasible, in the Eagle and Silver King HMAs also would be applied to Alternative D. Effectiveness: The effectiveness should be the same as for the Proposed Action.

Residual impacts include:

- Exposed ground and a reduction in the overall grazing area would occur until vegetation is re-established. The surface disturbance impacts to the HMAs would be less than 1 percent of the total HMA areas.

##### *Impacts Affecting Foaling Season*

The potential impacts affecting foaling season and the recommended mitigation implemented to reduce impacts would be the same as discussed for the Proposed Action.

Conclusion. The majority of the HMAs are not disturbed by construction and wild horses tend to avoid areas with unusual activity; interaction between wild horses and the construction site is unlikely and short term. With appropriate pre-consultation with the BLM to avoid construction activities in HMAs during foaling season, impacts to foaling mares or foals themselves are unlikely.

Proposed mitigation measures:

**ROW-WH-2: Preconstruction Consultation.** Preconstruction consultation with the BLM to identify construction avoidance areas in HMAs between April and July would be applied to Alternative D. Effectiveness: The effectiveness would be the same as for the Proposed Action.

Residual impacts include:

None.

*Fences and Other Restrictions to Movement Patterns*

The potential effects of fences and other restrictions to movement patterns and the ACMs implemented to reduce impacts would be the same as discussed for the Proposed Action.

Conclusion. During the 6- to 12-month period of construction, typical movement patterns of wild horses could be affected; however, this represents a small portion of either HMA. Permanent fencing would be restricted to permanent facilities and would be associated with a very small (<1 percent) area in Eagle and Silver King HMAs in Cave, Dry Lake, Lake, and Spring valleys. The impact of facility fencing would be long term. Temporary fencing would constitute a short-term impact as temporary fencing would be removed when the current trench spread is backfilled. Wild horses may be excluded by temporary fencing around certain livestock high-use areas to promote revegetation for a short-term period (ROW-GRA-1).

Proposed mitigation measures:

None.

Residual impacts include:

- There would be a 6- to 12-month period when a minor portion of a HMA would be disturbed by activities within construction segments. This could temporarily have an effect on typical movement patterns of wild horses. Permanent facilities would be surrounded by permanent fencing; however, they would not restrict wild horse movement patterns. Despite being flagged, the potential for injury to wild horses does exist.

*Loss or Injuries from Open Trenches*

The potential effects of open trenches and the ACMs implemented to reduce impacts would be the same as discussed for the Proposed Action.

Conclusion. The risk for loss or injury of wild horses is short-term in nature and is adequately addressed by applicant committed measures.

Proposed mitigation measures:

None.

Residual impacts include:

None.

*Effects of Noise*

The potential effects of noise and the ACMs implemented to reduce impacts would be the same as discussed for the Proposed Action.

Conclusion. Construction activities in a given area will be short term and noise effects associated with those activities also will be short term. Noise effects will be minimized to the extent possible by ACM A9.1 through A.9.3.

Proposed mitigation measures:

None.

Residual impacts include:

- There will be an area around the construction activities where noise will likely have a deterring effect on wild horses. The actual effects on the horses is difficult to quantify.

*Impacts to Water Source Access*

The potential impacts to water source access and the ACMs implemented to reduce impacts would be the same as discussed for the Proposed Action.

Conclusion. ACMs and consultation with the BLM and NDOW will ensure that horses have adequate water supplies and are encouraged to move away from active construction sites.

Proposed mitigation measures:

**ROW-WH-3: Existing Water Supplies.** Preconstruction consultation with the BLM will occur to ensure that wild horses have access to existing water sources or that supplemental water is provided. Effectiveness: The effectiveness would be the same as described for the Proposed Action. Effects on other resources: This measure would be beneficial to wildlife that use the same water sources as wild horses.

Residual impacts include:

None.

**Facility Maintenance**

Maintenance activities for operational facilities are unlikely to have additional impacts to HMA carrying capacities as they would be conducted in areas already identified as lost to permanent disturbance. If maintenance or repair activities require additional ROWs, prior approval would be obtained from the BLM. A long-term reduction in forage could occur because of permanent aboveground facilities, including access roads in both Eagle and Silver King HMAs. The total of 164 acres (42 in Eagle and 122 in Silver King) is less than 1 percent of the total acreage of the ROW areas for both HMAs combined.

In addition to the impacts identified for construction of ROWs, the following impacts potentially may occur.

*Animal-vehicle Collisions*

A construction access road would be maintained on the pipeline ROW for facility maintenance access. In an effort to avoid animal-vehicle collisions and similar effects related to the operation of the pipeline, ACM A.2.1 would require that a maximum speed of 25 mph be maintained to allow adequate reaction time to avoid collisions with wild horses on or near roadways. In addition, signage to notify workers of the potential for wild horses in the area would be installed per direction from the Ely District ROD/FEIS (BLM 2008).

Conclusion. Signage to warn travelers that wild horses could be in the area and maintaining a speed of 25 mph or less per ACM A.1.29 would adequately protect wild horses from animal-vehicle collisions.

Proposed mitigation measures:

None.

Residual impacts include:

- There is potential for animal-vehicle collisions in the future, since pipeline and power line maintenance would be performed as long as the pipeline is in operation.

**3.13.2.4 Alternative E**

The ROWs for the main and lateral pipelines, power lines, access roads, and aboveground facilities would be located in Clark, Lincoln, and White Pine counties; however, there would be no disturbance in Snake Valley. The footprint would consist of 263 miles of pipeline and 280 miles of power lines in Clark and Lincoln counties.

## Right-of-way Construction

### *Reduction of Carrying Capacity on Herd Management Areas*

Pipeline and power line construction would create surface disturbance in Eagle and Silver King HMAs. The resulting loss of forage would total 693 acres (less than 1 percent of the available total forage in the HMA), and 2,322 acres (less than 2 percent of the available total), respectively. The surface reclamation process is considered long term, as it is estimated to take up to four years to establish new vegetation (Hoover 2009). There is a risk that halogeton or other nuisance plant species could invade the ROW and reduce the amount of quality forage; however, this risk would be offset by ACMs A.1.82 through A.1.89, which addresses the control of noxious weeds.

Power line construction would require an approximately 50-ft by 50-ft clearing for each pole and a temporary access road for installation access. Per ACM A.1.20, crushing of vegetation would be preferred over blading for clearing ground for access roads. Installing facilities and clearing ROWs for roads could impact trees and shrubs that are important for browse or shelter. Mitigation measure ROW-WH-1 would preclude the removal of shrubs and trees except in situations where conflicts with pole positioning or ROW access cannot be resolved in another manner.

Conclusion. Surface disturbance in Eagle and Silver King HMAs in Cave, Dry Lake, Lake, and Spring valleys would impact less than 1 percent of the total acreage of the HMAs. The disturbance would be long term while vegetation is re-established; however, the carrying capacity of the HMA would not be affected.

Proposed mitigation measures:

**ROW-WH-1: Shrub/tree Removal.** Restrictions on removal of trees and shrubs also would be applied to Alternative E. Effectiveness: The effectiveness should be the same as for the Proposed Action.

Residual impacts include:

- Exposed ground and a reduction in the overall grazing area would occur until vegetation is re-established. The surface disturbance impacts to the HMAs would be less than 1 percent of the total HMA areas.

### *Impacts Affecting Foaling Season*

The impacts affecting foaling season and ACMs implemented to reduce impacts would be the same as discussed for the Proposed Action.

Conclusion. The majority of the HMAs are not disturbed by construction and wild horses tend to avoid areas with unusual activity; interaction between wild horses and the construction site is unlikely and short term. With appropriate pre-consultation with the BLM to avoid construction activities in HMAs during foaling season, impacts to foaling mares or foals themselves are unlikely.

Proposed mitigation measures:

**ROW-WH-2: Preconstruction Consultation.** Preconstruction consultation with the BLM to identify construction avoidance areas in HMAs between April and July. Effectiveness: The effectiveness should be the same as for the Proposed Action.

Residual impacts include:

None.

### *Fences and Other Restrictions to Movement Patterns*

The effects of fencing on movement patterns and ACMs implemented to reduce impacts would be the same as discussed for the Proposed Action.

Conclusion. During the 6- to 12-month period of construction, typical movement patterns of wild horses could be affected; however, this represents a small portion of either HMA. Permanent fencing would be restricted to permanent

facilities and would be associated with a very small (<1 percent) area in Eagle and Silver King HMAs in Cave, Dry Lake, Lake, and Spring valleys. The impact of facility fencing would be long term. Temporary fencing would constitute a short-term impact as temporary fencing would be removed when the current trench spread is backfilled. Wild horses may be excluded by temporary fencing around certain livestock high-use areas to promote revegetation for a short-term period (ROW-GRA-1).

Proposed mitigation measures:

None.

Residual impacts include:

- There would be a 6- to 12-month period when a minor portion of a HMA would be disturbed by activities within construction segments. This could temporarily change typical movement patterns of wild horses or short distances. Permanent facilities would be surrounded by permanent fencing; however, they would not restrict wild horse movement patterns. Despite fences being flagged, the potential for injury to wild horses does exist.

#### *Loss or Injuries from Open Trenches*

The effects of open trenches on wild horses and ACMs implemented to reduce impacts would be the same as discussed for the Proposed Action.

Conclusion. The risk for loss or injury of wild horses is short-term in nature and is adequately addressed by applicant committed measures.

Proposed mitigation measures:

None.

Residual impacts include:

None.

#### *Effects of Noise*

The effects of noise on wild horses and ACMs implemented to reduce impacts would be the same as discussed for the Proposed Action.

Conclusion. Construction activities in a given area will be short term and noise effects associated with those activities also will be short term. Noise effects will be minimized to the extent possible by applicant committed measures A9.1 – A.9.3.

Proposed mitigation measures:

None.

Residual impacts include:

- There would be an area around the construction activities that wild horses would avoid during the construction period.

#### *Impacts to Water Source Access*

The impacts to water source access and ACMs implemented to reduce impacts would be the same as discussed for the Proposed Action.

Conclusion. ACMs and consultation with the BLM and NDOW will ensure that horses have adequate water supplies and are encouraged to move away from active construction sites.

Proposed mitigation measures:

**ROW-WH-3: Existing Water Supplies.** Preconstruction consultation with the BLM will ensure that wild horses have access to existing water sources or that supplemental water is provided. Effectiveness: The effectiveness should be the same as described for the Proposed Action. Effects on other resources: This measure would be beneficial to wildlife that use the same water sources as wild horses.

Residual impacts include:

None.

### **Facility Maintenance**

Maintenance activities for operational facilities are unlikely to have additional impacts to HMA carrying capacities as they would be conducted in areas already identified as lost to permanent disturbance. If maintenance or repair activities require additional ROWs, prior approval would be obtained from the BLM. A long-term reduction in forage could occur because of permanent aboveground facilities, including access roads in both Eagle and Silver King HMAs. This total of 164 acres (42 in Eagle and 122 in Silver King) is less than 1 percent of the total acreage of the ROW areas for both HMAs combined.

#### *Animal-vehicle Collisions*

A construction access road would be maintained on the pipeline ROW for facility maintenance access. In an effort to avoid animal-vehicle collisions and similar effects related to the operation of the pipeline, ACM A.2.1 would require that a maximum speed of 25 mph be maintained to allow adequate reaction time to avoid collisions with wild horses on or near roadways. In addition, signage to notify workers of the potential for wild horses in the area would be installed per direction from the Ely District ROD/FEIS (BLM 2008).

Conclusion. Signage to warn travelers that wild horses could be in the area and maintaining a speed of 25 mph or less per ACM A.1.29 would adequately protect wild horses from animal-vehicle collisions.

Proposed mitigation measures:

None.

Residual impacts include:

- There is potential for animal-vehicle collisions in the future since pipeline and power line maintenance will be performed as long as the pipeline is in operation.

#### **3.13.2.5 Alignment Options 1 through 4**

Impacts for the alignment options (1 through 4) are identified in relation to the relevant segment of the Proposed Action (**Table 3.13-6**).



**Table 3.13-6 Wild Horse Impact Summary for Alignment Options 1 through 4**

Option	Comparison to Relevant Proposed Action Segment
<p><b>Alignment Option 1</b> (Humboldt-Toiyabe Power Line Alignment)  <b>Option Description:</b> Change the locations of a portion of the 230-kV power line from Gonder Substation near Ely to Spring Valley.  <b>Applicable To:</b> Proposed Action and Alternatives A through C and E.</p>	<p>This option and the equivalent segment of the Proposed Action would not cross an HMA, and there would be no difference in effects to wild horses.</p>
<p><b>Alignment Option 2</b> (North Lake Valley Pipeline Alignment)  <b>Option Description:</b> Change the locations of portions of the mainline pipeline and electrical transmission line in North Lake Valley.  <b>Applicable To:</b> Proposed Action and Alternatives A through C and E.</p>	<p>This option would reduce the surface disturbance in the Eagle HMA by 537 acres, but increase the surface disturbance within the Silver King HMA by 44 acres as compared to the equivalent Proposed Action segments. The net effect would be that implementation of the option would reduce the overall long term forage loss for wild horses by approximately 493 acres.</p>
<p><b>Alignment Option 3</b> (Muleshoe Substation and Power Line Alignment)  <b>Option Description:</b> Eliminate the Gonder to Spring Valley transmission line, and construct a substation with an interconnection with an interstate, high voltage power line in Muleshoe Valley.  <b>Applicable To:</b> Proposed Action and Alternatives A through C and E.</p>	<p>This option would increase the permanent commitment of wild horse forage area by 44 acres as the result of constructing the Muleshoe Substation and power line, as compared to the Proposed Action facilities that do not include a new Muleshoe Substation.</p>
<p><b>Alignment Option 4</b> (North Delamar Valley Pipeline and Power Line Alignment)  <b>Option Description:</b> Change the location of a short section of mainline pipeline in Delamar Valley to follow an existing transmission line.  <b>Applicable To:</b> All alternatives.</p>	<p>This option and the equivalent segment of the Proposed Action would not cross an HMA, and there would be no difference in effects to wild horses.</p>

### 3.13.2.6 No Action

Under the No Action Alternative, the project would not be constructed or operated as proposed and no proposed project-related surface disturbance would occur. Impacts to HMAs would continue at present levels as result of natural conditions and existing and other proposed development within the project area. Wild horse management on public lands would continue based on the management direction in the Ely and Las Vegas RMPs.

### 3.13.2.7 Comparison of Alternatives

**Table 3.13-7** provides a comparison of impacts for construction and facility maintenance of the Proposed Action and all alternatives on the affected HMAs. ROW construction and facility maintenance impacts to HMAs are the same for all pumping alternatives as the two affected HMAs (Eagle and Silver King) occur in Lincoln County and all of the ROWs for the pumping alternatives follow the same route in Lincoln County.

**Table 3.13-7 Comparison of Alternatives**

Parameter	Proposed Action and Alternatives A through C	Alternative D	Alternative E
Temporary Reduction in Acres in Eagle HMA	693	693	693
Temporary Reduction in Acres in Silver King HMA	2,322	2,322	2,322
Permanent Reduction in Acres in Eagle HMA	42	42	42
Permanent Reduction in Acres in Silver King HMA	122	122	122

### 3.13.2.8 Groundwater Development and Groundwater Pumping

#### Issues

##### *Groundwater Field Development Construction and Facility Maintenance*

- Permanent reduction of HMA carrying capacity from construction activities and permanent facilities;
- Potential for increased human presence;
- Potential for increased animal-vehicle collisions;
- Potential effects of noise from construction and facility operation; and
- Potential disruption of normal herd movement from temporary or permanent fencing.

##### *Groundwater Pumping*

- Potential effects on forage production from construction disturbance and groundwater drawdown;
- Effects of groundwater pumping on water sources (availability) for wild horses; and

#### Assumptions

##### *Groundwater Field Development Construction and Facility Maintenance*

- Vegetation community disturbance calculations were based on the proposed construction and operational configurations (footprints) presented for each pipeline, power facility, and ancillary facility ROW in Chapter 2, Proposed Action and Alternatives A to E.
- Short-term impacts are defined as less than two years. Long-term impacts are defined as greater than 2 years.
- Vegetation reclamation could take 4 or more years (Hoover 2009).
- Construction disturbances, while temporary in nature, have been defined as “long-term” for all vegetation cover types due to existing vegetation structure and composition, long recovery time frames, and limiting revegetation factors (e.g., low precipitation rates, soil chemistry constraints, and low levels of soil moisture over most the year for most vegetation communities).
- Vegetation that is not dependent on groundwater could transition to other states or types over time; however, the density and overall composition is not anticipated to substantially change (see Section 3.5, Vegetation).

##### *Groundwater Pumping*

- Groundwater pumping potentially could impact groundwater-fed water sources in the high- to medium-risk areas closely associated with perennial streams and springs, see Water Resources, Section 3.3. Phreatophytic vegetation within wild horse HMAs could experience gradual changes including loss of vigor, changes in plant community composition, or even total loss in areas of groundwater drawdown greater than 50 feet (see Vegetation Resources, Section 3.5).
- Riparian and medium density vegetation within HMA areas have a high potential to be affected if they are located within the 10-foot drawdown contour, as determined by groundwater modeling (SNWA 2011).
- Grasses, forbs, and shrubs not connected to the groundwater table would not incur major reductions in amount or quality from groundwater drawdown, although vegetation composition may change over time.
- Assumptions about the potential changes in wild horse water sources and forage (vegetation composition and structure) from groundwater pumping do not incorporate additional assumptions about the effects of climate change because specific long-term effects of climate change are not presently known, and the magnitude of these effects will likely vary regionally. A general discussion of climate change effects is provided in Section 3.1.3.2, Climate Change Effects to All Other Resources.

### **Methodology for Analysis**

BLM RMP management actions and best management practices plus current applicant-committed protection measures were evaluated to limit the extent and duration of predicted impacts. Additional mitigation measures were recommended to reduce or offset impacts, mitigation measure effectiveness was estimated, and a residual impact summary was developed for each impact issue.

#### *Groundwater Field Development Construction and Facility Maintenance*

- Estimates of the short- and long-term reduction of forage within HMAs will be based on acreage calculations of surface impacts.

#### *Groundwater Pumping*

- Estimates of effects to areas containing wetland vegetation and phreatophytes were determined based on the areas that occur where the 10 foot or greater drawdown contour overlaps with areas where depth to groundwater is less than 50 feet, respectively, as predicted by the groundwater model. For more detailed information on the model analysis see Vegetation Resources, Section 3.5.2.8.
- Estimates of the effects to water supplies (streams and springs) within HMAs were based on their location within the areas of low, medium, or high risk (as predicted by the area geology and groundwater model predictions of drawdown of 10-foot or greater), see Water Resources, Section 3.3.

### **3.13.2.9 Proposed Action**

#### **Groundwater Development Area**

An accurate location of well development facilities is undefined at this project stage. For the Proposed Action, the well locations would be optimized based on groundwater modeling and test results. Additional NEPA analysis (NEPA subsequent tiers) will be required to address specific well locations and collector pipelines. Proposed groundwater development areas located within Eagle and Silver King HMAs would overlap three hydrologic basins: Spring, Cave, and Dry Lake. Impacts resulting from the construction of wells, access roads, collector lines, and supporting ancillary facilities in the three valleys would be similar to the impacts discussed for the pipeline and power line ROWs.

#### *Reduction of Carrying Capacity in Herd Management Areas*

Construction of well pads, collector pipelines, access roads, and power lines would result in surface disturbance. Forage quality and quantity, shelter, and natural water sources would likely be compromised by temporary construction activities and permanent facilities and maintenance activities. Although no development plans are available, it could be assumed that beneficial vegetation would be impacted in proportion to the relative surface area within the groundwater development areas.

#### *Animal-vehicle Collisions*

Construction and operation/maintenance would require access roads which generally would be contained within the ROWs. In an effort to avoid animal-vehicle collisions and similar effects related to the operation of the pipeline, ACM A.2.1 would require that a maximum speed of 25 mph be maintained to allow adequate reaction time to avoid collisions with wild horses or other wildlife on or near roadways. In addition, signage to notify workers of the potential for wild horses in the area would be installed per direction from the Ely District ROD/FEIS (BLM 2008).

#### *Effects of Noise*

Noise effects would extend beyond the physical boundary of the construction site and likely would create a larger area that would be avoided by wild horses during construction. In an effort to minimize noise disturbance, the applicant has committed to ACM A.9.1 and ACM A.9.2, including noise control devices on equipment. Pump station noise would be limited to 70 A-weighted decibels at 500 feet from the source. In addition, frequent inspection of equipment to ensure noise control devices are functioning properly will occur and conservative operation of equipment and machinery to minimize noise levels (ACMs A.9.1 and A.9.3) will be enforced.

*Impacts to Water Source Access*

Disturbance to wild horse movement and access to existing water sources could occur from construction activities; however, pre-construction consultation with the BLM would ensure that existing water sources would continue to be available or supplemental water sources would be supplied. If construction occurs within two miles of an existing water source, temporary supplemental stock water tanks would be placed in suitable locations away from the construction sites (ACM A.5.71) to draw the horses away from the construction activities. Measure ROW-WH-3 states that selection of suitable locations would be determined through consultation with the BLM and NDOW.

*Fencing*

No fencing would be permanently located along pipeline ROWs. Temporary fencing could consist of highly visible 4-foot-high orange snow fence. Permanent security fencing would surround aboveground facilities. For consistency with the BMPs set forth in the Ely ROD and Approved RMP (BLM 2008), 12 inch x 1 inch flagging would be secured to new fences every 16 feet to increase visibility and reduce the potential for horse injury (BLM 2008). Wild horses may be excluded by temporary fencing around certain livestock high-use areas to promote revegetation for a short-term period (ROW-GRA-1).

Conclusion. Well locations have not been identified so specific impacts to vegetation communities cannot be accurately predicted. Long term or permanent vegetation loss would occur due to temporary ROWs and permanent facilities in the Eagle and Silver King HMAs (see **Table 3.13-5**). It is unlikely that lost grazing acreage would reduce the available forage to the extent where a decrease in the AML would be needed.

The construction impacts associated with increased human presence would be largely short term (less than 2 years) but would occur around the clock for several months. Operation and maintenance impacts will be long term although intermittent. Operation would be minimized through the use of off-site monitoring.

Signage to warn travelers that wild horses could be in the area and maintaining a speed of 25 mph or less per ACM A.2.1 will adequately protect wild horses from animal-vehicle collisions.

Construction activities in a given area will be short term and noise effects associated with those activities also will be short term. Noise effects will be minimized to the extent possible by ACMs A9.1 through A.9.3.

Permanent fencing would be restricted to enclosing permanent facilities and would be associated with a very small (<1 percent) area in Eagle and Silver King HMAs in Cave, Dry Lake, Lake, and Spring valleys. The impact of facility fencing would be long term. Temporary fencing would constitute a short-term impact as temporary fencing would be removed when the trench is backfilled.

Proposed mitigation measures:

The same mitigation measures (ROW-WH-1, ROW-WH-2, and ROW-WH-3) would be applied to the Proposed Action for groundwater development construction and facility maintenance. The effectiveness of these measures should be the same as for the ROW Proposed Action.

Residual impacts include:

- Exposed ground and a reduction in the overall grazing area would occur until vegetation is re-established. There is potential for animal-vehicle collisions during construction and in the future since facility maintenance will be performed as long as the pipeline is in operation. Wild horses may avoid construction and permanent facilities where noise is generated. There would be a 6- to 12-month period when a minor portion of a HMA would be disturbed by activities within construction segments. This activity may temporarily modify typical movement patterns of wild horses. Despite fences being flagged, the potential for injury to wild horses due to fencing does exist.

### Groundwater Pumping

The capacity of the habitat within each HMA to sustain a wild horse population includes consideration of adequate forage, water, space, and cover. Water is a limiting factor for horse herds in some HMAs, affecting not only the basic survival of horses within these areas, but also the distribution of their use and degree of conflict with other animals, including livestock and wildlife (BLM 2007). As an index for change to perennial streams and springs, areas within the 10-foot drawdown contour, as predicted by the groundwater model, potentially could exhibit diminished or eliminated flow from natural water sources. Information related to groundwater development areas and groundwater pumping, including the methodology, and assumptions is available in Section 3.3.2.8.

**Table 3.13-8** shows the number of springs, both field verified and unverified, and miles of perennial streams that occur within the area of moderate to high risk of drawdown, as predicted by the groundwater model and the geology in the area (unverified streams were defined from map data sources). These areas typically are associated with the valley margins and valley bottoms. The table shows the drawdown predictions of the Water Resource risk analysis at three time frames: full build out, full build out plus 75 years, and full build out plus 200 years.

**Table 3.13-8 Number of Springs and Miles of Perennial Streams within Herd Management Areas Potentially Affected by Groundwater Drawdown for the Proposed Action**

HMA	Springs (Verified/Unverified) <sup>1</sup>			Perennial Streams (Miles)		
	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Antelope	0 / 0	0 / 0	0 / 8	0	0	0
Silver King	0 / 0	0 / 0	0 / 1	0	0	0
Eagle	0 / 0	1 / 1	1 / 4	0	0	<1
<b>Total</b>	<b>0 / 0</b>	<b>1 / 1</b>	<b>1 / 13</b>	<b>0</b>	<b>0</b>	<b>&lt;1</b>

<sup>1</sup> Unverified springs originate from map data sources and may change over time. Verified streams have been inventoried through field surveys.

Reduction in flow or elimination of spring and stream flows within HMAs could decrease the available water and result in increased distance between adequate forage and water supplies. The overuse of remaining water sources could result in damage to areas around the sources. A reduced number of water sources could effectively reduce the acreage of the HMAs by limiting the horses to the range that is within a reasonable distance for daily travel by the herds. As a result, the BLM may need to reevaluate the AML in the HMA. Management action WH-7 of the BLM Ely District ROD and Approved RMP (BLM 2008) allows adjustments in AML based on monitoring data (including monitoring for available habitat), typically in conjunction with the watershed analysis process.

With the exception of wetland/meadow and basin shrubland areas, the majority of forage for wild horses is supported by rain, snow, and other water sources not connected to groundwater. As such, upland forage would not be affected by Proposed Action pumping (see Section 3.5, Vegetation Resources for more information).

**Table 3.13-9** shows the acreage of impacts to wetland/meadow and basin shrubland areas potentially affected by Proposed Action pumping. According to this analysis, impacts would occur in Lake Valley in the time frame of full build out plus 200 years.

**Table 3.13-9 Acres of Wetland/Meadow and Basin Shrubland within Herd Management Areas Potentially Affected by Proposed Action**

HMA/Valley	Full Build Out	Full Build Out Plus 75 years	Full Build Out Plus 200 years
<b>Antelope Valley HMA</b>			
Steptoe Valley	0	0	0
<b>Eagle HMA</b>			
Dry Valley	0	0	0
Eagle Valley	0	0	0
Lake Valley	0	0	2,511
<b>Total</b>	<b>0</b>	<b>0</b>	<b>2,511</b>

Proposed mitigation measures:

**GW-WH-1: Water Source Maintenance.** In cooperation with the BLM, SNWA shall identify key natural water sources and monitor those sources on a regular basis (frequency determined by the BLM). If impacts to those sources are observed, SNWA would consult with the BLM to identify locations where artificial water sources could be maintained to supply herds with adequate water supplies. Effectiveness: This would be highly effective for ensuring that horses have adequate access to water supplies. Effects on other resources: Implementation of this measure could result in short-term surface disturbance, human presence, and minor vehicle traffic to establish artificial water supplies.

Monitoring for the above mentioned mitigation measure could be conducted in conjunction with the hydrologic and biological monitoring that is to be conducted under the comprehensive monitoring, mitigation, and management plan for Snake Valley (3M plan) and Spring, Delamar, Dry Lake, and Cave valleys as summarized in mitigation measure GW-WR-3.

Residual impacts include:

ACM's and monitoring and mitigation measures would be effective in maintaining water sources for wild horses. Reductions in the quantity and reliability of some water sources could occur within HMAs considering the long project operation period, and large geographic area.

### 3.13.2.10 Alternatives A through E

#### Groundwater Development

Due to the fact that exact well locations are undetermined, it is not possible to assess surface disturbance to HMAs resulting from groundwater development. Additional NEPA analysis will be required to address these impacts. The nature of these impacts would be similar to those discussed for the Proposed Action.

#### Groundwater Pumping

The impacts to HMAs that could result from groundwater pumping for Alternatives A through E are summarized in **Table 3.13-10**. The majority of the springs, streams, and ET area acres in the moderate and high risk areas are located within the Eagle HMA.

**Table 3.13-10 Summary for Herd Management Areas Impacts, Proposed Mitigation, and Residual Effects for Groundwater Pumping, Alternatives A through E**

Parameter	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Unverified springs at risk within HMAs at full build out, full build out plus 75 years, and full build out plus 200 years <sup>1</sup>	0, 1, and 4	0, 1, and 7	0, 1, and 1	0, 6, and 25	0, 1, and 4
Verified springs at risk within HMAs at full build out, full build out plus 75 years, and full build out plus 200 years <sup>1</sup>	0, 1, and 1	0, 1, and 2	0, 1, and 1	0, 1, and 2	0, 1, and 1
Perennial stream miles at risk within HMAs at full build out, full build out plus 75 years, and full build out plus 200 years	0, 0, and <1 miles	0, 0, and <1 miles	0 miles	0, <1 and 6 miles	0 miles
ET area acres at risk within HMAs at full build out, full build out plus 75 years, and full build out plus 200 years <sup>1</sup>	0	0, 0, and 2,511	0	0, 0, and 2,511	0
<b>Recommended Mitigation</b>					
	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action
<b>Residual Impacts</b>					
ACMs, monitoring and mitigation measures could be effective in reducing impacts to water sources, however, it is not possible to determine the level of impact reduction. Residual effects could occur to some water sources could occur considering the long-term recovery period.					

<sup>1</sup>Unverified springs originate from map data sources and may change over time. Verified streams have been inventoried through field surveys.

### 3.13.3 Cumulative Impacts

#### 3.13.3.1 Issues

##### **Rights-of-way and Groundwater Development Area Construction and Facility Maintenance**

- Reduction of HMA carrying capacity resulting from surface disturbance.
- Construction effects to foaling season.
- Effects to wild horse movement from moving and staging of pipeline equipment, including possible entanglement in temporary fencing.
- Loss of, or injury to, wild horses due to open trenches.
- Effects of construction noise on wild horses.
- Construction impacts to water sources

##### **Groundwater Pumping**

- Potential effects on forage production from construction disturbance and groundwater drawdown; and
- Effects of groundwater pumping on water sources (availability) for wild horses.

#### 3.13.3.2 Assumptions

##### **Rights-of-way and Groundwater Development Area Construction and Facility Maintenance**

- The study area is the proposed ROW surface disturbance area for pipelines, power lines, aboveground facilities, and access roads for each project alternative plus the total surface disturbance area including well pads, collector pipelines, power lines, and access roads for groundwater development. For groundwater development areas, the existence of past, present, and reasonably foreseeable actions within the groundwater development area boundary within each hydrographic basin was used for evaluating potential cumulative effects.
- Past and present action footprints based on utility ROWs and other surface disturbing activities have been identified in BLM and other databases.

##### **Groundwater Pumping**

- The study area is the boundary for the groundwater model simulation.
- Time frame effects range from full build out of the project to full build out plus 200 years.
- Springs and streams are high value areas and impacts to them need to be quantified or, where possible, qualified as the best means for determining impacts to HMAs.
- ET areas mapped as Wetland/Meadow and Basin Shrubland cover types represent the primary cover types that would be affected by drawdown affects.
- An index drawdown contour of 10 feet is assumed to be a reasonable estimate of the point at which long-term changes to vegetation community vigor and composition would begin to appear (see Vegetation Resources, section 3.5, for greater detail on the anticipated changes in response to drawdown).

#### 3.13.3.3 Methodology for Analysis

##### **Rights-of-way and Groundwater Development Area Construction and Facility Maintenance**

- The cumulative surface disturbance effects to vegetation communities by hydrographic basin were estimated by overlaying the existing surface disturbances for (past and present actions), reasonably foreseeable projects (FFAs), and the development areas for the project alternative being evaluated (**Table 2.9-1**). The estimated cumulative surface disturbance was then compared with the overall area of the hydrographic basin affected. Potential effects on vegetation communities that occupy relatively small areas within individual basins, such as wetlands, were considered.



- Estimate of change to HMA carrying capacity and management based on short- and long-term displacement and drawdown effects; and

### Groundwater Pumping

- Wetland/Meadow and Basin Shrubland. The area enclosed by the maximum extent of the 10-foot drawdown contour was superimposed over the area of the primary ET units (Wetland/Meadow, Basin Shrubland cover types) to calculate the area of vegetation that could experience reductions in soil moisture and long-term vegetation community composition changes caused by groundwater drawdown of 10 feet or more at different points in time (full build out, full build out plus 75 years, and full build out plus 200 years). Figures were generated that illustrate the expansion of the 10-foot and greater drawdown contours over time in relation to the vegetation communities within the hydrographic ET boundaries. For more information on the analysis of drawdown effects see Vegetation Resources, Section 3.5.2.8.
- Springs and perennial stream reaches. The 10-foot drawdown index was applied to the springs and perennial stream reaches that were classified as being at risk from being affected by groundwater drawdown (Section 3.3). The springs included for analysis were those rated as presenting a “high” or “moderate” risk of effects. Springs are described as both field verified and unverified. Unverified springs have not been inventoried and, for purpose of analysis, their location comes from various map data sources. For greater distinction between and a more in-depth analysis see Water Resources Section 3.3.

#### 3.13.3.4 No Action

##### Groundwater Development

Under the No Action Alternative the project would not be constructed and there would be no maintenance. There would be no surface impacts to vegetation or affects to HMAs. Current environmental conditions would continue to influence the landscape and current land management objectives and activities would provide guidance.

Surface impacts would be compounded by recent projects that have not yet been reclaimed and those projects that are likely to occur in the foreseeable future (Chapter 2). These impacts could further reduce the amount of forage and disturb normal horse movement patterns. As the majority of the projects that are projected to occur in the future are related to power production or conveyance, additional surface disturbance is anticipated to be minimal. For more information regarding past and present and reasonably foreseeable future actions see Section 2.9.

##### Groundwater Pumping

**Table 3.13-11** summarizes the cumulative expansion of the 10-foot drawdown contour from existing pumping in relation to the potentially affected springs, potentially affected perennial stream segments, and acres of wetland/meadow and basin shrubland vegetation within HMAs for the No Action Alternative. This represents current trends based on environmental conditions and land management objectives and activities. The majority of the effects to springs, streams, and wetland/meadow and basin shrubland vegetation will occur in the Eagle HMA. The following is a summary of the incremental expansion of the groundwater drawdown area over time whose surface and groundwater supply may be reduced.

**Table 3.13-11 Summary of Potential Cumulative Pumping Effects with the No Action on Wild Horse Herd Management Areas**

Parameter	HMA	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs (Verified / Unverified) <sup>1</sup>	Antelope	1 / 0	2 / 5	2 / 7
	Eagle	1 / 7	1 / 14	1 / 25
	Silver King	0 / 4	0 / 4	0 / 4
	<b>Total</b>	<b>2 / 11</b>	<b>3 / 23</b>	<b>3 / 36</b>
Miles of Perennial Streams	Eagle	0	1	12
Acres of Wetland/Meadow and Basin Shrubland Vegetation	Antelope Valley	15	153	194
	Eagle	1,473	2,511	2,524
	<b>Total</b>	<b>1,488</b>	<b>2,664</b>	<b>2,718</b>

<sup>1</sup> Unverified springs originate from map data sources and may change over time. Verified streams have been inventoried through field surveys.

**Full Build Out.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects would occur within the Eagle HMA. Similarly, the majority of the at-risk springs are also located within the Eagle HMA. Although there is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA, there are potential drawdown effects to springs.

**Full Build Out Plus 75 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects would occur within the Eagle HMA. Similarly, the majority of the at-risk springs and perennial streams are also located within the Eagle HMA. Although there is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA, there are drawdown impacts to springs and perennial streams.

**Full Build Out Plus 200 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects would occur within the Eagle HMA. Similarly, the majority of the at-risk springs and perennial streams are also located within the Eagle HMA. Although there is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA, there are drawdown impacts to springs and perennial streams.

### 3.13.3.5 Proposed Action

#### Rights-of-way and Groundwater Development

In addition to the temporary and permanent reductions in acreage due to ROW surface disturbances (see Section 3.13.2.8) there would also be surface disturbances related to groundwater development for which surface disturbance estimates have been made. Past and present actions include roads and other utility ROWs. All sources of surface disturbance would combine with the GWD Project and other foreseeable future actions (Chapter 2). These disturbances could further reduce the amount of forage and disturb normal horse movement patterns. The Proposed Action surface disturbance would overlap with two reasonably foreseeable future actions located within areas occupied by wild horses. The Wilson Creek Wind Project transmission lines would utilize the LCCRDA corridor in Lake and Dry Lake Valleys where ROWs for the GWD Project could be collocated. The ON Transmission Line Project would share the same utility corridor with groundwater development facilities in Cave, and Dry Lake, valleys. For more information regarding past and present and reasonably foreseeable future actions see Section and Chapter 2, Section 2.9.

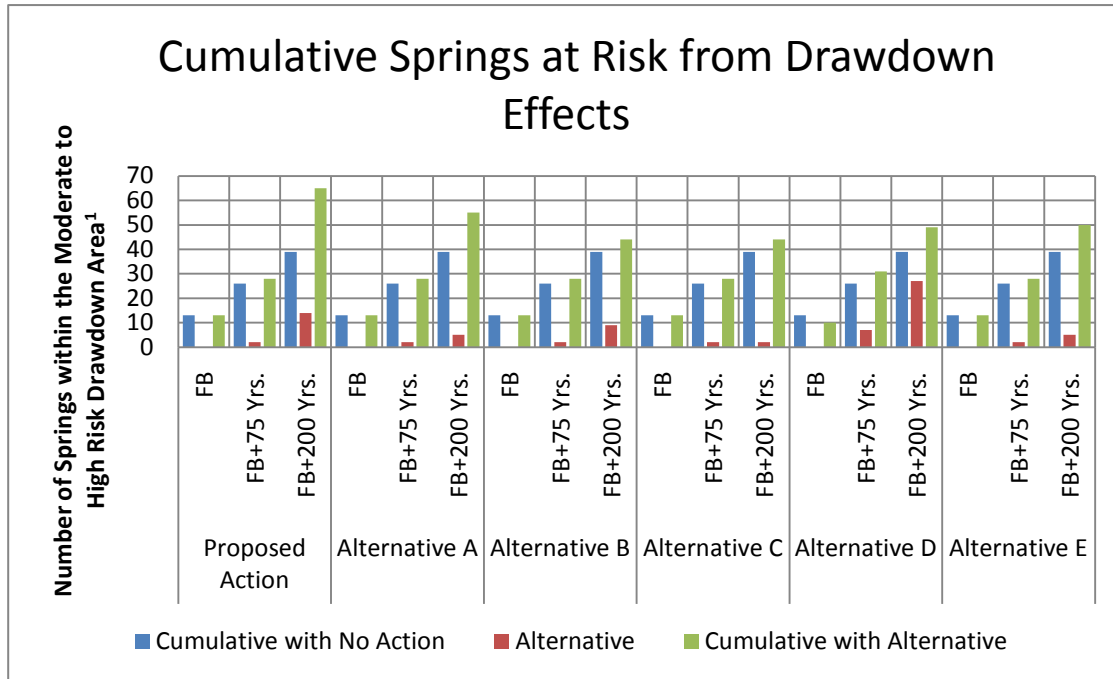
#### Groundwater Pumping

Two to five HMAs within the region of study would be affected by cumulative groundwater drawdown as predicted by the 10-foot or greater drawdown contour of the groundwater model (see **Table 3.13-12**). Two HMAs would be at risk of impacts to forage vegetation at the time frame associated with full build out plus 200 years. Five would be at risk of impacts to springs and perennial streams. The incremental contribution of the Proposed Action pumping on the cumulative impacts to springs and streams is relatively small. The highest impact level would be at 200 years past full build out when at risk springs comprise approximately 20 percent of the total impact (see **Figures 3.13-2** and **3.13-3**).

**Full Build Out.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation occur within the Eagle HMA. The majority of the at-risk springs and wetland/meadow and basin shrubland vegetation are located within the Eagle HMA. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. None of the cumulative impacts to springs, streams, or wetland/meadow or basin shrubland vegetation are the result of the Proposed Action pumping.

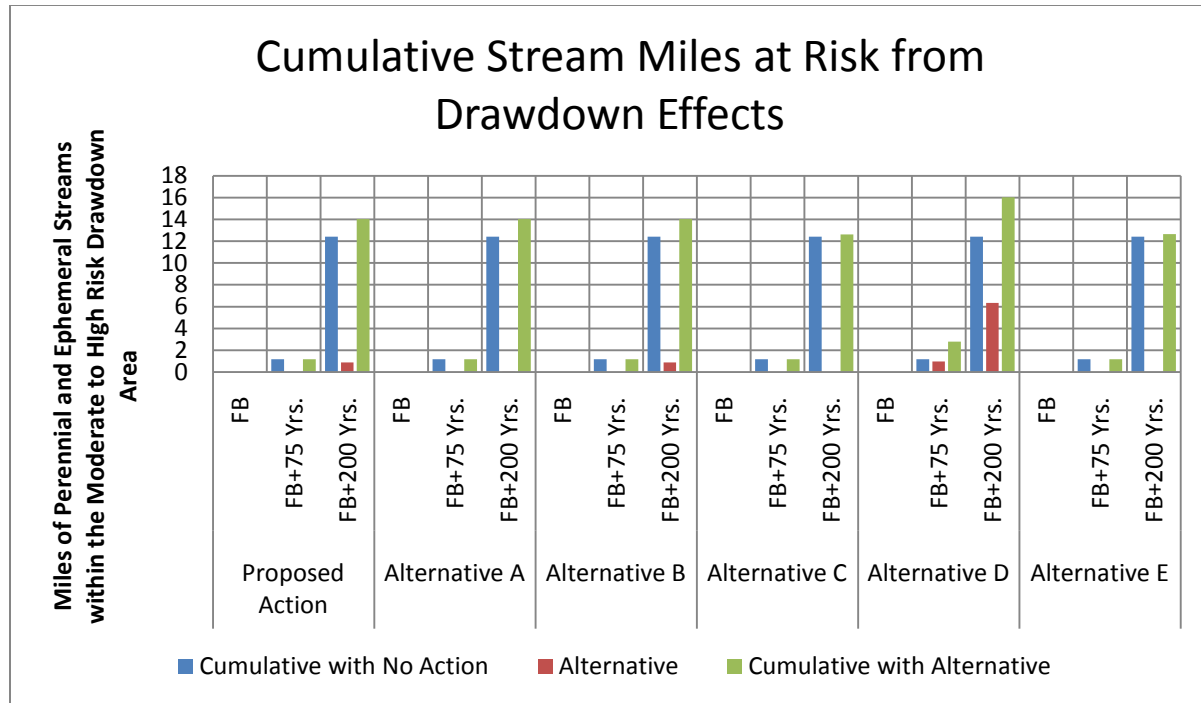
**Full Build Out Plus 75 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation and perennial streams occur within the Eagle HMA. The majority of the at-risk springs are located within the Silver King HMA. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, approximately 7 percent of the cumulative impacts to springs is the result of the Proposed Action pumping. None of the cumulative impacts to perennial streams and wetland/meadow or basin shrubland vegetation are the result of the Proposed Action pumping.

**Full Build Out Plus 200 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation and perennial streams occur within the Eagle HMA. The majority of the at-risk springs are located within the Eagle and Silver King HMAs. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, approximately 22 percent of the cumulative impacts to springs and 6 percent to perennial streams are the result of the Proposed Action pumping. Approximately 92 percent of the cumulative impacts to wetland/meadow or basin shrubland vegetation is the result of the Proposed Action pumping.



<sup>1</sup> Includes both verified and unverified springs. Unverified springs originate from map data sources and may change over time. Verified streams have been inventoried through field surveys.

**Figure 3.13-2 Incremental Contribution of the Proposed Action and All Alternatives on Springs in Moderate to High Risk Areas within Herd Management Areas**



**Figure 3.13-3 Incremental Contribution of the Proposed Action and All Alternatives on Perennial Streams in Moderate to High Risk Areas within Herd Management Areas**

**Table 3.13-12 Summary of Potential Cumulative Pumping Effects with the Proposed Action on Wild Horse Herd Management Areas**

Parameter	HMA	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs (Verified / Unverified) <sup>1</sup>	Antelope	1 / 0	2 / 5	2 / 28
	Eagle	1 / 7	2 / 15	2 / 29
	Silver King	0 / 4	0 / 4	0 / 4
	<b>Total</b>		2 / 11	4 / 24
Miles of Perennial Streams	Eagle	0	1	14
	<b>Total</b>			
Acres of Wetland/Meadow and Basin Shrubland Vegetation	Antelope Valley	15	153	194
	Eagle	1,473	2,511	2,524
	<b>Total</b>	1,488	2,664	2,718

<sup>1</sup>Unverified springs originate from map data sources and may change over time. Verified springs have been inventoried through field surveys.

### 3.13.3.6 Alternative A

#### Groundwater Development

Alternative A surface disturbance overlap with foreseeable future projects in HMAs would be the same as for the Proposed Action and cumulative surface disturbance effects would be the same.

#### Groundwater Pumping

Some of the HMAs within the region of study would see some impacts from the cumulative groundwater drawdown as predicted by the 10-foot or greater drawdown contour of the groundwater model (see **Table 3.13-13**). The incremental contribution of Alternative A pumping on the cumulative impacts to springs and streams is relatively small. The most significant effect would be at 200 years past full build out when at risk springs (both field verified and unverified) comprise less than 10 percent of the total impact (see **Figures 3.13-2** and **3.13-3**).

**Full Build Out.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to springs and wetland/meadow and basin shrubland vegetation occur within the Eagle HMA. No perennial streams are at risk at full build out. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, none of the cumulative impacts to springs, streams, and wetland/meadow or basin shrubland vegetation are the result of the Proposed Alternative pumping.

**Full Build Out Plus 75 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation, springs and perennial streams occur within the Eagle HMA. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, approximately 7 percent of the cumulative impacts to springs is the result of the Alternative A pumping. None of the cumulative impacts to perennial streams and wetland/meadow or basin shrubland vegetation are the result of the Alternative A pumping.

**Full Build Out Plus 200 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation, springs, and perennial streams occur within the Eagle HMA. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, approximately 10 percent of the cumulative impacts to springs and less than 1 percent to perennial streams are the result of the Alternative A pumping. None of the cumulative impacts to wetland/meadow or basin shrubland vegetation are the result of the Alternative A pumping.

**Table 3.13-13 Summary of Potential Cumulative Pumping Effects with Alternative A on Wild Horse Herd Management Areas**

Parameter	HMA	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs (Verified / Unverified) <sup>1</sup>	Antelope	1 / 0	2 / 5	2 / 14
	Eagle	1 / 7	2 / 15	2 / 29
	Silver King	0 / 4	0 / 4	0 / 4
	<b>Total</b>	2 / 11	4 / 24	4 / 51
Miles of Perennial Streams	Eagle	0	1	14
Acres of Wetland/Meadow and Basin Shrubland Vegetation	Antelope Valley	15	153	194
	Eagle	1,473	2,511	2,524
	<b>Total</b>	1,488	2,664	2,718

<sup>1</sup> Unverified springs originate from map data sources and may change over time. Verified springs have been inventoried through field surveys.

### 3.13.3.7 Alternative B

#### Groundwater Development

Alternative B surface disturbance overlap with foreseeable future projects would be the same as for the Proposed Action and cumulative surface disturbance impacts would be the same.

#### Groundwater Pumping

Some of the HMAs within the region of study would see some impacts from the cumulative groundwater drawdown as predicted by the 10-foot or greater drawdown contour of the groundwater model (see **Table 3.13-14**). The incremental contribution of Alternative B pumping on the cumulative impacts to springs and streams is relatively small. The greatest effect would be at full build out plus 200 years when at risk springs (both field verified and unverified) comprise approximately 20 percent of the total impact (see **Figures 3.13-2** and **3.13-3**).

**Full Build Out.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to springs and wetland/meadow and basin shrubland vegetation occur within the Eagle HMA. No perennial streams are at risk at full build out. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, none of the cumulative impacts to springs, perennial streams, or wetland/meadow or basin shrubland vegetation are the result of the Alternative B pumping.

**Full Build Out Plus 75 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation, springs and perennial streams occur within the Eagle HMA. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, approximately 7 percent of the cumulative impacts to springs is the result of the Alternative B pumping. None of the cumulative impacts to perennial streams or wetland/meadow or basin shrubland vegetation are the result of the Alternative B pumping.

**Full Build Out Plus 200 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation, springs and perennial streams occur within the Eagle HMA. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, approximately 20 percent of the cumulative impacts to springs and 6 percent to perennial streams are the result of the Alternative B pumping. Approximately 92 percent of the cumulative impacts to wetland/meadow or basin shrubland vegetation is the result of the Alternative B pumping.

**Table 3.13-14 Summary of Potential Cumulative Pumping Effects with Alternative B on Wild Horse Herd Management Areas**

Parameter	HMA	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs (Verified / Unverified) <sup>1</sup>	Antelope	1 / 0	2 / 5	2 / 7
	Eagle	1 / 7	2 / 15	2 / 29
	Silver King	0 / 4	0 / 4	0 / 4
	<b>Total</b>	2 / 11	4 / 24	4 / 40
Miles of Perennial Streams	Eagle	0	1	14
Acres of Wetland/Meadow and Basin Shrubland Vegetation	Antelope Valley	15	153	194
	Eagle	1,740	2,511	2,524
	<b>Total</b>	1,755	2,664	2,718

<sup>1</sup> Unverified springs originate from map data sources and may change over time. Verified springs have been inventoried through field surveys.

### 3.13.3.8 Alternative C

#### Groundwater Development

Alternative C surface disturbance overlap with foreseeable future projects would be the same as for the Proposed Action and cumulative surface impacts would be the same.

#### Groundwater Pumping

Some of the HMAs within the region of study would see some impacts from the cumulative groundwater drawdown as predicted by the 10-foot or greater drawdown contour of the groundwater model (see **Table 3.13-15**). The incremental contribution of Alternative C pumping on the cumulative effects to springs and streams is relatively small. The largest effect would be at 75 years past full build out when at risk springs (both field verified and unverified) comprise less than 7 percent of the total impact (see **Figures 3.13-2** and **3.13-3**).

**Full Build Out.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to springs and wetland/meadow and basin shrubland vegetation occur within the Eagle HMA. No perennial streams are at risk at full build out. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, none of the cumulative impacts to springs, streams or wetland/meadow or basin shrubland vegetation are the result of the Alternative C pumping.

**Full Build Out Plus 75 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation, springs, and perennial streams occur within the Eagle HMA. The majority of the at-risk springs are located within the Silver King HMA. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, approximately 7 percent of the cumulative impacts to springs is the result of the Alternative C pumping. None of the cumulative impacts to streams or wetland/meadow or basin shrubland vegetation are the result of the Alternative C pumping.

**Full Build Out Plus 200 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation, streams, and perennial streams occur within the Eagle HMA. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, approximately 5 percent of the cumulative impacts to springs is the result of the Alternative C pumping. None of the cumulative impacts to streams or wetland/meadow or basin shrubland vegetation are the result of the Alternative C pumping.

**Table 3.13-15 Summary of Potential Cumulative Pumping Effects with Alternative C on Wild Horse Herd Management Areas**

Parameter	HMA	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs (Verified / Unverified) <sup>1</sup>	Antelope	1 / 0	2 / 5	2 / 10
	Eagle	1 / 7	2 / 15	2 / 26
	Silver King	0 / 4	0 / 4	0 / 4
	<b>Total</b>	2 / 11	4 / 24	4 / 40
Miles of Perennial Streams	Eagle	0	1	12
Acres of Wetland/Meadow and Basin Shrubland Vegetation	Antelope Valley	15	153	194
	Eagle	1,473	2,511	2,524
	<b>Total</b>	1,488	2,664	2,718

<sup>1</sup> Unverified springs originate from map data sources and may change over time. Verified springs have been inventoried through field surveys.

### 3.13.3.9 Alternative D

#### Groundwater Development

Alternative D surface disturbance overlap with foreseeable future projects in HMAs would be the same as for the Proposed Action and cumulative surface disturbance impacts would be the same.

#### Groundwater Pumping

Some of the HMAs within the region of study would see some impacts from the cumulative groundwater drawdown as predicted by the 10-foot or greater drawdown contour of the groundwater model (see **Table 3.13-16**). The incremental contribution of Alternative D on the cumulative effects to springs and streams would be greater than the Proposed Action or Alternatives A through C. At 200 years past full build out Alternative D pumping would be responsible for approximately 55 percent of the cumulative impacts to at risk springs (both field verified and unverified) and 38 percent to at risk perennial streams (see **Figures 3.13-2** and **3.13-3**).

**Full Build Out.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to springs and wetland/meadow and basin shrubland vegetation and springs occur within the Eagle HMA. No perennial streams are at risk at full build out. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, none of the cumulative impacts to springs, streams or wetland/meadow or basin shrubland vegetation are the result of the Alternative D pumping.

**Full Build Out Plus 75 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation, springs, and perennial streams occur within the Eagle HMA. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, approximately 23 percent of the cumulative impacts to springs and 35 percent to perennial streams are the result of the Alternative D pumping. None of the cumulative impacts to wetland/meadow or basin shrubland vegetation are the result of the Alternative D pumping.

**Full Build Out Plus 200 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation, springs, and perennial streams occur within the Eagle HMA. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, approximately 55 percent of the cumulative impacts to springs and 38 percent to perennial streams are the result of the Alternative D pumping. Approximately 92 percent of the cumulative impacts to wetland/meadow or basin shrubland vegetation is the result of the Alternative D pumping.

**Table 3.13-16 Summary of Potential Cumulative Pumping Effects with Alternative D on Wild Horse Herd Management Areas**

Parameter	HMA	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs (Verified / Unverified) <sup>1</sup>	Antelope	1 / 0	2 / 5	2 / 7
	Eagle	1 / 5	2 / 18	2 / 34
	Silver King	0 / 3	0 / 4	0 / 4
	<b>Total</b>	2 / 8	4 / 27	4 / 45
Miles of Perennial Streams	Eagle	0	3	16
	<b>Total</b>			
Acres of Wetland/Meadow and Basin Shrubland Vegetation	Antelope Valley	15	153	194
	Eagle	626	2,511	2,524
	<b>Total</b>	641	2,664	2,718

<sup>1</sup> Unverified springs originate from map data sources and may change over time. Verified streams have been inventoried through field surveys.



### 3.13.3.10 Alternative E

#### Groundwater Development

Alternative E surface disturbance overlap with foreseeable future projects in HMAs would be the same as for the Proposed Action and cumulative surface disturbance effects would be the same.

#### Groundwater Pumping

Some of the HMAs within the region of study would see some impacts from the cumulative groundwater drawdown as predicted by the 10-foot or greater drawdown contour of the groundwater model (see **Table 3.13-17**). The incremental contribution of Alternative E pumping on the cumulative effects to springs and streams is relatively small. The most significant effect would be at 200 years past full build out when at risk springs (both field verified and unverified) comprise 10 percent of the total impact (see **Figures 3.13-2** and **3.13-3**).

**Full Build Out.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to springs and wetland/meadow and basin shrubland vegetation and springs occur within the Eagle HMA. No perennial streams are at risk at full build out. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, none of the cumulative impacts to springs, streams, or wetland/meadow or basin shrubland vegetation are the result of the Alternative E pumping.

**Full Build Out Plus 75 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation, springs, and perennial streams occur within the Eagle HMA. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, approximately 7 percent of the cumulative impacts to springs is the result of the Alternative E pumping. None of the cumulative impacts to streams or wetland/meadow or basin shrubland vegetation are the result of the Alternative E pumping.

**Full Build Out Plus 200 Years.** The 10-foot drawdown area of effect overlaps with the Antelope, Antelope Valley, Eagle, and Silver King HMAs. The majority of the drawdown effects to wetland/meadow and basin shrubland vegetation, springs, and perennial streams occur within the Eagle HMA. There is no wetland/meadow or basin shrubland vegetation within the 10-foot or greater drawdown area in the Silver King HMA. Based on the 10-foot or greater drawdown contour of the groundwater model, approximately 10 percent of the cumulative impacts to springs is the result of the Alternative E pumping. None of the cumulative impacts to streams or wetland/meadow or basin shrubland vegetation are the result of the Alternative E pumping.

**Table 3.13-17 Summary of Potential Cumulative Pumping Effects with Alternative E on Wild Horse Herd Management Areas**

Parameter	HMA	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs (Verified / Unverified) <sup>1</sup>	Antelope	1 / 0	2 / 5	2 / 14
	Eagle	1 / 7	2 / 15	2 / 28
	Silver King	0 / 4	0 / 4	0 / 4
	<b>Total</b>	2 / 11	4 / 24	4 / 46
Miles of Perennial Streams	Eagle	0	1	13
Acres of Wetland/Meadow and Basin Shrubland Vegetation	Antelope Valley	15	153	194
	Eagle	1,473	2,511	2,524
	<b>Total</b>	1,488	2,664	2,718

<sup>1</sup> Unverified springs originate from map data sources and may change over time. Verified streams have been inventoried through field surveys.