3.10 Noxious Weeds and Non-native Invasive Plant Species

The noxious weeds and non-native invasive plant species study area for direct and indirect impacts is the project area, the Ivanhoe Road extending from the mine site to its juncture with Midas-Tuscarora Road, and seeps and springs within the maximum extent of the 10-foot groundwater drawdown contour (**Figures 3.10-1** and **3.6-1**). The cumulative effects study area (CESA) for noxious weeds and non-native invasive plant species includes the Carlin Trend area because surface disturbance associated with numerous mining projects have occurred or would occur in the area thereby increasing the potential for establishment of noxious weeds and non-native invasive plant species (**Figure 3.10-2**). Additionally, the decrease or cessation of flow in seeps and springs in the Carlin Trend due to mining projects would over the long term result in a decrease or loss of wetland vegetation. This would provide an opportunity for noxious weeds and non-native invasive plant species to become established because they readily invade areas supporting sparse or no vegetation. Excessive water also may provide habitat for noxious weeds and non-native invasive plant species to become established. Definitions of terms and a brief listing of applicable regulations governing noxious weeds and non-native invasive plant species are provided in the following section.

3.10.1 Affected Environment

A “noxious weed” is defined as any species of plant that is, or is likely to be, detrimental or destructive and difficult to control or eradicate (Nevada Revised Statute [NRS] 555.010-555.220). Noxious weeds and non-native invasive plant species have become a growing concern in Nevada based on their ability to increase in cover relative to surrounding vegetation and exclude native plants from an area. The spread of noxious weeds and non-native invasive plant species have resulted in substantial economic impacts on some sectors of the State of Nevada (State). As a result, the State has enacted laws requiring the control of noxious weed species (NRS 555.005, Nevada Administrative Code 555.010). In addition, the federal Noxious Weed Act of 1974, as amended (7 United States Code 2801 et. seq.) requires cooperation with state, local, and other federal agencies in the application and enforcement of all laws and regulations relating to the management and control of noxious weeds and non-native invasive plant species. Recognizing these regulations, the Bureau of Land Management (BLM) requires that National Environmental Policy Act documents consider and analyze the potential for the spread of noxious weeds and non-native invasive plant species and provide preventative rehabilitation measures for each management action involving surface disturbance.

The BLM considers plants “invasive” if they have been introduced into an environment where they did not evolve (i.e., non-native). As a result, invasive species usually have no natural enemies to limit their reproduction and spreading (Westbrooks 1998). Some invasive plant species can produce substantial changes to vegetation composition, structure, or ecosystem function (Cronk and Fuller 1995).

Noxious weeds and non-native invasive plant species have the ability to readily establish and spread rapidly, particularly in disturbed areas, and may cause damage to agriculture, range resources, riparian and wildlife habitat, and forestry, as well as increase fire susceptibility. Noxious weeds and non-native invasive plant species may spread either by seed, root, or plant parts. Plant growth stimulation varies per species and may be caused by various means such as fire, ground disturbance, cutting off plants, and using the wrong chemicals to spray the plant. They are spread by a variety of means including vehicles, construction equipment, construction and reclamation materials, livestock, wildlife and wind. Vehicle traffic is a major contributor to weeds invading a new area because seeds and plant parts can become embedded in tire treads and any mud carried on a vehicle from an infested area. Weeds would then establish themselves most easily along roadways.

Seeds and plant parts can get caught in construction equipment or imbedded in soil and dust that collects on construction equipment. After the construction equipment has been transported to another site, the weed seeds and plant parts can be washed off the equipment as a result of precipitation

events, which results in the spread of noxious weeds and non-native invasive plant species into new areas. Construction materials (e.g., gravel and soil) and reclamation materials (e.g., mulch and plant seed) can be contaminated with noxious weeds and non-native invasive plant species, which can be transported and used at a new site, causing contamination and establishment of new weed infestations. Road maintenance activities, such as grading and adding gravel to roads, also is a means of spreading noxious weeds and non-native invasive plant species to roadside shoulders and ditches. Animals also can spread seeds and plant parts that attach to their hair or fur and get caught in their hooves.

A list of the noxious weed species designated by the state and BLM Elko District Office is provided in **Table 3.10-1**. Under NRS 555.010-555.220, noxious weeds are classified into three categories: A, B, and C. Each category has specific control requirements, with the most stringent requirements for those species found in Category A.

Category A includes noxious weeds, which are:

- Not found or limited in distribution throughout the state;
- Actively excluded from the state and actively eradicated wherever found; and
- Controlled by the state for all infestations.

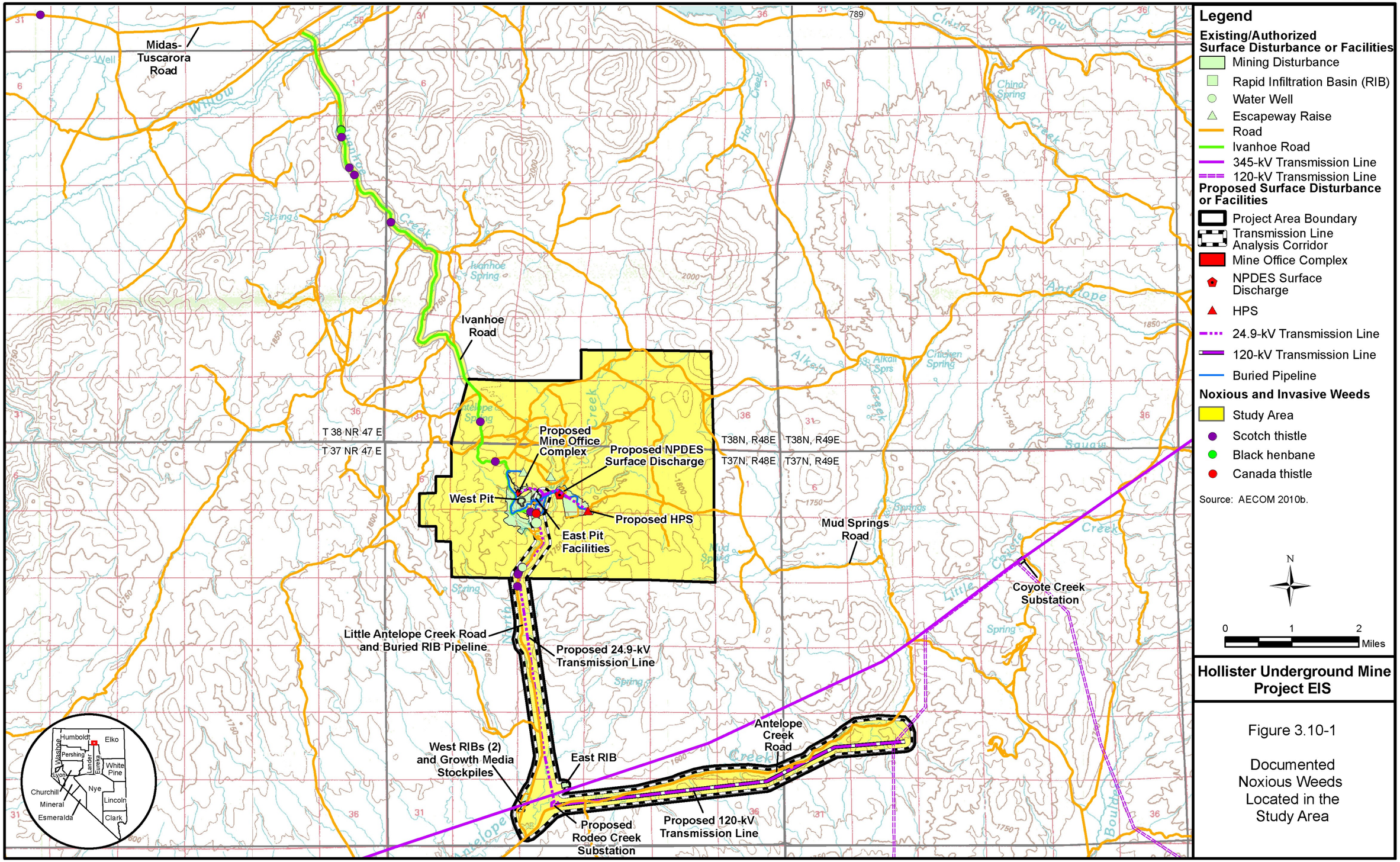
Category B includes noxious weed species, which are:

- Established in scattered populations in some counties of the state;
- Actively excluded where possible; and
- Controlled by the state in areas where populations are not well established or previously unknown to occur.

Category C includes noxious weeds, which are:

- Currently established and generally widespread in many counties of the state; and
- Controlled and abated at the discretion of the state quarantine officer (Nevada Department of Agriculture 2006).

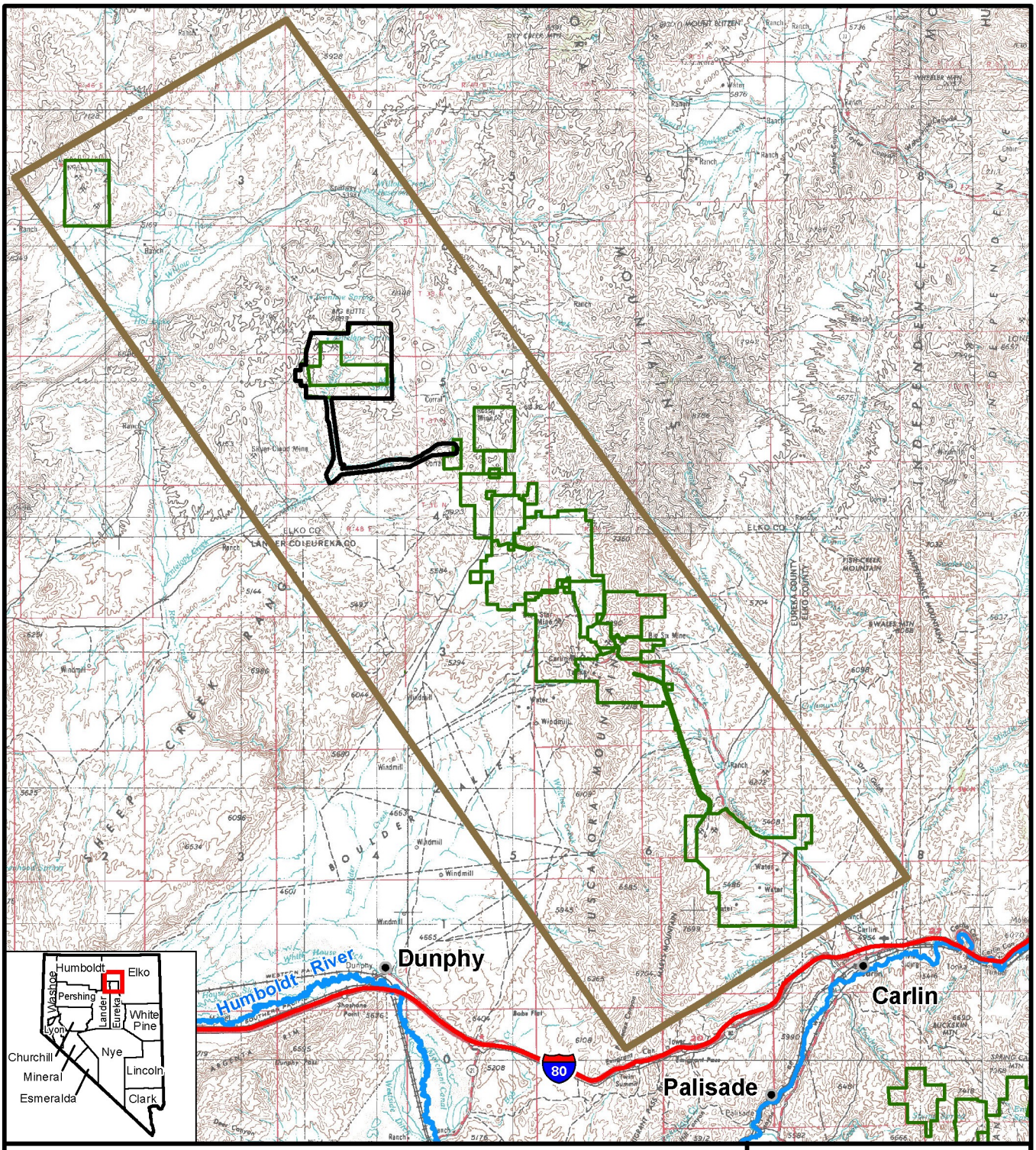
Baseline vegetation studies, which included field assessments and subsequent documentation of noxious weeds and non-native invasive plant species occurrences, were conducted within the project area in 2004, 2007, 2008, and 2010 (AECOM 2010b; JBR Environmental Consultants, Inc. 2008, 2007, 2004b). Noxious weeds and non-native invasive plant species found on site during those surveys include low whitetop (*Cardaria draba*) in 2007 and 2008; Canada thistle (*Cirsium arvense*) in 2008; and Scotch thistle (*Onopordum acanthium*) and black henbane (*Hyoscyamus niger*) in 2010 (**Figure 3.10-1**). Canada thistle was found in the Hollister Site, usually associated with water or moist areas. Scotch thistle was found along Little Antelope Creek and Mud Springs roads, likely brought in on vehicles visiting the Hollister Site or passing through. Black henbane was found along the Ivanhoe and Midas-Tuscarora roads. Hoary cress or low whitetop is located along roads that provide access to the project area. These roads (Izzenhood, Antelope Creek, Silver Cloud, Mud Springs, and Tuscarora-Midas) are frequently used as travel routes, which provides the potential for these species to spread to the project area. In 2007, hoary cress infestations were found along these roads (BLM 2011c).



Hollister Underground Mine Project EIS

Figure 3.10-1

Documented Noxious Weeds Located in the Study Area



Legend

- Project Area Boundary
- Cumulative Effects Study Area
- Other Mine Plan Boundaries

N

0 2.5 5 7.5 10 Miles

Source: BLM 2009b.

Hollister Underground Mine Project EIS

Figure 3.10-2

Noxious Weeds and Non-native Invasive Species Cumulative Effects Study Area

1/19/2012

Table 3.10-1 Designated Noxious Weed Species Potentially Occurring within Elko County, Nevada

Common Name	Scientific Name	NRS Designated Noxious Weed Species Category[1]
Russian knapweed	*Acroptilon repens*	B
Camel thorn	*Alhagi camelorum*	A
Mayweed chamomile	*Anthemis cotula*	A
Giant reed	*Arundo donax*	A
Sahara mustard	*Brassica tournefortii*	B
Low whitetop or hoary cress	*Cardaria draba*	C
Musk thistle	*Carduus nutans*	B
Purple starthistle	*Centaurea calcitrapa*	A
Diffuse knapweed	*Centaurea diffusa*	B
Iberian star thistle	*Centaurea iberica*	A
Spotted knapweed	*Centaurea maculata*	A
Malta starthistle	*Centaurea melitensis*	A
Yellow starthistle	*Centaurea solstitialis*	A
Squarrose knapweed	*Centaurea virgata* var. *squarrosa*	A
Rush skeletonweed	*Chondrilla juncea*	A
Water hemlock	*Cicuta maculata*	C
Canada thistle	*Cirsium arvense*	C
Poison hemlock	*Conium maculatum*	C
Common crupina	*Crupina vulgaris*	A
Houndstongue	*Cynoglossum officinale*	A
Leafy spurge	*Euphorbia esula*	B
Goat's rue	*Galega officinalis*	A
Hydrilla	*Hydrilla verticillata*	A
Black henbane	*Hyoscyamus niger*	A
Klamath weed	*Hypericum perforatum*	A
Dyer's woad	*Isatis tinctoria*	A
Tall whitetop or perennial	*Lepidium latifolium*	C
Dalmatian toadflax	*Linaria dalmatica*	A
Yellow toadflax	*Linaria vulgaris*	A
Purple loosestrife	*Lythrum salicaria*	A
Eurasian water-milfoil	*Myriophyllum spicatum*	A

Table 3.10-1 Designated Noxious Weed Species Potentially Occurring within Elko County, Nevada

Common Name	Scientific Name	NRS Designated Noxious Weed Species Category[1]
Scotch thistle	*Onopordum acanthium*	B
African rue	*Peganum harmala*	A
Green fountaingrass	*Pennisetum setaceum*	A
Sulfur cinquefoil	*Potentilla recta*	A
Austrian fieldcress	*Rorippa austriaca*	A
Mediterranean sage	*Salvia aethiopis*	A
Giant salvinia	*Salvinia molesta*	A
Carolina horse-nettle	*Solanum carolinense*	B
White horse-nettle	*Solanum elaeagnifolium*	B
Sow thistle	*Sonchus arvensis*	A
Johnson grass	*Sorghum halepense*	C
Austrian peaweed	*Sphaerophysa salsula* (= *Swainsona salsula*)	A
Medusahead	*Taeniatherum caput-medusae*	B
Saltcedar or tamarisk	*Tamarix ramosissima*	C
Puncture vine	*Tribulus terrestris*	C
Syrian bean caper	*Zygophyllum fabago*	A

[1] No additional noxious weeds or non-native invasive plant species were identified for additions to this list by Elko County. Elko County manages for the species listed by the State of Nevada in their jurisdiction.

Source: Eklund-Brown 2007; Nevada Department of Agriculture, Plant Industry Division 2006.

Cheatgrass (*Bromus tectorum*) is a non-native invasive grass species that is prevalent in burned and disturbed areas. It is a minor component of the adjacent undisturbed plant communities. Cheatgrass is a concern within the understory of the sagebrush scrub community as cheatgrass provides very little habitat for threatened and sensitive species such as the greater sage-grouse and the pygmy rabbit that rely upon sagebrush vegetation for food and shelter. Cheatgrass also is able to alter the natural fire regimes of the sagebrush community. The dry, dead cheatgrass stems produce a continuous layer of fuel to carry sagebrush fires. Cheatgrass has increased in the vegetation understory in the vicinity of the project area as a result of the 2001 Hot Lakes Fire, 2005 Esmeralda Fire, and 2006 North Antelope and Sheep fires.

3.10.2 Environmental Consequences

Primary issues associated with the Proposed Action related to noxious weeds and non-native invasive plant species include direct and indirect impacts. Direct impacts associated with the introduction or spread of noxious weeds and non-native invasive plant species includes the establishment of infestation areas and the loss or degradation of native vegetation communities.

Potential indirect impacts associated with noxious weeds and non-native invasive plant species infestations may include loss of wildlife habitat and loss of rangeland for grazing due to the diminished native vegetation communities, soil erosion due to shorter-lived annual species invasions, and consequent increased fire susceptibility due to dry dead stands of annual non-native invasive plant species (e.g., cheatgrass stands). Left untreated, infestations of noxious weeds or non-native invasive plant species sites would increase, eventually eliminating the native vegetation and replacing the plant regime with an undesirable plant community. Weed infestations at the Hollister Site have been most commonly found along roads and waterways.

Direct impacts could occur in the project area where vehicle traffic is common as well as along the access roads, electric power transmission line (transmission line) corridor, and in the areas accessed for surface exploration. Indirect impacts such as soil erosion could occur on the site. However, the fence system surrounding the Hollister Site precludes its use by livestock. Therefore, the access road, waterways, and surface exploration areas are most susceptible to indirect impacts such as habitat degradation and fire susceptibility.

Vehicles and equipment transported to and working at the Hollister Site may bring in noxious weeds or non-native invasive plant species from other locations, causing new infestations to develop within the project area or along roadways unless washed prior to arriving at the Hollister Site. Gravel or soil brought into the project area from locations contaminated with noxious weeds or non-native invasive plant species for road maintenance and mine facility construction may transport weed seed or plant parts to the Hollister Site creating potential new infestations.

Indirect impacts from the Proposed Action may include vehicles and equipment leaving the Hollister Site that have worked in an area infested with noxious weeds or non-native invasive plant species. If not washed prior to leaving the Hollister Site, vehicles may transport and spread noxious weeds or non-native invasive plant species to other locations away from the project area. Animals in the area also could transport noxious weeds or non-native invasive plant species seed to the project area in their fur and hooves. Birds that have eaten seeds and wind dispersion are additional possible seed vectors.

3.10.2.1 Proposed Action

Surface Disturbance

Noxious weeds and non-native invasive plant species readily invade areas that have been subject to surface disturbance, which typically lack, or have minimal vegetative cover. Under the Proposed Action, mine development and operation would remove or disturb approximately 92 acres of vegetation in addition to the approximately 80 acres of previously authorized mining surface disturbance. A total of 34.7 of the 92 acres would be for construction of the transmission line. An additional 25 acres would be disturbed by exploration activities for a total of 50 acres of disturbance associated with surface exploration. Approximately 222 acres would be disturbed at the Hollister Site as a result of previous authorizations combined with the Proposed Action. All surface disturbance would be reclaimed.

The salvage of growth media and the application for growth media as part of the reclamation of surface disturbance areas may increase the potential for the establishment of noxious weeds and non-native invasive plant species if seeds are present in the growth media. Rodeo Creek Gold Inc (RCG) would expand surface exploration activities on the Hollister mining claims to further delineate known ore zones and to target potential mineralized resource areas. Surface exploration activities consist of surface geologic or geophysical surveys, frequent driving along access routes, drill site preparation, and drilling. These activities also could increase the spread of noxious weeds and non-native invasive plant species along access routes and drill sites.

Noxious weed invasion would potentially increase due to the road maintenance activities along Ivanhoe Road and Little Antelope Creek Road. Blading the Ivanhoe Road would potentially spread seeds and propagules along the road shoulder.

Transmission line construction activities also would potentially increase noxious weed invasion due to overland construction traffic and additional surface disturbance created by trucks and construction vehicles from off-site.

Implementation of RCG's Reclamation Plan (see Section 2.4.10, Reclamation and Site Closure) would reduce the potential for noxious weeds and non-native invasive plant species establishment in the study area. However, minor populations of noxious weeds or non-native invasive plant species (e.g., halogeton, cheatgrass) may become established in localized areas for short periods of time.

To stabilize the growth media, reduce soil erosion, and minimize the potential for the establishment of noxious weeds and non-native invasive plant species, growth media stockpiles would be reclaimed with an interim seed mix created from the plant list presented in Section 2.4.10.4, Seed Mixes. Successful reclamation of mine and mineral exploration disturbance areas (including pit backfill areas) would result in the establishment of a permanent vegetative cover, which would minimize the potential establishment of noxious weeds and non-native invasive plant species in the long term.

As described in the Reclamation Plan, certified weed-free seed mixes and mulches would be used for reclamation. If noxious weeds or non-native invasive plant species become established in project-related disturbance areas, a weed removal or spraying program would be implemented for at least a minimum of 3 years following reclamation. All chemicals used to treat weeds would be approved for use on public lands. As described in Section 2.4.10.5, Noxious Weed Management, and RCG's Noxious Weed Prevention and Control Plan (RCG 2011a) weed monitoring and control practices would be implemented during vegetation establishment to limit the growth and spread of noxious weeds or non-native invasive plant species and to facilitate successful revegetation with the proposed seed mixes. Weed control practices follow BLM and Nevada Division of Environmental Protection (NDEP) regulations and are already in place at the Hollister Site to control weed populations as they are located. The weed control program would continue to be implemented in coordination with the BLM to limit the spread and introduction of noxious weeds or non-native invasive plant species in the study area.

Water Management Activities

In the event of a continued decrease or cessation of flow in seeps and springs within the mine-related maximum extent of the 10-foot groundwater drawdown contour (**Figure 3.6-2**) and Vinini Formation, areas may increase in likelihood of potential establishment of noxious weeds and non-native invasive plant species known to invade riparian/wetland habitats (e.g., Scotch thistle, other thistles, and cheatgrass). The decrease or cessation of flow in seeps and springs over the long term would result in a decrease or loss of wetland vegetation, which would provide an opportunity for noxious weeds and non-native invasive plant species to become established because they readily invade areas supporting sparse or no vegetation.

With an increase in flow in Little Antelope and Antelope creeks, water-loving species such as tamarisk, Russian olive, and purple loosestrife have the potential to become established along the margins of the creeks. Tamarisk occurs in disturbed and undisturbed streams, waterways, bottomlands, banks and drainage washes of natural or artificial water bodies, moist rangelands and pastures, and other areas where seedlings can be exposed to extend periods of saturated soil for establishment (U.S. Forest Service 2006).

Various methods have been used to attempt to control existing stands of tamarisk along western rivers, including chemical, mechanical, and biological controls (U.S. Geological Survey [USGS] 2006). Chemical control has been successfully used for site-specific removal (e.g., application to cut stumps) or for larger areas (aerial spraying). Mechanical control generally involves cutting or bulldozing the aboveground material, raking up the root crowns, and burning the slash. Biological control agents (herbivorous insects from tamarisk's native range in Asia) have recently been released at a number of field sites. Biological control is potentially more sustainable than other methods, but it is controversial because it involves introducing another non-native organisms, with potentially unforeseeable consequences (USGS 2006).

3.10.2.2 Mud Springs Road Transmission Line Alternative

Surface Disturbance

The potential introduction or spread of noxious weeds and non-native invasive plant species would be lower than the Proposed Action because 9.5 and 15.2 fewer acres of disturbance would occur from the construction of the North and South options of this alternative, respectively.

Water Management Activities

The potential introduction or spread of noxious weeds and non-native invasive plant species as a result of loss or reduction in flow at seeps or springs would be the same as described for the Proposed Action.

3.10.2.3 Mud Springs Waste Rock Storage Facility Alternative

Surface Disturbance

Construction and operation of this alternative would result in additional surface disturbance (21 acres) as compared to the Proposed Action, which would increase the potential for establishment and spread of noxious weeds and non-native invasive plant species. Implementation of RCG's noxious weed management practices, as described in Section 2.4.10.5, Noxious Weed Management, would minimize the potential for establishment and spread of new noxious weeds and non-native invasive plant species populations within surface disturbance areas during project operation and reclamation.

Water Management Activities

The potential introduction or spread of noxious weeds and non-native invasive plant species as a result of loss or reduction in flow at seeps or springs would be the same as described for the Proposed Action.

3.10.2.4 Backfill Alternative

Surface Disturbance

The potential establishment of noxious weeds and non-native invasive plant species within the project area from the implementation of this alternative would be the same as described for the Proposed Action except that 10.6 additional acres of land would be disturbed and thus open to potential establishment of noxious weeds and non-native invasive plant species.

Water Management Activities

The potential introduction or spread of noxious weeds and non-native invasive plant species as a result of loss or reduction in flow at seeps or springs would be the same as described for the Proposed Action.

3.10.2.5 No Action Alternative

Existing RCG weed control measures would continue to be implemented to prevent the establishment of new populations and to control existing populations in exploration-related disturbance areas.

3.10.3 Cumulative Impacts

The CESA for noxious weeds and non-native invasive plant species is shown in **Figure 3.10-2**. The past, present, and reasonably foreseeable future actions in this area are identified in Section 3.2, **Table 3.2-1**. Mining operations are illustrated in **Figure 3.2-1**.

Surface Disturbance

The CESA (455,584 acres) was developed for the Carlin Trend because it is an area of a large amount of surface disturbance created by similar types of activities to the Proposed Action. Noxious weeds and non-native invasive plant species populations already exist within the CESA in unreclaimed previously disturbed areas and along existing roads. The common elements associated with most weed infestations are ground disturbance, wildfire, grazing, or use of motorized vehicles. Maintenance on other roads outside the project area, such as Tuscarora-Midas, Mud Springs, Antelope Creek, and Silver Cloud roads, can transport noxious weeds and non-native invasive plant species into the area. Surface disturbances associated with mining typically create areas that are devoid of vegetation or are sparsely vegetated until desirable vegetation can become established after reclamation. Intensive long-term grazing in localized areas and burned areas as a result of wildfires can reduce the vegetative cover provided by native vegetation. Past and recent wildfires have converted what was once primarily sagebrush habitat to expanses of cheatgrass in some areas within the CESA. Surface disturbances from off-road recreational vehicle use and vehicles in general, as well as road maintenance equipment can result in the loss of vegetative cover. Noxious weeds and non-native invasive plant species readily become established in areas that have been subjected to surface disturbances that have removed or reduced vegetative cover. After the weeds are introduced into an area and infestations become established, they generally continue to spread into adjacent areas. The spread of weeds results in the displacement of native vegetation important to some wildlife.

Cheatgrass infestations prevalent in the Carlin Trend initially resulted from the 1964 wildland fires that burned vast acreage from Boulder Valley to the base of the Tuscarora Mountains, converting the dominant vegetation type from sagebrush community to a cheatgrass community. Cheatgrass has been spread in the past by placing soil contaminated with cheatgrass seed onto reclaimed areas. The mines avoid this practice. Growth media stockpiles are now planted with vegetation (e.g., crested wheatgrass [*Agropyron cristatum*]) to compete with cheatgrass. Non-cheatgrass contaminated soil, such as the Carlin Formation, also is used as growth medium during reclamation to combat the spread of cheatgrass.

Tamarisk began showing up in the Carlin Trend as a result of the dewatering activities from mines, growing in the wet areas such as tailing impoundments, sediment ponds, water infiltration areas, reservoirs, wetlands and moving into streams and natural waterways. Noxious weeds in the Carlin Trend consist mostly of Scotch thistle, Canada thistle, various thistles, hoary cress, and tamarisk. The mines currently treat known infestations of the noxious weeds and non-native invasive plant species within their project areas.

Recreational users of the lands within the CESA can unknowingly promote weed infestations when they bring recreational vehicles from an invested area to drive on- or off-road, spreading seeds as they travel. Foot traffic on trails also can spread seeds from infested mud on boots or on camping equipment.

Wildlife and domestic livestock also can spread seeds and plant parts that become embedded in their fur or feet.

Most infestations are associated with surface disturbance areas cleared for construction of facilities, exploration drill sites, or roads. Road maintenance has increased the spread of noxious weeds and non-native invasive plant species along the roadways by grading roads with untreated infestations of noxious weeds and non-native invasive plant species. Vehicles are probably the most common means of spreading noxious weeds and non-native invasive plant species with people driving through infestations without washing vehicles and equipment.

Currently disturbed or unreclaimed areas, including the East Pit mining facilities, road shoulders, two-track roads, surface exploration areas, laydown areas, and areas open to grazing, all provide an additional opportunity for weeds to spread to new disturbance areas during Proposed Action activities. The past disturbances, present on-going activities, and proposed disturbances may have a cumulative negative effect by increasing the introduction and spread of noxious weeds and non-native invasive plant species.

Implementation of RCG's Reclamation and Noxious Weed Prevention and Control plans, in association with the Proposed Action and other authorized actions, would minimize the introduction or spread of noxious weeds and non-native invasive plant species within the study area and, thereby minimize the proposed project's contribution to cumulative effects in the CESA.

Mud Springs Road Transmission Line Alternative

The Mud Springs Road Transmission Line Alternative would result in 9.5 and 15.2 acres of less disturbance for the North and South options, respectively within the CESA, when compared with the Proposed Action. As a result, fewer acres would be available for the introduction of noxious weeds and non-native invasive plant species.

Mud Springs Road Waste Rock Storage Facility and Backfill Alternatives

The Mud Springs Road Waste Rock Storage Facility and the Backfill alternatives would result in 21 and 10.6 acres of disturbance, respectively, in addition to the disturbance for the Proposed Action that would be susceptible to the spread of noxious weeds and non-native invasive plant species in the CESA.

Water Management Activities

Cumulative impacts caused by the introduction or spread of noxious weeds and non-native invasive plant species as a result of decreased or cessation of flow in seeps, springs, and riparian habitats may result from cumulative groundwater drawdown. The decrease or cessation of flow in seeps and springs over the long term would result in a decrease or loss of wetland vegetation, which would provide an opportunity for noxious weeds and non-native invasive plant species to become established because they readily invade areas supporting sparse or no vegetation.

3.10.4 Potential Monitoring and Mitigation Measures

During construction, operation, and reclamation, RCG would identify and monitor the project area for the establishment of noxious weeds and non-native invasive plant species. RCG would treat weed infestations according to their Noxious Weed Prevention and Control Plan (RCG 2011a), including BLM and NDEP regulations. Treatment would consist of grubbing and spraying with chemicals approved for use on public lands.

3.10.5 Residual Impacts

Residual impacts from noxious weeds and non-native invasive plant species are not anticipated from the implementation of the proposed project. However, infestations of cheatgrass in the area may increase in size.