

Appendix C: Biological Survey Report



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Subject: Flora And Fauna Preliminary Assessment for the Wild Rose Transmission Line, Gabbs Valley, Mineral County, Nevada

Project Background

Ormat Nevada, Incorporated (Ormat) is proposing the Wild Rose Power Transmission Line for the Gabbs Valley Geothermal Project. The project consisted of three proposed alignment options with one having an alternate route located in Gabbs Valley, Mineral County, Nevada. A preliminary biological assessment for the transmission line was conducted in the late summer of 2011 and early spring 2012

Regional and Geographic Overview

The proposed alignments are approximately 31 miles long. Elevations range from approximately 4,250 feet at the Gabbs Valley Geothermal Project to 5,300 feet at the top of Nugent Wash on the Third Option and to about 4,900 feet on the Eastern Option near Powerline Rd just off Highway 361. The project area terrain is highly diverse and includes high desert valley washes, low alkali playas, steep rocky cliffs, and canyon mountain passes. The varying combinations of vegetation types, elevation, and terrain provide a wide variety of habitat for wildlife and botanical species in the region.

Methods

The area of analysis was defined as the potential disturbance footprint plus an additional 300-foot buffer. Further, a 0.5-mile area on each side of the proposed transmission line was considered for bats and raptor species.

The area of analysis was evaluated through a combination of existing data review, including information provided by the US Bureau of Land Management (BLM), US Fish and Wildlife Service (USFWS), Nevada Department of Wildlife (NDOW), Nevada Natural Heritage Program (NNHP), and previous biological surveys. Prior to conducting surveys, various data from these sources were reviewed to familiarize the surveyor with the habitat types, wildlife, and botanical species that were likely to be encountered in the survey area. Appropriate buffer zones surrounding the project features to be surveyed were plotted on maps and aerial photos, and uploaded to a GPS unit.

Pedestrian surveys were used when nearby access roads were unavailable, when wildlife habitat communities appeared highly variable, or in the presence of existing or potential special status wildlife habitat. Windshield surveys were used where habitat communities appeared to be consistent and uniform across large expanses, and received only brief visual inspection. Vegetation species composition, ecological conditions, and the presence of wildlife were recorded during field surveys. All uncommon detections and sensitive species map points were collected with a GPS unit.

Vegetation Types within the Project Area

The areas associated with the currently proposed surface disturbances within the three project areas were biologically surveyed in the late summer of 2011 and early spring of 2012. Vegetative community map units were based on a combination Shiflet (1994), Holland (1986) and Sawyer and Keeler-Wolf (1995) where applicable. Vegetation types were established, using dominant species to delineate discrete communities. Nomenclature used throughout this report conforms to Cronquist (1972) and Hickman (1993). The following vegetative communities were mapped within the survey area, and they are described in detail below:

Salt desert shrub – Greasewood
Salt desert shrub - Rabbitbrush
Salt desert shrub - Mixed

Desert Playa - Greasewood
Disturbed

Salt Desert Shrub Community

This area consisted of widely spaced plants, giving the community an open appearance, with over 40 to 60 percent bare ground. The community was separated into three distinct sub-communities that varied across the landscape in response to slight changes in elevation (i.e., soil moisture) and changes in soil types.

The salt desert shrub – mixed community area was dominated with shadscale (*Atriplex confertifolia*), bud sagebrush (*Artemisia spinescens*), horsebrush (*Tetradymia canescens*), spiny hopsage (*Grayia spinosa*), and quailbush (*Atriplex lentiformis*) as the dominant shrub species. Greasewood (*Sarcobatus vermiculatus*), fourwing saltbush (*Atriplex canescens*), and ephedra (*Ephedra* sp.) were less common. One species of cactus (*Opuntia* sp.) was observed rarely in this community. Herbaceous vegetation was not abundant, but a variety of grasses and forbs were present in small amounts. Saltgrass (*Distichylis spicata*), Indian ricegrass (*Achnatherum hymenoides*), milkvetch (*Astragalus* sp.), Prince's plume (*Stanleya pinnata*), globemallow (*Sphaeralcea parvifolia*), halogeton (*Halogeton glomeratus*), and Russian thistle (*Salsola iberica*) were all recorded in this community.

The salt desert shrub – greasewood community was dominated by greasewood, spiny hopsage, quailbush, and ephedra, with lesser amounts of shadscale, bud sagebrush, horsebrush, and fourwing saltbush. The grass species and forbs were similar to the mixed community with saltgrass, Indian ricegrass, milkvetch, Prince's plume, globemallow, halogeton, and Russian thistle. This community was found on the soils that appeared to have higher water holding capacity. Halogeton and Russian thistle were more abundant in this community.

The salt desert shrub – rabbitbrush community was dominated by rabbitbrush and Russian thistle, with lesser amounts of spiny hopsage, quailbush, ephedra, shadscale, bud sagebrush, horsebrush, greasewood, fourwing saltbush, and winterfat (*Krascheninnikovia lanta*). The grass species and forbs observed were saltgrass, Indian ricegrass, milkvetch, and halogeton. This community was found on the moist gravels of the larger washes.

Disturbed Community

Numerous areas of disturbance were located throughout the survey area. All access roads and wells with corrals were observed to be dominated with invasive weeds. The plant community composition was dominated by halogeton and Russian thistle, which comprised over 90 percent of plants. Horsebrush, greasewood, and fourwing saltbush were intermixed randomly throughout the area. These areas appeared to have been cleared/graded and/or heavily impacted by cattle. Disturbed areas were not mapped due to their small size and numerous occurrences.

Desert Playa - Greasewood Community

The playa was primarily open with islands of greasewood scattered throughout the area. Saltgrass was also found in the greasewood islands.

West Option Project Area

The lands within the West Option Project Area were divided into three main vegetative communities consisting of salt desert shrub, and disturbed areas. The majority of the survey area was dominated by the salt desert shrub – mixed community and salt desert shrub - rabbitbrush community, with disturbed areas intermixed. Cryptobiotic soils were found in the salt desert shrub – mixed community along Nugent Wash.

Third Option Project Area

The survey found that the overall vegetation of the Third Option Project Area was salt desert shrub. The majority of the survey area was dominated by the salt desert shrub – mixed community and small patch of salt desert shrub - rabbitbrush community.

East Option Project Area

The survey found that the overall vegetation of the East Option Project Area was salt desert shrub. However, the dominant shrub species was not the same over the entire area, giving the appearance of four vegetative communities. The three communities, salt desert shrub – mixed community, salt desert shrub - greasewood community, and salt desert shrub - rabbitbrush community overlapped considerably in species, but varied with the relative abundance of each species. Located in the northern portion of the alignment was a small playa - greasewood community, which had sparse vegetation over most of the area.

East Alternate Option Project Area

The survey found that the overall vegetation of the East Alternate Option Project Area was salt desert shrub. However, the dominant shrub species was not the same over the entire area, giving the appearance of two vegetative communities. The two communities, salt desert shrub – mixed community and salt desert shrub - rabbitbrush community, overlapped considerably in species, but varied with the relative abundance of each species.

Wildlife Observed within the Project Area

Leopard lizard (*Gambemia wislizenii*), zebra-tailed lizard, white-tailed antelope squirrel (*Ammospermophilus leucurus*), and black-tailed jack rabbit (*Lepus californicus*) were detected on numerous occasions throughout the survey area.

West Option Project Area

No birds were observed during the course of the biological assessment within the buffer zone of the West Option Project Area. A golden eagle (*Aquila chrysaetos*) was observed 0.5 miles to the north of the alignment roosting on the crossbar of a power line tower. A red tailed-hawk (*Buteo jamaicensis*) was also observed in the same general vicinity and was observed calling overhead, appearing to be agitated by the golden eagle's presence.

One burrow was observed and appears to be active by the partial foot prints at the burrow's opening. Positive identification of species was not confirmed due to a small patch of loose soil not providing a clear print. By the depth and size of the hole no confirmed usage was determined. No scat was observed in the vicinity.

Deer (*Odocoileus hemionus*) scat was observed on the alignment in numerous locations.

The rocky nature of the canyon has possible roosting location for bats, and habitat for bighorn sheep (*Ovis canadensis*). The rocky steep out cropping could provide nest locations for raptors. Large patches of white wash were observed on raised rock points near and on the alignment.

East Option Project Area

Two bird species, black-throated sparrow (*Amphispiza bilineata*) and loggerhead shrike (*Lanius ludovicianus*), were observed within the alignment East Option Project Area buffer area during the course of the biological assessment. One nest structure built on a corral gate side post was observed 900 ft. north of the assessment buffer zone. The nest appeared to have been rebuilt numerous times. The area around the nest was intensely searched and two black feathers were observed that could possibly be from a Corvid species. Two ravens were viewed crossing the road on Highway 361, 1.5 miles north of the East Option alignment.

Approximately two miles north of the project area on Highway 368 a kit fox (*Vulpes macrotis*) was observed dead on the road from vehicular impact.

East Alternate Option Project Area

No birds were observed during the course of the biological assessment within the East Alternate Option Project Area buffer zone.

Third Option Project Area

No birds were observed during the course of the biological assessment within the Third Option Project Area buffer zone.

The rocky nature of the canyon has possible habitat for bighorn sheep (*Ovis canadensis*). The rocky steep out cropping could provide nest locations for raptors. A large linear crack was observed on a rock outcropping near the alignment in Nugent wash which could be roosting location for bats

Invasive, Nonnative Species

West Option, East Option, East Alternate, and Third Option Project Area

No noxious weeds were observed during the field assessment. In the disturbed areas, invasive weeds Russian thistle and halogeton were present in the disturbed areas along access roads and around corrals and wells. These species were also observed as a dominant component of the herbaceous understory in the salt desert shrub - rabbitbrush community within the wash of all four areas.

Feral cattle (*Bos primigenius*) and horse (*Equus ferus caballus*) were observed utilizing the Eastern Option alignment. Sign (e.g., prints and scat) was observed on all four project options.

Conclusion

No special status plants were observed during the survey. The survey was completed during the late summer and early spring and was not conducted during the optimal time for floristic surveys. A focused survey of potential suitable habitat within the project area should be conducted during the optimal time for potentially occurring species. The occurrence of the cryptobiotic soils on the western option and the numerous lichens on the rocks, boulders and outcroppings throughout all three alignments should be evaluated by a specialist.

The proposed corridor of the eastern option has a large and extensive population of Russian thistle, and to a lesser degree halogeton. This should be taken in to account with mitigation measures warranted.

Additional wildlife surveys should be implemented on the two western option through the canyon, due to the possible usage of this area by nesting raptors, roosting bats and bighorn sheep.

If you have any questions, please contact Jon Silva at 775.842.3006.

Yours sincerely,

A handwritten signature in black ink that reads "Jonathan P. Silva". The signature is written in a cursive style with a large initial "J" and a long horizontal stroke at the end.

Jonathan P. Silva
Principle, Silva Environmental Services

References

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Appendix A - Site Photographs



Photo 1 – Proposed East Option. Salt Scrub - Rabbitbrush habitat in wash. - Viewing north.



Photo 2 – West study area. Salt Scrub - mixed habitat of proposed alignment, viewing southeast.



Photo 3 – Proposed East Option alignment. Desert Playa - greasewood habitat. Viewing north.



Photo 4 –East Option area. Salt Scrub- greasewood habitat, viewing North



Photo 5 – Lichen population on boulders of the East Option.



Photo 6 –West Option burrow.



Photo 7 – Proposed West option. Cryptobiotic soil



Photo 8 – Proposed East Option. Nest structure at corral.



Photo 9 – Proposed West options. *Opuntia* sp.



Photo 10 – Proposed Third Option. Salt Scrub - Rabbitbrush habitat in wash. - Viewing northwest.



Photo 11 -Third option area. Salt Scrub - mixed habitat of proposed alignment, viewing northwest.



Photo 12 - Proposed Third Option. Out-cropping with large crack feature - Viewing north.

Table 1. Wildlife and Botanical Species Detections

Common Name	Scientific Name	Special Status
Reptiles		
Leopard lizard	<i>Gambelia wislizenii</i>	-
Zebra-tailed lizard	<i>Callisaurus draconoides</i>	-
Birds		
Black-throated Sparrow	<i>Amphispiza bilineata</i>	USFWS-MBTA
Common raven	<i>Corvus corax</i>	USFWS-MBTA
Loggerhead shrike	<i>Lanius ludovicianus</i>	BLM - BCC USFWS-MBTA
Golden eagle	<i>Aquila chrysaetos</i>	BLM - SSC USFWS-MBTA
Red-tailed hawk	<i>Buteo jamaicensis</i>	USFWS-MBTA
Mammals		
White-tailed antelope squirrel	<i>Ammospermophilus leucurus</i>	-
Black-tailed jack rabbit	<i>Lepus californicus</i>	-
Kit fox	<i>Vulpes macrotis</i>	-
Cattle	<i>Bos primigenius</i>	-
Horse	<i>Equus ferus caballus</i>	-
Plants		
Shadscale	<i>Atriplex confertifolia</i>	-
Bud sagebrush	<i>Artemisia spinescens</i>	-
Horsebrush	<i>Tetradymia canescens</i>	-
Stickyleaf rabbitbrush	<i>Chrysothamnus viscidiflorus</i>	-
Rabittbrush	<i>Chrysothamnus sp.</i>	-
Spiny hopsage	<i>Grayia spinosa</i>	-
Quailbush	<i>Atriplex lentiformis</i>	-
Fourwing saltbush	<i>Atriplex canescens</i>	-
Greasewood	<i>Sarcobatus vermiculatus</i>	-
Ephedra	<i>Ephedra sp.</i>	-
Winterfat	<i>Krascheninnikovia lanta</i>	-
Globemallow	<i>Sphaeralcea parvifolia</i>	-
Prince's plume	<i>Stanleya pinnata</i>	-
Milkvetch	<i>Astragalus sp.</i>	-
Halogeton	<i>Halogeton glomeratus</i>	-
Russian thistle	<i>Salsola iberica</i>	-
Opuntia - Cactus	<i>Opuntia sp.</i>	NNHP
Indian ricegrass	<i>Achnatherum hymenoides</i>	-
Saltgrass	<i>Distichylis spicata</i>	-

BLM - BCC BLM Birds species of conservation concern

BLM - SSC Special Species of concern

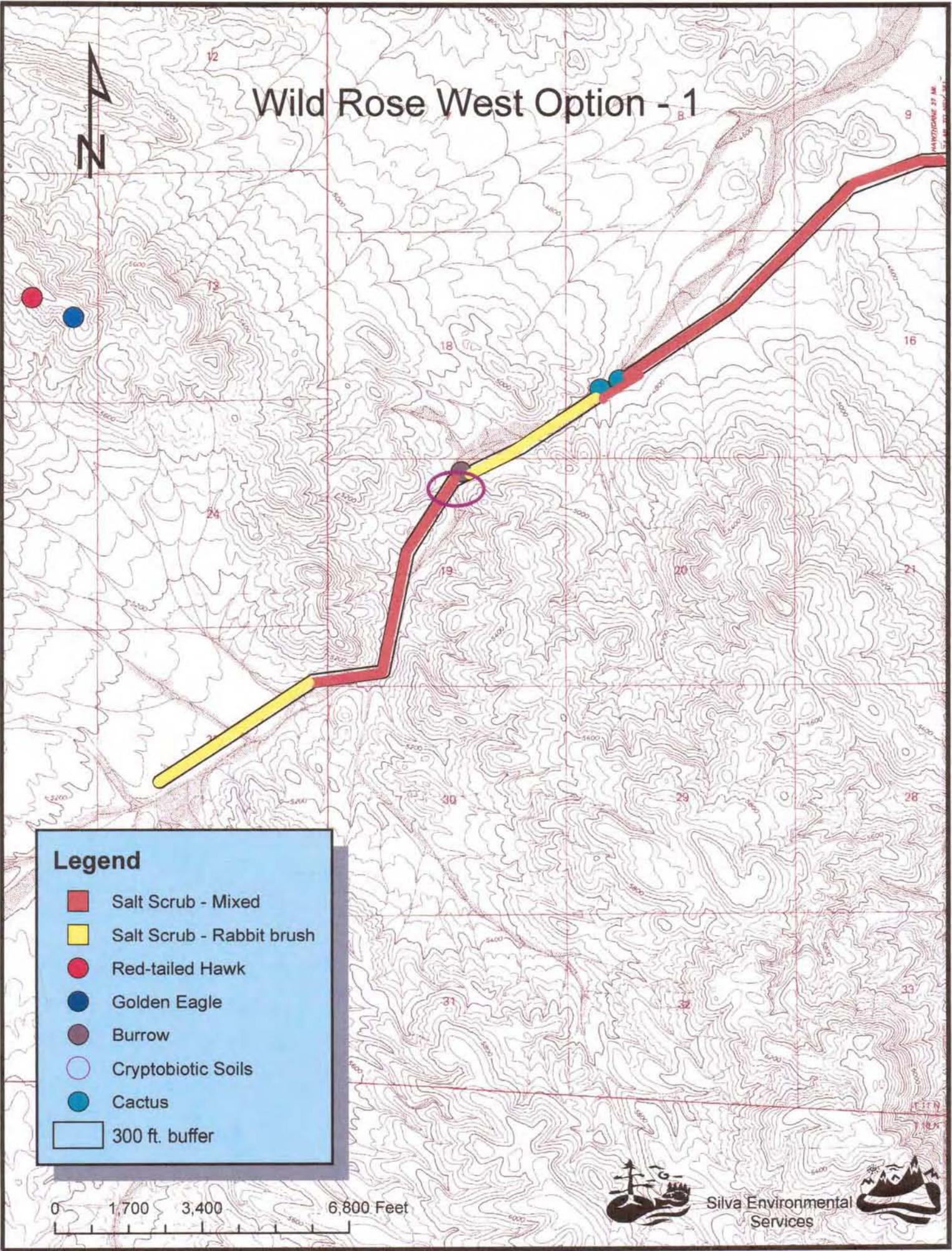
USFWS-MBTA US Fish Wildlife Service, Migratory Bird Treaty Act

NNHP - protected NRS 527

Table 2. Wildlife and Botanical GPS Points

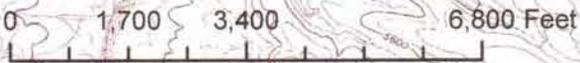
Common Name	Scientific Name	Latitude	Longitude
Loggerhead shrike	<i>Lanius ludovicianus</i>	N38.71978	W118.04607
Golden eagle	<i>Aquila chrysaetos</i>	N38.75862	W118.32684
Red-tailed hawk	<i>Buteo jamaicensis</i>	N38.77509	W118.33684
Cactus - Opuntia	<i>Opuntia</i> sp.	N38.81944	W118.40105
Cactus - Opuntia	<i>Opuntia</i> sp.	N38.81888	W118.40257
Cactus - Opuntia	<i>Opuntia</i> sp.	N38.72020	W118.04636
Nest Structure	N/A	N38.79004	W118.15526
Cryptobiotic Soils	N/A	N38.81360	W118.41386
Burrow	N/A	N38.81360	W118.41386

Wild Rose West Option - 1



Legend

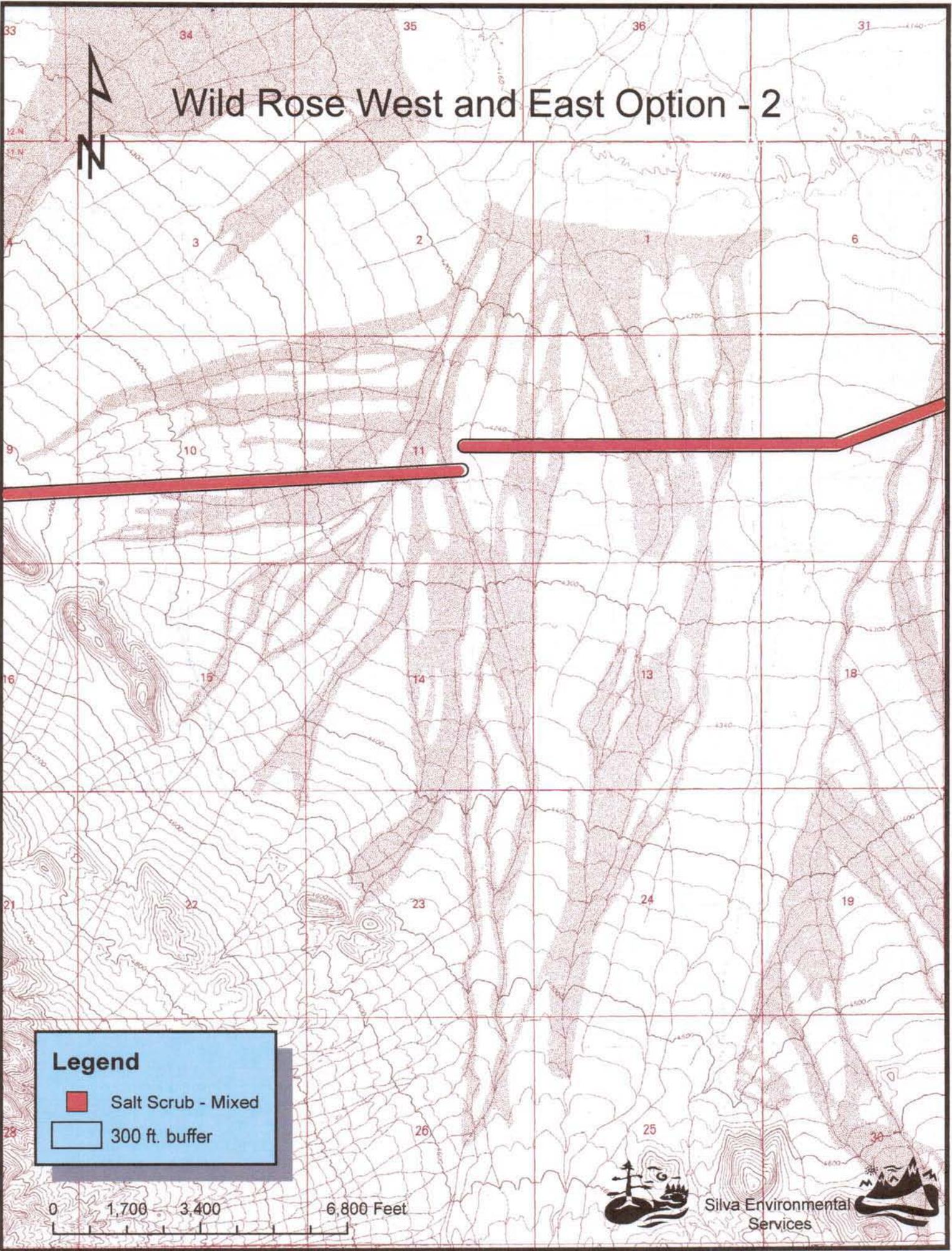
-  Salt Scrub - Mixed
-  Salt Scrub - Rabbit brush
-  Red-tailed Hawk
-  Golden Eagle
-  Burrow
-  Cryptobiotic Soils
-  Cactus
-  300 ft. buffer



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Wild Rose West and East Option - 2



Legend

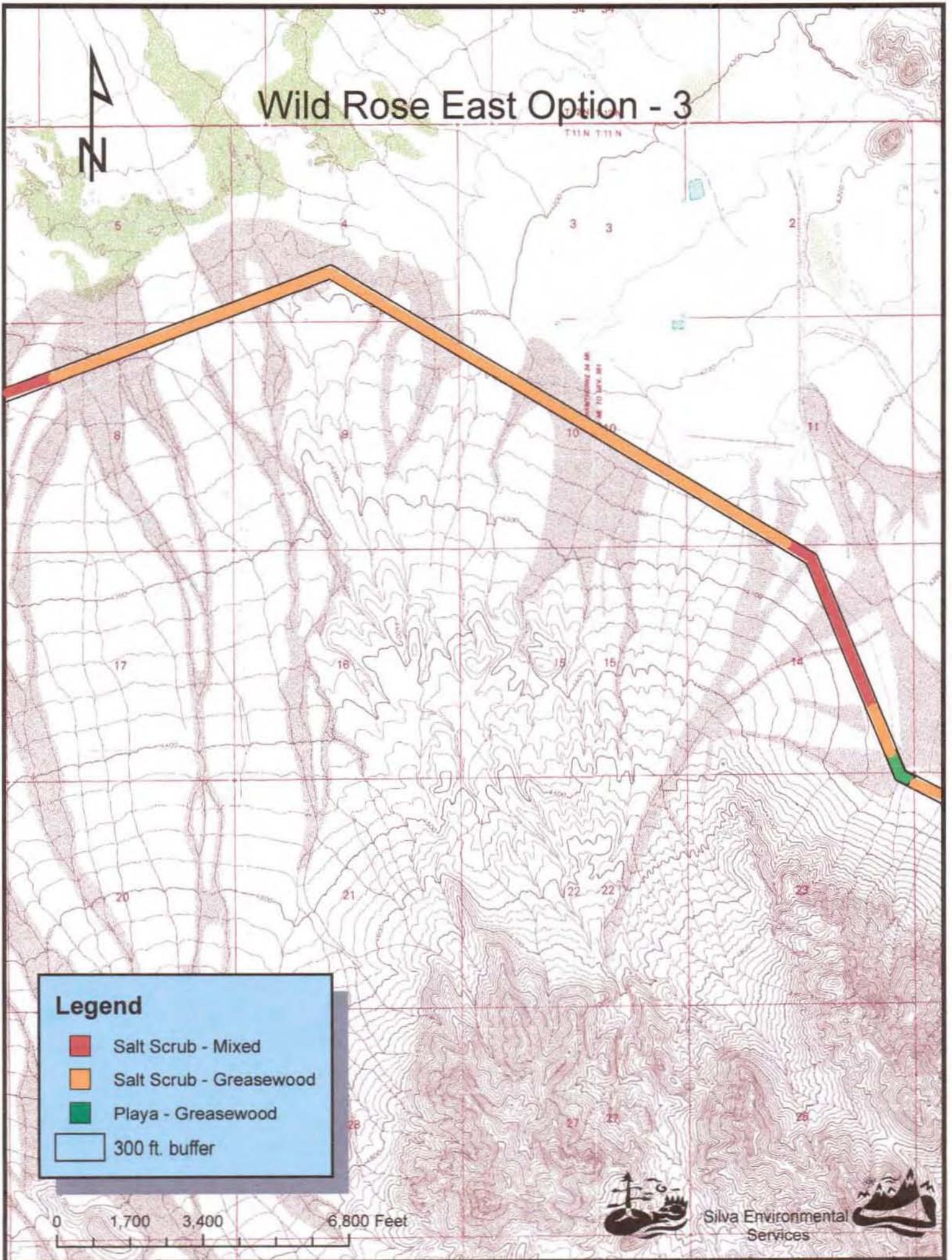
-  Salt Scrub - Mixed
-  300 ft. buffer



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Wild Rose East Option - 3



Legend

-  Salt Scrub - Mixed
-  Salt Scrub - Greasewood
-  Playa - Greasewood
-  300 ft. buffer

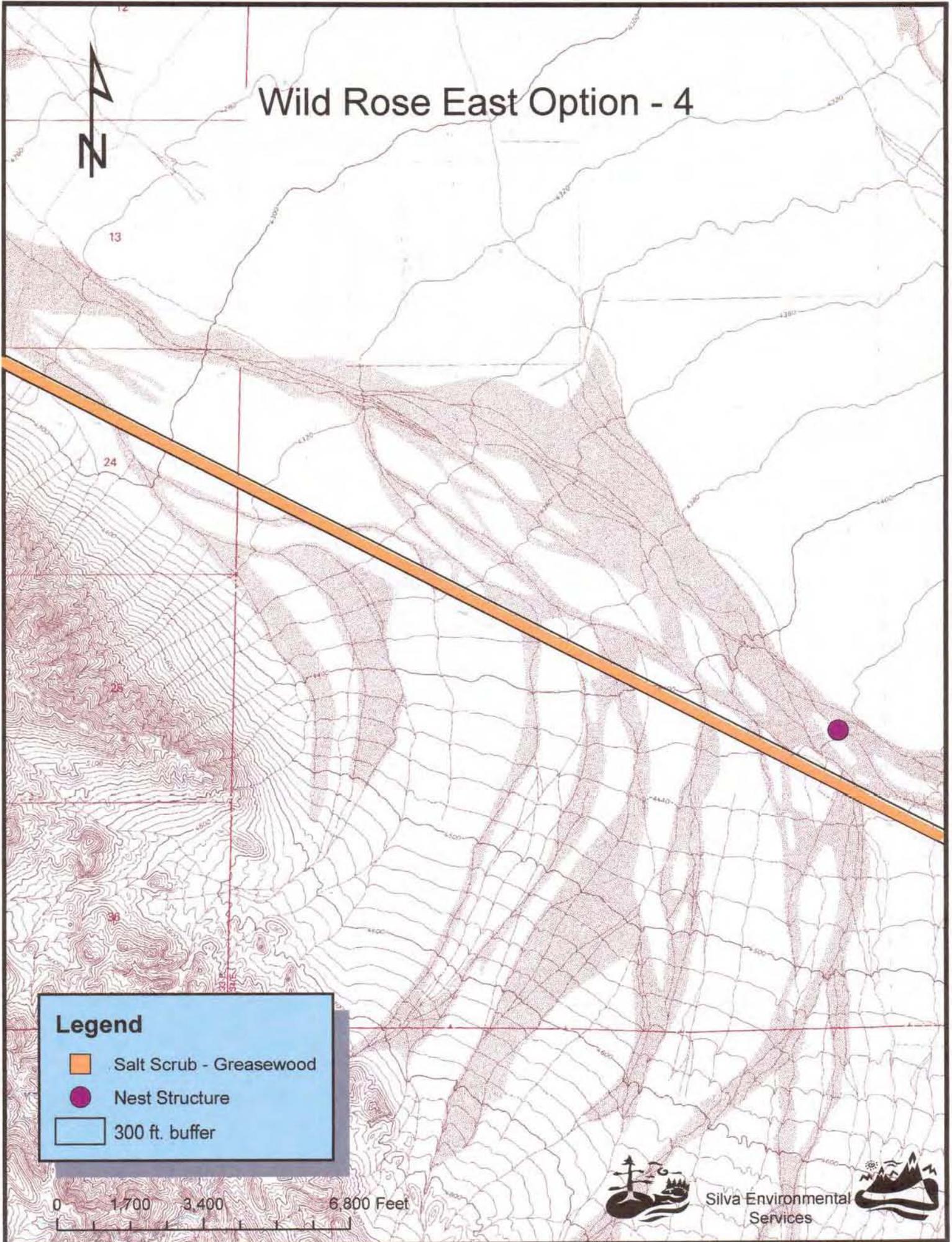
0 1,700 3,400 6,800 Feet



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Wild Rose East Option - 4



Legend

-  Salt Scrub - Greasewood
-  Nest Structure
-  300 ft. buffer

0 1,700 3,400 6,800 Feet

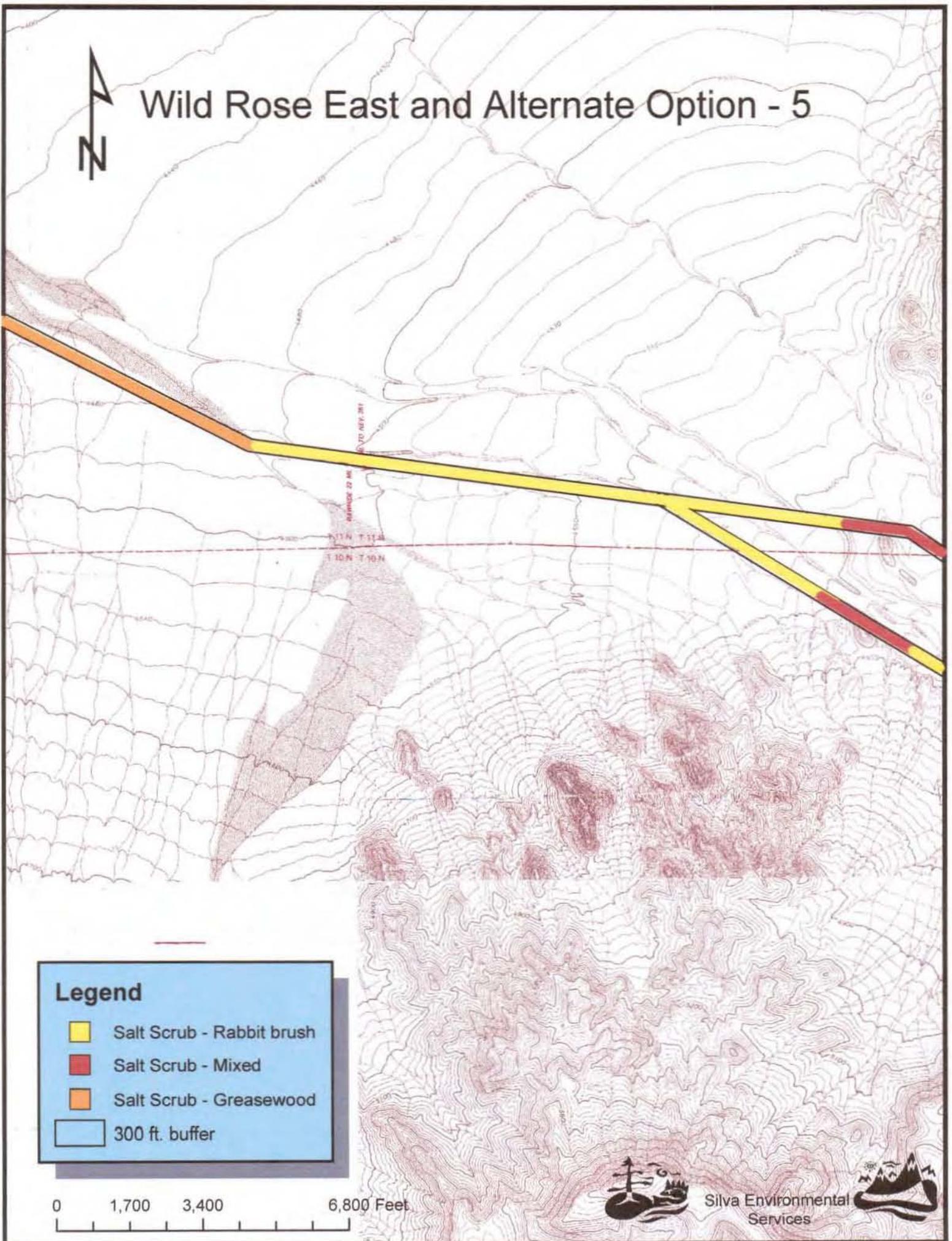


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Wild Rose East and Alternate Option - 5



Legend

-  Salt Scrub - Rabbit brush
-  Salt Scrub - Mixed
-  Salt Scrub - Greasewood
-  300 ft. buffer

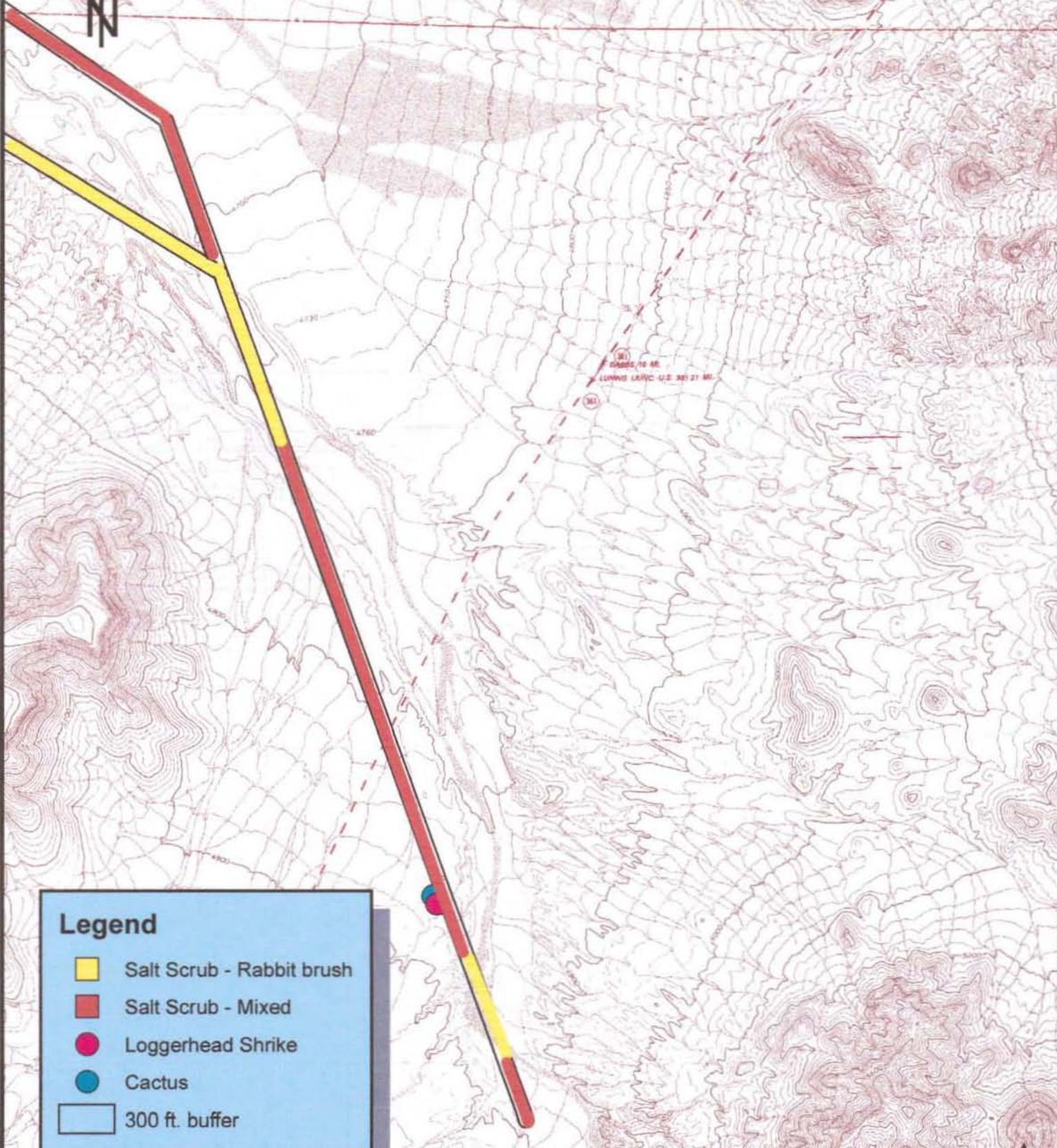
0 1,700 3,400 6,800 Feet



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Wild Rose East and Alternate Option - 6



Legend

-  Salt Scrub - Rabbit brush
-  Salt Scrub - Mixed
-  Loggerhead Shrike
-  Cactus
-  300 ft. buffer

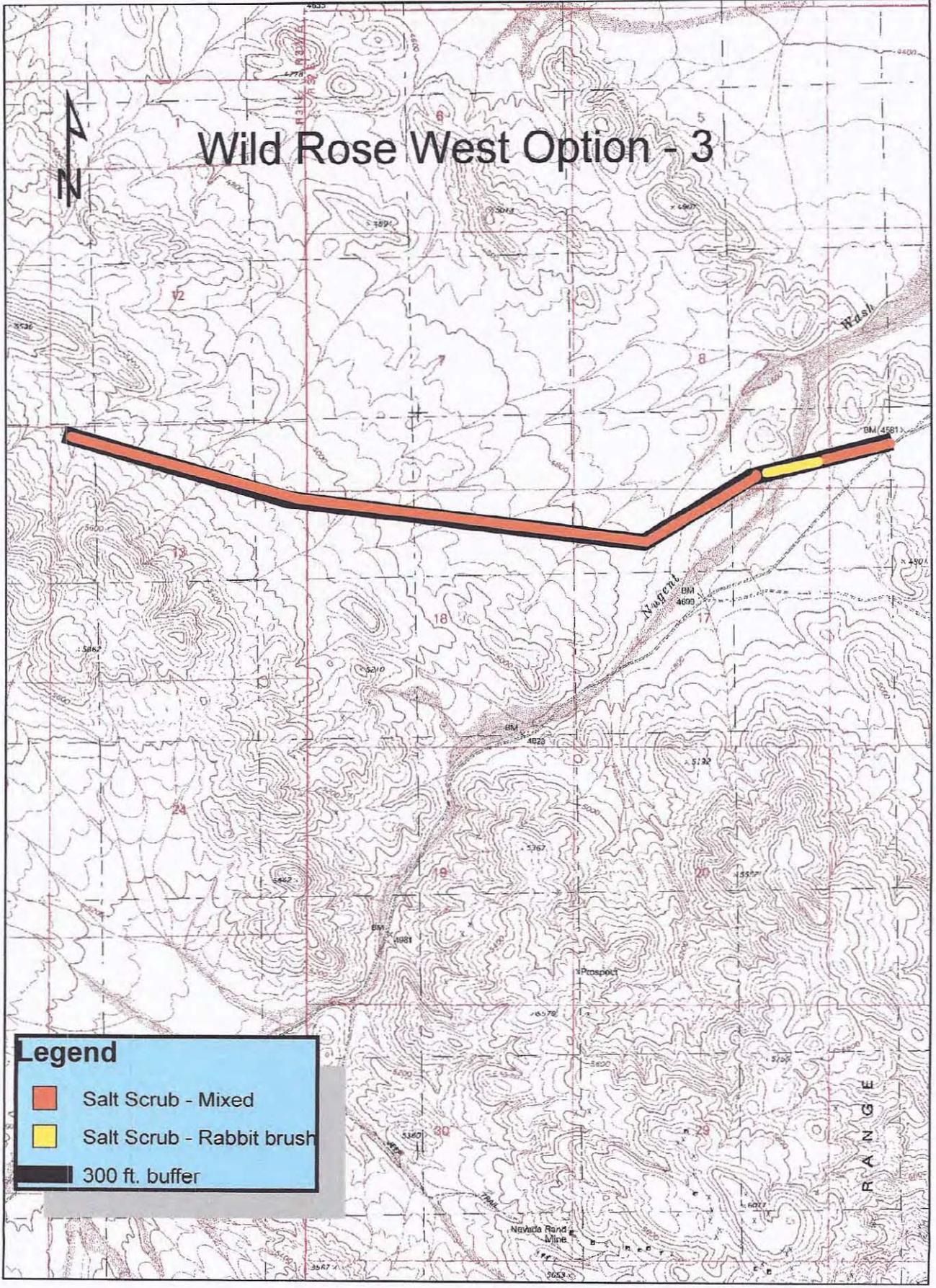
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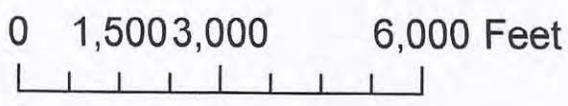


Wild Rose West Option - 3



Legend

-  Salt Scrub - Mixed
-  Salt Scrub - Rabbit brush
-  300 ft. buffer



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