3.12 Rangelands and Grazing

3.12.1 Affected Environment

3.12.1.1 Overview

Grazing allotments are the geographical management units used to characterize rangelands and grazing. The location of grazing allotments in relation to the project's proposed ROWs, groundwater development areas, and the water resources region of study (hydrologic model boundary) is shown in **Figure 3.12-1**. Depending on the specific allotment and types of rangeland contained therein, livestock grazing may involve winter or spring sheep grazing, seasonal cattle grazing or in some cases, year-round cattle grazing. Year-round grazing most commonly occurs on larger allotments involving a wide elevation range and diversity of vegetation types where livestock can move to higher elevations within the same allotment during the summer. Some allotments involve combinations of sheep and cattle grazing. Winter and spring grazing tend to be more prevalent in the lower elevation desert areas while summer and fall grazing predominate on allotments with a greater proportion of higher elevation areas. Because of the limited amount of available surface water over this large area, spring flows, perennial streams, and vegetation supported by springs and perennial streams are heavily utilized by livestock during the grazing season.

QUICK REFERENCE

ACM – Applicant Committed Protection Measures

GIS – Global Information System

GWD – Groundwater Development

POD – Plan of Development

PRMP/FEIS – Preliminary RMP/Final Environmental Impact Statement

RMP – Resource Management Plan

ROW – Right-of-way

3.12.1.2 Right-of-way Areas

Areas of high quality forage, referred to as ET units, are very important components of grazing allotments due to their disproportionately high ability to provide forage for livestock grazing. ET units represent primary cover types that were originally mapped as vegetation density classes and not species types. There are two cover types that make up ET units; 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 livestock. 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 for livestock 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 allotments shown in **Table 3.12-1** contain high-quality forage consisting of either basin shrubland and/or wetland meadow vegetation. The table also presents the acreage of these vegetation types that occur within the footprint of the ROWs and ancillary facilities by alternative.

Table 3.12-2 identifies the grazing allotments and the ROW and ancillary facility footprint for the Proposed Action. Surface disturbance potentially could occur in the 14 basins in which project facilities are planned. Twenty-three allotments intersect the ROWs and ancillary facilities. The footprint associated with the ROWs equals 10,544 acres.

The specific allotments and the acreage within the ROW and ancillary facilities area are shown in **Table 3.12-2**.

Figure 3.12-1 Grazing Allotments

Table 3.12-1 Acres of Wetland/Meadow and Basin Shrubland Vegetation within the Right-of-way

	Proposed Action, Alternatives A through C	Alternative D (LCCRDA-only)	Alternative E (Spring/DDC)	Alignment Option 1 (Humboldt -Toiyabe Power Line)	Alignment Option 2 (North Lake Valley)	Alignment Option 3 (Muleshoe Substation)	Alignment Option 4 (North Delamar Valley Pipeline)
Allotment Name			**Acreage within Alignment**				
NV - Baker Creek - 10125	34	0	0	34	34	34	34
NV - Geyser Ranch - 01101	170	170	170	170	3	170	170
Hamlin Valley	15	0	0	15	15	15	15
NV - Oak Springs - 01050	48	48	48	48	48	48	48
Tamberlaine - 00901	1	0	1	1	1	0	1
Willow Springs - 10129	14	0	14	14	14	14	14
Total	**282**	**218**	**233**	**282**	**115**	**281**	**282**

Table 3.12-2 Grazing Allotments and Associated Acreage Intersecting the Rights-of-way and Ancillary Facilities for the Proposed Action

Allotment Name	Acreage within ROW
Baker Creek - 10125	491
Buckhorn - 21012	618
Cave Valley Ranch - 00904	63
Cleveland Ranch - 01119	12
Cliff Springs - 21016	289
Cold Spring - 00909	68
Cottonwood - 00132	467
Delamar - 01083	560
Ely Springs - 11029	430
Geyser Ranch - 01101	722
Hamlin Valley - 00133	631
Lower Lake East - 21022	563
Majors - 10126	713
North Chokecherry - 20134	149
Oak Springs - 01050	767
Shingle Pass - 00906	103
Simpson - 21004	127
South Spring Valley - 10130	639
Sunnyside - 21023	514
Tamberlaine - 00901	143
West Schell Bench - 00433	115
Willow Springs - 10129	555
Wilson Creek - 01201	1,805
Total Acres within the area of the ROWs and Ancillary Facilities	**10,544**

3.12.1.3 Groundwater Development Areas

Groundwater development areas represent the acreage of the allotment within development areas by hydrologic basin. The total footprint associated with the development areas equals 729,957 acres. Within that footprint, approximately 144 to 174 wells would be developed with an estimated permanent displacement of 2,373 to 5,537 acres and estimated temporary displacement of 1,214 to 2,875 acres.

Within the region of study (defined by the boundary analyzed for natural resources), 3,456 springs and 1,197 miles of perennial streams are located on grazing allotments.

There are 41 allotments in Nevada that intersect the groundwater development areas. The specific allotments and associated acreage within the groundwater development areas are shown in **Table 3.12-3**.

Table 3.12-3 Grazing Allotments and Associated Acreage within the Groundwater Development Areas

Allotment Name	Acreage within Groundwater Development Area
NEVADA	
Baker Creek - 10125	30,330
Bassett Creek - 10114	2,405
Bastian Creek - 10121	13,626
Buckhorn - 21012	21,692
Cave Valley Ranch - 00904	3,715
Cave Valley Seeding - 00908	757
Chokecherry - 10131	7,663
Cleveland Ranch - 01119	10,490
Cliff Springs - 21016	10,483
Cottonwood - 00132	37,206
Delamar - 01083	16,843
Ely Springs - 11029	21,851
Ely Springs Sheep - 21030	2,874
Fox Mountain - 11001	4
Geyser Ranch - 01101	7,743
Hamlin Valley - 00133	21,137
Majors - 10126	67,365
Mccoy Creek - 10135	5,133
Meadow Creek - 10113	5,013
Muncy Creek - 20111	40,315
Mustang - 01047	5,397
Negro Creek - 00120	17,959
North Chokecherry - 20134	8,288
Oak Springs - 01050	49,834
Pahroc - 01052	480
Rattlesnake - 01058	11,393
Red Hills - 00108	19
Scotty Meadows - 10128	16,117

Table 3.12-3 Grazing Allotments and Associated Acreage within the Groundwater Development Areas (Continued)

Allotment Name	Acreage within Groundwater Development Area
Shingle Pass - 00906	4,840
Simpson - 21004	2,671
Smith Creek - 20117	36,412
South Spring Valley - 10130	68,289
Stephens Creek - 10118	2,935
Sunnyside - 21023	25,116
Taft Creek - 10116	3,828
USFS – 00417 - 00432	238
USFS – 00433 - 00434	9
USFS – 00435 - 00442	325
Willard Creek - 10127	8,649
Willow Springs - 10129	46,896
Wilson Creek - 01201	93,614
Total Acres within the Groundwater Development Areas	**729,957**

The exact location of well development facilities is undefined at this project stage, although SNWA has provided estimates of well numbers and surface disturbance by basin in their POD. **Table 3.12-4** shows the estimated surface disturbance for the groundwater development areas. 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.

Table 3.12-4 Acres of Groundwater Development Area Surface Disturbance Assumptions

Assumptions	Proposed Action	A and C	B	D	E
Total Construction Disturbance Area (temporary and permanent)	3,530 – 8,265	2,035 – 4,732	4,585	2,470 – 3,936	1,725 – 3,987
Temporary Disturbed Area to be revegetated	1,165 – 2,727	672 – 1,562	1,513	815 – 1,299	569 – 1,316
Permanent Disturbance	2,365 – 5,538	1,363 – 3,170	3,072	1,655 – 2,637	1,156 – 2,661

3.12.1.4 Region of Study

The region of study for rangeland and livestock grazing corresponds to the boundary associated with the water resources region of study (see **Figure 3.12-1**). Within the region of study, GIS analysis has identified 298 grazing allotments. Many of these allotments will be unaffected by ROWs, ancillary facilities, or groundwater development areas.

The allotments shown in **Table 3.12-5** contain high-quality forage (categorized as ET units) consisting of wetland/meadow and/or basin shrubland vegetation types (see Section 3.12.1.2 and Section 3.5.2.8, Vegetation Resources, for more information regarding wetland/meadow and basin shrubland vegetation types). The acres that occur within the footprint of the groundwater development areas in those allotments also are shown. These acreages are being evaluated due to their disproportionately high ability to provide forage for livestock grazing and their susceptibility to stress related to soil moisture fluctuation. Although other vegetation types contained within these

allotments are also important for livestock grazing, they are less susceptible to the effects of groundwater drawdown due to differences in plant rooting depth and drought tolerance, and therefore, would be less affected by groundwater development.

Table 3.12-5 Acres of Wetland/Meadow and Basin Shrubland Vegetation within the Groundwater Development Areas

Allotment Name	Proposed Action, Alternatives A through C	Alternative D - LCCRDA-only	Alternative E – Spring/DDC
NEVADA	**Acreage within Groundwater Development Areas**		
Baker Creek - 10125	3,019		
Bassett Creek - 10114	55		55
Bastian Creek - 10121	11,071		11,071
Chokecherry - 10131	6,149		
Cleveland Ranch - 01119	1,420		1,420
Hamlin Valley - 00133	3,320		
Majors - 10126	9,083		9,083
Mccoy Creek - 10135	22		22
Meadow Creek - 10113	822		822
Muncy Creek - 20111	2,535		2,535
Negro Creek - 00120	1,805		1,805
North Chokecherry - 20134	228		
Scotty Meadows - 10128	12,139		12,139
Smith Creek - 20117	5,583		
South Spring Valley - 10130	17,323		17,323
Stephens Creek - 10118	1,069		1,069
Sunnyside - 21023	7,975	7,975	7,975
Taft Creek - 10116	947		947
Willard Creek - 10127	2,358		2,358
Willow Springs - 10129	16,665		16,665
UTAH	**Acreage within Groundwater Development Areas**		
Baker - 04305	262		
Burbank - 04299	2		
Out - 999	4		
Smith Creek - 04335	81		
Stateline - 06238	2		
Unalloted - 09999	6		
Total	**103,945**	**7,975**	**85,289**

As indicated in Section 3.3, Water Resources, the largest number of springs and perennial and ephemeral streams generally flow in valleys bounded by large mountain ranges. However, numerous springs and streams occur in high-elevation upland areas throughout much of the region. Perennial flow in these upland springs and streams is generally controlled by discharge from localized or perched groundwater sources that are not hydraulically connected to the regional groundwater system (see Water Resources, Section 3.3.1). The estimate of the number and extent of springs within the grazing allotment boundaries in the water resources region of study (**Table 3.12-6** was obtained from GIS analysis. Within the region of study, 3,456 springs and 1,197 miles of perennial and ephemeral streams are located on

grazing allotments. As some private lands also may occur within the grazing allotments, some springs accounted for in the table could occur on private land.

Table 3.12-6 Water Sources in the Bureau of Land Management Livestock Allotments at Least Partially within the Region of Study

Hydrologic Basin	Perennial Streams (Miles)	Springs (Numbers)
Black Mountains Area	10	16
Butte Valley (Southern Part)	16	45
California Wash	8	0
Cave Valley	9	48
Clover Valley	18	27
Coal Valley	0	7
Coyote Spring Valley	<1	13
Delamar Valley	0	31
Dry Lake Valley	<1	100
Dry Valley	8	12
Eagle Valley	6	11
Fish Springs Flat	<1	2
Garden Valley	16	43
Hamlin Valley	10	166
Jakes Valley	11	11
Kane Springs Valley	<1	9
Lake Valley	16	66
Las Vegas Valley	11	96
Long Valley	<1	3
Lower Meadow Valley Wash	60	52
Lower Moapa Valley	20	1
Muddy River Springs Area	7	27
Pahranagat Valley	33	19
Pahroc Valley	13	3
Panaca Valley	8	20
Patterson Valley	3	28
Pleasant Valley	<1	65
Rose Valley	0	1
Snake Valley	166	450
Spring Valley (184)	283	670
Spring Valley (201)	28	102
Steptoe Valley	231	1,009
Tippett Valley	2	30
White River Valley	83	273

BIO-WEST (2007) conducted an evaluation of selected springs in Snake and Spring valleys, and as part of that evaluation, noted springs that exhibited signs of livestock use and/or were modified with diversions. The following named springs (presented in alphabetical order) show evidence of extensive use by livestock. Of 28 spring sites

surveyed in Snake Valley, diversion structures were present at 15; of 25 spring sites surveyed in Spring Valley, diversion structures were present at 15 (BIO-WEST 2007). Big Springs in Snake Valley is the only spring surveyed where a residence has been constructed nearby.

Snake Valley – Big Springs, Big Springs Pond, Big Springs Creek, North Beck Spring, South Beck Spring, Bishop Springs/Foote Reservoir, Caine Spring, Callao Big Spring, Clay Spring, Cold Spring, Gandy Salt Marsh (6 sites), Gandy Warm Springs, Knoll Spring, Leland Harris Spring, Miller Spring, North Little Spring, South Little Spring, Swimming Hole, Twin Springs, unnamed Big Spring #1, unnamed Big Spring #2, unnamed spring south of Caine Spring, unnamed spring south of Knoll Spring, and unnamed spring at Skating Pond.

Spring Valley – Blind Spring, Cedars Spring, Keegan Ranch North, Keegan Ranch Middle, Keegan Ranch South, Layton Spring, North Millick Spring, South Millick Spring, Shoshone Ponds (3 sites), South Bastion Spring, Swallow Spring, Turnley/Woodsman, unnamed springs east of Cleve Creek (2 sites), unnamed Minerva springs (3 sites), unnamed Stonehouse complex, unnamed spring (1 site), West Spring Valley Complex (2 sites), Willard Spring, and Willow Spring.

3.12.2 Environmental Consequences

3.12.2.1 Rights-of-way

Issues

Construction and Facility Maintenance

- Temporary reduction of grazing forage production due to surface disturbance. Permanent reduction of grazing forage production due to permanent surface disturbance for roads and facilities.
- Loss of, or injury to, livestock due to open trenches and fences.
- Effects to livestock movement due to staging of pipeline and power line equipment.
- Impacts to rangeland improvements.
- Animal-vehicle collisions.

Assumptions

The following assumptions were used in the impact analysis for rangelands and livestock grazing:

- Current grazing allotment carrying capacities are appropriate and reflect the desired level for the present and foreseeable future of the affected allotments; and
- Short-term impacts are defined as less than 2 years. Long-term impacts are defined as greater than 2 years. Permanent impacts assume that the land will not be reclaimed or returned to its previous use.

Methodology for Analysis

For the impact analysis study, impact parameters were used as both an indication of impacts and as a means of quantifying impacts. The water resources region of study boundary is used for analysis of these impacts as water is the limiting factor for livestock health. These parameters also allowed for comparison between alternatives or groups of alternatives.

To quantify impacts to grazing allotments, reductions to vegetation communities were evaluated. SSURGO data was used to identify NRCS ecological site descriptions (ESD). The dominant plant species associated with the soil map units for each ESD were used to represent the vegetation community type. ROW surface disturbances are measured in terms of acreage impacts to the various vegetation communities. Impact parameters for rangelands and livestock grazing include the following:

- Determine number of grazing allotments located within the pipeline and power line ROWs, based on GIS information and the Ely RMP.
- Estimate change to livestock forage production and management in grazing allotments based on short- and long-term surface disturbances.

3.12.2.2 Proposed Action and Alternatives A through C

Construction and Facility Maintenance

Reduction of Rangeland Carrying Capacity

Temporary surface disturbance areas consist of the pipeline and power line ROWs and construction support areas. A total of 10,544 acres affecting 23 allotments would be disturbed resulting in long-term reductions in grazing forage production. Impacts to vegetation communities within the affected allotments are shown in **Table 3.12-7**. The reclamation process could take 4 or more years after construction is complete, based on the restoration of disturbed soils and vegetation (Hoover 2009). Revegetation of disturbed ROW areas may be delayed, or may not succeed in areas of intensive seasonal livestock use. Examples of these areas include the vicinity of surface water sources including riparian vegetation areas; stock tanks; corrals; and sheep bed grounds. To improve the likelihood of revegetation success in this area, temporary fencing may be erected to protect these sensitive areas, while insuring livestock access to water sources. To provide opportunities to improve overall revegetation success, and stabilize sensitive soils, ROW–GRA-1 would be implemented.

ROW-GRA-1: Temporary fencing in livestock high use areas. In the final POD to be prepared as an attachment to the BLM ROD, the SNWA would conduct pre-construction surveys to determine livestock high-use locations in and adjacent to the construction ROW where application of temporary fencing would benefit revegetation species establishment. The results of these surveys would be provided to the BLM for review and concurrence. Reseeded areas that are temporarily fenced would be monitored by the SNWA on a yearly basis until the BLM determines that reseeded areas are self-sustaining, and fencing removed. It is anticipated that this measure would be applied in discrete areas of 5 acres or less, unless the BLM identifies a need to temporarily fence larger areas. Effectiveness: Temporary fencing would be effective in improving the stabilization and persistence of reseeded areas in the short-term. In the long-term, annual precipitation from year to year, and the seasonal distribution of livestock within the allotment would determine the survival of reseeded plants. Effects on other resources: This measure would also limit wild horse access to forage inside fenced areas. Big game species would not likely be deterred by temporary livestock fencing. Temporary fencing in riparian areas could improve the recovery rate of shrubs and herbs that assist in stabilizing channel banks.

Table 3.12-7 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Proposed Action and Alternatives A through C

Allotment Name/Size (acres)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Baker Creek - 10125 / 58,720	491 / 1%	R028AY013NV	Black sagebrush - *Artemisia nova*	170	35
		R028AY013NV	Galleta - *Pleuraphis jamesii*	73	15
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	143	29
		R028AY012NV	Indian ricegrass - *Achnatherum hymenoides* / Shadscale - *Atriplex confertifolia*	42	9
		R028AY015NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	36	5
		R028BY074NV	Shadscale - *Atriplex confertifolia*/Black greasewood - *Sarcobatus vermiculatus*	27	5
Buckhorn - 21012 / 80,664	618 / 1%	030XB001NV_1	Black sagebrush - *Artemisia nova*	19	3
		R029XY079NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	3	<1
		R029XY085NV	Desert needlegrass - *Achnatherum speciosum*	30	5
		R030XB010NV	Galleta - *Pleuraphis jamesii*	39	6
		029XY017NV_3	Indian ricegrass - *Achnatherum hymenoides* / Shadscale - *Atriplex confertifolia*	109	18
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Spiny Hopsage - *Grayia spinosa*	92	15

Table 3.12-7 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Proposed Action and Alternatives A through C (Continued)

Allotment Name/Size (acres)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Buckhorn (continued)		R029XY042NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	198	32
		R029XY059NV	Shadscale - *Atriplex confertifolia*	59	10
		R029XY079NV	Unidentified	69	10
Cave Valley Ranch - 00904 / 38,585	63 / <1%	R028AY015NV	Indian ricegrass - *Achnatherum hymenoides* / Desert needlegrass - *Achnatherum speciosum*	63	100
Cleveland Ranch - 01119 / 16,749	12 / <1%	R028AY013NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	12	100
Cliff Springs - 21016 / 32,964	289 / 1%	R029XY079NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	3	1
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Desert needlegrass - *Achnatherum speciosum*	43	15
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Spiny hopsage - *Grayia spinosa*	134	46
		R029XY042NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	109	38
Cold Spring - 00909 / 13,102	68 / <1%	R028BY008NV	Indian ricegrass - *Achnatherum hymenoides*	5	7
		R028BY080NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	4	6
		F028BY060NV	Wyoming big sagebrush - *Artemisia tridentata*	5	7
		R028BY070NV R028BY011NV	Unidentified	54	80
Cottonwood - 00132 / 49,964	467 / 1%	R028AY013NV R028AY015NV	Black sagebrush - *Artemisia nova*	281	60
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	10	2
		R028AY027NV	Littleleaf mountain mahogany - *Cercocarpus intricatus*	8	2
		R028AY030NV	Winterfat - *Krascheninnikovia lanata*	6	1
		R028AY015NV	Wyoming big sagebrush - *Artemisia tridentata*	162	35

Table 3.12-7 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Proposed Action and Alternatives A through C (Continued)

Allotment Name/Size (acres)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Delamar - 01083 / 165,499	560 / <1%	030XB019NV_2	Black sagebrush - *Artemisia nova*	50	9
		030XB019NV_2	Creosotebush - *Larrea tridentata*	152	27
		030XB019NV_1	Indian ricegrass - *Achnatherum hymenoides*	266	47
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	4	1
		030XB005NV_4	White bursage - *Ambrosia dumosa*	88	16
Ely Springs - 11029 / 57,849	430 / 1%	R029XY042NV R029XY046NV	Indian ricegrass - *Achnatherum hymenoides*	340	79
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	3	<1
		R029XY042NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	14	3
		R029XY059NV	Shadscale - *Atriplex confertifolia* / Winterfat - Krascheninnikovia lanata	20	5
		R029XY042NV	Winterfat - *Krascheninnikovia lanata*	53	12
Geyser Ranch - 01101 / 247,746	722 / <1%	R028AY043NV	Basin wildrye - *Leymus cinereus* / Bluebunch wheatgrass - *Pseudoroegneria spicata*	136	19
		R028AY008NV	Black greasewood - *Sarcobatus vermiculatus*	58	8
		R028AY050NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	12	2
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	83	12
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	29	4
		R028AY015NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Atremisia tridentata*	47	7
		R028AY015NV 028AY008NV_1 R028AY001NV	Wyoming big sagebrush - *Artemisia tridentata*	357	50

Table 3.12-7 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Proposed Action and Alternatives A through C (Continued)

Allotment Name/Size (acres)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Hamlin Valley - 00133 / 106,621	631 / <1%	R028AY013NV R028AY015NV R028AY004NV	Black sagebrush - *Artemisia nova*	24	4
		R028AY013NV	Galleta - *Pleuraphis jamesii*	28	4
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	576	91
		R028AY027NV	Littleleaf mountain mahogany - *Cercocarpus intricatus*	3	<1
Lower Lake East - 21022 / 52,550	563 / 1%	030XB019NV_2	Black sagebrush - *Artemisia nova*	76	14
		R030XB006NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	35	6
		R030XB019NV	Creosotebush - *Larrea tridentata*	134	24
		R029XY085NV	Desert needlegrass - *Achnatherum speciosum*	104	19
		R030XB010NV 030XB029NV_1	Galleta - *Pleuraphis jamesii*	62	11
		030XB019NV_1	Indian ricegrass - *Achnatherum hymenoides*	102	18
		R030XB006NV	Indian ricegrass - *Achnatherum hymenoides* / Shadscale - *Atriplex confertifolia*	39	7
		030XB029NV_1 R029XY022NV	Unidentified	11	2
Majors - 10126 / 103,533	713 / 1%	R028AY013NV R028AY004NV	Black sagebrush - *Artemisia nova*	102	14
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	85	12
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	334	47
		R028BY013NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	43	6
		F028BY058NV R028AY017NV R028AY015NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	51	7
		F028BY060NV R028AY013NV	Wyoming big sagebrush - *Artemisia tridentata*	98	14
North Chokecherry - 20134 / 8,745	149 / 2%	R028AY013NV	Black sagebrush - *Artemisia nova*	37	25
		R028AY013NV	Galleta - *Pleuraphis jamesii*	82	55
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	30	20

Table 3.12-7 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Proposed Action and Alternatives A through C (Continued)

Allotment Name/Size (acres)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Oak Springs - 01050 / 191,412	767 / <1%	R029XY079NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	122	16
		R029XY006NV	Indian ricegrass - *Achnatherum hymenoides*	35	5
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Desert needlegrass - *Achnatherum speciosum*	211	28
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Spiny hopsage - *Grayia spinosa*	68	9
		R029XY042NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	69	9
		R029XY049NV 029XY049NV_2	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	96	13
		R029XY008NV	Low sagebrush - *Artemisia arbuscula*	25	3
		029XY010NV_3	Wyoming big sagebrush - *Artemisia tridentata*	5	<1
		R029XY079NV	Unidentified	136	18
Shingle Pass - 00906 / 75,280	103 / <1%	R028AY030NV	Winterfat - *Krascheninnikovia lanata*	26	25
		R028AY015NV	Wyoming big sagebrush - *Artemisia tridentata*	77	75
Simpson - 21004 / 8,088	127 / 2%	R029XY059NV	Shadscale - *Atriplex confertifolia* / Winterfat - Krascheninnikovia lanata	127	100
South Spring Valley - 10130 / 84,624	639 / 1%	028AY121NV_1	Basin wildrye - *Leymus cinereus*	48	8
		R028AY013NV	Black sagebrush - *Artemisia nova*	40	6
		R028AY013NV	Galleta - *Pleuraphis jamesii*	95	15
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	198	31
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	46	7
		R028AY015NV R028AY017NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	157	25
		R028AY015NV	Wyoming big sagebrush - *Artemisia tridentata*	55	9

Table 3.12-7 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Proposed Action and Alternatives A through C (Continued)

Allotment Name/Size (acres)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Sunnyside - 21023 / 72,094	514 / 1%	R029XY008NV	Black sagebrush - *Artemisia nova*	107	21
		R028AY015NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	6	1
		R028AY030NV	Winterfat - *Krascheninnikovia lanata*	47	9
		R028AY015NV R028AY001NV	Wyoming big sagebrush - *Artemisia tridentata*	354	69
Tamberlaine - 00901 / 36,839	143 / <1%	R028BY011NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	14	10
			Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	66	46
		R028BY011NV	Unidentified	63	44
West Schell Bench - 00433 / 50,279	115 / <1%	R028BY011NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	19	17
		R028BY086NV	Wyoming big sagebrush - *Artemisia tridentata*	26	23
		R028BY011NV R028BY089NV	Unidentified	70	61
Willow Springs - 10129 / 85,708	555 / 1%	028AY121NV_1	Basin wildrye - *Leymus cinereus*	39	7
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	178	32
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	187	34
		R028AY015NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	151	27

Table 3.12-7 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Proposed Action and Alternatives A through C (Continued)

Allotment Name/Size (acres)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Wilson Creek - 01201 / 567,448	1805 / <1%	R029XY008NV R028AY013NV R028AY015NV	Black sagebrush - *Artemisia nova*	276	15
		R028AY050NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	82	5
		029XY049NV_2	Indian ricegrass - *Achnatherum hymenoides*	246	13
		R029XY008NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	94	5
		R028AY015NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	94	5
		R029XY046NV R029XY059NV	Shadscale - *Atriplex confertifolia* / Winterfat - Krascheninnikovia lanata	118	7
		R029XY046NV R029XY159NV R029XY020NV	Winterfat - *Krascheninnikovia lanata*	345	19
		R028AY013NV R028AY015NV R028AY001NV	Wyoming big sagebrush - *Artemisia tridentata*	521	29
		R029XY046NV R028AY088NV	Unidentified	29	2

[1] Unidentified plant communities are due to soil data gaps and incomplete ecological site surveys.

There is the risk that halogeton or other invasive plants could invade the ROW disturbed areas and hamper the establishment of quality forage species. Invasive vegetation degrades quality forage in several ways. Weeds out compete most native plants and can lead to a homogeneous vegetative landscape. Weedy habitats often contain fewer highly nutritious forage species for grazers. The potential for invasive vegetation that is currently occurring to spread, and for new invasive species to be introduced, would be highest along the linear features (e.g., roads, pipeline system). However, this risk would be offset by ACMs for weed treatment (A.1.82 through A.1.89).

Permanent surface disturbances would consist of access roads and aboveground facilities. A total of 708 acres affecting 18 allotments would have a permanent reduction in rangeland carrying capacity. **Table 3.12-8** gives a breakdown of permanent facility-related surface impacts by grazing allotment.

During the reclamation process 9,836 acres would be reclaimed to pre-construction conditions. This recovery process would be long-term and would initially reduce the carrying capacity of grazing forage.

Maintenance activities for operational facilities are unlikely to have additional impacts to rangelands and livestock grazing, since they would be conducted in areas already described as permanently disturbed. If maintenance or repair activities require additional ROWs, prior approval would be obtained from the BLM.

All construction and maintenance activities have the potential to reduce forage production and palatability due to the deposition of fugitive dust particles around areas of construction and along unpaved roads. The effect of dust deposition

on livestock grazing can vary depending on factors such as wind, frequency, and timing of precipitation events, and the availability of palatable vegetation elsewhere within the affected allotments. These effects would be offset by ACMs for air quality (A.10.1, A.10.2, A.10.4, and A.10.6 through A.10.8).

Table 3.12-8 Aboveground Facility Permanent Impacts by Grazing Allotment, Proposed Action and Alternatives A through C

Project Facility	Basin	Allotment	Impacted Acreage
Access Road	Cave Valley	NV - Sunnyside - 21023	20
	Coyote Spring Valley	NV - Delamar - 01083	39
		NV - Lower Lake East - 21022	15
	Delamar Valley	NV - Buckhorn - 21012	42
		NV - Oak Springs - 01050	30
	Dry Lake Valley	NV - Cliff Springs - 21016	25
		NV - Ely Springs - 11029	35
		NV - Oak Springs - 01050	23
		NV - Simpson - 21004	11
		NV - Wilson Creek - 01201	88
	Lake Valley	NV - Geyser Ranch - 01101	24
		NV - Wilson Creek - 01201	26
	Pahranagat Valley	NV - Buckhorn - 21012	<1
	Snake Valley	NV - Baker Creek - 10125	36
	Spring Valley	NV - Cleveland Ranch - 01119	1
		NV - Majors - 10126	62
		NV - South Spring Valley - 10130	14
		NV - Willow Springs - 10129	34
		NV - Wilson Creek - 01201	14
	Steptoe Valley	NV - Cold Spring - 00909	8
		NV - Majors - 10126	<1
		NV - Tamberlaine - 00901	11
Electrical Substation Site - Primary	Dry Lake Valley	NV - Oak Springs - 01050	10
	Spring Valley	NV - South Spring Valley - 10130	45
Electrical Substation Site - Secondary	Cave Valley	NV - Sunnyside - 21023	1
	Coyote Spring Valley	NV - Lower Lake East - 21022	7
	Snake Valley	NV - Baker Creek - 10125	1
	Spring Valley	NV - Majors - 10126	1
		NV - Willow Springs - 10129	1
Pressure Reducing Station	Coyote Spring Valley	NV - Lower Lake East - 21022	7
	Dry Lake Valley	NV - Wilson Creek - 01201	4
Pumping Station Site	Lake Valley	NV - Geyser Ranch - 01101	5
	Snake Valley	NV - Baker Creek - 10125	15
	Spring Valley	NV - Majors - 10126	5
		NV - South Spring Valley - 10130	30
Regulating Tank Site	Delamar Valley	NV - Buckhorn - 21012	5
	Dry Lake Valley	NV - Oak Springs - 01050	5
		NV - Wilson Creek - 01201	4
	Hamlin Valley	NV - Hamlin Valley - 00133	2
	Lake Valley	NV - Geyser Ranch - 01101	2

Conclusion. Acreage and forage production in the grazing allotments crossed by the ROWs would be disturbed. The reclamation would take more than two years to complete; therefore, this would be considered a long-term impact. ACMs for weed treatment would help to ensure that the vegetation restoration is completed in a timely manner and that invasive weed species are controlled to the extent possible. There may be a short-term loss of forage production and/or quality due to dust deposition. ACMs related to air quality would reduce the dust-related effects.

Proposed mitigation measures:

ROW-GRA-1: Temporary fencing in livestock high use areas. In the final POD to be prepared as an attachment to the BLM ROD, the SNWA would conduct pre-construction surveys to determine livestock high use locations in and adjacent to the construction ROW where application of temporary fencing would benefit revegetation species establishment. The results of these surveys would be provided to the BLM for review and concurrence. Reseeded areas that are temporarily fenced would be monitored by the SNWA on a yearly basis until the BLM determines that reseeded areas are self-sustaining, and fencing removed. It is anticipated that this measure would be applied in discrete areas of 5 acres or less, unless the BLM identifies a need to temporarily fence larger areas. Effectiveness: Temporary fencing would be effective in improving the stabilization and persistence of reseeded areas in the short-term. In the long-term, annual precipitation from year to year, and the seasonal distribution of livestock within the allotment would determine the survival of reseeded plants. Effects on other resources: This measure would also limit wild horse access to forage inside fenced areas. Big game species would not likely be deterred by temporary livestock fencing. Temporary fencing in riparian areas could improve the recovery rate of shrubs and herbs that assist in stabilizing channel banks.

Residual impacts include:

- Short-term loss of forage production and/or quality due to dust deposition as a result of construction and maintenance activities.
- Long-term disturbance in grazing allotments crossed by the GWD Project ROWs. In addition, permanent disturbance would occur in areas where permanent facilities are constructed. Long-term loss of forage production would occur due to surface disturbance of 10,544 acres within project ROWs.
- Long-term potential for a reduction of forage production and/or quality due to the establishment of invasive weedy species.

Injury to Livestock

Open trenches during construction could result in low level impacts to animals from injury or mortalities. ACM A.1.42 would ensure that escape ramps would be placed at either end, or at 0.25-mile intervals in unfenced trenches deeper than 1 foot to allow animals to escape. During this time, staging areas may be enclosed with temporary security fences, which should reduce the potential for loss or injury of livestock. Security fencing would be 6 to 8 feet in height and would be removed once the trench has been back-filled and construction activities are completed (ACM A.1.12). As stated in ACM A.1.17, a 4-foot-high orange snow fence or similar would be used to enclose construction activities in areas where security fences are not utilized. Per management direction described in the Ely RMP FEIS/ROD, new wire fencing would be marked with white 12-inch by 1-inch flagging every 16 feet (BLM 2007).

Conclusion. There is potential for livestock to be injured or killed due to open trenches and fencing, although ACMs A.1.42, A.1.12, and A.1.17 and the guidance provided in the Ely FEIS/ROD reduce this potential impact.

Proposed mitigation measures:

None.

Residual impacts include:

- Short-term potential for livestock injury or death due to open trenches or fencing.

Livestock Movement

Pipeline construction could interfere with the normal movement of livestock due to the presence of construction personnel, open trenches, staging areas, and temporary fencing. This could result in inaccessible areas of rangeland in the short term. Results could include concentrated grazing in accessible areas and an inability to access water sources in restricted areas. ACM A.8.4 would require that alternative water sources (water troughs or similar) be made available if access to water sources is restricted.

Effects of concentrated grazing potentially would include soil compaction and overgrazed vegetation. As stated in ACM A.8.1, pre-construction coordination with the BLM and grazing permit holders would be conducted to allow for advance planning of grazing practices and ensure the best use of available rangeland.

Conclusion. Interference with normal livestock movement would be short-term. ACMs would provide adequate water supplies and protect wildlife and rangeland resources.

Proposed mitigation measures:

None.

Residual impacts include:

- Short-term potential for concentrated grazing resulting in soil compaction and overgrazed vegetation.

Range Improvements

Pipeline and power line construction would cross 23 grazing allotments. Due to the size of the project area, it is impracticable to identify all the rangeland improvements that are located within these allotments; however, all improvements would be documented prior to the start of construction activities. Temporary removal or damage to some improvements (e.g., fences, cattle guards, water sources) could occur. Any improvements that are removed or damaged would be replaced or repaired to BLM standards upon completion of construction; protocols for documenting, replacing, and repairing rangeland improvements are included in ACM A.8.2.

Conclusion. According to ACM A.8.2, preconstruction conditions would be documented and range improvements disturbed by construction activities would be restored to their previous condition upon construction completion.

Proposed mitigation measures:

None.

Residual impacts include:

- Temporary removal or destruction of rangeland improvements.

Animal-vehicle Collisions

There is potential for livestock to be injured or killed by animal-vehicle collisions, although ACM A.2.1 would reduce the potential by restricting vehicle speeds to 25 mph or less in construction areas. ACM A.8.3 specifies that property owners would be compensated at fair market value for any livestock struck by a vehicle directly associated with construction activities.

Conclusion. ACMs would adequately protect range animals from vehicles and property owners from incurring loss due to animal-vehicle collisions.

Proposed mitigation measures:

None.

Residual impacts include:

- Short-term potential for injury to livestock due to construction activities.
- Short- and long-term potential for animal-vehicle collisions due to operation and maintenance activities.

3.12.2.3 Alternative D

Construction and Facility Maintenance

Development would be eliminated in the White Pine County portion of Spring Valley. No construction and facility maintenance effects would occur north of the White Pine County line since the Spring and Snake valley laterals and associated facilities would not be constructed outside the LCCRDA corridor. In addition, fewer power line facilities would be constructed.

Reduction in Rangeland Carrying Capacity

Temporary surface disturbance areas consist of the pipeline and power line ROWs and construction support areas. A total of 7,162 acres affecting 14 allotments would be disturbed and there would be a long-term reduction in grazing forage production. Impacts to vegetation communities within the affected allotments are shown in **Table 3.12-9.** The reclamation process could take 4 or more years after construction is completed, based on the restoration of disturbed soils and vegetation (Hoover 2009). To improve revegetation success in areas where livestock may congregate (e.g., water sources, corrals and bed grounds), SNWA would install temporary fencing, and achieve revegetation results satisfactory to the BLM before temporary fencing is removed (ROW-GRA-1).

Table 3.12-9 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Alternative D

Allotment Name/Size (acres)	Surface Disturbance (acres)/Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Buckhorn - 21012 / 80,664	618 / 1%	030XB001NV_1	Black sagebrush - *Artemisia nova*	19	3
		R029XY079NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	3	<1
		R029XY085NV	Desert needlegrass - *Achnatherum speciosum*	30	5
		R030XB010NV	Galleta - *Pleuraphis jamesii*	39	6
		029XY017NV_3	Indian ricegrass - *Achnatherum hymenoides* / Shadscale - *Atriplex confertifolia*	109	18
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Spiny Hopsage - *Grayia spinosa*	92	15
		R029XY042NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	198	32
		R029XY059NV	Shadscale - *Atriplex confertifolia*	59	10
		R029XY079NV	Unidentified	69	11
Cave Valley Ranch - 00904 / 38,585	63 / 2%	R028AY015NV	Wyoming big sagebrush - *Artemisia tridentata*	63	100

Table 3.12-9 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Alternative D (Continued)

Allotment Name/Size (acres)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Cliff Springs - 21016 / 32,964	289 / 1%	R029XY079NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	3	1
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Desert needlegrass - *Achnatherum speciosum*	43	15
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Spiny hopsage - *Grayia spinosa*	134	46
		R029XY042NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	109	38
Cottonwood - 00132 / 49,964	384 / 1%	R028AY015NV	Black sagebrush - *Artemisia nova*	216	56
		R028AY030NV	Winterfat - *Krascheninnikovia lanata*	6	2
		R028AY015NV	Wyoming big sagebrush - *Artemisia tridentata*	162	42
Delamar - 01083 / 165,499	560 / <1%	030XB019NV_2	Black sagebrush - *Artemisia nova*	50	9
		030XB019NV_2	Creosotebush - *Larrea tridentata*	152	27
		030XB019NV_1	Indian ricegrass - *Achnatherum hymenoides*	266	47
		030XB005NV_4	White bursage - *Ambrosia dumosa*	88	16
		Data Gap	Unidentified	4	1
Ely Springs - 11029 / 57,849	430 / 1%	R029XY042NV	Indian ricegrass - *Achnatherum hymenoides*	340	79
		R029XY042NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	14	3
		R029XY059NV	Shadscale - *Atriplex confertifolia* / Winterfat - Krascheninnikovia lanata	20	5
		R029XY042NV	Winterfat - *Krascheninnikovia lanata*	53	12
		Data Gap	Unidentified	3	1

Table 3.12-9 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Alternative D (Continued)

Allotment Name/Size (acres)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Geyser Ranch - 01101 / 247,746	722 / <1%	R028AY043NV	Basin wildrye - *Leymus cinereus* / Bluebunch wheatgrass - *Pseudoroegneria spicata*	136	19
		R028AY008NV	Black greasewood - *Sarcobatus vermiculatus*	58	8
		R028AY050NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	12	2
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	83	11
		R028AY015NV	Indian ricegrass -*Achnatherum hymenoides* / Wyoming big sagebrush - *Atremisia tridentata*	47	7
		R028AY015NV	Wyoming big sagebrush - *Artemisia tridentata*	357	49
		Data Gap	Unidentified	29	4
Lower Lake East - 21022 / 52,550	563 / 1%	030XB019NV_2	Black sagebrush - *Artemisia nova*	76	13
		R030XB006NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	35	6
		R030XB019NV	Creosotebush - *Larrea tridentata*	134	24
		R029XY085NV	Desert needlegrass - *Achnatherum speciosum*	105	19
		R030XB010NV 030XB029NV_1	Galleta - *Pleuraphis jamesii*	68	12
		030XB019NV_1	Indian ricegrass - *Achnatherum hymenoides*	101	18
		R030XB006NV	Indian ricegrass - *Achnatherum hymenoides* / Shadscale - *Atriplex confertifolia*	39	7
		R029XY022NV	Unidentified	5	1
Oak Springs - 01050 / 191,412	767 / <1%	R029XY079NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	122	16
		R029XY006NV	Indian ricegrass - *Achnatherum hymenoides*	35	5
		R029XY008NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	6	1
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Desert needlegrass - *Achnatherum speciosum*	212	27

Table 3.12-9 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Alternative D (Continued)

Allotment Name/Size (acres)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Oak Springs (Continued)		R029XY079NV	Indian ricegrass -*Achnatherum hymenoides* / Spiny hopsage - *Grayia spinosa*	176	23
		R029XY042NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	79	10
		R029XY049NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	96	13
		R029XY008NV	Low sagebrush - *Artemisia arbuscula*	25	3
		R029XY020NV	Winterfat - *Krascheninnikovia lanata*	6	1
		029XY010NV_3	Wyoming big sagebrush - *Artemisia tridentata*	10	1
Shingle Pass - 00906 / 75,280	103 / <1%	R028AY030NV	Winterfat - *Krascheninnikovia lanata*	26	25
		R028AY015NV	Wyoming big sagebrush - *Artemisia tridentata*	77	75
Simpson - 21004 / 8,088	127 / 2%	R029XY059NV	Shadscale - *Atriplex confertifolia* / Winterfat - Krascheninnikovia lanata	127	100
South Spring Valley - 10130 / 84,624	138 / <1%	R028AY013NV	Black sagebrush - *Artemisia nova*	1	<1
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	67	49
		R028AY015NV	Wyoming big sagebrush - *Artemisia tridentata*	55	40
		Data Gap	Unidentified	15	11
Sunnyside - 21023 / 72,094	514 / 1%	R029XY008NV R029XY006NV	Black sagebrush - *Artemisia nova*	107	21
		R028AY030NV	Winterfat - *Krascheninnikovia lanata*	47	9
		R028AY015NV R028AY001NV	Wyoming big sagebrush - *Artemisia tridentata*	360	70
Wilson Creek - 01201 / 567,448	1,805 / <1%	R029XY008NV R028AY013NV R028AY015NV	Black sagebrush - *Artemisia nova*	275	15
		R028AY050NV R028AY088NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	87	5
		R029XY046NV 029XY049NV_2	Indian ricegrass - *Achnatherum hymenoides*	252	14

Table 3.12-9 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Alternative D (Continued)

Allotment Name/Size (acres)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Wilson Creek (Continued)		R029XY008NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	94	5
		R028AY015NV R029XY006NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	99	5
		R029XY046NV R029XY059NV	Shadscale - *Atriplex confertifolia* / Winterfat - Krascheninnikovia lanata	118	7
		R029XY046NV R029XY159NV R029XY020NV	Winterfat - *Krascheninnikovia lanata*	346	19
		R028AY013NV R028AY015NV R028AY001NV	Wyoming big sagebrush - *Artemisia tridentata*	521	29
		F028AY074NV	Unidentified	13	1

[1] Unidentified plant communities are due to soil data gaps and incomplete ecological site surveys.

There is the risk that halogeton or other invasive plants could invade the ROW disturbed areas and hamper the establishment of quality forage species. Invasive vegetation degrades quality forage in several ways. Weeds out compete most native plants and can lead to a homogeneous vegetative landscape. Weedy habitats often contain fewer highly nutritious forage species for grazers. The potential for invasive vegetation that is currently occurring to spread, and for new invasive species to be introduced, would be highest along the linear features (e.g., roads, pipeline system). However, this risk would be offset by ACMs for weed treatment (A.1.82 through A.1.89).

Permanent surface disturbances would consist of access roads and aboveground facilities. A total of 564 acres affecting 11 allotments would have a permanent reduction in grazing forage production. **Table 3.12-10** gives a breakdown of permanent facility-related surface impacts by grazing allotment.

Table 3.12-10 Aboveground Facility Permanent Impacts by Grazing Allotment, Alternative D

Project Facility	Basin	Allotment	Impacted Acreage
Access Road	Cave Valley	NV - Sunnyside - 21023	20
	Coyote Spring Valley	NV - Delamar - 01083	39
		NV - Lower Lake East - 21022	15
	Delamar Valley	NV - Buckhorn - 21012	42
		NV - Oak Springs - 01050	30
	Dry Lake Valley	NV - Cliff Springs - 21016	25
		NV - Ely Springs - 11029	35
		NV - Oak Springs - 01050	23
		NV - Simpson - 21004	11
		NV - Wilson Creek - 01201	88
	Lake Valley	NV - Geyser Ranch - 01101	24
		NV - Wilson Creek - 01201	26
	Spring Valley	NV - Wilson Creek - 01201	14

Table 3.12-10 Aboveground Facility Permanent Impacts by Grazing Allotment, Alternative D (Continued)

Project Facility	Basin	Allotment	Impacted Acreage
Electrical Substation Site - Primary	Dry Lake Valley	NV - Oak Springs - 01050	10
	Spring Valley	NV - South Spring Valley - 10130	45
Electrical Substation Site - Secondary	Cave Valley	NV - Sunnyside - 21023	1
	Coyote Spring Valley	NV - Lower Lake East - 21022	7
Pressure Reducing Station	Coyote Spring Valley	NV - Lower Lake East - 21022	7
	Dry Lake Valley	NV - Wilson Creek - 01201	4
Pumping Station Site	Lake Valley	NV - Geyser Ranch - 01101	5
	Spring Valley	NV - South Spring Valley - 10130	75
Regulating Tank Site	Delamar Valley	NV - Buckhorn - 21012	3
	Dry Lake Valley	NV - Oak Springs - 01050	8
		NV - Wilson Creek - 01201	5
	Lake Valley	NV - Geyser Ranch - 01101	2

During the reclamation process, 6,598 acres would be reclaimed to pre-construction conditions. This recovery process would be long-term and would initially reduce grazing forage production.

Maintenance activities for operational facilities are unlikely to have additional impacts to rangelands and livestock grazing since they would be conducted in areas already described as permanently disturbed. If maintenance or repair activities require additional ROWs, prior approval would be obtained from the BLM.

All construction and maintenance activities have the potential to reduce forage production and palatability due to the deposition of fugitive dust particles around areas of construction and along unpaved roads. The effect of dust deposition on livestock grazing can vary depending on factors such as wind, frequency, and timing of precipitation events, and the availability of palatable vegetation elsewhere within the affected allotments. These effects would be offset by ACMs for air quality (A.10.1, A.10.2, A.10.4, and A.10.6 through A.10.8).

Conclusion. Acreage and forage production in the grazing allotments crossed by the ROWs would be disturbed. The reclamation would take more than 2 years to complete; therefore, this would be considered a long-term impact. ACMs for weed treatment would help to ensure that the vegetation restoration is completed in a timely manner and that invasive weed species are controlled to the extent possible. There may be a short-term loss of forage production and/or quality due to dust deposition. ACMs related to air quality would reduce the dust-related effects.

Proposed mitigation measures:

ROW-GRA-1: Temporary fencing in livestock high use areas. In the final POD to be prepared as an attachment to the BLM ROD, the SNWA would conduct pre-construction surveys to determine livestock high use locations in and adjacent to the construction ROW where application of temporary fencing would benefit revegetation species establishment. The results of these surveys would be provided to the BLM for review and concurrence. Reseeded areas that are temporarily fenced would be monitored by the SNWA on a yearly basis until the BLM determines that reseeded areas are self-sustaining, and fencing removed. It is anticipated that this measure would be applied in discrete areas of 5 acres or less, unless the BLM identifies a need to temporarily fence larger areas. Effectiveness: Temporary fencing would be effective in improving the stabilization and persistence of reseeded areas in the short-term. In the long-term, annual precipitation from year to year, and the seasonal distribution of livestock within the allotment would determine the survival of reseeded plants. Effects on other resources: This measure would also limit wild horse access to forage inside fenced areas. Big game species would not likely be deterred by temporary livestock fencing. Temporary fencing in riparian areas could improve the recovery rate of shrubs and herbs that assist in stabilizing channel banks.

Residual impacts include:

- Short-term loss of forage production and/or quality due to dust deposition as a result of construction and maintenance activities.
- Short- and long-term disturbance in grazing allotments crossed by the GWD Project ROWs. In addition, permanent disturbance would be seen in areas where permanent facilities are constructed. Long-term loss of forage production due to surface disturbance in 7,162 acres along the ROW.
- Long-term potential for a reduction of quality vegetation from the establishment of invasive weedy species.

Injury to Livestock

As discussed for the Proposed Action, open trenches could result in low level impacts to livestock from injury or mortalities. The same applicant-committed measures discussed for the Proposed Action would be applied to this issue involving potential injury to livestock.

Conclusion. There is potential for livestock to be injured or killed due to open trenches and fencing, although ACM A.1.42, A.1.12, and A.1.17 and the guidance provided in the Ely FEIS/ROD reduce this potential impact.

Proposed mitigation measures:

None.

Residual impacts include:

- Short-term potential for livestock injury or death due to open trenches or fencing.

Livestock Movement

Pipeline construction could interfere with the normal movement of livestock due to the presence of construction personnel, open trenches, staging areas, and temporary fencing. This could result in inaccessible areas of rangeland in the short-term. Results could include concentrated grazing in accessible areas and an inability to access water sources in restricted areas. ACM A.8.4 would require that alternative water sources (water troughs or similar) be made available if access to water sources is restricted.

Effects of concentrated grazing potentially would include soil compaction and overgrazed vegetation. As discussed for the Proposed Action, ACM A.8.1 would involve pre-construction coordination with the BLM and grazing permit holders to allow for advance planning of grazing practices.

Conclusion. Interference with normal livestock movement would be short-term. ACMs would provide adequate water supplies and protect wildlife and rangeland resources.

Proposed mitigation measures:

None.

Residual impacts include:

- Short-term potential for concentrated grazing resulting in soil compaction and overgrazed vegetation.

Range Improvements

Pipeline and power line construction would cross 14 grazing allotments. Due to the size of the project area, it is impracticable to identify all the rangeland improvements that are located on these allotments; however, all improvements would be documented prior to the start of construction activities. Temporary removal or damage to some improvements (e.g., fences, cattle guards, water sources) could occur. Any improvements that are removed or damaged

would be replaced or repaired to BLM standards upon completion of construction; protocols for documenting, replacing, and repairing rangeland improvements are included in ACM A.8.2.

Conclusion. According to ACM A.8.2, preconstruction conditions would be documented and range improvements disturbed by construction activities would be restored to their previous condition upon construction completion.

Proposed mitigation measures:

None.

Residual impacts include:

- Temporary removal or destruction of rangeland improvements.

Animal-vehicle Collisions

There is potential for livestock to be injured or killed from animal-vehicle collisions, although ACM A.2.1 would reduce the potential by restricting vehicle speeds to 25 mph or less in construction areas. ACM A.8.3 specifies that property owners would be compensated at fair market value for any livestock struck by a vehicle directly associated with construction activities.

Conclusion. ACMs would adequately protect range animals from vehicles and property owners from incurring loss due to animal-vehicle collision.

Proposed mitigation measures:

None.

Residual impacts include:

- Short-term potential for injury to livestock due to construction activities.
- Short- and long-term potential for animal-vehicle collisions due to operation and maintenance activities.

3.12.2.4 Alternative E

Construction and Facility Maintenance

Reduction of Rangeland Carrying Capacity

Temporary surface disturbance areas consist of the pipeline and power line ROWs and construction support areas. A total of 8,937 acres affecting 20 allotments would be disturbed and there would be a long-term reduction of grazing forage production. Impacts to vegetation communities within the affected allotments are shown in **Table 3.12-11**. The reclamation process could take 4 or more years after construction is completed, based on the expected restoration of disturbed soils and vegetation (Hoover 2009). To improve revegetation success in areas where livestock may congregate (e.g. water sources, corrals and bed grounds), SNWA would install temporary fencing, and achieve revegetation results satisfactory to the BLM before temporary fencing is removed (ROW-GRA-1).

Table 3.12-11 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Alternative E

Allotment Name/Size (acre)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Buckhorn - 21012 / 80,664	618 / 1%	030XB001NV_1	Black sagebrush - *Artemisia nova*	19	3
		R029XY079NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	3	<1
		R029XY085NV	Desert needlegrass - *Achnatherum speciosum*	30	5
		R030XB010NV	Galleta - *Pleuraphis jamesii*	39	6
		029XY017NV_3	Indian ricegrass - *Achnatherum hymenoides* / Shadscale - *Atriplex confertifolia*	109	18
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Spiny Hopsage - *Grayia spinosa*	92	15
		R029XY042NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	198	32
		R029XY059NV	Shadscale - *Atriplex confertifolia*	59	10
		R029XY079NV	Unidentified	69	11
Cave Valley Ranch - 00904 / 38,585	63 / <1%	R028AY015NV	Wyoming big sagebrush - *Artemisia tridentata*	63	100
Cleveland Ranch - 01119 / 16,749	12 / <1%	R028AY013NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	12	100
Cliff Springs - 21016 / 32,964	289 / 1%	R029XY079NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	3	1
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Desert needlegrass - *Achnatherum speciosum*	43	15
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Spiny hopsage - *Grayia spinosa*	134	46
		R029XY042NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	109	38

Table 3.12-11 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Alternative E (Continued)

Allotment Name/Size (acre)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Cold Spring - 00909 / 13,102	68 / <1%	R028BY008NV	Indian ricegrass - *Achnatherum hymenoides*	5	7
		R028BY080NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	4	6
		F028BY060NV	Wyoming big sagebrush - *Artemisia tridentata*	5	7
		R028BY070NV R028BY011NV	Unidentified	54	80
Cottonwood - 00132 / 49,964	384 / 1%	R028AY015NV	Black sagebrush - *Artemisia nova*	216	56
		R028AY030NV	Winterfat - *Krascheninnikovia lanata*	6	2
		R028AY015NV	Wyoming big sagebrush - *Artemisia tridentata*	162	42
Delamar - 01083 / 165,499	560 / <1%	030XB019NV_2	Black sagebrush - *Artemisia nova*	50	9
		030XB019NV_2	Creosotebush - *Larrea tridentata*	152	27
		030XB019NV_1	Indian ricegrass - *Achnatherum hymenoides*	266	48
		030XB005NV_4	White bursage - *Ambrosia dumosa*	88	16
		Data Gap	Unidentified	4	<1
Ely Springs - 11029 / 57,849	430 / 1%	R029XY042NV R029XY046NV	Indian ricegrass - *Achnatherum hymenoides*	340	79
		R029XY042NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	15	3
		R029XY059NV	Shadscale - *Atriplex confertifolia* / Winterfat - Krascheninnikovia lanata	21	5
		R029XY042NV	Winterfat - *Krascheninnikovia lanata*	54	13

Table 3.12-11 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Alternative E (Continued)

Allotment Name/Size (acre)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Geyser Ranch - 01101 / 247,746	722 / <1%	R028AY043NV	Basin wildrye - *Leymus cinereus* / Bluebunch wheatgrass - *Pseudoroegneria spicata*	136	19
		R028AY008NV	Black greasewood - *Sarcobatus vermiculatus*	58	8
		R028AY050NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	12	2
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	83	11
		R028AY015NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Atremisia tridentata*	47	7
		R028AY015NV 028AY008NV_1 R028AY001NV	Wyoming big sagebrush - *Artemisia tridentata*	357	49
		Data Gap	Unidentified	29	4
Lower Lake East - 21022 / 52,550	563 / 1%	030XB019NV_2	Black sagebrush - *Artemisia nova*	76	13
		R030XB006NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	35	6
		R030XB019NV	Creosotebush - *Larrea tridentata*	134	24
		R029XY085NV	Desert needlegrass - *Achnatherum speciosum*	105	19
		R030XB010NV 030XB029NV_1	Galleta - *Pleuraphis jamesii*	68	12
		030XB019NV_1	Indian ricegrass - *Achnatherum hymenoides*	101	18
		R030XB006NV	Indian ricegrass - *Achnatherum hymenoides* / Shadscale - *Atriplex confertifolia*	39	7
		R029XY022NV	Unidentified	5	1
Majors - 10126 / 103,533	713 / 1%	R028AY013NV R028AY004NV	Black sagebrush - *Artemisia nova*	102	14
		R029XY079NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	4	1
		R028BY008NV R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	86	12
		R028BY013NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	313	44

Table 3.12-11 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Alternative E (Continued)

Allotment Name/Size (acre)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Majors (Continued)		R028BY013NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	43	6
		F028BY058NV R028AY017NV R028AY015NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	51	7
		F028BY060NV R028AY013NV	Wyoming big sagebrush - *Artemisia tridentata*	108	15
		R028BY070NV	Unidentified	6	1
Oak Springs - 01050 / 191,412	767 / <1%	R029XY079NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	122	16
		R029XY006NV	Indian ricegrass - *Achnatherum hymenoides*	35	5
		R029XY008NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	6	1
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Desert needlegrass - *Achnatherum speciosum*	211	27
		R029XY079NV	Indian ricegrass - *Achnatherum hymenoides* / Spiny hopsage - *Grayia spinosa*	176	23
		R029XY042NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	79	10
		R029XY049NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	96	13
		R029XY008NV	Low sagebrush - *Artemisia arbuscula*	25	3
		R029XY020NV	Winterfat - *Krascheninnikovia lanata*	6	1
		029XY010NV_3	Wyoming big sagebrush - *Artemisia tridentata*	10	1
		029XY077NV	Unidentified	1	<1
Shingle Pass - 00906 / 75,280	103 / <1%	R028AY030NV	Winterfat - *Krascheninnikovia lanata*	26	25
		R028AY015NV	Wyoming big sagebrush - *Artemisia tridentata*	77	75

Table 3.12-11 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Alternative E (Continued)

Allotment Name/Size (acre)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Simpson - 21004 / 8,088	127 / 2%	R029XY059NV	Shadscale - *Atriplex confertifolia* / Winterfat - Krascheninnikovia lanata	127	100
South Spring Valley - 10130 / 84,624	386 / <1%	028AY121NV_1	Basin wildrye - *Leymus cinereus*	33	8
		R028AY004NV R028AY013NV	Black sagebrush - *Artemisia nova*	3	1
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	111	29
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	28	7
		R028AY015NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	141	37
		R028AY015NV	Wyoming big sagebrush - *Artemisia tridentata*	55	14
		Data Gap	Unidentified	15	4
Sunnyside - 21023 / 72,094	514 / 1%	R029XY008NV R029XY006NV	Black sagebrush - *Artemisia nova*	107	21
		R028AY030NV	Winterfat - *Krascheninnikovia lanata*	47	9
		R028AY015NV R028AY001NV	Wyoming big sagebrush - *Artemisia tridentata*	360	70
Tamberlaine - 00901 / 36,839	143 / <1%	R028BY080NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	65	45
		R028BY011NV R028BY045NV	Unidentified	78	55
West Schell Bench - 00433 / 50,279	115 / <1%	R028BY011NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	19	17
		R028BY013NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	1	1
		R028BY086NV	Wyoming big sagebrush - *Artemisia tridentata*	26	22
		R028BY011NV R028BY089NV	Unidentified	69	60

Table 3.12-11 Right-of-way Impacts to Vegetation Communities by Grazing Allotment, Alternative E (Continued)

Allotment Name/Size (acre)	Surface Disturbance (acres)/ Percent of Allotment	Ecosite ID	Vegetation Community[1]	Surface Disturbance Acres	Percentage of Surface Disturbance within Allotment
Willow Springs - 10129 / 85,708	555 / 1%	028AY121NV_1	Basin wildrye - *Leymus cinereus*	39	7
		R028AY004NV	Black sagebrush - *Artemisia nova*	4	1
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides*	178	32
		R028AY013NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	171	31
		R028BY013NV	Indian ricegrass - *Achnatherum hymenoides* / Winterfat - *Krascheninnikovia lanata*	12	2
		R028AY015NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	151	27
Wilson Creek - 01201 / 567,448	1,805 / <1%	R029XY008NV R028AY013NV R028AY015NV	Black sagebrush - *Artemisia nova*	274	15
		R028AY050NV R028AY088NV	Bluebunch wheatgrass - *Pseudoroegneria spicata*	87	5
		R029XY046NV 029XY049NV_2	Indian ricegrass - *Achnatherum hymenoides*	252	14
		R029XY008NV	Indian ricegrass - *Achnatherum hymenoides* / Black sagebrush - *Artemisia nova*	94	5
		R028AY015NV R029XY006NV	Indian ricegrass - *Achnatherum hymenoides* / Wyoming big sagebrush - *Artemisia tridentata*	99	5
		R029XY046NV R029XY059NV	Shadscale - *Atriplex confertifolia* / Winterfat - Krascheninnikovia lanata	118	7
		R029XY046NV R029XY159NV R029XY020NV	Winterfat - *Krascheninnikovia lanata*	346	19
		R028AY013NV R028AY015NV R028AY001NV	Wyoming big sagebrush - *Artemisia tridentata*	521	29
		F028AY074NV R028AY088NV	Unidentified	14	1

[1] Unidentified plant communities are due to soil data gaps and incomplete ecological site surveys.

There is the risk that halogeton or other invasive plants could invade the ROW disturbed areas and hamper the establishment of quality forage species. Invasive vegetation degrades quality forage in several ways. Weeds out compete most native plants and can lead to a homogeneous vegetative landscape. Weedy habitats often contain fewer

highly nutritious forage species for grazers. The potential for invasive vegetation that is currently occurring to spread, and for new invasive species to be introduced, would be highest along the linear features (e.g., roads, pipeline system). However, this risk would be offset by ACMs for weed treatment (A.1.82 through A.1.89).

Permanent surface disturbances would consist of access roads and aboveground facilities. A total of 562 acres affecting 16 allotments would have a permanent reduction of grazing forage production. **Table 3.12-12** gives a breakdown of permanent facility-related surface impacts by grazing allotment.

During the reclamation process 8,375 acres would be reclaimed to pre-construction conditions. This recovery process would be long-term and would initially reduce grazing forage production for all affected allotments.

Maintenance activities for operational facilities are unlikely to have additional impacts to rangelands and livestock grazing, since they would be conducted in areas already described as permanently disturbed. If maintenance or repair activities require additional ROWs, prior approval would be obtained from the BLM.

All construction and maintenance activities have the potential to reduce forage production and palatability due to the deposition of fugitive dust particles around areas of construction and along unpaved roads. ACMs for air resources (A.10.1, A.10.2, A.10.4, and A.10.6 through A.10.8) would be applied for this issue involving potential dust effects on livestock forage.

Table 3.12-12 Aboveground Facility Permanent Impacts by Grazing Allotment, Alternative E

Project Facility	Basin	Allotment	Impacted Acreage
Access Road	Cave Valley	NV - Sunnyside - 21023	20
	Coyote Spring Valley	NV - Delamar - 01083	39
		NV - Lower Lake East - 21022	15
	Delamar Valley	NV - Buckhorn - 21012	42
		NV - Oak Springs - 01050	30
	Dry Lake Valley	NV - Cliff Springs - 21016	25
		NV - Ely Springs - 11029	35
		NV - Oak Springs - 01050	23
		NV - Simpson - 21004	11
		NV - Wilson Creek - 01201	88
	Lake Valley	NV - Geyser Ranch - 01101	24
		NV - Wilson Creek - 01201	26
	Spring Valley	NV - Wilson Creek - 01201	14
Electrical Substation Site - Primary	Dry Lake Valley	NV - Oak Springs - 01050	10
	Spring Valley	NV - South Spring Valley - 10130	45
Electrical Substation Site - Secondary	Cave Valley	NV - Sunnyside - 21023	1
	Coyote Spring Valley	NV - Lower Lake East - 21022	7
Pressure Reducing Station	Coyote Spring Valley	NV - Lower Lake East - 21022	7
	Dry Lake Valley	NV - Wilson Creek - 01201	4
Pumping Station Site	Lake Valley	NV - Geyser Ranch - 01101	5
	Spring Valley	NV - South Spring Valley - 10130	75

Table 3.12-12 Aboveground Facility Permanent Impacts by Grazing Allotment, Alternative E (Continued)

Project Facility	Basin	Allotment	Impacted Acreage
Regulating Tank Site	Delamar Valley	NV - Buckhorn - 21012	5
	Dry Lake Valley	NV - Oak Springs - 01050	5
		NV - Wilson Creek - 01201	4
	Lake Valley	NV - Geyser Ranch - 01101	2

Conclusion. Acreage and forage production in the grazing allotments crossed by the ROW would be disturbed. The reclamation would take more than two years to complete; therefore, this would be considered a long-term impact. ACMs for weed treatment would help to ensure that the vegetation restoration is completed in a timely manner and that invasive weed species are controlled to the extent possible. There may be a short-term loss of grazing forage production and/or quality due to dust deposition. ACMs related to air quality will reduce the dust-related effects.

Proposed mitigation measures:

None.

Residual impacts include:

- Short-term loss of grazing forage and/or quality due to dust deposition as a result of construction and maintenance activities.
- Short- and long-term disturbance in grazing allotments crossed by the GWD Project ROWs. In addition, permanent disturbance would be seen in areas where permanent facilities are constructed. Long-term loss of grazing forage production due to surface disturbance in 8,937 acres along the ROW.
- Long-term potential for a reduction of quality vegetation from the establishment of invasive weedy species.

Injury to Livestock

The potential effects of open trenches on livestock for Alternative E would be the same as discussed for the Proposed Action. ACMs would be applied to reduce injury or mortalities to livestock.

Conclusion. There is potential for livestock to be injured or killed due to open trenches and fencing, although ACMs A.1.42, A.1.12, and A.1.17 and the guidance provided in the Ely FEIS/ROD reduce this potential impact.

Proposed mitigation measures:

None.

Residual impacts include:

- Short-term potential for livestock injury or death due to open trenches or fencing.

Livestock Movement

The effects of ROW and facility construction on livestock movement for Alternative E would be the same as discussed for the Proposed Action. The only notable difference is livestock in Snake Valley allotments would not be affected for this alternative. ACM A.8.4 would require that alternative water sources (water troughs or similar) be made available if access to water sources is restricted.

Effects of concentrated grazing potentially would include soil compaction and overgrazed vegetation. As stated in ACM A.8.1, to ensure the best use of available rangeland, pre-construction coordination with the BLM and grazing permit holders would be conducted to allow for advance planning of grazing practices.

Conclusion. Interference with livestock movement would be short-term. ACMs would provide adequate water supplies and protect wildlife and rangeland resources.

Proposed mitigation measures:

None.

Residual impacts include:

- Short-term potential for concentrated grazing resulting in soil compaction and overgrazed vegetation.

Range Improvements

Pipeline and power line construction would cross 20 grazing allotments. Due to the size of the project area, it is impracticable to identify all the rangeland improvements that are located on these allotments; however, all improvements would be documented prior to the start of construction activities. Temporary removal or damage to some improvements (e.g., fences, cattle guards, water sources) could occur. Any improvements that are removed or damaged would be replaced or repaired to BLM standards upon completion of construction; protocols for documenting, replacing, and repairing rangeland improvements are included in ACM A.8.2.

Conclusion. According to ACM A.8.2, pre-construction conditions would be documented and range improvements disturbed by construction activities would be restored to their previous condition upon construction completion.

Proposed mitigation measures:

None.

Residual impacts include:

- Temporary removal or destruction of rangeland improvements.

Animal-vehicle Collisions

There is potential for livestock to be injured or killed from animal-vehicle collisions, although ACM A.2.1 would reduce the potential by restricting vehicle speeds to 25 mph or less in construction areas. ACM A.8.3 specifies that property owners would be compensated at fair market value for any livestock struck by a vehicle associated with construction activities.

Conclusion. ACMs would adequately protect range animals from vehicles and property owners from incurring loss due to an animal-vehicle collision.

Proposed mitigation measures:

None.

Residual impacts include:

- Short-term potential for injury to livestock due to construction activities.
- Short- and long-term potential for animal-vehicle collisions due to operation and maintenance activities.

3.12.2.5 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 3.12-13**).

Table 3.12-13 Rangeland and Livestock Grazing Impact Summary for Alignment Options 1 through 4

Alignment Options	Analysis
Alignment Option 1 (Humboldt-Toiybe Power Line Alignment) **Option Description**: Change the locations of a portion of the 230-kV power line from Gonder Substation near Ely to Spring Valley. **Applicable To**: Proposed Action and Alternatives A through C and E.	• This option transmission line alignment would result in 24 fewer acres of surface disturbance, and consequently a slightly smaller long-term loss of livestock forage than along the corresponding Proposed Action segment. Access for livestock would be slightly better than the Proposed Action alignment because the option would widen an existing transmission line ROW.
Alignment Option 2 (North Lake Valley Pipeline Alignment) **Option Description**: Change the locations of portions of the mainline pipeline and electrical transmission line in North Lake Valley. **Applicable To**: Proposed Action and Alternatives A through C and E.	• This option would cause long-term surface disturbance of 23 more acres of sagebrush shrubland to construct the mainline pipeline and transmission, and would commit 5 more acres for long term industrial use for a pump station as compared to the Proposed Action.
Alignment Option 3 (Muleshoe Substation and Power Line Alignment) **Option Description**: Eliminate the Gonder to Spring Valley transmission line and construct a substation with an interconnection with an interstate, high voltage power line in Muleshole Valley. **Applicable To**: Proposed Action and Alternatives A through C and E.	• This option would eliminate all vegetation clearing associated with construction of a 230-kV transmission line from Gonder Substation near Ely to Spring Valley, for a surface disturbance reduction of 410 acres as compared to the Proposed Action. Construction of the Muleshoe Substation would require an additional long-term land commitment of 43 acres of sagebrush shrubland for industrial uses as compared to the Proposed Action.
Alignment Option 4 (North Delamar Valley Pipeline and Power Line Alignment) **Option Description**: Change the location of a short section of mainline pipeline in Delamar Valley to follow an existing transmission line. **Applicable To**: All alternatives.	• This option would be located adjacent to an existing transmission line and would be shorter by 2 miles (representing 24 fewer acres of surface disturbance) as compared to the Proposed Action. However, a 10-acre pump station (5 acres permanent, 5 acres temporary) would be constructed adjacent to the Highway 93. As a consequence, implementation of the option would result in a net of 14 fewer acres of long-term surface disturbance to Mojave desert shrubland, as compared to the Proposed Action.

3.12.2.6 No Action

Under the No Action Alternative, the project would not be constructed or operated as proposed; therefore, no proposed project-related surface disturbance would occur. Impacts to grazing allotments would continue at present levels as a result of natural conditions and existing and other proposed development within the project area. Livestock management on public lands would continue to be directed by the Ely and Southern Nevada District offices in Nevada and the Fillmore Field Office in Utah.

3.12.2.7 Comparison of Alternatives

Table 3.12-14 provides a comparison of impacts for construction and facility maintenance of the Proposed Action and Alternatives A through E.

Table 3.12-14 Comparison of Alternatives

Parameter	Proposed Action and Alternatives A through C	Alternative D	Alternative E
Allotments Located within ROWs or Facilities	23	14	20
Temporary Reduction in Acres	10,544	7,162	8,937
Permanent Reduction in Acres	708	564	562

3.12.2.8 Groundwater Development and Groundwater Pumping

Issues

Groundwater Field Development Construction and Facility Maintenance

- Temporary reduction of rangeland carrying capacity due to surface disturbance. Permanent reduction of rangeland carrying capacity due to permanent surface disturbance for roads and facilities.
- Loss of, or injury to, livestock due to open trenches and fences.
- Effects to livestock movement due to staging of pipeline and power line equipment.
- Impacts to rangeland improvements.
- Animal-vehicle collisions.

Groundwater Pumping

- Potential effects of groundwater pumping on water source availability for livestock.
- Effects of groundwater drawdown on forage production due to loss of or changes to vegetation production or composition (see Vegetation Resources, Section 3.6).

Assumptions

The following assumptions were used in the impact analysis for rangelands and livestock grazing:

Groundwater Field Development Construction and Facility Maintenance

- Short-term impacts are defined as less than 2 years. Long-term impacts are defined as greater than 2 years. Permanent impacts assume that the land will not be reclaimed or returned to its previous use.
- In situations where the Las Vegas RMP does not specify management actions related to range management and livestock grazing, the actions described in the Ely RMP will be used.

Groundwater Pumping

- Springs and streams are high value areas and impacts to them need to be qualified or, where possible, quantified as the best means for determining impacts to livestock grazing forage.
- 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).
- A groundwater depth of 50 feet or deeper in relation to the ground surface elevation is not accessible to the roots of nearly all phreatophytic shrubs, and this groundwater depth represents a reasonable boundary for: 1) estimating the deepest root zone extent of plant communities that are at least partially dependent on underlying groundwater and 2) defining a groundwater drawdown boundary that assumes that the roots of overlying plant communities no longer have access to groundwater as a moisture source at depths greater than 50 feet.
- ET units mapped as Wetland/Meadow and Basin Shrubland cover types represent the primary cover types that would be affected by drawdown effects.
- Groundwater pumping could impact groundwater-feed water sources in the high- to medium-risk areas identified within rangeland grazing allotments. Information related to groundwater development areas and groundwater pumping, including the methodology, assumptions, and limitations of the Central Carbonate-rock Province (CCRP) groundwater model developed specifically for this project, is available in Section 3.3.2.8.
- Assumptions about the potential changes in livestock 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 incremental contribution of climate change effects to project effects cannot be reasonably estimated. 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

Groundwater Field Development Construction and Facility Maintenance

- For the impact analysis study, impact parameters were used as both an indication of impacts and as a means of quantifying impacts. These parameters also allowed for comparison between alternatives or groups of alternatives.
- Estimates of change to livestock grazing forage production and management in grazing allotments were based on short- and long-term displacement and drawdown effects and effects on allotment forage production.

Groundwater Pumping

- The 10-foot drawdown contour was applied to the springs and perennial stream reaches that were classified as being at risk from groundwater drawdown (Section 3.3, Water Resources). The springs included for analysis were those rated as presenting a "high" or "moderate" risk of effects. The number of springs, and miles of perennial stream reaches potentially affected were enumerated for each alternative during the three model time frames (full build out, full build out plus 75 years, full build out plus 200 years).
- Identification of water supplies within grazing allotments that occur within the APE were determined by the 10-foot and greater drawdown contour predicted by the groundwater model. Information related to groundwater development areas and groundwater pumping, including the methodology, assumptions, and limitations of the CCRP groundwater model developed specifically for this project, is available in Water Resources, Section 3.3.2.8.
- 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 (Vegetation Resources, Section 3.5).

3.12.2.9 Proposed Action

Groundwater Development Area

Construction, Operation, and Maintenance

Since the exact location of well field development facilities has not been determined, this impact discussion is general in regard to rangeland and livestock grazing. Further NEPA analysis would be required once specific locations for wells, collector lines, and other future facilities have been identified.

Reduction of Rangeland Carrying Capacity

Construction of well pads, transmission lines, access roads, and collector pipelines would cause similar reductions in forage availability, as discussed for pipeline and power line ROW construction. A maximum of 8,300 acres would be temporarily disturbed by construction. Approximately 67 percent or 5,540 acres of the surface disturbance would be in the form of permanent facilities and would not be revegetated. Approximately 2,760 acres would be reclaimed to pre-construction conditions. This recovery would be a long-term process and would initially reduce the carrying capacity of grazing forage.

The Proposed Action could result in reduced forage quality from the spread of existing invasive vegetation and the introduction of new species of invasive vegetation. Invasive vegetation degrades quality forage in several ways. Weeds out-compete most native plants and can lead to a homogeneous vegetative landscape. Weedy habitats often contain fewer highly nutritious forage species for grazers. The potential for invasive vegetation that is currently occurring to spread and for new invasive species to be introduced would be highest along the linear features (e.g., roads, pipeline system). ACMs discussed for the Proposed Action ROWs and facilities also would be applied to groundwater development disturbance areas.

All construction and maintenance activities have the potential to reduce forage production and palatability due to the deposition of fugitive dust particles around areas of construction and along unpaved roads. The effect of dust deposition on livestock grazing can vary depending on factors such as wind, frequency and timing of precipitation events, and the

availability of palatable vegetation elsewhere within the affected allotments. These effects would be offset by ACMs for air quality (A.10.1, A.10.2, A.10.4, and A.10.6 through A.10.8).

Proposed well development areas would be located within five hydrologic basins: Cave, Delamar, Dry Lake, Snake, and Spring valleys. A total of 41 grazing allotments (729,957 acres) are within, or partially within, the groundwater development areas. Although construction activities are expected to last 2 to 3 years, it could take several more years before temporary disturbance areas are successfully reclaimed. Even when vegetation is established following reclamation efforts, the composition of species in the recovery area is often different from the original plant community, which could result in the diminished quality of available forage. **Table 3.12-3** details the acreage of groundwater development areas within affected allotments that have the potential for disturbance by well field development.

Effects of concentrated grazing potentially would include soil compaction and overgrazed vegetation. As stated in ACM A.8.1, to ensure the best use of available rangeland, pre-construction coordination with the BLM and grazing permit holders would be conducted to allow for advance planning of grazing practices. To improve revegetation success in areas where livestock may congregate (e.g. water sources, corrals and bed grounds), it is recommended that SNWA install temporary fencing, and achieve revegetation results satisfactory to the BLM before temporary fencing is removed (ROW-GRA-1).

Injury to Livestock

Potential effects of open trenches during construction of linear pipelines would represent a low level impact to livestock, as discussed for the Proposed Action ROWs. The same ACMs would be applied to groundwater development activities involving open trenches to reduce livestock injuries or mortalities.

Livestock Movement

Construction of groundwater development areas could result in restrictions to livestock movements, as discussed for the Proposed Action ROWs. The same ACMs would be applied to groundwater development activities involving reductions in any restrictions to livestock movements.

Range Improvements

Groundwater development construction would cause surface disturbance in 41 grazing allotments. Construction of groundwater development areas could result in the removal or damage of rangeland improvements, as discussed for the Proposed Action ROWs. The same ACMs would be applied to groundwater development activities involving documentation, replacement, and repairs to existing improvements.

Animal-vehicle Collisions

There is potential for livestock to be injured or killed by animal-vehicle collisions, although ACM A.2.1 would reduce the potential by restricting vehicle speeds to 25 mph or less in construction areas. ACM A.8.3 specifies that property owners would be compensated at fair market value for any livestock struck by a vehicle directly associated with construction activities.

Conclusion. Impacts resulting from the construction and operation of wells, access roads, collector pipelines, and supporting ancillary facilities in Cave, Dry Lake, Delamar, Snake, and Spring valleys would likely be similar to, but would affect more acres than the pipeline and power line ROWs. The main emphasis would be on loss of grazing acreage, loss of natural and man-made water sources, and an associated reduction of forage production. Livestock could potentially suffer injury or even death due to open trenches or fencing. Restrictions to free movement could result in compacted soil, overgrazed vegetation or the need to provide supplemental sources of water. Rangeland improvements could be damaged or removed by construction activities in the short term. Any changes to rangeland improvements would be returned to their post-construction state upon completion of construction activities. There is potential for livestock injury or death due to animal-vehicle collisions.

Proposed mitigation measures:

ROW-AQ-2: Alternative Dust Control Measure. ROW-AQ-2 would reduce fugitive dust deposition and potential effects on forage vegetation.

ROW-VEG-1: Green Stripping. ROW-VEG-1 would assist in the prevention of invasive weeds and effects on livestock forage.

ROW-GRA-1: Temporary fencing in livestock high use areas. ROW-GRA-1 would be implemented in high livestock use areas to improve revegetation success by providing short-term protection of reseeded surface disturbance.

GW-WL-1: Wildlife Resources. GW-WL-1 also would reduce impacts to livestock grazing by avoiding crucial summer and winter ranges when considering the placement of wells, roads, and other facilities.

Residual impacts include:

- Temporary and permanent loss of forage associated with construction and maintenance activities and permanent facilities.
- Short- and long-term potential for livestock injury or death due to construction and maintenance activities.
- Short-term potential for concentrated grazing resulting in soil compaction and overgrazed vegetation.
- Temporary removal of, or damage to, rangeland improvements.

Groundwater Pumping

The capacity of the habitat within each grazing allotment to sustain livestock includes consideration of adequate forage, water, space, and cover. Reduced stream or spring flows could adversely affect forage production on a given allotment and cause overgrazing close to existing water sources.

For the purposes of this EIS, the index for delineation of drawdown with potential effects to water sources was determined by the 10-foot or greater drawdown contour, as predicted by the groundwater model. Information related to groundwater development areas and groundwater pumping, including the methodology, assumptions, and limitations of the groundwater model developed specifically for this project, is available in Water Resources, Section 3.3.2.8. Approximately 8 springs in 2 allotments occur within the high or moderate risk areas at full build out and 210 springs in 25 allotments and 303 springs in 34 allotments occur at full build out plus 75 years and full build out plus 200 years, respectively; 6 miles of perennial streams in 5 allotments occur within the high or moderate risk areas at full build out and 73 miles in 25 allotments and 102 miles in 32 allotments occur at full build out plus 75 years and full build out plus 200 years, respectively, as predicted by the groundwater model across all allotments (**Tables F3.12-2** and **F3.12-3**). These tables show the potentially affected number of springs and miles of perennial streams at the time period related to full build out, full build out plus 75 years, and full build out plus 200 years for all pumping alternatives. If no effects were shown at full build out, the table presents only the data from the time period associated with full build out plus 200 years. The above mentioned springs are a combination of field verified and unverified types. Unverified springs typically originate from map data sources and may change over time. See **Table F3.12-2** for the total number of springs affected as well as the number of affected field verified springs.

Additional effects beyond drying of streams and springs are the potential for livestock to damage remaining water sources due to the overuse of a reduced number of available water sources and impacts to wetland meadows and basin shrubland areas. **Table F3.12-4** shows the acreage of wetland/meadow and basin shrubland vegetation communities within the area of potential concern at full build out (9 allotments and 17,819 acres) at full build out plus 75 years (28 allotments and 142,975 acres), and at full build out plus 200 years (32 allotments and 200,080 acres). Drawdown in these areas potentially could reduce available high-quality forage in wetland/meadow and basin shrubland areas (see Section 3.12.1.2, 3.12.1.4 and Vegetation Resources, Section 3.5.2.8). Although beneficial upland vegetation may become established in these affected areas, this also presents an opportunity for unpalatable or less nourishing species, as well as undesirable invasive species, to become established. Based on the overall size (730,000 acres) of the potentially affected allotments within the region of study, the Wetland/Meadow and Basin Shrubland area where plant

species composition could potentially change as the result of groundwater pumping would range from 2 percent at full build out; 20 percent at full build out plus 75 years; and 27 percent at full build out plus 200 years. Depending on the rates of vegetation species composition change, it may be necessary to re-evaluate livestock stocking rates over the long time periods. As discussed below, there may be opportunities to offset forage value change by rangeland improvements, and provision of more surface water in selected locations to improve livestock distribution and forage use.

ACMs would offset some impacts from drawdown in grazing allotments. Measures identified as part of the applicant's Adaptive Management Plan are listed below.

- ACM C.2.15: Modify use of SNWA's agricultural water rights in Spring Valley (i.e., changing crops, watering cycles, diverting saved water to the wet meadow areas) to offset changes in spring discharges needed to maintain wet meadow areas in other Spring Valley areas.
- ACM C.2.19: Utilize conservation and protection non-use on BLM grazing allotments on which SNWA holds grazing permits for the purposes of: 1) protecting the land and its resources from destruction or unnecessary injury; 2) improving rangeland conditions; or 3) enhancing resource values, uses, or functions (in accordance with guidelines set forth in BLM Instruction Memorandum No. 2009-057).
- ACM C.2.21: Conduct facilitated recharge projects to offset local groundwater drawdown to benefit sensitive biological areas.

Conclusion. Flow reductions in streams and springs could occur where those streams and springs occur in an area of moderate to high risk (determined by their location within the area of greater than 10 feet of drawdown and occurrence in the valley floors and valley margins). Groundwater-dependent water features (natural and man-made) in those areas potentially could be impacted. In addition, there is the potential for livestock to damage remaining water sources and the wetland meadows and phreatophyte areas that typically surround them due to the overuse of a reduced number of available water sources. While there may a decline in carrying capacity in the ET areas (Wetland/Meadow and Basin Shrubland) as the result of groundwater pumping, there are opportunities over the long term to conduct upland rangeland improvement projects to offset losses elsewhere, and to improve the distribution and reliability of surface water sources to improve the overall forage utilization rate.

Proposed mitigation measures:

- None.

Residual impacts include:

- Long-term loss of vegetation/forage production due to groundwater drawdown.
- ACM's and monitoring and mitigation measures could be effective in reducing impacts to water sources for wild horses. However; it is not possible to determine the level of impact reduction at this time. Residual effects on some water sources could occur considering the potential long-term recovery period.
- Long-term potential for forage quality reduction due to drying of phreatophyte and wet meadow areas.
- Long-term potential for forage quality reduction due to concentrated grazing in phreatophyte and wet meadow areas.

3.12.2.10 Alternatives A through E

Groundwater Development Area

The impacts to grazing and rangelands that could result from construction, operation, and maintenance of groundwater development areas for Alternatives A through E are summarized in **Table 3.12-15**.

Table 3.12-15 Summary of Grazing and Rangeland Impacts, Proposed Mitigation, and Residual Effects, Alternatives A through E

Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Construction, Operation, and Maintenance				
Temporary forage production loss of 4,800 acres. 67% of disturbance area is permanent with a forage production loss of 3,216 acres. 1,584 acres being reclaimed.	Temporary forage production loss of 4,660 acres. 67% of disturbance area is permanent with a forage production loss of 3,122 acres. 1,538 acres being reclaimed.	Temporary forage production loss of 4,800 acres. 67% of disturbance area is permanent with a forage production loss of 3,216 acres. 1,584 acres being reclaimed.	Temporary forage production loss of 3,900 acres. 67% of disturbance area is permanent with a forage production loss of 2,613 acres. 1,287 acres being reclaimed. There would be no facilities located north of Lincoln County.	Temporary forage production loss of 4,000 acres. 67% of disturbance area is permanent with a forage production loss of 2,680 acres. 1,320 acres being reclaimed. There would be no facilities located in Snake Valley.
Same residual impacts as the Proposed Action	Same residual impacts as the Proposed Action	Same residual impacts as the Proposed Action	Same residual impacts as the Proposed Action	Same residual impacts as the Proposed Action
Recommended Mitigation				
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.
Residual Impacts				
ACM's, mitigation, and monitoring 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 considering the long-term recovery period.				

Groundwater Pumping

The impacts of pumping on grazing and rangelands for Alternatives A through E and No Action are summarized in **Table 3.12-16**.

Table 3.12-16 Summary of Pumping Impacts for Alternatives A through E

Parameter	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	No Action
Springs within Grazing Allotments[1] (three model periods)	3, 118, 180	41, 156, 259	3, 63, 94	1, 41, 121	3, 55, 104	28, 46, 86
Miles of Perennial Streams within Grazing Allotments (three model periods)	1, 52, 72	3, 78, 105	1, 37, 50	0, 5, 39	1, 6, 20	7, 19, 52
Wetland Meadow and/or Basin Shrubland Forage Quality Reductions within Grazing Allotments[2] (three model periods)	12,150, 111,564, 130,378	18,745, 103,467, 156,713	12,150, 45,413, 53,799	18,245, 18,245, 85,811 Groundwater pumping would only occur in Lincoln County.	12,150, 73,977, 87,224 There would be no groundwater pumping in Snake Valley.	10,595, 32,490, 43,460

Table 3.12-16 Summary of Grazing and Rangelands Impacts, Proposed Mitigation, and Residual Effects for Alternatives A through E (Continued)

Parameter	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	No Action
Recommended Mitigation						
	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.	
Residual Impacts						
ACM's, mitigation, and monitoring could be effective in reducing impacts to water sources, however it is not possible to tell the level of impact reduction .Residual effects could occur to some water sources considering the long-term recovery period.						

[1] Springs listed include those that have been field verified and unverified. See **Table F3.12-2** for impacts specific to field verified springs.
[2] This refers to basin shrubland and wetland/meadow ET unit vegetation cover types. See Proposed Action – Groundwater Pumping for a description of vegetation transitions.

3.12.2.11 No Action

Groundwater Development Area

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 livestock grazing. Current environmental conditions would continue to influence the landscape and current land management objectives and activities would provide guidance.

Groundwater Pumping

The types of impacts to springs, streams, and wetland/meadow and basin shrubland (ET unit) forage reductions associated with groundwater drawdown, due to existing pumping activities, would be similar to the Proposed Action. **Tables F3.12.2** through **F3.12.4** present numbers for springs, streams, and ET unit areas contained within high or moderate risk areas for all alternatives. **Table 3.12-16** provides a summary of potential impacts to these resources for the No Action Alternative.

Conclusion. Model simulations predicted that current groundwater pumping would have drawdown effects of 10-foot or greater primarily in Lincoln County. Similar vegetation composition changes as discussed under the Proposed Action due to a reduction of available soil moisture would occur. At full build out plus 200 years, modeling predicted that 86 springs, 53 miles of perennial streams, and 43,460 acres of wetland/meadow and basin shrubland ET areas would be affected by a lack of plant available soil moisture.

3.12.3 Cumulative Impacts

3.12.3.1 Issues

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

- Temporary reduction of grazing forage production due to surface disturbance. Permanent reduction of grazing forage production due to permanent surface disturbance for roads and facilities.
- Loss of, or injury to, livestock due to open trenches and fences.
- Effects to livestock movement due to staging of pipeline and power line equipment.
- Impacts to rangeland improvements.
- Animal-vehicle collisions.

Groundwater Pumping

- Potential effects of groundwater pumping on water source availability for livestock.
- Effects of groundwater drawdown on forage production due to loss of, or changes to, vegetation production or composition (see Vegetation Resources, Section 3.6).

3.12.3.2 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, gathering lines, 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 water resources region of 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 qualified or, where possible, quantified as the best means for determining impacts to livestock grazing.
- A groundwater depth of 50 feet or deeper in relation to the ground surface elevation is not accessible to the roots of nearly all phreatophytic shrubs, and this groundwater depth represents a reasonable boundary for: 1) estimating the deepest root zone extent of plant communities that are at least partially dependent on underlying groundwater; and 2) defining a groundwater drawdown boundary that assumes that the roots of overlying plant communities no longer have access to groundwater as a moisture source at depths greater than 50 feet.
- ET units mapped as Wetland/Meadow and Basin Shrubland cover types represent the primary cover types that would be affected by drawdown effects.
- 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).

3.12.3.3 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 activities), reasonably foreseeable projects (RFFAs), and the development areas for the project alternative being evaluated. 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 livestock carrying capacity and management in grazing allotments based on short- and long-term displacement and drawdown effects, and effects on forage production for impacted allotments.
- Projects considered as past and present activities and RFFAs were compiled from the Geocommunicator.gov website hosting LR2000 data. Types of projects for past and present activities and RFFAs include ROWs (telephone, fiber optic, pipelines, power lines, roads, railroads, and other utility corridors), geothermal, wind, and solar energy, agriculture, vegetation treatments, recent fires, and mining activities. Utility corridors are considered part of past and present activities and were removed from RFFA analysis.

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 areas (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.
- Identification of water supplies within grazing allotments that occur within the APE as determined by the 10 foot or greater drawdown contour predicted by the groundwater model and areas of high and moderate risk. Information related to groundwater development areas and groundwater pumping; including the methodology, assumptions, and limitations of the CCRP groundwater model developed specifically for this project; is available in Section 3.3.2.8.
- 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. The number of springs and miles of perennial stream reaches potentially affected were enumerated for each alternative over time from the modeling results.

3.12.3.4 No Action

Rights-of-way and 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 effects to livestock grazing. 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 livestock 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 Chapter 2, Section 2.9.

Groundwater Pumping

Existing and other proposed groundwater pumping projects are anticipated to go forward, resulting in an extension of the APE (within the 10-foot and greater drawdown area identified by the groundwater model). The types of potential impacts to springs, streams, and wetland/meadow and basin shrubland (ET areas) forage reductions associated with groundwater drawdown, due to existing and proposed pumping activities, would be the similar to the Proposed Action.

Table F3.12.5 presents numbers for springs, streams and ET unit areas contained within the 10-foot or greater drawdown boundary for the cumulative effects related to all alternatives. This represents current trends based on environmental conditions and land management objectives and activities. The majority of the effects to wetland/meadow and basin shrubland vegetation would occur in the Wilson Creek-01201 allotment. **Tables 3.12-17** and **F3.12-5** and the following information summarize the incremental expansion of the groundwater drawdown area over time in relation to surface water sources and possible reductions to forage vegetation for rangeland resources.

Table 3.12-17 Summary of Potential Cumulative Pumping Effects with the No Action on Rangeland Resources

Parameter	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs within Grazing Allotments[1]	44	78	116
Miles of Perennial Streams within Grazing Allotments	24	37	72
Acres of Wetland/Meadow and Basin Shrubland Vegetation within Grazing Allotments[2]	23,461	49,198	62,292

[1] Springs listed include those that have been field verified and unverified. See **Table F3.12-2** for impacts specific to field verified springs.
[2] This refers to wetland/meadow and basin shrubland ET unit vegetation cover types.

Full Build Out. The 10-foot drawdown area overlaps with 17 grazing allotments. The Becky Springs, Cherry Creek, and Geyser Ranch allotments contain more than 1,000 acres of wetland/meadow and basin shrubland vegetation potentially at risk.

Full Build Out Plus 75 Years. The 10-foot drawdown area overlaps with 23 grazing allotments. The Becky Springs, Cherry Creek, Comet, Geyser Ranch, and Private-A allotments contain more than 1,000 acres of wetland/meadow and basin shrubland vegetation potentially at risk.

Full Build Out Plus 200 Years. The 10-foot drawdown area overlaps with 31 grazing allotments. The Becky Springs, Cherry Creek, Closed-A, Comet, Douglas Point, Geyser Ranch, and Private-A allotments contain more than 1,000 acres of wetland/meadow and basin shrubland vegetation potentially at risk.

3.12.3.5 Proposed Action

Rights-of-way and Groundwater Development

Surface disturbance impacts to grazing allotments have resulted from recent projects that may have not yet been reclaimed. These impacts would combine with the GWD Project and other foreseeable future actions (Chapter 2, Section 2.8). These disturbances could further reduce the amount of forage and disturb normal livestock movement patterns. The Proposed Action surface disturbance would overlap with three reasonably foreseeable future actions. 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 co-located. The Spring Valley Wind Project would overlap with a GWD area in Spring Valley. The ON Transmission Line Project would share the same utility corridor with GWD facilities in Cave, Dry Lake, Delamar, Pahranagat, Coyote Springs, Hidden, and Garnet Valleys. The Proposed Action surface disturbance is estimated to be between 15,813 and 20,638 acres. Reasonably foreseeable future actions would be approximately 4,340 acres. Until restoration is complete, this would fragment the existing vegetation communities and cause a reduction in forage production. For more information regarding past and present and reasonably foreseeable future actions see Sections 3.12.3.3 and Chapter 2, Section 2.9.

Groundwater Pumping

Several of the grazing allotments 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. The model analysis predicted 50 allotments are at risk of impacts to forage vegetation at the time frame associated with full build out plus 200 years. Information related to groundwater development areas and groundwater pumping; including the methodology, assumptions, and limitations of the Central Carbonate-rock Province (CCRP) groundwater model developed specifically for this project; is available in Water Resources, Section 3.3.2.8. Forage impacts primarily would occur in wetland/meadow and basin shrubland vegetation types as these are reliant on groundwater. These vegetation types are

valuable sources of forage for livestock due to the nourishment they provide and the time of year they are utilized (see Section 3.12.1.2). As these vegetation types experience the effects of groundwater drawdown they will likely be replaced by upland plant communities. These communities may be beneficial for livestock grazing, but there is also a chance that undesirable species (less palatable, nourishing, or available) or invasive species could become established and reduce the quantity and/or quality of available livestock forage (see Section 3.12.1.4 and Vegetation Resources, Section 3.5.2.8 for more information on vegetation transitions). Drawdown effects to springs and streams could include reduced flow rates or complete lack of discharge. This would not only decrease the amount of water available for livestock but may also concentrate grazing pressure into areas where water remains available. The result of this could include excessive stream bank erosion (and by extension increased water turbidity), soil compaction and areas of over grazing. The largest majority of these affected allotments are located in Spring Valley. **Tables 3.12-18** and **F3.12.2** through **F3.12-5** and the following information summarize the effects of cumulative pumping for the Proposed Action on surface water sources and wetland/meadow and basin shrubland vegetation for rangelands. At full build out plus 75 years and full build out plus 200 years, the incremental contribution of pumping effects for the Proposed Action Alternative is approximately 75 percent for springs (both field verified and unverified) and 60 percent for perennial streams (see **Figures 3.12-2** and **3.12-3**). This percentage is based on the relative contribution of Proposed Action pumping to No Action and other cumulative pumping. In Snake and Spring valleys, Proposed Action pumping contributes most of the incremental effects to cumulative drawdown impacts on water and food sources for grazing allotments.

Table 3.12-18 Summary of Potential Cumulative Pumping Effects with the Proposed Action on Rangeland Resources

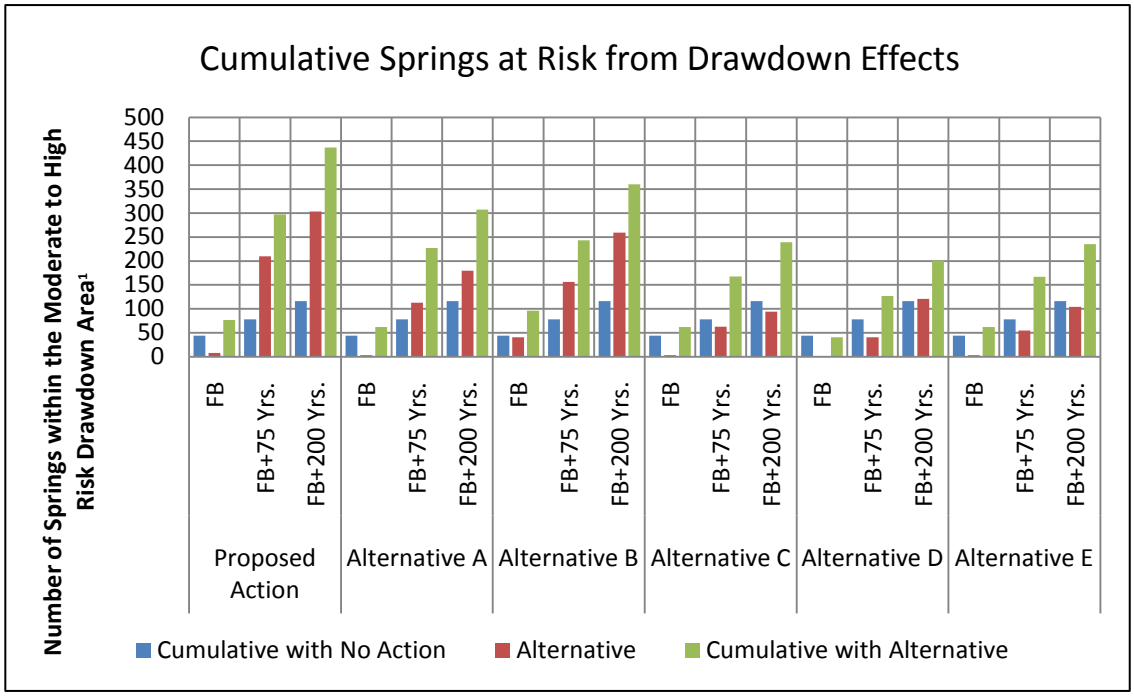
Parameter	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs within grazing allotments[1]	77	297	437
Miles of Perennial and Ephemeral Streams within Grazing Allotments	23	119	176
Acres of Wet/Meadow and Basin Shrubland Vegetation within Grazing Allotments[2]	46,562	196,202	229,159

[1] Springs listed include those that have been field verified and unverified. See Table F3.12-2 for impacts specific to field verified springs.
[2] This refers to wetland/meadow and basin shrubland ET unit vegetation cover types.

Full Build Out. The 10-foot drawdown area overlaps with 25 grazing allotments. The Cherry Creek, Geyser Ranch, and South Spring Valley allotments contain more than 5,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 20 percent of the potential cumulative impacts to springs and streams is the result of the Proposed Action pumping. Approximately 38 percent of the potential cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of the Proposed Action pumping.

Full Build Out Plus 75 Years. The 10-foot drawdown area overlaps with 52 grazing allotments. The Baker, Bastian Creek, Cherry Creek, Chokecherry, Geyser Ranch, Knoll Springs, Majors, Muncy Creek, Scotty Meadows, Smith Creek, South Spring Valley, and Willow Spring allotments contain more than 5,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 66 percent of the potential cumulative impacts to springs and streams is the result of the Proposed Action pumping. Approximately 73 percent of the potential cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of the Proposed Action pumping.

Full Build Out Plus 200 Years. The 10-foot drawdown area overlaps with 59 grazing allotments. The Baker, Cherry Creek, Geyser Ranch, Muncy Creek, Scotty Meadows, South Spring Valley, and Willow Spring allotments contain more than 10,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 70 percent of the potential cumulative impacts to springs and streams is the result of the Proposed Action pumping. Approximately 87 percent of the potential cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of the Proposed Action pumping.



[1] 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 3.12-2 Incremental Contribution of the Proposed Action and All Alternatives on Springs in Moderate to High Risk Areas

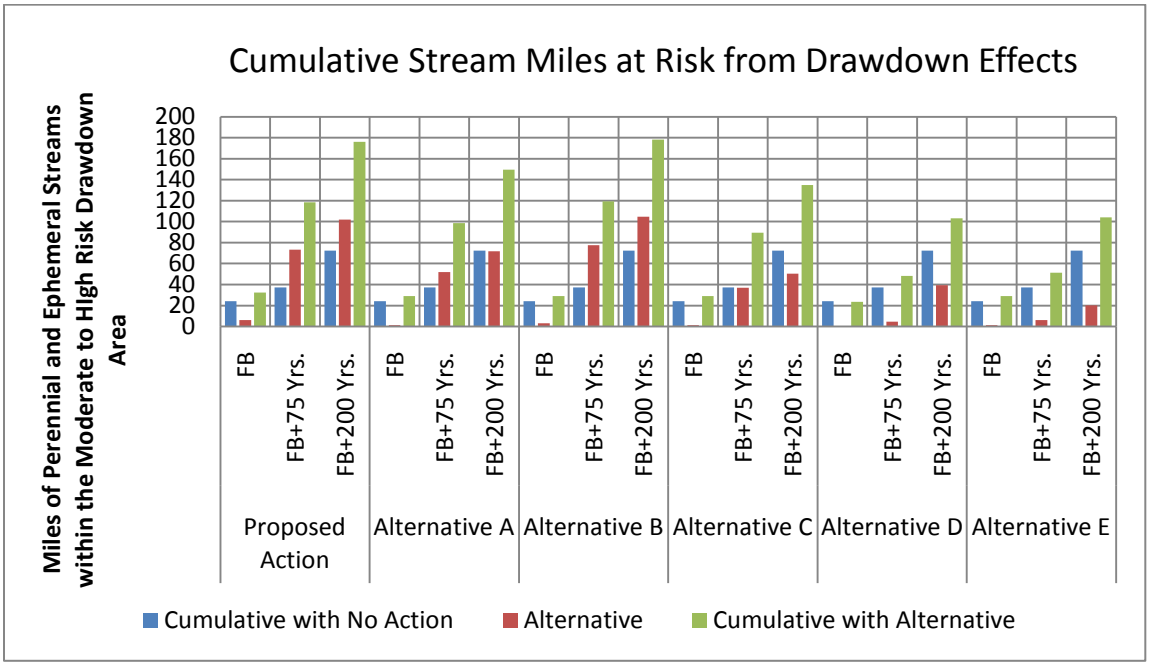


Figure 3.12-3 Incremental Contribution of the Proposed Action and All Alternatives on Perennial Streams in Moderate to High Risk Areas

3.12.3.6 Alternative A

Rights-of-way and Groundwater Development

Surface impacts from this and present and foreseeable actions would be the same in nature as for the Proposed Action. Alternative A surface disturbance is estimated to be between 14,294 and 17,040 acres. Overlap with foreseeable future projects would be the same as for the Proposed Action. Until restoration is complete, this would fragment the existing vegetation communities and cause a reduction in forage production. For more information regarding past and present and reasonably foreseeable future actions see Section 2.9. For more information regarding past and present and reasonably foreseeable future actions see Sections 3.12.3.3 and Chapter 2, Section 2.8.

Groundwater Pumping

Several of the grazing allotments within the region of study would be affected by cumulative groundwater drawdown. Based on the drawdown risk analysis; 61 are at risk of impacts to forage vegetation at the time frame associated with full build out plus 200 years (for information related to the groundwater model developed specifically for this project see Section 3.3.2.8). Drawdown impacts to springs, streams, and wetland/meadow and basin shrubland vegetation would be similar in nature as for the Proposed Action (see Section 3.12.3.5). The largest majority of these affected allotments are located in Spring Valley. **Tables 3.12-19,** and **F3.12-5** and the following information summarize the effects of cumulative pumping for Alternative A on surface water sources and forage vegetation for rangeland. At full build out plus 75 years and full build out plus 200 years the incremental contribution of pumping effects for Alternative A is approximately 50 to 60 percent for springs (both field verified and unverified) and 50 percent for perennial streams (see **Figures 3.12-2** and **3.12-3**). In Snake and Spring valleys, Alternative A pumping contributes most of the incremental effects to cumulative drawdown impacts on water and food sources for grazing allotments.

Table 3.12-19 Summary of Potential Cumulative Pumping Effects with Alternative A on Rangeland Resources

Parameter	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs within grazing allotments[1]	62	227	307
Miles of Perennial Streams within grazing allotments	29	99	149
Acres of Wetland/Meadow and Basin Shrubland Vegetation within grazing allotments[2]	40,959	165,666	189,601

[1] Springs listed include those that have been field verified and unverified. See Table F3.12-2 for impacts specific to field verified springs.

[2] This refers to wetland/meadow and basin shrubland ET unit vegetation cover types.

Full Build Out. The 10-foot drawdown area overlaps with 24 grazing allotments. The Bastian Creek, Becky Springs, Cherry Creek, Geyser Ranch, Majors, Scotty Meadows, South Spring Valley, and Willard Creek allotments contain more than 1,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 7 percent of the cumulative impacts to springs and streams is the result of Alternative A pumping. Approximately 30 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative A pumping.

Full Build Out Plus 75 Years. The 10-foot drawdown area of effect overlaps with 47 grazing allotments. The Baker, Cherry Creek, Chokecherry, Geyser Ranch, Majors, Muncy Creek, Scotty Meadows, Smith Creek, South Spring Valley, and Willow Springs allotments contain more than 5,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 50 percent of the cumulative impacts to springs and streams is the result of Alternative A pumping. Approximately 67 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative A pumping.

Full Build Out Plus 200 Years. The 10-foot drawdown area of effect overlaps with 56 grazing allotments. The Cherry Creek, Geyser Ranch, Muncy Creek, Scotty Meadows, South Spring Valley, and Willow Springs allotments contain more than 10,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis,

approximately 60 percent of the cumulative impacts to springs and 50 percent to streams are the result of Alternative A pumping. Approximately 69 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative A pumping.

3.12.3.7 Alternative B

Rights-of-way and Groundwater Development

Expected cumulative effects of Alternative B would be the same as described for Alternative A. It is not expected that Alternative B would contribute any additional cumulative surface disturbance effects to rangelands or livestock grazing. Alternative B surface disturbance would be approximately 16,890 acres. Overlap with foreseeable future projects would be the same as for the Proposed Action. Until restoration is complete, this would fragment the existing vegetation communities and cause a reduction in forage production. For more information regarding past and present and reasonably foreseeable future actions see Sections 3.12.3.3 and Chapter 2, Section 2.8.

Groundwater Pumping

Several of the grazing allotments within the region of study would be affected by cumulative groundwater drawdown. Based on the drawdown risk analysis, 62 are at risk of impacts to forage vegetation at the time frame associated with full build out plus 200 years (for information related to the groundwater model developed specifically for this project see Section 3.3.2.8). The types of drawdown impacts to springs, streams, and wetland/meadow and basin shrubland vegetation would be similar in nature as discussed for the Proposed Action (see Section 3.12.3.5). The largest majority of these affected allotments are located in Spring Valley. **Tables 3.12-20** and **F3.12-5** and the following information summarize effects of cumulative pumping for Alternative B on surface water sources and forage vegetation for rangeland. At full build out plus 75 years and full build out plus 200 years the incremental contribution of pumping effects for Alternative B is approximately 60-70 percent for springs (both field verified and unverified) and 50 to 60 percent for perennial streams (see **Figures 3.12-2** and **3.12-3**). In Snake and Spring valleys, Alternative B pumping contributes most of the incremental effects to cumulative drawdown impacts on water and food sources for grazing allotments.

Table 3.12-20 Summary of Potential Cumulative Pumping Effects with Alternative B on Rangeland Resources

Parameter	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs within grazing allotments[1]	96	243	360
Miles of Perennial and Ephemeral Streams within grazing allotments	29	119	178
Acres of Wetland/Meadow and Basin Shrubland Vegetation within grazing allotments[2]	48,439	161,778	183,815

[1] Springs listed include those that have been field verified and unverified. See Table F3.12-2 for impacts specific to field verified springs.

[2] This refers to wetland/meadow and basin shrubland ET unit vegetation cover types.

Full Build Out. The 10-foot drawdown area overlaps with 24 grazing allotments. The Bastian Creek, Becky Springs, Cherry Creek, Cleveland Ranch, Geyser Ranch, Majors, Negro Creek, Scotty Meadows, Willow Springs allotments contain more than 1,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 52 percent of the cumulative impacts to springs and 26 percent to streams are the result of Alternative B pumping. Approximately 39 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative B pumping.

Full Build Out Plus 75 Years. The 10-foot drawdown area overlaps with 46 grazing allotments. The Bastian Creek, Cherry Creek, Chokecherry, Geyser Ranch, Majors, Scotty Meadows, Smith Creek, South Spring Valley, and Willow Springs allotments contain more than 5,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 67 percent of the cumulative impacts to springs and streams is the result of

Alternative B pumping. Approximately 64 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative B pumping.

Full Build Out Plus 200 Years. The 10-foot drawdown area overlaps with 56 grazing allotments. The Cherry Creek, Geyser Ranch, Scotty Meadows, South Spring Valley, and Willow Springs allotments contain more than 10,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 69 percent of the cumulative impacts to springs and streams is the result of Alternative B pumping. Approximately 85 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative B pumping.

3.12.3.8 Alternative C

Rights-of-way and Groundwater Development

Expected cumulative effects of Alternative C would be the same as described for Alternative A. It is not expected that Alternative C would contribute any additional cumulative surface disturbance effects to rangelands or livestock grazing. Alternative C surface disturbance is estimated to be between 14,294 and 17,040 acres. Overlap with foreseeable future projects would be the same as for the Proposed Action. Until restoration is complete, this would fragment the existing vegetation communities and cause a reduction in forage production. For more information regarding past and present and reasonably foreseeable future actions see Sections 3.12.3.3 and Chapter 2, Section 2.8.

Groundwater Pumping

Several of the grazing allotments within the region of would be affected by cumulative groundwater drawdown. Based on the drawdown risk analysis; 60 are at risk of impacts to forage vegetation at the time frame associated with full build out plus 200 years (for information related to the groundwater model developed specifically for this project see Section 3.3.2.8). Drawdown impacts to springs, streams, and wetland/meadow and basin shrubland vegetation would be similar in nature as for the Proposed Action (see Section 3.12.3.5). The largest majority of these affected allotments are located in Spring Valley. **Table 3.12-21** and **Appendix F**, **Table F3.12-5** and the following information summarize effects of cumulative pumping with Alternative C on surface water sources and forage vegetation for rangeland. The incremental contribution of Alternative C pumping on the cumulative effects to springs and streams is less than the Proposed Action or Alternatives A and B. At full build out plus 75 years and full build out plus 200 years the incremental contribution of pumping effects is approximately 40 percent for springs (both field verified and unverified) and perennial streams (see **Figures 3.12-2** and **3.12-3**). In Snake and Spring valleys, Alternative C pumping contributes most of the incremental effects to cumulative drawdown impacts on water and food sources for grazing allotments.

Table 3.12-21 Summary of Potential Cumulative Pumping Effects with Alternative C on Rangeland Resources

Parameter	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs within grazing allotments[1]	62	161	239
Miles of Perennial Streams within grazing allotments	29	89	135
Acres of Wetland/Meadow and Basin Shrubland Vegetation within grazing allotments[2]	40,959	101,782	129,838

[1] Springs listed include those that have been field verified and unverified. See Table F3.12-2 for impacts specific to field verified springs.

[2] This refers to wetland/meadow and basin shrubland ET unit vegetation cover types.

Full Build Out. The 10-foot drawdown area overlaps with 24 grazing allotments. The Bastian Creek, Becky Springs, Cherry Creek, Geyser Ranch, Majors, Scotty Meadows, South Spring Valley, and Willard Creek allotments contain more than 1,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 7 percent of the cumulative impacts to springs and streams are the result of Alternative C pumping. Approximately 30 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative C pumping.

Full Build Out Plus 75 Years. The 10-foot drawdown area overlaps with 46 grazing allotments. The Cherry Creek, Geyser Ranch, and South Spring Valley allotments contain more than 5,000 acres of wetland/meadow and basin

shrubland vegetation. Based on the drawdown risk analysis, approximately 40 percent of the cumulative impacts to springs and streams is the result of Alternative C pumping. Approximately 45 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative C pumping.

Full Build Out Plus 200 Years. The 10-foot drawdown area overlaps with 55 grazing allotments. The Cherry Creek, Geyser Ranch, and South Spring Valley allotments contain more than 10,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 38 percent of the cumulative impacts to springs and streams is the result of Alternative C pumping. Approximately 41 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative C pumping.

3.12.3.9 Alternative D

Rights-of-way and Groundwater Development

Expected cumulative effects of Alternative D would be the less than described for Alternative A. Alternative D eliminated construction in White Pine County. The short-term loss of acreage is 800 less than that of Alternative A. Alternative D surface disturbance is estimated to be between 14,738 and 16,231 acres. Overlap with foreseeable future projects would be the same as for the Proposed Action with the exception of Spring Valley, which would see no surface disturbing activity. Until restoration is complete, this would fragment the existing vegetation communities and cause a reduction in forage production. For more information regarding past and present and reasonably foreseeable future actions see Sections 3.12.3.3 and 2.8.

Groundwater Pumping

Several of the grazing allotments within the region of study would be affected by cumulative groundwater drawdown. Based on the drawdown risk analysis; 43 are at risk of impacts to forage vegetation at the time frame associated with full build out plus 200 years (for information related to the groundwater model developed specifically for this project see Section 3.3.2.8, Water Resources). The types of drawdown impacts to springs, streams, and wetland/meadow and basin shrubland vegetation would be similar in nature as for the Proposed Action (see Section 3.12.3.5). The largest majority of these affected allotments are located in Spring Valley. **Tables 3.12-22** and **F3.12-5** and the following information summarize effects of cumulative pumping for Alternative D on surface water sources and forage vegetation for rangeland. The incremental contribution of Alternative D pumping on the cumulative effects to springs and streams is less than the Proposed Action or Alternatives A and B. The percentage of contribution to impacts increases throughout the three model time frames assessed, but range from 30 to 60 percent of the cumulative impacts to springs (both field verified and unverified). Impacts to perennial stream are minor until full build out plus 200 years when they account for 38 percent of the cumulative effects to streams (see **Figures 3.12-2** and **3.12-3**). In Snake and Spring valleys, Alternative A pumping contributes most of the incremental effects to cumulative drawdown impacts on water and food sources for grazing allotments.

Table 3.12-22 Summary of Potential Cumulative Pumping Effects with Alternative D on Rangeland Resources

Parameter	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs within grazing allotments[1]	41	127	201
Miles of Perennial Streams within grazing allotments	23	48	103
Acres of Wetland/Meadow and Basin Shrubland Vegetation within grazing allotments[2]	17,547	75,333	119,366

[1] Springs listed include those that have been field verified and unverified. See Table F3.12-2 for impacts specific to field verified springs.

[2] This refers to wetland/meadow and basin shrubland ET unit vegetation cover types.

Full Build Out. The 10-foot drawdown area overlaps with 15 grazing allotments. The Becky Springs, Cherry Creek, and Geyser Ranch allotments contain more than one thousand acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 23 percent of the cumulative impacts to springs and 0 percent to streams are the result of Alternative D pumping. None of the cumulative impacts to wetland/meadow and basin shrubland vegetation are the result of Alternative D pumping.

Full Build Out Plus 75 Years. The 10-foot drawdown area overlaps with 27 grazing allotments. The Cherry Creek, Geyser Ranch, and South Spring Valley allotments contain more than 5,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 32 percent of the cumulative impacts to springs and less than 10 percent to streams are the result of Alternative D pumping. Approximately 24 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative D pumping.

Full Build Out Plus 200 Years. The 10-foot drawdown area overlaps with 38 grazing allotments. The Cherry Creek, Geyser Ranch, South Spring Valley, and Willow Springs allotments contain more than 10,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 60 percent of the cumulative impacts to springs and 38 percent to streams are the result of Alternative D pumping. Approximately 72 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative D pumping.

3.12.3.10 Alternative E

Rights-of-way and Groundwater Development

Expected cumulative effects of Alternative E would be the less than described for Alternative A. Alternative E eliminated construction in Snake Valley. The short-term loss of acreage is 720 less than that of Alternative A. Alternative E surface disturbance would be between 13,979 and 16,305 acres. Overlap with foreseeable future projects would be the same as for the Proposed Action with the exception of Snake Valley, which would see no surface disturbing activity. Until restoration is complete, this would fragment the existing vegetation communities and cause a reduction in forage production. For more information regarding past and present and reasonably foreseeable future actions see Sections 3.12.3.3 and 2.8.

Groundwater Pumping

Several of the grazing allotments within the region of study would be affected by cumulative groundwater drawdown. Based on the drawdown risk analysis, 47 are at risk of impacts to forage vegetation at the time frame associated with full build out plus 200 years (for information related to the groundwater model developed specifically for this project see Section 3.3.2.8). Drawdown impacts to springs, streams, and wetland/meadow and basin shrubland would be similar in nature as for the Proposed Action (see Section 3.12.3.5).The largest majority of these affected allotments are located in Spring Valley. **Tables 3.12-22** and **F3.12-5** and the following information summarize effects of cumulative pumping for Alternative E on surface water sources and forage vegetation for rangeland. The incremental contribution of Alternative E pumping on the cumulative effects to springs and streams is less than the Proposed Action or Alternatives A and B. The percentage of contribution to impacts ranges from approximately 30-45 percent of the cumulative impacts to springs (both field verified and unverified). Impacts to perennial stream are minor until full build out plus 200 years when they account for approximately 20 percent (see **Figures 3.12-2** and **3.12-3**). In Snake and Spring valleys, Alternative A pumping contributes most of the incremental effects to cumulative drawdown impacts on water and food sources for grazing allotments.

Table 3.12-23 Summary of Potential Cumulative Pumping Effects with Alternative E on Rangeland Resources

Parameter	Full Build Out	Full Build Out Plus 75 Years	Full Build Out Plus 200 Years
Number of Springs within grazing allotments[1]	62	167	235
Miles of Perennial Streams within grazing allotments	29	51	104
Acres of Wetland/Meadow and Basin Shrubland Vegetation within grazing allotments[2]	40,959	127,338	148,516

[1] Springs listed include those that have been field verified and unverified. See Table F3.12-2 for impacts specific to field verified springs.
[2] This refers to wetland/meadow and basin shrubland ET unit vegetation cover types.

Full Build Out. The 10-foot drawdown area overlaps with 24 grazing allotments. The Bastian Creek, Becky Springs, Cherry Creek, Geyser Ranch, Majors, Scotty Meadows, South Spring Valley, and Willard Creek allotments contain

more than 1,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 7 percent of the cumulative impacts to springs streams is the result of Alternative E pumping. Approximately 30 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative E pumping.

Full Build Out Plus 75 Years. The 10-foot drawdown area overlaps with 32 grazing allotments. The Cherry Creek, Geyser Ranch, Majors, Muncy Creek, Scotty Meadows, South Spring Valley, and Willow Springs allotments contain more than 5,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 34 percent of the cumulative impacts to springs and 11 percent to streams is the result of Alternative E pumping. Approximately 58 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative E pumping.

Full Build Out Plus 200 Years. The 10-foot drawdown area overlaps with 42 grazing allotments. The Cherry Creek, Geyser Ranch, Muncy Creek, Scotty Meadows, South Spring Valley, and Willow Springs allotments contain more than 10,000 acres of wetland/meadow and basin shrubland vegetation. Based on the drawdown risk analysis, approximately 44 percent of the cumulative impacts to springs and 19 percent to streams are the result of Alternative E pumping. Approximately 59 percent of the cumulative impacts to wetland/meadow and basin shrubland vegetation is the result of Alternative E pumping.