Vegetation, Forest/Woodland Products, Special Status Plants, and Noxious Weeds, Invasive, and Non-Native Species

Report for the

Barrick Nevada Sage-Grouse Bank Enabling Agreement Public Land Project Plan

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1.0 INTRODUCTION

This resource report describes the affected environment and considers direct, indirect, and cumulative effects to vegetation, forest/woodland products, special status plants, and noxious weeds and invasive, non-native species that may occur with the implementation of the proposed Public Land Project Plan (ERM 2017a). This resource report has been prepared to support and supplement the Environmental Assessment (EA) by providing additional background data and supporting detail for those interested in particular resources. Comments on this report are being sought from the public together with comments on the EA.

The analysis area for direct and indirect effects to vegetation, forest/woodland products, special status plants, and noxious weeds and invasive, non-native species includes the Public Land Project Plan area (**Appendix A**, **Figure 1**). The cumulative effects study area (CESA) for vegetation, forest/woodland products, special status plants, and noxious weeds and invasive, non-native species is the Barrick Gold of North America, Inc. (Barrick) Nevada Sage-Grouse Bank Property (Bank Property).

The Bank Property encompasses approximately 238,192 acres in Eureka and Elko counties, Nevada, between the Cortez Mountains (to the north and west) and Sulphur Spring Mountains (to the east). The Roberts Mountains are situated to the south. Within the Bank Property are 189,005 acres of public land administered by the Bureau of Land Management (BLM) Mount Lewis Field Office (MLFO) Battle Mountain District (BMD) and the BLM Tuscarora Field Office Elko District, and 49,187 acres of privately owned land managed by Barrick. The public land portion of the Bank Property is referred to in this resource report as the Public Land Project Plan area.

1.1 PROPOSED PUBLIC LAND PROJECT PLAN

1.1.1 Background

Barrick established the Bank Enabling Agreement (BEA) in 2015 with the United States (U.S.) Department of the Interior (DOI), acting through the U.S. Fish and Wildlife Service (FWS) and the BLM, to compensate for impacts to the greater sage-grouse (*Centrocercus urophasianus*; hereinafter "sage-grouse" or "GRSG") and sagebrush ecosystems as a result of Barrick's proposed mining activities. The BEA set forth an agreement between Barrick, the BLM, and the FWS regarding the establishment, use, operation, and maintenance of the Bank Property; and established a system for calculating credits associated with conservation actions, and debits associated with mining activities. The overall goal of the BEA is to provide benefits to sage-grouse and sagebrush ecosystems.

The credit and debit metrics for the Bank were established using the Sage Grouse Conservation Forecasting Methodology, developed by The Nature Conservancy (TNC Methodology). The TNC Methodology uses statistical models to estimate existing habitat value to sage-grouse using the metric of functional acres. Functional Acre is the unit of value that expresses the assessment of quantity (acreage) and quality (function) of habitat at the time of assessment or in the future through the quantification of a set of observed or predicted local and landscape conditions (Provencher et al. 2017). Increasing the functional acres represents an improvement in GRSG habitat, thereby resulting in a net conservation gain for GRSG. The model then simulates expected increases or decreases in functional acres over a set time period as a result of human-directed management actions (i.e., conservation actions). Conservation actions (i.e., habitat restoration activities) and credits were identified on a landscape level within the Bank Property.

Using the results of the TNC Methodology, and in accordance with requirements of the BEA, Barrick developed two implementation plans, the Public Land Project Plan (ERM 2017a) and the Private Land

Project Plan (ERM 2017b), which identify the conservation actions proposed within the Bank Property on public and private land, respectively. The Public Land Project Plan and the Private Land Project Plan also identify the credits and schedule associated with the proposed conservation actions. Through implementation of the Public Land Project Plan and the Private Land Project Plan, Barrick will initiate a voluntary management program to improve sagebrush ecosystems in the Bank Property and achieve a measurable, net conservation gain for sage-grouse. In addition, implementation of the Public Land Project Plan would:

- Meet objectives of the Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (ARMPA), which incorporates greater sage-grouse conservation measures into land use plans and aligns BLM management with that of the States' conservation strategies (BLM 2019). The ARMPA guides land and resource management on BLM-administered land to benefit greater sage-grouse and addresses threats identified in the 2013 FWS Conservation Objectives Team (COT) report (FWS 2013).
- Would help to fulfill the following BLM district-wide and agency-wide goals:
    - Improve and protect sage-grouse habitat
    - Improve and protect wetland habitat
    - Improve pinyon-juniper woodland health, productivity, and functionality
    - Slow the expansion of pinyon-juniper into sagebrush communities
    - Slow the spread of noxious weeds and other invasive non-natives, including cheatgrass (*Bromus tectorum*)
    - Improve rangeland health and productivity
    - Protect and improve wildlife habitat, including game and sensitive species
- Would help to fulfill BLM's multiple-use mandate under the Federal Land Policy and Management Act of 1976 (FLPMA) to help protect, maintain and enhance resources in a sustainable way.

1.1.2 Proposed Public Land Project Plan

The proposed Public Land Project Plan (ERM 2017a) was submitted to the FWS and the BLM for review on September 18, 2017. The FWS and BLM are in agreement that the Public Land Project Plan satisfies the intent of the BEA (BLM 2017; FWS 2017). The Public Land Project Plan uses a variety of conservation actions to be undertaken by Barrick on public land to restore and/or enhance habitat to benefit sage-grouse and sagebrush ecosystems. In addition, the Public Land Project Plan develops a compensatory mitigation approach that may be used in connection with Barrick's future mining operations that require DOI approval.

In developing the Public Land Project Plan, specific conservation actions were identified by TNC Methodology for implementation. The conservation actions are modeled combinations of habitat restoration actions that can be performed on the landscape to restore sagebrush ecosystems. The conservation actions are the overall undertakings to preserve, enhance, or restore habitat functionality, thereby reducing threats to sagebrush ecosystems. Conservation actions proposed according to modeling results are shown in **Appendix A, Figures 5-13**; and **Appendix B**, **Table 1.**

Of the 37,006 acres of public land proposed for conservation actions over 35 years, Barrick would implement conservation actions on approximately 70 percent within the first five years. By Year 10, over 80 percent of land targeted for conservation actions would be treated. After Year 10, additional anticipated conservation actions largely target ongoing management of undesirable plant species and maintenance of wet meadows and fuel breaks.

The conservation methods are the treatments that will be implemented to achieve the conservation actions. Conservation methods describe the specific tools available and steps to implement each conservation action. The conservation methods identified in the proposed Public Land Project Plan that Barrick would implement to achieve conservation actions include:

- Tree thinning and removal;
- Seeding and sagebrush shrub planting;
- Undesirable plant control and/or extirpation throughout upland, wet meadow, and riparian systems;
- Fencing and water conveyance to restore wet meadows; and,
- Establishing and/or maintaining fuel breaks.

Details on conservation actions are provided in the Public Land Project Plan (ERM 2017a). Conservation methods are summarized below in section 1.1.2.1.

The TNC Methodology modeled the best actions to restore habitat for the benefit of sage-grouse. Decisions about the type of method to use (e.g., mastication versus chainsaw for tree removal) were incorporated into the model, and are based on ecological, financial, and land use considerations. As such, implementation of conservation actions would follow the modeled conservation actions to the extent practicable. However, small scale variations in ground conditions compared to modeled baseline, or changes in land use may necessitate adjustments to conservation methods in order to achieve performance standards. Final decisions as to implementation methods will incorporate best available science and consider relevant guidance for restoration decision making.

1.1.2.1 Conservation Methods

Tree Thinning and Removal

This method would be used in areas where tree encroachment has been identified, but there would be no reduction in acreage of Pinyon-Juniper Woodland ecological systems. Tree removal was modeled to apply to select vegetation classes within the following ecological systems:

- Upland Big Sagebrush Shrubland with Trees;
- Black Sagebrush;
- Low Sagebrush;
- Mountain Shrub; and
- Upland Montane Sagebrush Steppe.

Within these ecological systems, mid to late successional reference vegetation classes, and uncharacteristic vegetation classes, would be targeted for conservation actions. Pinyon pine and juniper trees would be removed to reduce or eliminate tree canopy cover, which would promote development of native grasses, forbs, and shrubs; thereby improving the habitat functionality of sage-grouse nesting habitat. At higher elevations, late-brood rearing habitat may also be restored through this method. Removing trees would also reduce heavy fuel loads, and improve vegetation cover, which has been shown to increase insect productivity and benefit sage-grouse hens and their broods.

Chainsaw hand thinning would be the preferred method for tree cutting, however, for large trees (>5 m), other methods may be considered on a case-by-case basis, such as mastication, feller-buncher or tree-shearer techniques. The selection of a particular method would be based on the following characteristics: size and density of the tree(s) to be removed; topography; soil characteristics and costs of the various techniques.

Mastication is the process of crushing, cutting, and shredding undesirable woody material. Masticator shredding level would be set to produce large debris (0.5 to 1 feet (ft) long) to avoid accumulation of fine debris that could smother herbaceous germination and growth. Equipment involved in mastication consists of a cutting head attached to a wheeled or tracked piece of machinery. Mastication would be restricted to areas appropriate for the machinery and attachment being used (e.g., less than 20 percent slope). Mastication may be used in areas where selective tree retention is needed, or where the trees are too large or dense for hand removal. Masticated trees would be left on site.

Feller-bunchers are machines that grab trees, cut them at the base, pick them up, and move them into a pile or onto the bed of a truck. A tree shearer is an implement that attaches to a tractor and can be used to cut down trees up to about 10 inches (in) in diameter with a single pass.

Depending on the technique(s) used, equipment would range from a hand-held chain saw, to a back-hoe or forklift, brush grubber or feller-buncher, and a pick-up and trailer may be used for hauling. Existing fencing, or small temporary exclosures, may be used to exclude livestock, horses, and other ungulates until treatment activities are concluded. SOPs 1.1. and 1.2, pre-implementation planning, would specify where and for how long excluding animals would be warranted to improve the success of a treatment.

Seeding and Sagebrush Shrub Planting

Seeding and planting was modeled to apply to vegetation classes within the following ecological systems:

- Upland Big Sagebrush Shrubland with Trees;
- Black Sagebrush;
- Low Sagebrush; and
- Upland Montane Sagebrush Steppe.

Within these ecological systems, mid to late successional reference vegetation classes, and uncharacteristic vegetation classes, would be targeted for conservation actions. This conservation method includes seeding areas and planting shrubs in upland ecological systems to promote the growth of shrubs, grasses, and forbs, to proportions and diversities that meet performance standards for that ecological system. Seeding or plantings would occur in areas where existing vegetation cover is inadequate to ensure successful revegetation. In upland big sagebrush with trees and upland montane sagebrush steppe systems, seeding and shrub planting would be used in conjunction with other conservation methods (i.e., tree removal and undesirable plant control) to restore or enhance habitat conditions preferred for sage-grouse nesting and/or late brood rearing.

Plantings would be done by hand and would utilize container stock, bare root stock, or cuttings and would involve digging holes and burying root. Areas could be overseeded (increasing the pure live seed per acre above recommended levels) to improve the composition and density of forbs, grasses, and shrubs on the area. Desirable plant species would be prioritized for use. Non-native species or species that are not used as cover or food by sage-grouse may be used as an intermediate species to promote the long-term restoration of preferred, native species.

Seeds would be obtained from commercially available sources or native seed would be harvested locally. Barrick would consider developing a seed bank for locally harvested seed. Seeds would be stored in an appropriate storage facility prior to use.

Depending on the terrain, soil type, soil moisture, and seed species, one or more of the following seeding methods may be used: hand seeding, broadcast (by ground or aerially), drill, or harrow seeding. Rates and seasonal timing would depend on the species used and terrain considerations.

Seed mixes and hand-planted species would consider the relative percentages of species of the ecological site in which the mix would be applied, the commercial availability of the species, and seed class and/or certification. Species identified for seed mixes are shown in the Public Land Project Plan Table 5-3. This list includes species identified by the FWS, BLM and TNC Methodology as suitable sage-grouse cover or food species in this ecoregion; and by BLM for effectiveness in providing erosion protection, the ability to grow within the constraints of the low annual precipitation experienced in the region, the site elevation and soil type, and the species' suitability for the site.

Areas may require soil preparation prior to seeding. These activities may include litter reduction or removal, or preparation of the seedbed to ensure optimal soil moisture and compactness. Litter reduction or removal may be performed by hand raking or mechanical raking using a hay or landscape rake pulled by a small tractor. Seedbed preparation techniques may include ripping or scarifying, mulching vegetative debris with a tractor-pulled disking or rototilling attachment, refining soil texture with a tractor-pulled light harrowing implement, or packing the soil using a soil packer attachment. In arid, sagebrush dominated landscapes, tractor-pulled land imprinters may be used to imprint small depressions into the soil to reduce runoff and erosion, increase infiltration, and crush small shrubs.

Control of Undesirable Plant Species

Undesirable plant species include noxious weeds or other plant species that are non-native and tend to exhibit invasive characteristics in the region of interest. Noxious weeds and other undesirable plant species are widespread throughout the landscape. 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); and is any plant designated by a Federal, State or county government as injurious to public health, agriculture, recreation, wildlife or property. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or non-native, new, or not common to the U.S. Control of undesirable plant species will include the current list of Nevada Department of Agriculture (NDA) noxious weeds.The primary undesirable species that the conservation actions would address is cheatgrass. Cheatgrass is of particular concern in Nevada due to its ability to outcompete and alter the native vegetation composition of landscapes. Its presence increases fuel load and fire risk.

Control of undesirable plant species may be used as a stand-alone conservation action or prior to other conservation actions. Undesirable plant control is targeted for a variety of vegetation classes. In vegetation classes of sagebrush and wet meadow systems that exhibit invasion by undesirable plants, methods to reduce or eliminate these species would be applied.

The TNC Methodology modeled chemical means (i.e., herbicide application) as the primary type of undesirable plant control method. However, Barrick may also consider mechanical means. Mechanical treatments can include tilling, plowing, hand pulling or targeted grazing. Mechanical control can be an effective control measure for annual species, but not rhizomatous species. The effectiveness of mechanical control measures is dependent upon proper timing to cut the vegetation prior to the maturation of seed and may require multiple treatments during the growing season. Mechanical methods are generally applicable for small and medium sized areas. Hand pulling is most appropriate for individual plants or areas that are extremely sensitive to disturbance, sinceplowing and tilling methods involve some heavy machinery or at least a gas-powered motor.

Plowing is generally done by a tractor or skid and has two primary types, disc or chisel. Disc plowing is extremely effective at uprooting, mulching and shredding vegetation, including shrubs. It can remove large

areas of undesirable plants while simultaneously preparing an area for reseeding or planting with natives. Chisel plowing is generally used for breaking up hard pan or packed soil. Both disc and chisel require relatively flat areas to work effectively and are best in areas that have a low brush density as the equipment has the potential to start fires in the summer.

Tilling involves the use of angled disks (disk tilling) or pointed metal-toothed implements (chisel plowing) to uproot, chop, and mulch vegetation. This technique is best used in situations where the complete removal of vegetation or thinning is desired, and in conjunction with seeding operations. Tilling leaves mulched vegetation near the soil surface, which encourages the growth of newly planted seeds. Tilling is usually done with a brushland plow, a single axle with an arrangement of angle disks that covers about 10 ft-wide swaths. An offset disk plow, which consists of multiple rows of disks set at different angles to each other, is pulled by a crawler-type tractor or a large rubber tire tractor. This method is often used for removal of shrubs, or to reduce annual competition from undesirable plant species such as cheatgrass, and works best on areas with smooth terrain, and deep, rock-free soils. Chisel plowing can be used to break up soils such as hardpan.

Chemical Treatment/Management is the use of herbicides that affect targeted undesirable species while minimizing the impact on desired native species. Herbicide treatment methods would be based on species-specific and area-specific conditions (e.g., annual vs. perennial species; proximity to wetlands, open water, riparian areas, or agricultural areas; and time of year Implementation of the Public LPP SOPs, specifically 1.1, and 1.2, would provide for site-specific and species-specific planning of weed control activities, including coordination with BLM or other land managers, as necessary. Treatments would be conducted in compliance with all federal, state, and local regulations and in consultation with the BLM. Herbicides must be applied by qualified and/or licensed personnel and used in accordance with label directions. The use of herbicides would follow the Record of Decision for the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States PEIS (BLM 2007), the EA Integrated Weed Management Plan Battle Mountain District Nevada Mount Lewis Field Office and Tonopah Field Office (BLM 2009), and the Elko District Programmatic EA of Integrated Weed Management on BLM Lands (BLM 1998). In addition, guidance in H-9011 Chemical Pest Control Handbook (BLM 1988) and 9011 Chemical Pest Control Manual (BLM 1992) would be incorporated. Herbicides would not be used as a treatment unless authorized by the landowner or land management agency. A Pesticide Use Proposal, or PUP, would be prepared prior to pesticide application on BLM-managed lands.

Chemicals may be applied by aerial methods or ground methods, including use of a vehicle-mounted sprayer or by an individual worker using a backpack applicator. Aerial herbicide can be applied by either fixed wings (airplanes) or helicopters and is effective at treating large areas and/or areas with challenging terrain. Vehicle-mounted spraying and application by individual workers are preferred in smaller areas, where discrimination between desirable and undesirable species on the ground is needed. Ground application can also help minimize the overall use of the herbicide relative to aerial dispersal. Appendix D of the Public LPP includes BMPs that would be implemented for chemical applications on public lands.

Wet Meadow Restoration

Within wet meadow systems, methods including exclusion techniques and grazing management would be implemented to improve water retention, restore or enhance water quality, and restore and stabilize the

wet meadow systems, would be implemented. Methods would reduce trampling and increase cover by native grass and forbs, to improve the habitat functionality of sage-grouse late brood-rearing habitat. Exclusion techniques include fencing or other means of access control. Where exclusion techniques are employed, alternative access to water would be provided. Spring development would entail placing storage tanks and/or troughs outside of the enclosure, as well as piping or other water conveyance system to deliver a portion of the water to the trough or storage tank. Fencing would be constructed per BLM guidelines, and managed so as to address wildlife access concerns. Types of fencing could include range fence or jack rail fence. Implementation of the Public LPP SOPs, specifically 1.1, and 1.2, would provide for site-specific planning of exclusion activities, including coordination with BLM or other land managers, as necessary.

Fuel Breaks

Fuel breaks support fire suppression efforts and can reduce the loss of habitat through reduction of the size and severity of wildfires. Fuel breaks are effective along roadways where fuels are modified to minimize fire size and rate of wildfire spread into adjacent larger blocks of sagebrush habitat. Established fuel breaks along roads provide firefighters with safer and effective access to the wildfire while minimizing disturbance in an adjacent sensitive area.

Fuel breaks are a tool to control the wildfire cycle and increase the viability and duration of sagebrush restoration. While not a stand-alone treatment, strategically placed fuel breaks can reduce the intensity and speed of a fire, thus reducing resources required for overall containment.

Fuel breaks are proposed in specific areas. Fuel breaks were modeled by TNC Methodology to follow existing roads and two-tracks to avoid further habitat fragmentation.

Fuel breaks would be created by various mechanical means, including disking, mowing, or tilling, or by planting fire resistant vegetation strips. Fuel breaks may also be created and maintained using targeted grazing. Fuel breaks would need to be wide enough to break large, wind-driven fires. Modeled fuel break width was 100 ft on either side of roads.

Clearing of vegetation with disking or tilling equipment would be most appropriate within low gradient areas containing erosion resistant or erosion neutral soils and where the possibility of invasion by undesirable plant species is low. Equipment can include a tractor-pulled disking or rototilling attachments.

If mowing, vegetation height would be cut down to at least 6 to 12 inches to most effectively slow down a wildfire. Mowing is a good option for areas where maintaining native vegetation is the priority and where erosion is a concern. Equipment can include agricultural mowers or shredders set at the lowest setting. Vegetation can either remain on site or be removed by baling or raking. Depending on the amount of vegetation present, scraping vegetation away with a dozer or road grader is also an option.

Fuel breaks can also be created by planting low plant species, which would require limited maintenance once established. TNC Methodology assumed the use of forage kochia (*Bassia prostrata*) in the model for fuel breaks. However, if other native species with similar structural and functional characteristics are available to use (e.g., *Poa secunda*), then those species would be considered as well. Other commercially

available and cost-efficient species for fuel breaks could include crested wheatgrass (*Agropyron cristatum*), or intermediate wheatgrass (*Thinopyrum intermedium*) at higher elevations.

Once created, fuel breaks would require monitoring and maintenance to ensure vegetation structure is maintained and undesirable plants are not encroaching into these areas. TNC Methodology modeled forage kochia in fuel breaks specifically because of the low maintenance requirements of this species. However, if fuel breaks are created by mowing, or if other species are used, fuel breaks may require regular monitoring to prevent establishment of undesirable plant species and maintenance of target vegetation heights and/or densities.

1.1.2.2 Implementation Schedule

The projected schedule for implementation used in TNC Methodology is 35 years. The majority of habitat restoration activities are anticipated to occur within the first 10 years. Approximately 70 percent of the currently available acreage on public land would receive conservation actions within the first 5 years. Each year, a subset of the 37,006 acres (the average number of acres modeled for conservation actions over 35 years) would be targeted and several projects would likely take place each year. The locations and acreage to be restored within any one year would be at the discretion of Barrick.

1.1.2.3 Standard Operating Procedures and Best Management Practices

The Standard Operating Procedures (SOPs) and Best Management Practices (BMPs) that would be implemented with the conservation methods are described in detail in the Public Land Project Plan, Appendices C and D, respectively (ERM 2017a). Each conservation method includes steps for pre-implementation, implementation, and post-implementation, as outlined in the SOPs. Pre-implementation steps will field-verify the appropriate tools to use to achieve each conservation action. BMPs will be followed to protect air, water and land resources, minimize erosion and disturbance, avoid sensitive biological resources, soil, and cultural areas, and minimize the chance of undesirable plant species from becoming established.

1.1.2.4 Monitoring

After conservation actions have been completed, monitoring would begin to validate whether conservation actions are achieving the Public Land Project Plan goals and objectives. Details of monitoring activities are described in the Public Land Project Plan (ERM 2017a).

1.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the BLM would not approve the implementation of the proposed Public Land Project Plan. Barrick would not implement the project specific conservation actions in the BMD and Elko District.

1.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

No other alternatives were considered.

1.4 CUMULATIVE EFFECTS: PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Cumulative effects are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and RFFAs regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time” (40 Code of Federal Regulations (CFR) 1508.7).

Projects and actions considered in the cumulative effects analysis are defined as those past, present, and reasonably foreseeable future actions (RFFAs) that could interact with the implementation of the proposed Public Land Project Plan in a manner that would result in cumulative effects. These projects and actions include other habitat improvement and restoration projects, including the Barrick BEA Private Land Project Plan, and if implemented, the 3 Bars Ecosystem and Landscape Restoration Project (The 3 Bars Project), the Roadside Fuel Break Hazardous Fuels Reduction Project (Roadside Fuel Break Project), and the Sagebrush Ecosystem Management Project (SEM Project). Projects and actions considered in this cumulative analysis also include other past, present, and reasonably foreseeable future mining, exploration, utilities/community, and other activities with surface disturbance (**Appendix B, Table 3)**. The period of potential cumulative impact is defined as 35 years, which spans the period of time conservation actions would be implemented.

The Barrick BEA Private Land Project Plan identifies the conservation actions, and associated credits and schedule, that Barrick would undertake on private land within the Bank Property to restore and/or enhance habitat to benefit sage-grouse and sagebrush ecosystems. The format and content of the Private Land Project Plan follows the direction provided in the BEA and addresses the need to implement conservation actions to improve sagebrush ecosystems and sage-grouse habitat in exchange for mitigation credit. Through implementation of the Private Land Project Plan, Barrick will initiate a voluntary management program to improve sagebrush ecosystems. Of the 49,187 acres of private land in the Bank Property, conservation actions have been identified by the TNC Methodology to occur on an average of 9,924 acres of private land over 35 years (**Appendix A**, **Figure 2**; **Appendix B**, **Table 2**). The Private Land Project Plan was submitted to the FWS and the BLM for review on September 18, 2017. The FWS and BLM are in agreement that the Private Land Project Plan satisfies the intent of the BEA (FWS 2017; BLM 2017).

The 3 Bars Project encompasses 725,000 acres and overlaps the southern portion of the Bank Property (**Appendix A**, **Figure 2**). It includes portions of three major mountain ranges (Roberts Mountain, Simpson Park Range, and Sulphur Springs Range). The project allows for treatments from several acres to several thousand acres with the goal of maintaining sagebrush steppe habitat and restoring fragmented habitat for at-risk wildlife species.

The Roadside Fuel Break Project allows for the establishment and maintenance of fuel breaks along existing roads on approximately 30,000 acres of public lands within the administrative boundary of the BLM BMD, specifically in the Shoshone-Eureka and Tonopah Planning Areas in Lander, Eureka, Nye, and Esmeralda counties, Nevada. The public lands are managed by the MLFO and the Tonopah Field Office. A variety of fuels treatment methods will be implemented in a phased manner over multiple years with treatments on approximately 500 to 3,000 acres implemented annually.

The SEM Project would implement sagebrush treatments within the BLM BMD on a total of 20,000 acres per year to improve and enhance sagebrush ecosystems and sage-grouse habitat. Treatments would include pinyon-juniper thinning, herbicide applications, seeding and planting of native plants, and collecting native seed.

The cumulative effects analysis in this resource report incorporates the analyses in the 3 Bars Final Environmental Impact Statement (FEIS) (BLM 2016a) and the Roadside Fuels Break Environmental Assessment (BLM 2016b).

2.0 AFFECTED ENVIRONMENT – VEGETATION

This section describes the affected environment for consideration of direct, indirect, and cumulative effects to vegetation, forest/woodland products, special status plants, and noxious weeds and invasive, non-native species that may occur with the implementation of the proposed Public Land Project Plan. The analysis area for direct and indirect effects to vegetation, forest/woodland products, special status plants, and noxious weeds and invasive, non-native species includes the Public Land Project Plan area (**Appendix A**, **Figure 1**). The CESA for vegetation, forest/woodland products, special status plants, and noxious weeds and invasive, non-native species is the Bank Property (**Appendix A**, **Figure 2**).

2.1 REGULATORY FRAMEWORK

2.1.1 Vegetation

BLM Handbook H-1740, Integrated Vegetation Management (BLM 2008) provides guidance on the management of vegetation on public lands. The BLM Nevada Northeastern Great Basin Resource Advisory Council, as chartered by the DOI to promote healthy rangelands, has developed standards and guidelines for grazing administration on about 16.2 million acres of public lands in Nevada. Included in the standards and guidelines are guidelines for vegetation management - control of noxious weeds and other invasive non-native vegetation, including cheatgrass; limit grazing in salt desert plant communities to very early season or dormant season; create and maintain a diversity of sagebrush age and cover classes; maintain healthy stands of pinyon-juniper and ensure a combination of stand stages; and use native vegetation to reclaim sites (BLM 2016a).

2.1.2 Forests/Woodland Products

The Healthy Forests and Restoration Act of 2003 was created to improve the capacity of the Secretary of Agriculture and the Secretary of the Interior to conduct hazardous fuels reduction projects on National Forest lands and BLM lands aimed at protecting communities, watersheds, and certain other at-risk lands from catastrophic wildfire, to enhance efforts to protect watersheds and address threats to forest and rangeland health, including catastrophic wildfire, across the landscape, and for other purposes.

The FLPMA and BLM Manual 5000-1, Forest Management Public Domain, include requirements for planning and implementing forestry and woodland projects. Additionally, 43 CFR Part 5400 regulates the sale of forest products harvested from public lands (ERM 2017c).

2.1.3 Special Status Plants

The Endangered Species Act of 1973 (ESA) provides for conserving federally listed endangered and threatened plant species, and plant species proposed for federal listing (ERM 2017c). The ESA also requires that federal agencies consult with the FWS to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the continued survival of a listed species or result in the adverse modification or destruction of its critical habitat (BLM 2016b). Critical habitat is a specific area or type of area that is considered to be essential for the survival of a species, as designated by the FWS under the ESA (ERM 2017c).

In addition to administering conservation programs for listed species and species proposed for listing under the ESA, the BLM also administers programs for sensitive species under guidance from Manual 6840, Special Status Species Management (BLM 2008). BLM special status species include federal candidate species for listing as threatened or endangered under the provisions of the ESA, and those designated by the Director or individual State Directors as BLM sensitive (ERM 2017c). Conservation of BLM sensitive species means the use of programs, plans, and management practices to minimize or eliminate threats affecting the overall condition of the species, and/or improve the condition of the species' habitat (BLM 2016a).

2.1.4 Noxious Weeds and Invasive, Non-native Species

2.1.4.1 Federal Laws

Executive Order (EO) 13112, Invasive Species (February 3, 1999), instructs federal agencies to prevent introductions of non-native invasive species, control their spread in a cost-effective and environmentally sound manner, and minimize the economic, ecological, and human health impacts that invasive species cause. The Invasive Species Council, made up of federal agencies and departments, oversees and facilitates implantation of the EO. The EO also instructs the Secretary of the Interior to establish an advisory committee comprised of local, state, tribal, and regional stakeholders (BLM 2016a).

Other federal laws pertaining to noxious and invasive weeds include the Lacey Act as amended (18 USC Part 42), the Carson Foley Act of 1968 (Public Law 90-583), the Federal Noxious Weed Act of 1974, as amended by the Food, Agriculture, Conservation, and Trade Act of 1990 (Section 1453, Management of Undesirable Plants on Federal Lands; 7 USC Part 2814 et seq.), the Federal Plant Pest Act (7 USC Part 150aa et seq.), and the Plant Protection Act of 2000 (7 USC Part 7701 et seq.), as amended by the Noxious Weed Control and Eradication Act of 2004 (Public Law 108-412) (BLM 2016a).

2.1.4.2 Nevada Laws

Chapter 555 of the Nevada Revised Statutes pertains to noxious weeds. The Nevada Department of Agriculture (NDA) is responsible for jurisdiction, management, and enforcement of this state law. The law mandates that plants on Nevada's noxious weed list be controlled on both private and public lands. The law also calls for establishment of county weed control districts, which are responsible for control and eradication of noxious weeds. The Nevada state noxious weed list can be found at: http://agri.nv.gov/Plant/Noxious_Weeds/Noxious_Weed_List/.

2.1.4.3 BLM Guidance and Regulations

BLM Manual 9015, Integrated Weed Management, provides policy relating to the management and coordination of noxious weeds and other invasive non-native vegetation activities. The policy requires that ground-disturbing projects and projects that alter plant communities be assessed to determine the risk of introducing or spreading noxious weeds and other invasive non-native vegetation. If the risk is moderate or higher, a management program must be established (BLM 2016a).

Two documents identify broad objectives for management of vegetation on BLM-administered lands – *Partners Against Weeds: An Action Plan for the BLM Management* and *Pulling Together: National Strategy for Invasive Plant Management*. Treatment activities at the local level are guided by the goals, standards, and objectives of land use plans developed for each BLM field office. The BLM's noxious weeds and other invasive non-native vegetation control program has three performance measures: inventory, treatment, and post-treatment effectiveness monitoring (BLM 2016a).

BLM Handbook H-1740, Integrated Vegetation Management (BLM 2008), the BLM Integrated Weed Management Plan Battle Mountain District Nevada Mount Lewis Field Office and Tonopah Field Office (BLM 2009), the Elko District Programmatic EA of Integrated Weed Management on BLM Lands (BLM 1998), and Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States Programmatic EIS (BLM 2007a) and Record of Decision (BLM 2007b) direct management of noxious weeds and other invasive non-native plant species within the Public Land Project Plan area. The BMD's and Elko District's weed management plans are concerned with State of Nevada noxious weeds and invasive annual grasses found on or with the potential to spread into the jurisdictional boundaries of the BMD and Elko District (BLM 2016a).

Barrick and the BLM share weed management responsibilities under three signed memoranda of understanding (MOUs) for the management of private lands owned by Barrick within the Public Land Project Plan area to facilitate management on parcels interspersed with BLM-administered lands. The MOUs detail management responsibilities for the Hay Ranch, the Dean Ranch, and the JD Property and pertinent areas of the Argenta, Carico Lake, and Grass Valley allotments where Barrick Cortez, Inc. is permitted to operate (Barrick 2015a, Barrick 2015b, Barrick 2016).

2.2 AFFECTED ENVIRONMENT - VEGETATION

2.2.1 Ecological Systems and Vegetation Classes

An ecological system is the dominant potential vegetation community expected in the physical environment under pre-European settlement ("natural") disturbance regimes. Within each ecological system, vegetation classes were assigned based on relative differences in canopy cover, successional stage, and other characteristics. A vegetation class is the current vegetation community that exists on the landscape now (ERM 2017c).

Vegetation communities were mapped throughout the Bank Property by TNC (Provencher et al. 2017). TNC used a combination of available data from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), high-resolution remote sensing, and on-the-ground field verification to create maps of ecological systems and vegetation classes in the Bank Property.

Appendix A, **Figure 3** shows the ecological group and ecological systems of the Bank Property. Ecological groups and systems are summarized in **Appendix B, Table 4**. For purposes of broad-level descriptions, the ecological systems were grouped into general categories ("ecological groups") (ERM 2017c). Details on environmental conditions and vegetation species of each ecological group and ecological system are documented in the Bank Project Area Baseline Report (ERM 2017c), which is available in the project record.

The majority of ecological systems in the Bank Property would be classified as sagebrush under a "natural" disturbance regime, with *Artemisia* species dominating canopy cover. Other ecological systems in the analysis area include woodland communities, and riparian and wet meadows systems, grasslands, other shrublands, and other systems (i.e., Agriculture, Badland, Mine-inactive, Roads – Local) (ERM 2017c).

Vegetation classes within these systems include both reference and uncharacteristic classes. A reference class represents the vegetation expected to occur under natural disturbance regimes. Uncharacteristic means that the classes exhibit characteristics that are departed from what would be expected under a pre-settlement regime. Approximately 41 percent of the vegetation classes in the Bank Property are in an uncharacteristic condition. Examples of departure characteristics include disproportionately high percentage of bare ground or annual non-natives, disproportionately low percentage of native grasses or forbs, hummocked land surface (from wild ungulate or livestock use),

tree encroachment into shrublands, or past seeding with non-native vegetation for livestock forage (Provencher et al. 2017). Approximately 31,191 acres (13 percent) of the Bank Property have burned since 2000, and from 1984 to 1999 approximately 43,751 acres (18 percent) burned. Fire return intervals in the Great Basin have been reduced from 20-100 years to 2-15 years on average, which has reduced the perennial grass and forb understory, and facilitated invasion of annual grasses (McAdoo et al. 2003). Once annual grasses are present, a perpetual grass-fire cycle often occurs (Shinneman et al. 2018). **Appendix A**, **Figure 4** shows a depiction of the relative acres identified as uncharacteristic (departed) compared to reference classes within the Bank Property (ERM 2017c).

2.2.2 Ecological Site Descriptions

Ecological Site Descriptions (ESDs) were developed by the USDA NRCS to provide a consistent framework for classifying land units that share similar capabilities and responses to management activities or disturbance. An ESD consists of a specific combination of soils and vegetation that have occurred over the long term as a result of landscape position, elevation, aspect, precipitation levels and geologic substrate (ERM 2017c).

The ecological system and vegetation class information mapped by TNC was developed in part by incorporating ESD information from USDA NRCS. The relationship between ESDs and TNC's ecological systems are included in **Appendix B, Table 5**. There are over 70 ESDs mapped within the Bank Property. (See the Bank Project Area Baseline Report (ERM 2017c) for figures depicting the ESDs mapped in the Bank Property.)

2.2.3 Forest/Woodland Products

Woodland ecological systems were mapped as part of the vegetation community mapping by TNC (**Appendix A, Figure 3**). Additional information on woodland communities in the Bank Property is described in the Bank Project Area Baseline Report (ERM 2017c).

Specific to Woodland ecological systems, the BLM allows the public access to designated areas for the harvest of a variety of woodland products, including Christmas trees, fuel wood, trees for fence posts, pine nuts, and native seeds. Fuel wood includes deadwood (dead branches or wood) and greenwood (living branches or wood). Juniper trees are commonly harvested for use as fence posts. The majority of woodland product harvest is wood cutting by private individuals. For commercial users, the BLM issues a permit for the harvest of Christmas trees or fuel wood and assigns the user to a specific area where pinyon-juniper occurs. Aspen and/or commercial harvest is handled on a case-by-case basis and requires site-specific National Environmental Policy Act (NEPA) documentation and a permit from the managing BLM Field Office.

Commercial wood harvest permits are uncommon in the BLM BMD. Based on data from 1996 through 2011, the BMD issued only 11 commercial harvest permits for cutting within Eureka County. During this same period, only one permit for commercial harvest for posts was issued (ERM 2017c). Between 1997 and 2010, the BMD issued permits to cut between 114 and 402 Christmas trees annually. In most years, between 100 and 200 trees were cut within the BMD (ERM 2017c).

2.2.4 Special Status Plants

Special status plant species and critical habitat information was obtained from the FWS Information for Planning and Consultation system (IPAC) website, and through queries to Nevada Department of Wildlife (NDOW), and Nevada Natural Heritage Program (NNHP) (BLM 2017c).

No federally listed plants are in Eureka County. The ESA candidate whitebark pine (*Pinus albicaulis*) may occur in Elko County; however, its habitat requirements of alpine timberline cold and windy sites are not met in the Bank Property (ERM 2017c).

The BLM special status species lists for the BMD and Elko District include 51 plant species that have the potential to occur in one or both districts (ERM 2017c). Information on these species and their potential to occur in the Bank Property is shown in Appendix A of the Bank Project Area Baseline Report (ERM 2017c), which is available in the project record.

None of the BLM special status species are listed by the NNHP as observed in the Bank Property. Reported records of two species occurring in the 3 Bars Project and Horse Canyon/Cortez Unified Exploration Project (HC/CUEP) analysis areas include: Beatley buckwheat (*Eriogonum beatleyae*) and least phacelia (*Phacelia minutissima*) (ERM 2017c).

Beatley buckwheat habitat includes dry, open to exposed, barren, basic, clay or rocky clay soils or crumbling outcrops on slopes and knolls of weathering rhyolitic or andesitic volcanic deposits, mostly on southerly to westerly aspects, in the sagebrush, pinyon-juniper, mountain mahogany, and mountain sagebrush zones. Associated species may include *Atriplex confertifolia* or *Artemisia arbuscula*. Beatley buckwheat appears to do well in disturbed areas, which is typical of many other buckwheat species (ERM 2017c).

Least phacelia occurs on areas with damp ground such as in meadows along streambanks, and under shrubs and trees. Habitat characteristics include vernally saturated, summer-drying, sparsely vegetated, partially shaded to fully exposed areas of bare soil and mud banks in meadows; sagebrush swales, creek bed high-water lines, or around flat to gently sloping spring areas. Associated species may include *Veratrum californicum* (corn lily), mule's ears wyethia, and/or *Populus tremuloides* (aspen) (ERM 2017c).

2.2.5 Noxious Weeds and Invasive, Non-native Species

The BLM defines a noxious weed as, "a plant that interferes with management objectives for a given area of land at a given point in time". An "invasive species" is defined as a species that has the potential to become dominant or co-dominant without management intervention and is either exotic, or normally a minor component of the plant community if native (FES 07-21, 2007) (BLM 2016b). Noxious weeds and invasive, non-native species are species that are highly competitive, aggressive, and spread easily. They typically establish and infest disturbed sites, along roadsides and waterways. Changes in plant community composition from native species to non-native species can change fire regimes, adversely affect wildlife habitat quality, biodiversity, and ecosystem structure and function (BLM 2016b).

The BMD and Elko District recognize the current noxious weed list designated by the NDA statute, found in NAC 555.010. The NDA, with approval of the Board of Agriculture, designates a species as a noxious weed. Upon listing, the NDA assigns a rating of "A", "B", or "C" to the species. The rating reflects the NDA view of the statewide importance of the noxious weed, the likelihood that eradication or control efforts would be successful, and the present distribution of noxious weeds within the state (BLM 2016b).

Information about the presence and distribution of noxious weeds and invasive, non-native vegetation was obtained from past inventories, observations from site visits, and data from TNC. No formal noxious weed surveys have been conducted in the Bank Property, but noxious weeds have been observed during baseline site visits for other species, primarily along roads, disturbed areas, and edges of seeps/springs and streams. Common species observed included perennial pepperweed (*Lepidium latifolium*), medusahead (*Taeniatherum caput-medusae*), and scotch thistle (*Onopordum acanthium*). Hoary cress (*Cardaria draba*), musk thistle (*Carduus nutans*), Canada thistle (*Cirsium arvense*) and

spotted knapweed (*Centaurea biebersteinii*) were also present. Invasive mustard species, such as elongated mustard and tansy mustard, were also observed in the Bank Property during sites visits (ERM 2017c). Noxious weeds recorded in the 3 Bars Project area included black henbane, Russian knapweed, and saltcedar (ERM 2017c). The BLM and Barrick MOUs for management of noxious weeds and invasive species on the JD, Hay, and Dean ranches also identified species targeted for management efforts.

Cheatgrass, a non-native and invasive species, was extensively mapped by TNC as part of the modeling effort (ERM 2017c and BLM 2016b). Flowering occurs in the early summer and germination occurs in fall or spring. Dormancy usually occurs in summer. Cheatgrass invades rangelands, pastures, prairies, and other open areas. This species has the potential to completely alter the ecosystems it invades. Cheatgrass can completely replace native vegetation and change fire regimes (BLM 2016b). Cheatgrass occurs throughout the Bank Property and predominates in many of the "departed" vegetation classes mapped by TNC (**Appendix A, Figure 4**).

3.0 ENVIRONMENTAL CONSEQUENCES – VEGETATION

3.1 DEFINITIONS OF INTENSITY, DURATION, AND CONTEXT LEVEL OF EFFECTS FOR VEGETATION

3.1.1 Vegetation and Special Status Plants

Negligible: Effects on native vegetation and special status plants–beneficial or adverse–would be so small it would not be measurable or perceptible.

Minor: Effects on native vegetation and special status plants–beneficial or adverse–would be detectable, measurable and perceptible but small, localized, and of little consequence. Adverse effects can be minimized or fully mitigated, would be relatively simple to implement, and would have a high probability of success.

Moderate: Effects on native vegetation and special status plants –beneficial or adverse–would be readily apparent, measurable, large and of consequence, but localized. Adverse effects would require mitigation and restoration. Mitigation could be extensive, but most likely effective.

Major: Effects on native vegetation and special status plants–beneficial or adverse–would be readily apparent and would substantially change the biological value of the native plant community in the context of the project area or region. Changes would be widespread and could have permanent consequences for the resource. Restoration would be necessary to reduce or rectify adverse effects, and its success could not be guaranteed.

Duration
Short- term: One year or less.
Long- term: Greater than one year.

Context
Localized: Affecting the Public Land Project Plan area or treatment site.
Regional: Affecting an area beyond the Public Land Project Plan area or treatment site.

3.1.2 Forest/Woodland Products

Negligible: Effects on forestry and woodland products would not be detectable; use of and access to forestry and woodland products would continue to be provided.

Minor: Effects on forestry and woodland products would occur, however BMPs would offset adverse effects and allow for continued use of and access to forestry and woodland products.

Moderate: Effects on forestry and woodland products would be readily apparent and may alter the resource use. Additional mitigation would be necessary to reduce adverse effects.

Major: Effects on forestry and woodland products would occur and would substantially change the resource use. Additional mitigation would be necessary to reduce adverse effects, and its success could not be guaranteed.

Duration
Short- term: Effects would last for up to 1 year or less, or may affect forestry and woodland uses for the project duration.
Long- term: Effects would last for longer than 1 year and may affect forestry and woodland uses for longer than the project duration.

Context
Localized: Affecting the Public Land Project Plan area or treatment site.
Regional: Affecting an area beyond the Public Land Project Plan area or treatment site.

3.1.3 Noxious Weeds and Invasive, Non-native Species

Negligible:

Adverse effect: There is a barely perceptible increase in noxious weeds, invasive and non-native plant species as a result of implementing the Proposed Action; mitigation efforts would be small and likely successful.

Beneficial effect: there is a barely perceptible decrease in noxious weeds, invasive and non-native plant species as a result of implementing the Proposed Action.

Minor:

Adverse effect: there is a slight increase in noxious weeds, invasive and non-native plant species as a result of implementing the Proposed Action, however effects can be easily managed and controlled through mitigation and the probability of success would likely be moderate to high.

Beneficial effect: there is a slight decrease in noxious weeds, invasive and non-native plant species as a result of implementing a Proposed Action.

Moderate:

Adverse effect: there is a measurable increase in noxious weeds, invasive and non-native plant species as a result of implementing the Proposed Action; mitigation efforts would need to be implemented repeatedly and there would be a slight risk of failure and increased proliferation.

Beneficial effect: there is a measurable decrease in noxious weeds, invasive and non-native plant species as a result of implementing the Proposed Action; monitoring and repeated action would be needed to maintain beneficial effects.

Major:

Adverse effect: there is a measurable and noted increase in noxious weeds, invasive and non-native plant species as a result of implementing the Proposed Action, affecting large areas; mitigation efforts would likely fail and there would be a high risk of increased proliferation over more geographic areas.

Beneficial effect: there is a measurable and noted decrease in noxious weeds, invasive and non-native plant species as a result of implementing the Proposed Action; monitoring would be needed to maintain beneficial effects, but native species would thrive over the long-term without much intervention.

Duration
Short-term: Effects would not alter the existing vegetation community or would last one or less.
Long- term: Effects would alter the existing vegetation community and last for longer than one year.

Context
Localized: Effects would be limited to the treatment site.
Regional: Effects would occur beyond the treatment site.

3.2 ISSUES

3.2.1 Vegetation

Issue: How would implementation of conservation methods change ecological systems and vegetation classes?

3.2.2 Forest/Woodland Products

Issue: Conservation methods that remove trees could affect use and availability of woodland products (pinyon-juniper woodlands for Christmas trees, pine nuts, firewood).

3.2.3 Special Status Plants

Issue: Would implementation of conservation methods affect special status plants?

3.2.4 Noxious Weeds and Invasive, Non-native Species

Issue:1 How would implementation of conservation methods affect noxious weeds and invasive, non-native species?

Issue 2: Conservation methods would cause minor ground disturbance and involve the use of vehicles and equipment, which may cause current populations of noxious weeds and invasive, non-native plant species to spread, or introduce new populations of noxious weeds and invasive, non-native plant species.

Issue 3: Potential for noxious weeds and invasive, non-native plant species to return following control techniques.

3.3 PROPOSED PUBLIC LAND PROJECT PLAN

3.3.1 Vegetation

3.3.1.1 Effects Common to All Conservation Actions

The goal and expectation of the proposed Public Land Project Plan is improvement of sagebrush, wet meadow, and montane riparian habitat that is currently in an uncharacteristic condition. To meet this goal, conservation actions were identified through input by ecological professionals and application of TNC Methodology, resulting in the selection of the best combination of actions to take to restore vegetation classes for the benefit of sage-grouse. Conservation actions were modeled to identify where the greatest net conservation gain to sage-grouse would occur using state-and-transition predictive

models for each ecological system, modeled over a 35-year time period (Provencher et al. 2017). These modeled conservation actions were tested to develop successful scenarios for sage-grouse habitat restoration. The modeled actions balanced financial inputs with ecological returns. The output of the model simulations included frequency plots showing where on the landscape each conservation action might be implemented over the 35-year period. Each conservation action was modeled with an associated cost per acre and an anticipated success rate to reflect that some actions may only partially succeed at restoring a suitable vegetation class. These success probabilities are shown across the Bank Property for each proposed conservation action in **Appendix A, Figures 5-13**.

The conservation actions include SOPs, which incorporate pre-implementation, implementation, and post-implementation steps to minimize adverse effects to resources in the Bank Property (see Appendix C of the Public Land Project Plan). Pre-implementation steps will field-verify the appropriate tools to use to achieve each conservation action. The proposed Public Land Project Plan incorporates BMPs (see Appendix D of the Public Land Project Plan), which would be followed to minimize potential negative effects on vegetation, such as minimizing the potential for establishment or spread of undesirable plant species, maintaining vegetative buffers near streams and wetlands, proper management of vegetation in riparian areas, and special status species clearance surveys. The proposed Public Land Project Plan includes an effectiveness monitoring phase and an adaptive management process that would be initiated to ensure performance standards are being met and that the conservation actions result in a net conservation gain to greater sage-grouse. Implementation of conservation actions would have moderate, localized, beneficial effects on vegetation. Depending on the conservation action, these moderate and localized beneficial effects would be realized over the short-term and the long-term. Conservation actions will alter uncharacteristic vegetation classes and, over time, are anticipated to achieve a reference class consistent with the ecological system for a particular treatment site. Implementation of conservation actions would result in moderate beneficial localized and regional effects on vegetation over the long-term.

3.3.1.2 Effects Specific to Conservation Methods

Tree Thinning and Removal

There would be no reduction in acreage of Pinyon-Juniper Woodland ecological systems. Removal of individual conifer trees (i.e., pinyon-juniper) in sagebrush systems would have a direct moderate, beneficial effect on vegetation in the short-term and the long-term, by returning the current state of mid to late successional and uncharacteristic vegetation classes to a class consistent with the recognized sagebrush ecological system for a particular site.

The indirect effect of tree thinning and removal would be to open the canopy and promote growth of native grasses, forbs, and shrubs over the long-term, resulting in improvements to sage-grouse nesting habitat. Changes in uncharacteristic vegetation classes would improve the habitat functionality of sage-grouse nesting habitat and, at higher elevations, late-brood rearing habitat. Removing trees would also reduce heavy fuel loads and reduce the potential for wildfire.

Seeding and Sagebrush Shrub Planting

Seeding and sagebrush shrub planting would promote the growth of favorable grasses, forbs, and shrubs resulting in an improvement in the performance standards for that ecological system. Seed mixes would be selected to enhance sage-grouse habitat (see Table 5-3 in the Public Land Project Plan). Returning the current mid to late successional and uncharacteristic vegetation classes to a class consistent with the sagebrush ecological system of the site through seeding and sagebrush shrub planting would result in a moderate, beneficial effect on vegetation over the long-term.

Control of Undesirable Plant Species

Control of undesirable plant species may be achieved through mechanical or chemical treatments; however, TNC modeled chemical means as the primary type of control. Control activities on public land would follow BLM management direction, cited above and incorporated by reference. Herbicide use may have a negligible, localized, short-term adverse effect on non-target species due to chemical drift onto non-target vegetation species during applications, but this effect would be negligible with implementation of proper application techniques. Control of undesirable plant species would promote growth of desirable grass and forb species in sagebrush and wet meadow ecological systems, resulting in a moderate beneficial, localized effect on vegetation in the short-term. Long-term localized and possibly regional effects would be realized with monitoring and follow-up treatments, and when conducted with the seeding and shrub planting conservation method, to ensure eradication has been successful.

Wet Meadow Restoration

Wet meadow systems would be restored by implementing exclusion techniques to reduce effects associated with ungulate use. Restoration would improve water retention, restore or enhance water quality, increase cover by native grass and forbs, and restore and stabilize wet meadow systems by reducing trampling. Restoring wet meadow systems would result in a moderate beneficial, localized effect on vegetation associated with springs and seeps in the short-term. Long-term localized and beneficial effects would be realized with monitoring and, if necessary, follow-up treatments.

Fuel Breaks

Development and maintenance of fuel breaks by mechanical disking, mowing or tilling would have a minor, localized adverse effect on vegetation for the short-term and the long-term. However, the potential to reduce fire size and severity would have moderate, beneficial, localized and regional effects to vegetation over the long-term.

3.3.2 Forest/Woodland Products

3.3.2.1 Effects Common to All Conservation Actions

There would be no reduction in acreage of Pinyon-Juniper Woodland ecological systems. Access to forest and woodland products would only be restricted within the Public Land Project Plan area during implementation of a conservation action. Adverse effects on forest and woodland products due to access restrictions would be negligible, localized, and short-term.

Tree Thinning and Removal

Conservation actions that involve the removal of pinyon-juniper trees would reduce the future availability of forest and woodland products in localized areas. However, tree removal was modeled to apply to select vegetation classes within mid to late successional and uncharacteristic sagebrush systems. There would be no reduction in acreage of Pinyon-Juniper Woodland ecological systems. Access to forest and woodland products would be restricted within the Public Land Project Plan area only during implementation of the conservation action. Pinyon and juniper trees removed would be made available to the public. Adverse effects on forest and woodland products would be negligible and localized, but would occur over the long-term.

3.3.3 Special Status Plants

3.3.4 Effects Common to All Conservation Actions

Conservation actions include pre-implementation, implementation, and post-implementation steps as outlined in the SOPs (see Appendix C of the Public Land Project Plan). Pre-implementation steps will

field-verify the appropriate tools to use to achieve each conservation action. BMPs would be followed to minimize potential negative effects on vegetation, including special status species clearance surveys where needed. Adverse effects on special status plants would be negligible, localized, and short-term.

3.3.5 Noxious Weeds and Invasive, Non-native Species

3.3.5.1 Effects Common to All Conservation Actions

Proposed conservation actions that result in minor amounts of ground disturbance or involve the use of mobile equipment (i.e., fencing, drill seeding, mechanical control of undesirable plant species, tree thinning and removal, creation of fuel breaks, and use of trucks for transportation of equipment and crews) could cause the spread of existing populations, or new infestation of, noxious weeds and invasive, non-native species. Proposed conservation actions incorporate SOPs and BMPs to minimize the potential for noxious weeds and invasive, non-native species to infest and/or spread following action implementation. Therefore, the proposed Public Land Project Plan would have negligible, localized, short-term effects on vegetation due to the potential for noxious weeds and invasive, non-native species to invade and/or spread.

Barrick would adhere to weed control methods established in BLM Integrated Weed Management Plan Battle Mountain District Nevada Mount Lewis Field Office and Tonopah Field Office (BLM 2009), the Elko District Programmatic EA of Integrated Weed Management on BLM Lands (BLM 1998), and Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States Programmatic EIS (BLM 2007a) and Record of Decision (BLM 2007b), which are incorporated by reference. In addition, guidance in H-9011 Chemical Pest Control Handbook (BLM 1988) and 9011 Chemical Pest Control Manual (BLM 1992) would be incorporated. Herbicides would not be used as a treatment unless authorized by the landowner or land management agency. A Pesticide Use Proposal, or PUP, would be prepared prior to pesticide application on BLM-managed lands. Barrick would also control weeds following the management responsibilities agreed to in existing BLM MOUs (Barrick 2015a, 2015b, 2016). Pre-implementation site visits would identify target species and preventative measures required. Adverse effects would be negligible and short-term. Implementation of the conservation methods that involve seeding and sagebrush planting, control of undesirable plant species, and wet meadow restoration, would improve vegetation composition, resulting in a moderate, beneficial effect on noxious weeds and invasive, non-native species over the long-term.

3.4 NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed Public LPP would not be approved. None of the conservation actions would occur in the Public LPP area. At a minimum, there would be no change to current general vegetation conditions. However, predictive models support that some vegetation classes will continue to deteriorate and may cross thresholds into more degraded states if conservation actions are not implemented (Provencher et al. 2017). Adverse effects of the No Action Alternative on general vegetation would be minor and long-term. There would be no effects to forest/woodland products and special status plants. Noxious weeds and invasive, non-native species in the Public LPP area would continue to spread if left untreated. The beneficial effects of improving vegetation condition across the landscape, in particular sagebrush, wet meadow, and montane riparian habitat that is currently in an uncharacteristic condition, would not be realized.

3.5 CUMULATIVE EFFECTS

3.5.1 Proposed Public Land Project Plan

The proposed Public Land Project Plan would result in beneficial cumulative effects on vegetation resources by improving sagebrush ecosystems when combined with other habitat improvement projects. Over the next 35 years, the Barrick BEA Private Land Project Plan and three other habitat improvement projects (if implemented - the 3 Bars Project, the Roadside Fuel Break Project, and the SEM Project) would preserve and restore sagebrush ecosystems on over 800,000 acres in central Nevada. This would be in addition to the 37,006 acres proposed in the Public Land Project Plan. The Private Land Project Plan will implement conservation actions on an additional 9,924 acres within the Bank Property, with the majority of actions occurring within 10 years.

The cumulative effects analysis in this resource report incorporates by reference the analyses in the 3 Bars FEIS (BLM 2016a), the Roadside Fuel Break Project EA (BLM 2016b), and the SEM Project EA (BLM 2018a). Beneficial cumulative effects on vegetation resources would occur over the long-term as these projects are successfully implemented across the landscape. Cumulative effects on special status plant species would not occur, as direct and indirect effects would be minimized with implementation of SOPs and BMPs.

3.5.2 No Action Alternative

Other restoration activities in the CESA would still occur, but the Public LPP would not contribute to the long-term beneficial effects of improving the health and resiliency of vegetation communities and reducing wildfire risk and severity. Cumulative effects would not occur under the No Action Alternative.

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APPENDIX A - FIGURES

Figure 1. Bank Property Public Land Project Plan Area

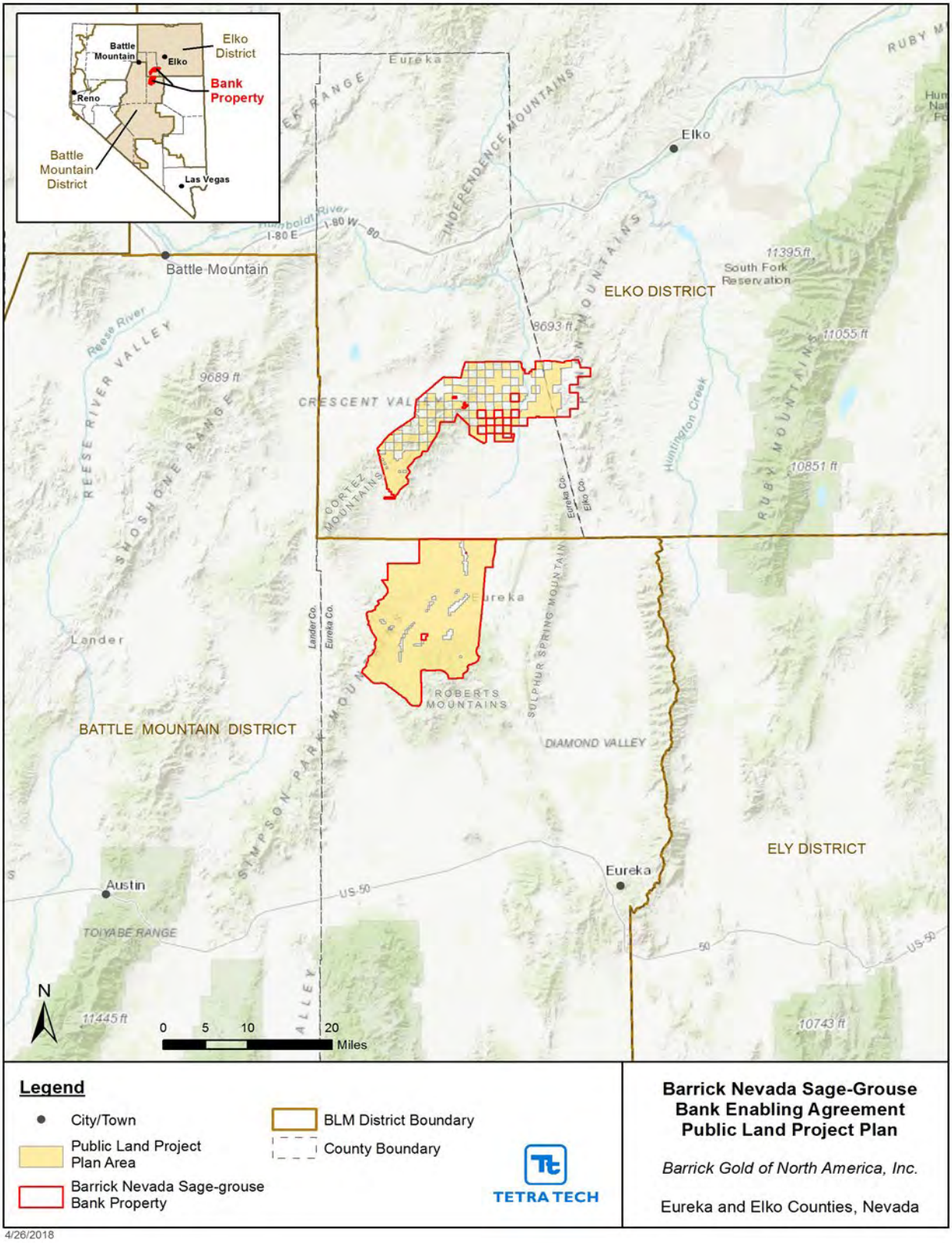


Figure 2. Past, Present, and RFFAs and CESA

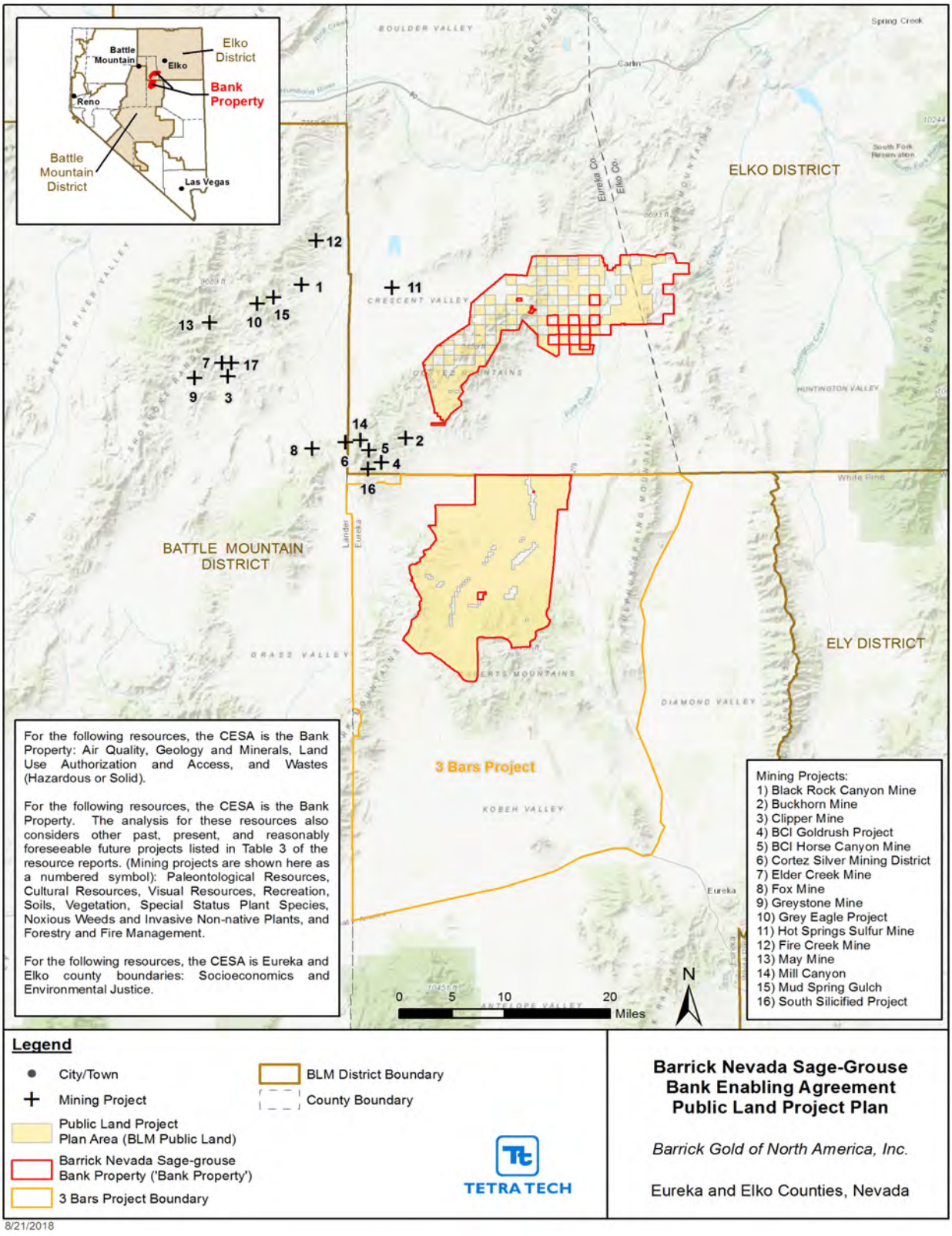


Figure 3. Ecological Systems in the Bank Property

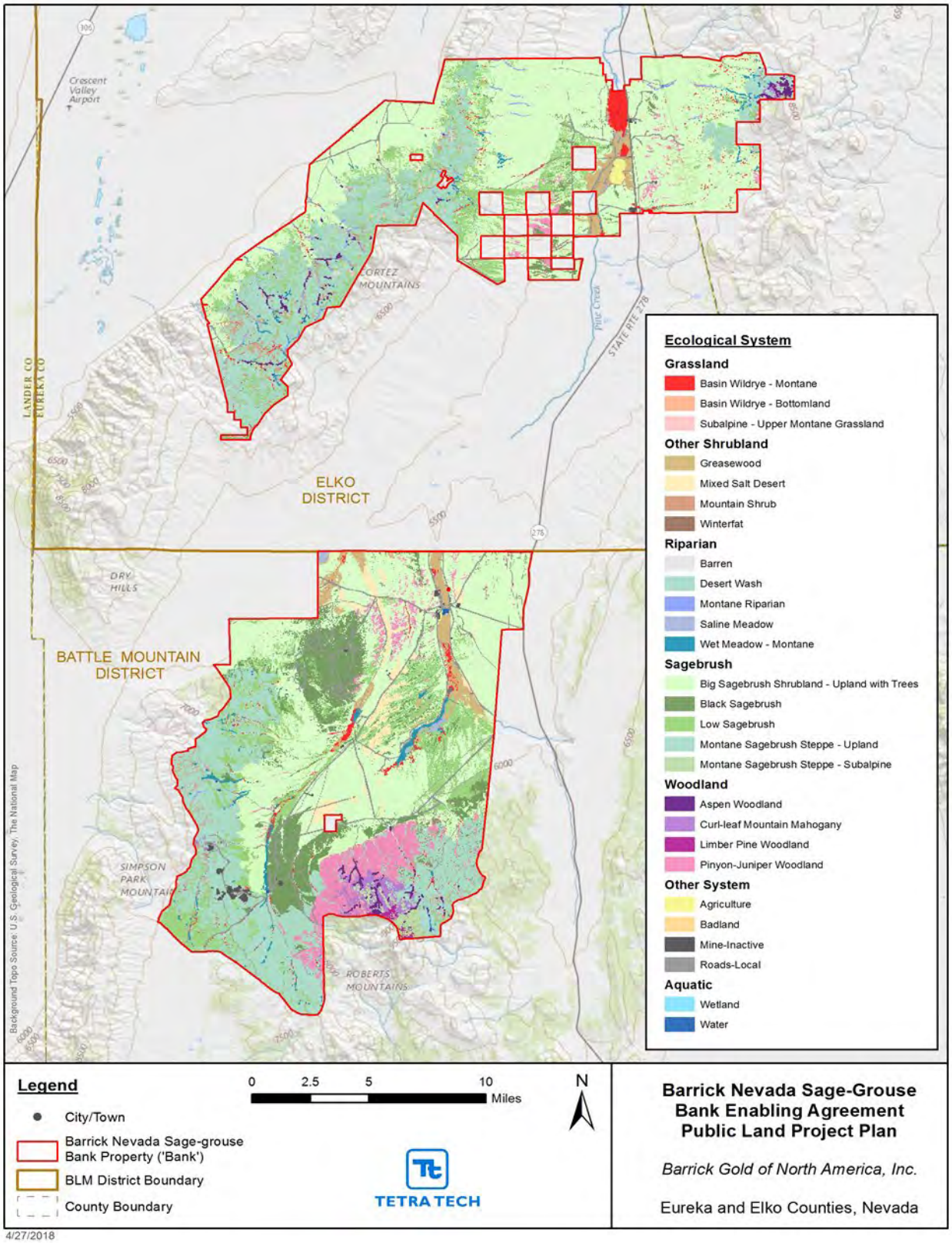


Figure 4. Vegetation Class

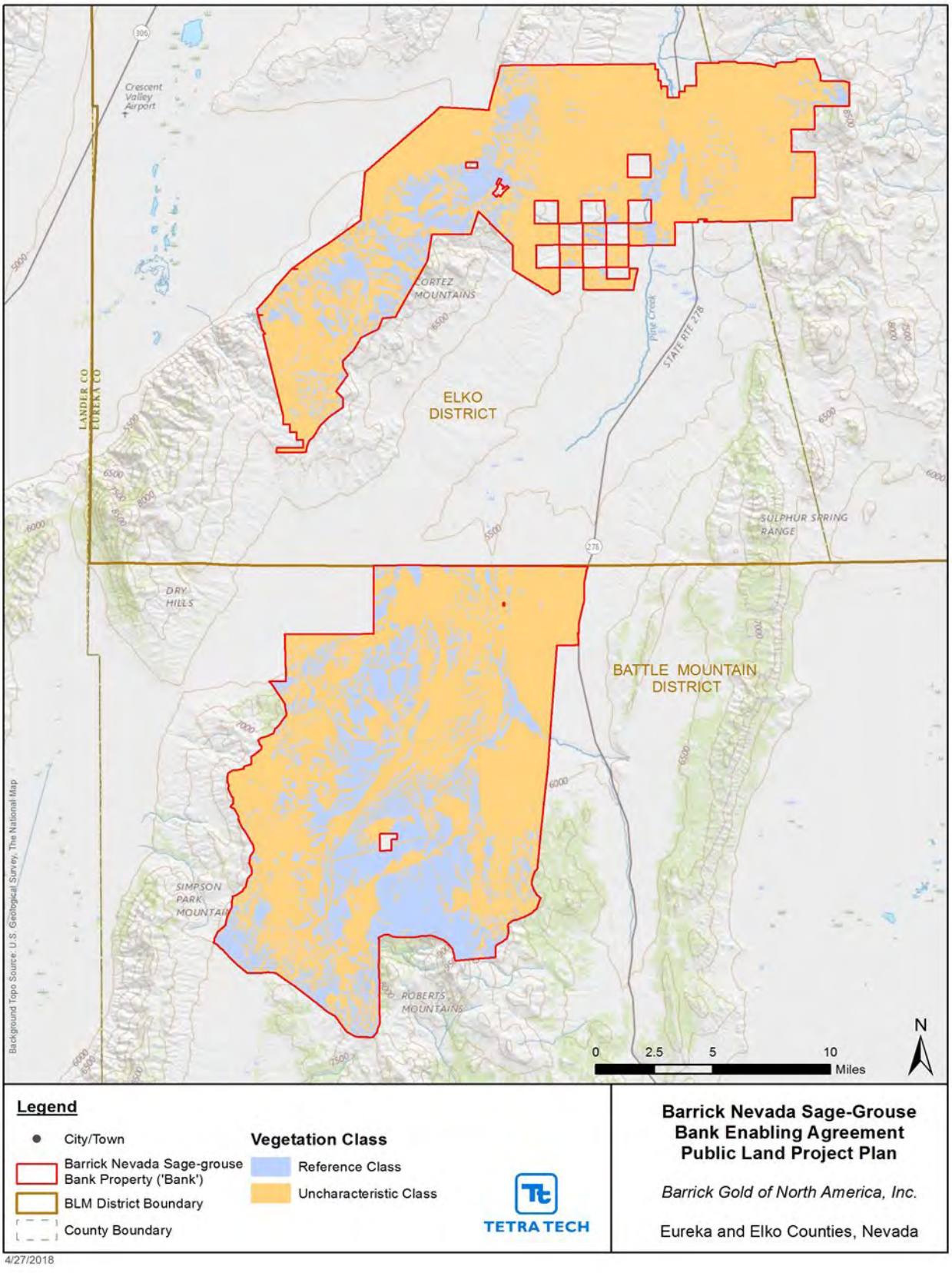


Figure 5. Modeled Conservation Action Tree Removal and Mastication, Aerial Seeding, and Undesirable Plant Control

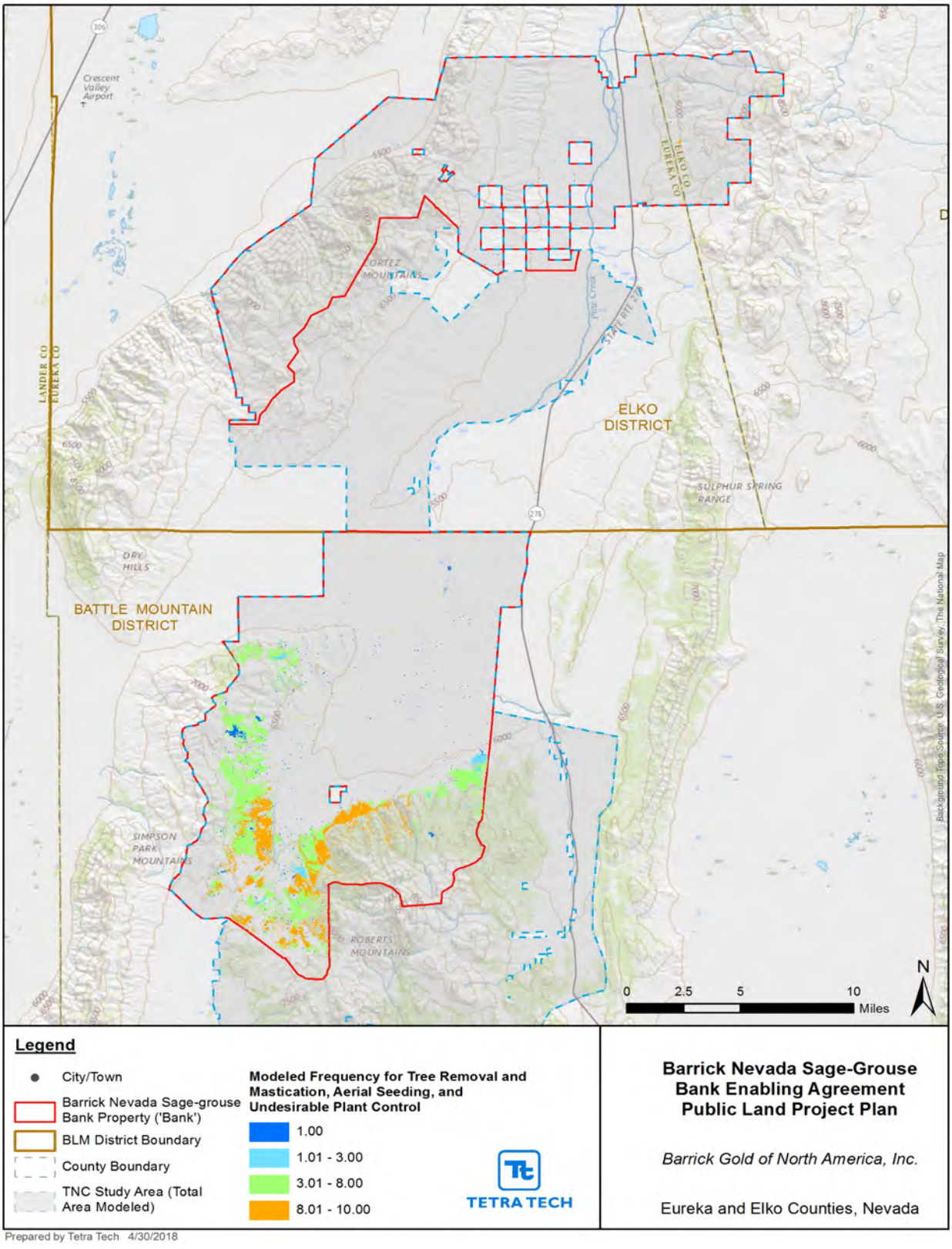


Figure 6. Modeled Conservation Action Tree Removal by Chainsaw Thinning

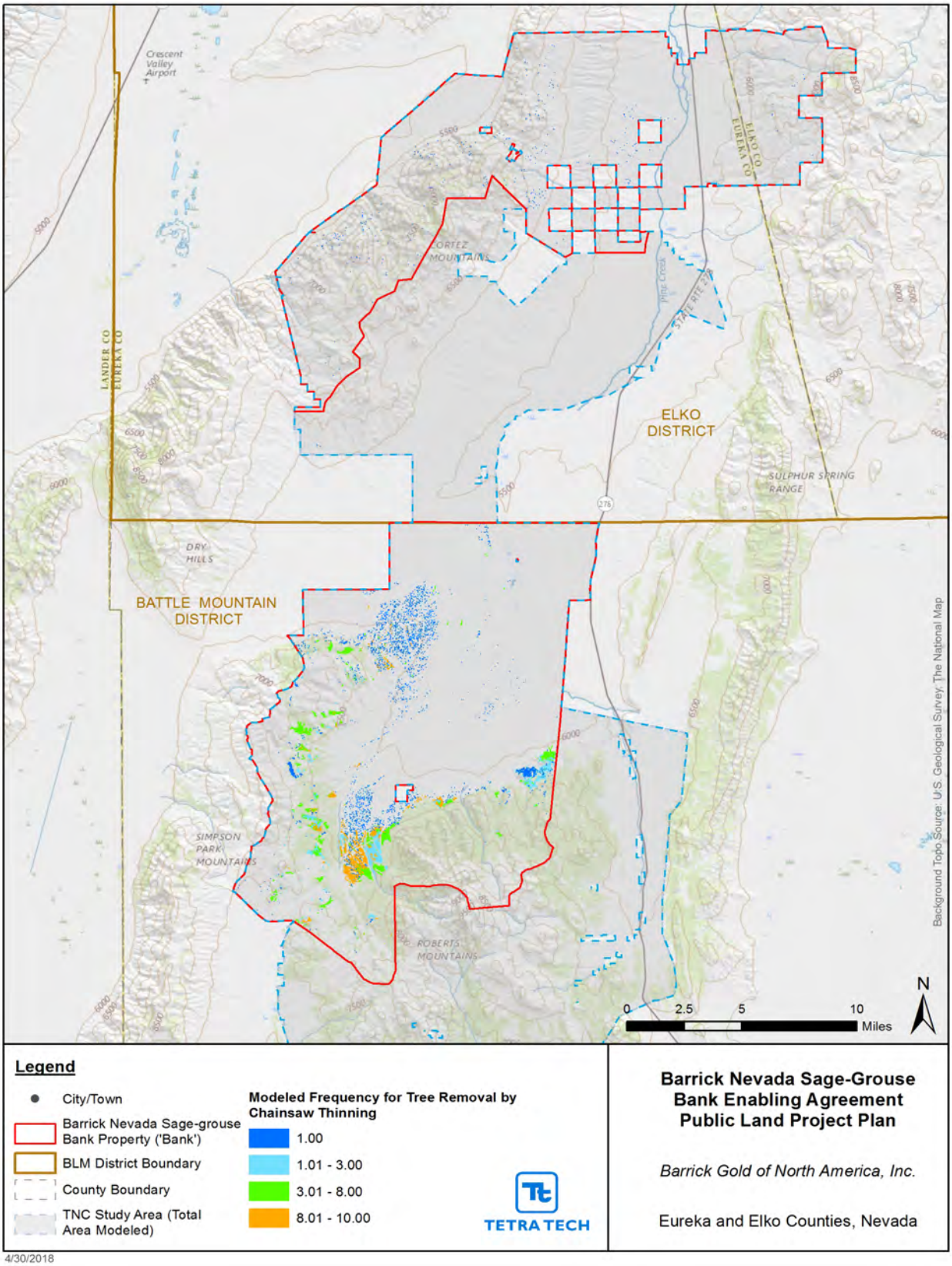


Figure 7. Modeled Conservation Action Tree Removal by Small Tree Lopping

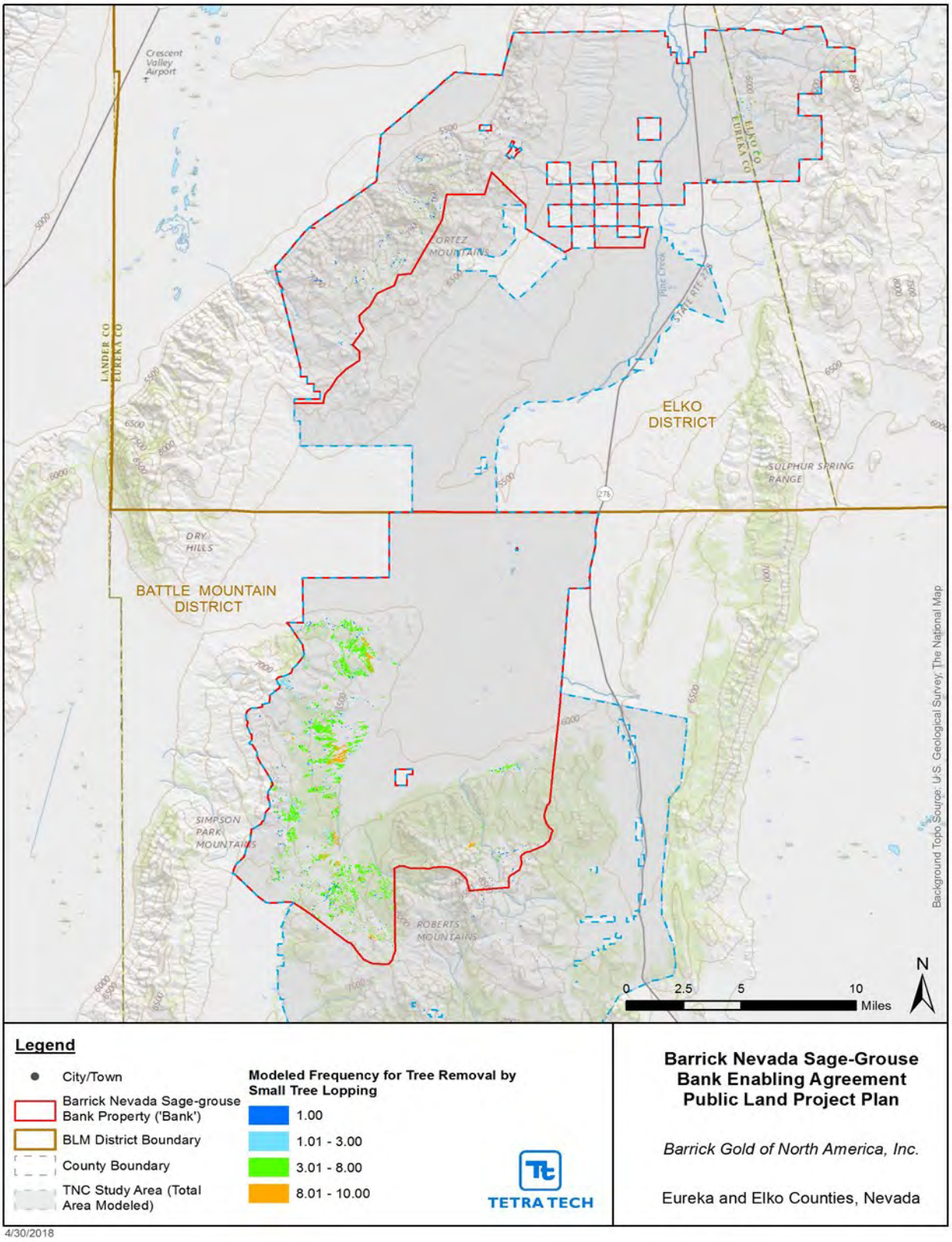


Figure 8. Modeled Conservation Action Undesirable Plant Control

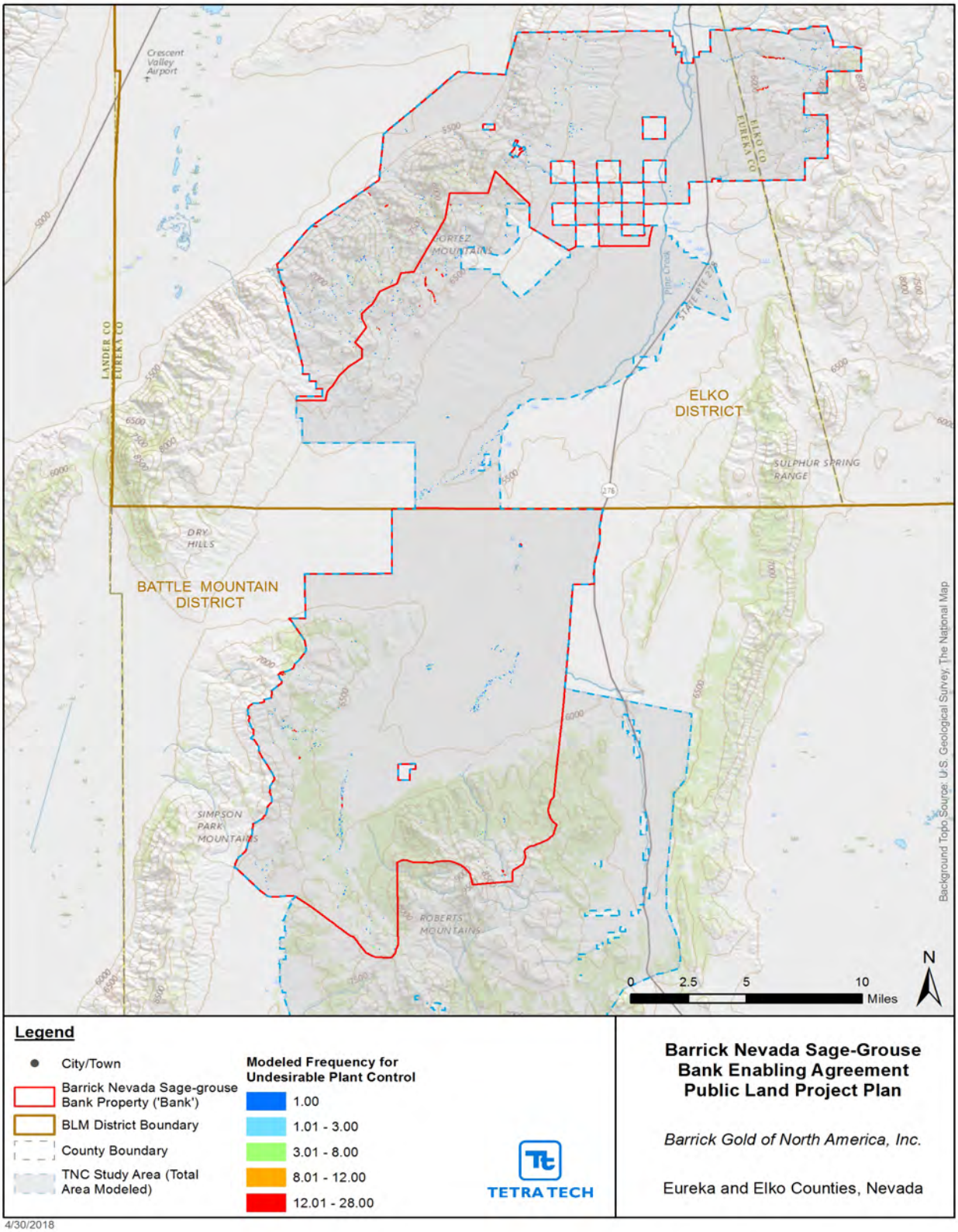


Figure 9. Modeled Conservation Action Undesirable Plant Control Spot Treat

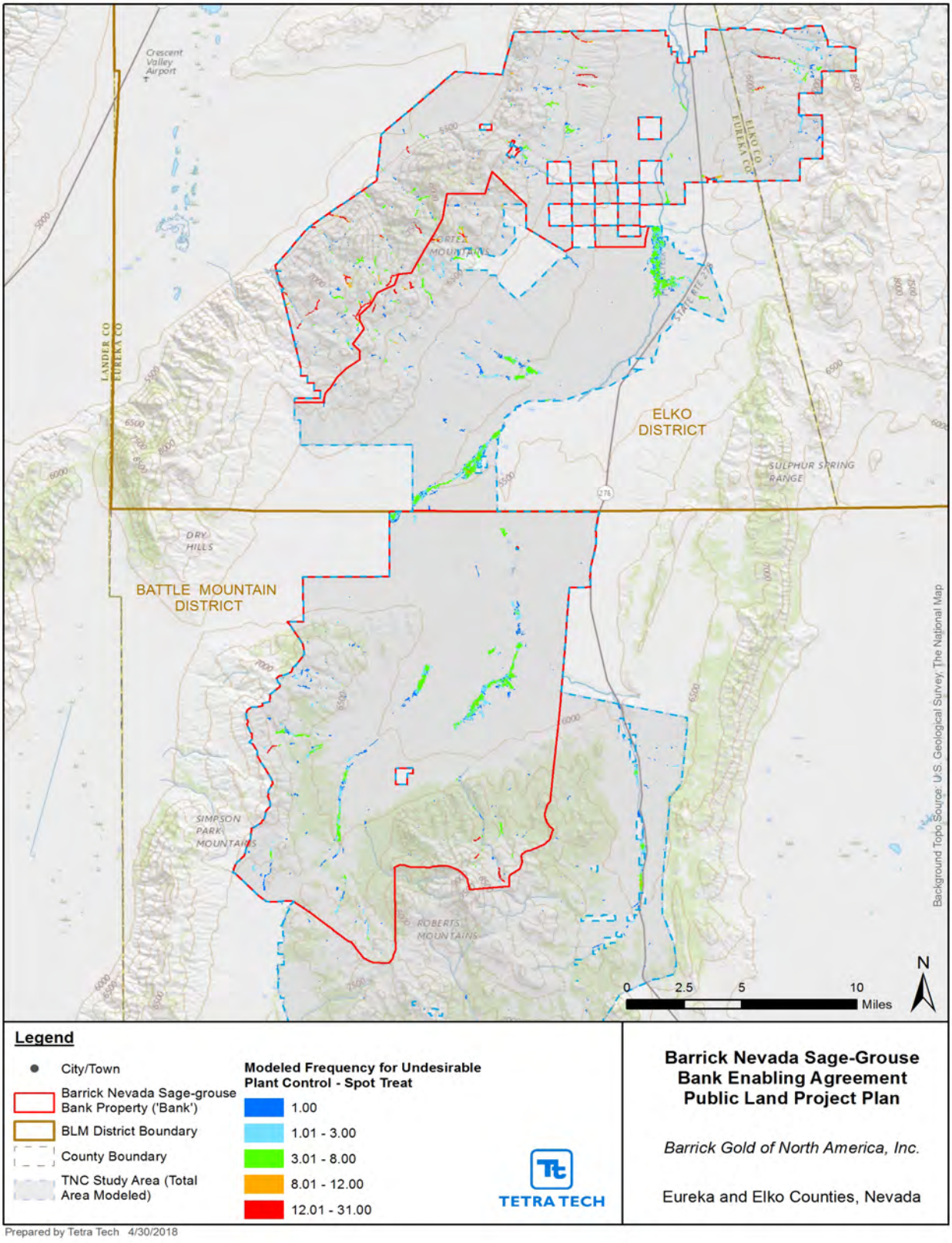


Figure 10. Modeled Conservation Action Undesirable Plant Control in Wet Meadow Habitat with Shrub Removal

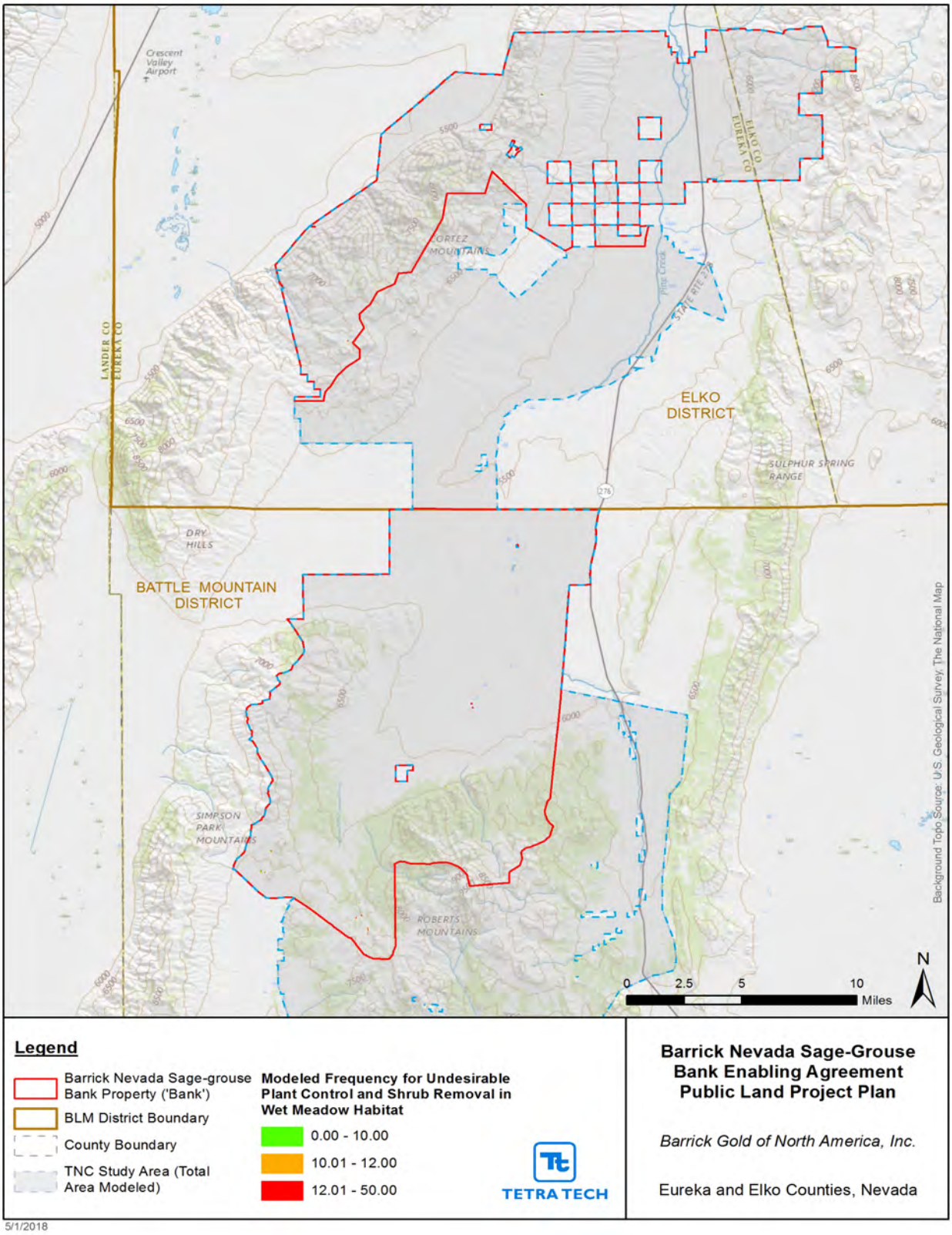


Figure 11. Modeled Conservation Action Seeding, Planting, and Undesirable Plant Control in Upland Habitat

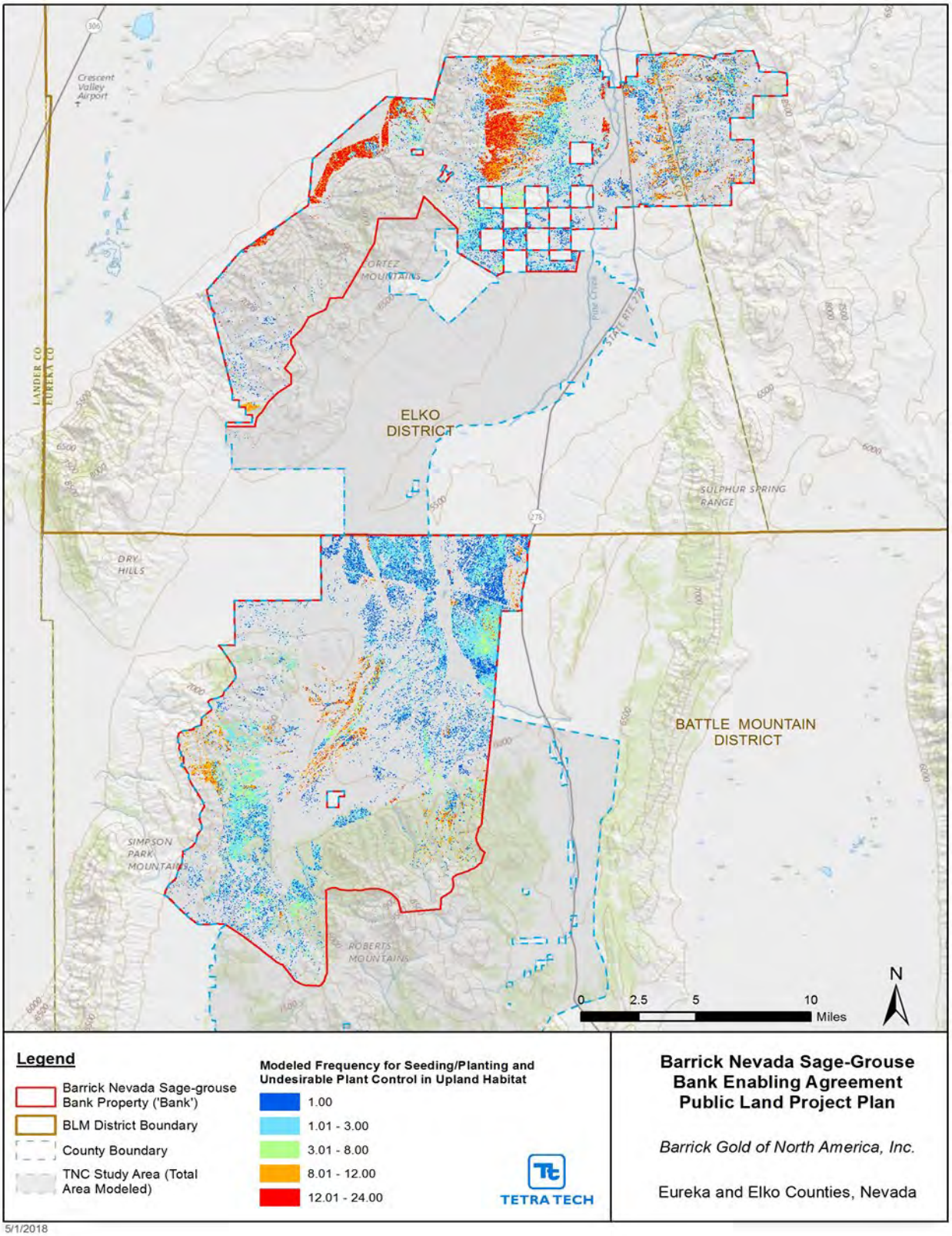


Figure 12. Wet Meadow Restoration

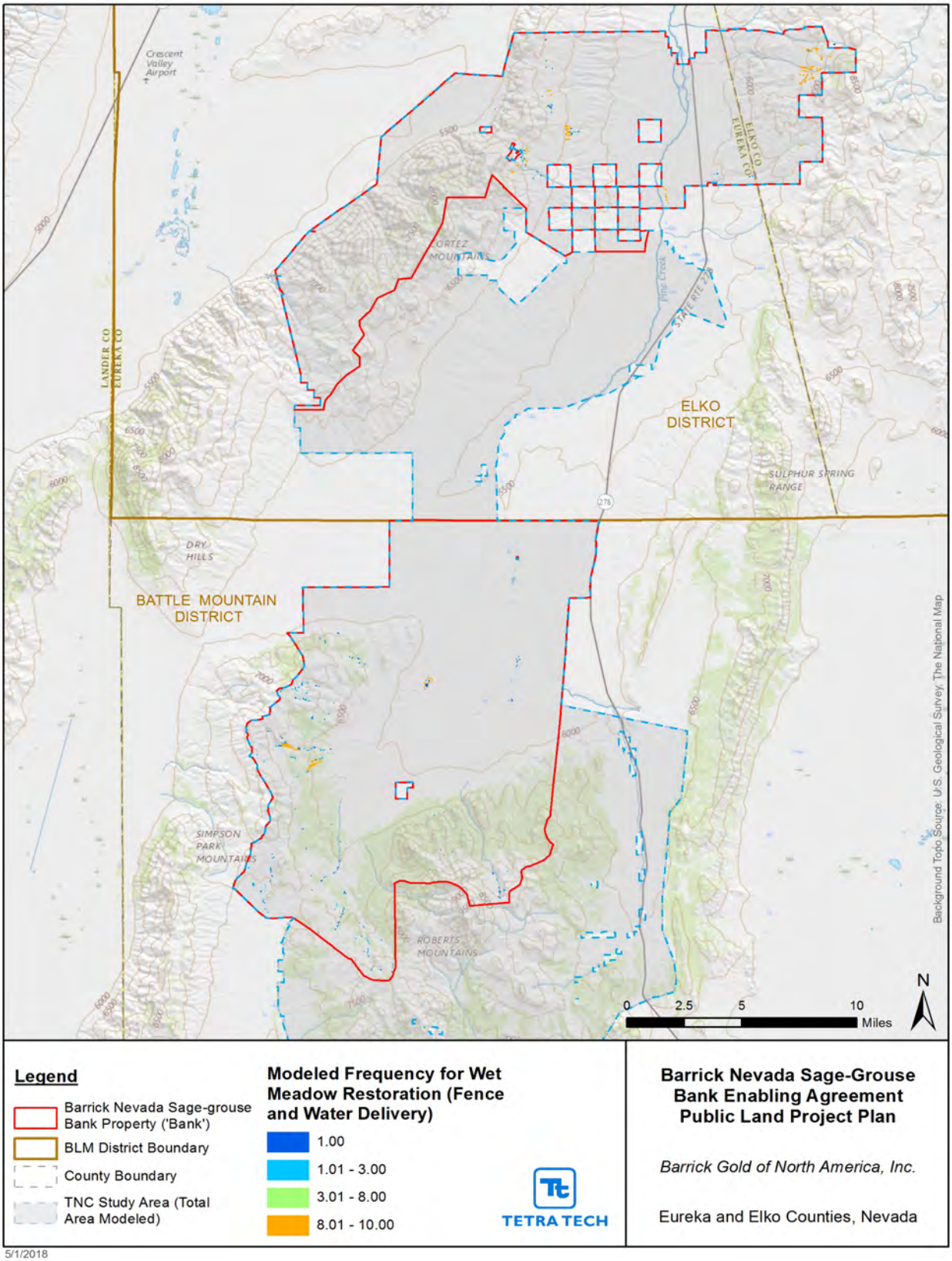
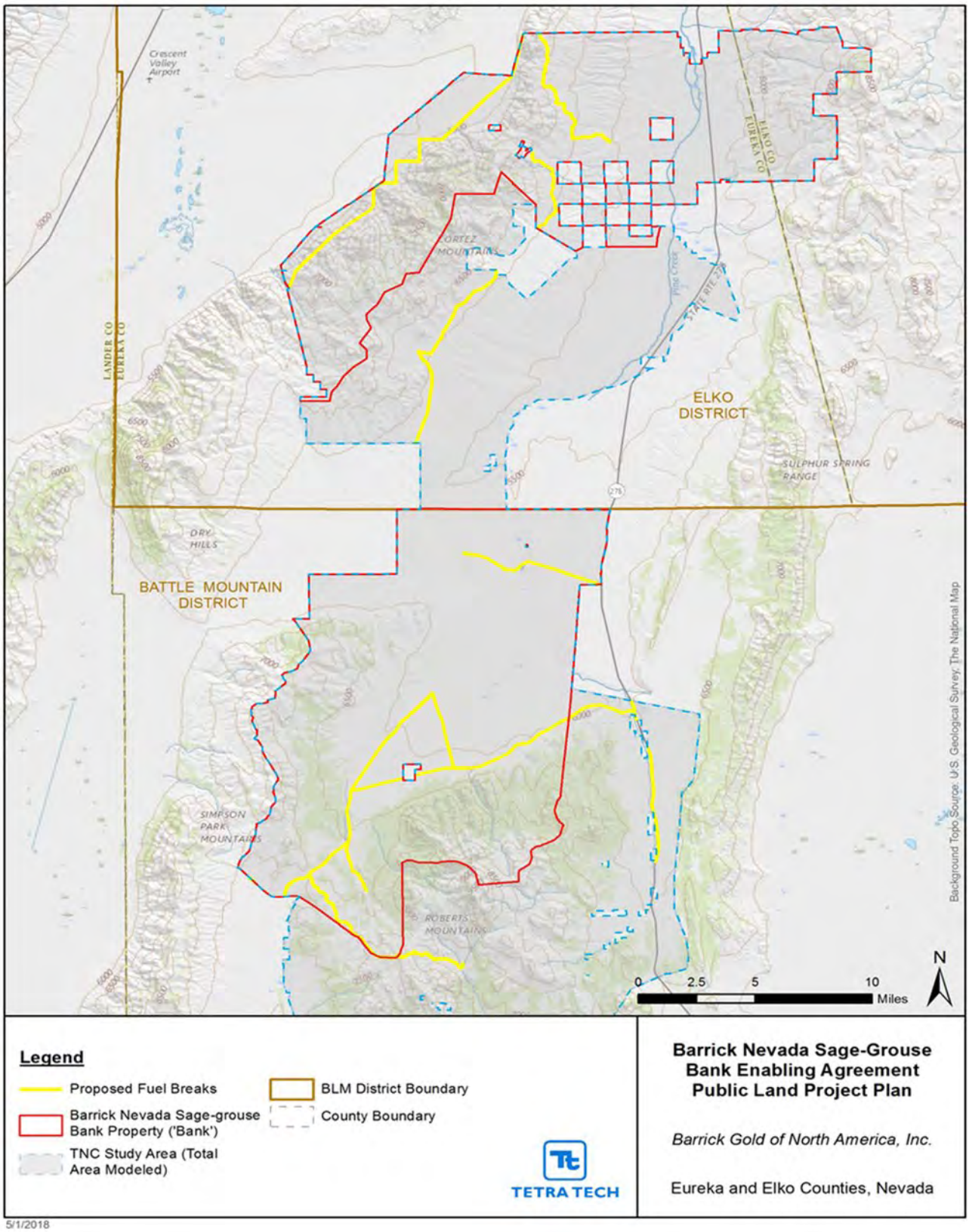


Figure 13. Fuel Breaks



APPENDIX B – TABLES

Table 1. Public Land Project Plan – Proposed Conservation Actions and Average Acres Modeled for Implementation on Public Land within the Bank Property Over Time

Conservation Action	Public Land (Acres) Over 35-years
Tree Removal and Mastication, Aerial Seeding, and Undesirable Plant Control	9,747
Tree Removal by Chainsaw Thinning	2,732
Tree Removal by Small Tree Lopping	2,685
Control of Undesirable Plants	394
Control of Undesirable Plants – Spot Treat	2,510
Undesirable Plant Control and Shrub Removal in Wet Meadow Habitat	45
Seeding/Planting and Undesirable Plant Control in Upland Habitat	17,236
Wet Meadow Restoration	82
Wet Meadow Preservation	0
JD Headquarters Project	0
Implement and Maintain Fuel Breaks	1,575
Total Acres	**37,006**

Source: ERM 2017a

Table 2. Private Land Project Plan – Average Acres of Private Land within the Bank Property Identified for Conservation Actions

Conservation Action	Private Land (Acres) Over 35-years
Tree Removal and Mastication, Aerial Seeding, and Undesirable Plant Control	186
Tree Removal by Chainsaw Thinning	84
Tree Removal by Small Tree Lopping	85
Control of Undesirable Plants	182
Control of Undesirable Plants – Spot Treat	645
Undesirable Plant Control and Shrub Removal in Wet Meadow Habitat	19
Seeding/Planting and Undesirable Plant Control in Upland Habitat	6,770
Wet Meadow Restoration	456
Wet Meadow Preservation	505

Conservation Action	Private Land (Acres) Over 35-years
JD Headquarters Project	553
Implement and Maintain Fuel Breaks	439
Total Acres	**9,924**

Source: ERM 2017b

Table 3. Past and Present Actions and RFFAs

Action	Past and Present Approved Disturbance (acres)	RFFA Projected Disturbance (acres)	Total Approved/ Projected Disturbance (acres)
Mining Projects			
Black Rock Canyon Mine	117	0	117
Buckhorn Mine	820	0	820
Clipper Mine	400	0	400
BCI Cortez Gold Mine (CGM) Operations Area – Proposed Deep South Expansion Project	16,700	4,380	21,080
BCI Goldrush Project	0	895	895
BCI Horse Canyon Mine	698	0	698
Cortez Silver Mining District[1]	92	0	92
Elder Creek Mine	143	0	143
Fox Mine	4	0	4
Greystone Mine	242	0	242
Grey Eagle Project	5	0	5
Hot Springs Sulfur Mine	5	0	5
Fire Creek Mine	285	5	290
May Mine	1	0	1
Mill Canyon	18	0	18
Mud Spring Gulch	10	0	10
South Silicified Project	31	0	31
Utah Mine and Camp	6	0	6
Other Mining Projects[2]	97	210	307
Subtotal	19,674	5,490	25,164

Action	Past and Present Approved Disturbance (acres)	RFFA Projected Disturbance (acres)	Total Approved/ Projected Disturbance (acres)
Exploration			
Notices BLM-Battle Mountain District (BMD) Office: 118 expired, 8 pending, and 30 authorized[3]	265	0	265
Plans (7) BLM-BMD Office[3]	306	0	306
Notices (10) BLM-Ely Field Office[3]	50	0	50
BCI Horse Canyon/Cortez Unified Exploration Project (HC/CUEP)	549	0	549
BCI West Pine Valley	150	0	150
BCI Hilltop Exploration/Mine	92	0	92
BCI Pipeline/South Pipeline/Gold Acres Exploration Project	50	0	50
Dean Mine	67	0	67
Mud Springs	0	10	10
Robertson Exploration Project[4]	294	0	294
South Roberts	0	3	3
Toiyabe Project	94	0	94
Uhalde Lease	100	0	100
Mill Canyon Exploration	250	0	250
Other Mining Exploration[4]	31	1,664	1,695
Subtotal	2,298	1,677	3,975
Utilities/Community			
SR 306 and roads in Northern Crescent Valley (100 feet wide)	422	0	422
Gravel Roads in Crescent Valley and Northern Carico Lake Valley (50 feet wide)	1,558	0	1,558
Dirt Roads in Crescent Valley and Northern Carico Lake Valley (30 feet wide)	776	78	854
Power lines in Crescent Valley (60 feet wide)	364	0	364

Action	Past and Present Approved Disturbance (acres)	RFFA Projected Disturbance (acres)	Total Approved/ Projected Disturbance (acres)
BCI Fiber Optic Cable (20 feet wide)[5]	53	0	53
BCI Jeremy's Knob Communications Tower and right-of-way (ROW)[6]	0.5	0	0.5
Towns of Crescent Valley and Beowawe[7]	900	0	900
Other Utilities (electric, communications, federal aviation administration)	1,176	2	1,178
Other ROWs (roads, mining)	27	161	188
Subtotal	5,276.5	241	5,517.5
Other Development and Actions			
BLM Fuels Reduction Projects[8]	5,641	900	6,541
Wildfires[9]	90,099	0	90,099
Recreation[10]	0	0	0
Livestock[11]	10	53	63
Agriculture Development[12]	9,750	0	9,750
BCI Additional Irrigation Pivots at Dean Ranch	0	640	640
Lodge at Pine Valley[13]	30	0	30
Crescent Valley Water Supply	2	0	2
BCI Cottonwood Infiltration Basins	104	0	104
Private Land Project Plan	9,924	0	9,924
Subtotal	115,560	1,593	117,153
Total	**142,808.5**	**13,261**	**151,809**

Source: BLM 2008a, BLM 2015, BLM 2016, ERM 2017b.

[1] Historic mining- and exploration-related disturbance first began in 1862, prior to the promulgation of surface land management laws and regulations governing mining activities on public lands (e.g., Federal Land Policy and Management Act (FLPMA) and 40 CFR 3809). Since there were no laws or regulatory programs in place at that time, there were no regulatory or administrative approvals granted. Therefore, the identified disturbance acreage does not include all historic mining-related disturbance in the area.

[2] Includes gold and barium/barite mines.

[3] Plans and notices outside of the general Crescent Valley area have not been quantified.

[4] Coral Resources' Robertson Exploration Project boundary is located immediately north of, and partially within, the CGM Operations Area; other exploration includes: Nu Legacy Gold, and 777 Minerals, Inc.

[5] ROW from the Lodge at Pine Valley to BCI Control #3. ROW length is approximately 24 miles.

[6] BCI facility located in Township 28 North, Range 47 East, just north of the CGM Operations Area; ROW N-092170

[7] Surface disturbance associated with the towns of Crescent Valley and Beowawe is 640 and 160 acres, respectively, with approximately 100 acres of private developed land on the periphery.
[8] Inclusive of acreage associated with the Crescent Valley Wildland Urban Interface Fire Defense System, Tonkin Hazardous Fuels Reduction Project, Red Hills Hazardous Fuels Reduction Project, and the greater sage-grouse applicant-committed EPM. Of the total acreage, planned prescribed burns would affect up to 2,537 acres of pinyon-juniper woodland, and 800 acres of pinyon-juniper woodland would be thinned. The HC/CUEP greater sage-grouse applicant-committed EPM accounts for future treatment of 900 acres of encroaching pinyon-juniper.
[9] Reflects acreage of vegetation affected by wildland fires from 1998 through 2006. The acreage is inclusive of approximately 27,804 acres of fire-affected pinyon-juniper woodland.
[10] Surface disturbance associated with recreation activities have not been quantified.
[11] Surface disturbance associated with proposed livestock water use is assumed to be twenty water rights at 0.5 acre per water right (20 X 0.5 = 10 acres) and 43 acres for fencing and cattle guards. The 4,313 acres previously included as proposed livestock activities (BLM 2008c; BLM 2015) inadvertently included surface occupancy instead of actual surface disturbance.
[12] Surface disturbance associated with agricultural development is based on the acreage under irrigation and assumes that a change in vegetation and habitat equates to surface disturbance. Acreage values were based on a February 15, 1998, special hydrographic abstract for Hydrographic Basin No. 054 from the Nevada Division of Water Resources. These values are based on permitted or authorized use of water and may not reflect actual use in a given year.
[13] This facility is located on the JD Ranch Road, 4 miles west of SR 278 at the BCI-owned JD Ranch.

Table 4. Summary of Ecological Group and System in the Bank Property

Ecological Group	Public Land Acres (Analysis Area)	Private Land Acres	Ecological System	Public Land Acres (Analysis Area)	Private Land Acres
Grassland	1,646	1,730	Basin Wildrye-bottomland	1	32
			Basin Wildrye-montane	1,501	1,648
			Subalpine-Upper Montane Grassland	143	50
Riparian and Wet Meadow	2,204	2,101	Barren	193	181
			Desert Wash	26	3.2
			Montane Riparian	630	441
			Saline Meadow	194	240
			Water	14	49
			Wet Meadow - montane	1,146	1,187
			Wetland	0.9	0
Sagebrush	157,764	40,506	Big Sagebrush	76,167	23,786

Ecological Group	Public Land Acres (Analysis Area)	Private Land Acres	Ecological System	Public Land Acres (Analysis Area)	Private Land Acres
			Shrubland-upland with trees		
			Black Sagebrush	14,285	775
			Low Sagebrush	23,444	5,538
			Montane Sagebrush Steppe-subalpine	1,044	0
			Montane Sagebrush Steppe-upland	40,870	9,718
			Mountain Shrub	1,955	691
Woodland	12,209	967	Aspen Woodland	1,033	622
			Curl-leaf Mountain Mahogany	1,614	132
			Limber Pine Woodland	277	0
			Pinyon-Juniper Woodland	9,285	213
Other Shrubland	6,900	1,803	Greasewood	3,424	1,803
			Mixed Salt Desert	3,456	0
			Winterfat	20	0
Other System	8,283	2,079	Agriculture	86	347
			Badland	105	60
			Mine-Inactive	544	89
			Roads-Local	7,148	1,477

Ecological Group	Public Land Acres (Analysis Area)	Private Land Acres	Ecological System	Public Land Acres (Analysis Area)	Private Land Acres
			Not Classified [1]	399	107
Total Acres				**189,005**	**49,187**

Source: ERM 2017c

Table 5. Relationship Between Ecological Systems and Ecological Site Descriptions

Ecological System[1]	ESD Name	ESD ID	MLRA
Agriculture	n/a	n/a	
Aspen Woodland	Aspen Thicket	024XY036NV	24
	POTR5 WSG:1R1707	025XY065NV	25
	POTR5 WSG:2W1710	025XY064NV	25
	POTR5 WSG:2W1707	028BY067NV	28B
	POTR5 WSG:2W10	028By025NV	28B
Badland	n/a	n/a	
Barren-Playa	n/a	n/a	
Barren-Rock-Mud	n/a	n/a	
Basin Wildrye-bottomland	Deep Sodic Fan	024XY015NV	24
	Dry Floodplain	024XY006NV	24
	Saline Bottom	024XY007NV	24
	Dry Floodplain	028BY041NV	28B
	Saline Bottom	028BY004NV	28B
Basin Wildrye-montane	Deep Loamy 14+"P.Z. (atypical)	025XY029NV	25
	Loamy Bottom 14+"P.Z.	025XY081NV	25
	Loamy Bottom 8-14"P.Z.	025XY003NV	25
	Loamy Bottom 10-14"P.Z.	028BY003NV	28B
	Loamy Bottom 14+"P.Z.	028BY024NV	28B
Big Sagebrush-semidesert	Droughty Loam 8-10"P.Z.	024XY020NV	24
	Ashy Loam 8-10" P.Z.	025XY066NV	25

Ecological System[1]	ESD Name	ESD ID	MLRA
	Loamy 8-10"P.Z.	025XY019NV, 028BY010NV	25, 28B
	Shallow Loam 8-10"P.Z.	024XY047NV, 028BY080NV	24, 28B
	Stony Slope 6-10"P.Z.	024XY026NV	24
	Droughty Loam 8-10"P.Z.	028BY052NV	28B
	Loamy Plain 8-10"P.Z.	028BY014NV	28B
	Silt Flat	028BY056NV	28B
Big Sagebrush Shrubland-upland with trees	Ashy Loam 10-12”P.Z.	025XY066NV	25
	Churning Clay 8-12"P.Z.	024XY028NV	24
	Gravelly Clay 10-12"P.Z.	028BY086NV	28B
	Loamy Fan 8-10"P.Z.	025XY070NV	25
	Loamy Fan 8-12"P.Z.	028BY045NV	28B
	Shallow Loam 8-12"P.Z.,	024XY021NV, 025XY021NV	24, 25
	South Slope 8-12"P.Z.	025XY015NV	25
	Loamy 10-12" P.Z.	024XY013NV, 025XY014NV, 028BY007NV	24, 25, 28B
	Shallow Loam 10-14"P.Z.	024XY035NV, 025XY021NV	24, 25
	Steep North Slope 10-12"P.Z.	024XY033NV	24
	Barren Fan 8-12" P.Z. (atypical, inclusion of pygmy sagebrush)	028BY040NV	28B
Black Sagebrush	Chalky Knoll	025XY025NV	25
	Shallow Calcareous Slope 14"P.Z.	025XY041NV	25
	Shallow Calcareous Loam 10-14"P.Z.	024XY031NV	24
	Shallow Calcareous Loam 8-10"P.Z.	024XY030NV	24
	Calcareous Mountain Ridge	028BY048NV	28B
	Droughty Calcareous Loam 8-10"P.Z.	028BY053NV	28B

Ecological System[1]	ESD Name	ESD ID	MLRA
	Shallow Calcareous Hill 10-14"P.Z.	028BY059NV	28B
	Shallow Calcareous Slope 10-14"P.Z.	023BY008NV	28B
	Shallow Calcareous Slope 14+"P.Z.	028BY027NV	28B
	Shallow Clay Loam 10-12"P.Z.	028BY089NV	28B
	Shallow Clay Loam 12-14"P.Z.	028BY093NV	28B
	Shallow Calcareous Loam 10-12"P.Z.	028BY006NV	28B
	Shallow Calcareous Slope 8-10"P.Z.	028BY016NV	28B
Curl-leaf Mountain Mahogany	Mahogany Savanna 14-16" P.Z.	025XY071NV	25
	Mahogany Savanna 16+"P.Z.	025XY075NV	25
	Mahogany Thicket	025XY030NV,028BY042NV	25, 28B
	Stony Mahogany Savanna	025XY031NV, 028BY032NV	25, 28B
	Calcareous Mahogany Savanna	028BY043NV	28B
	Limestone Hill (atypical)	028BY066NV	28B
Desert Wash	n/a	n/a	
Developed-Town	n/a	n/a	
Developed-Power Plant	n/a	n/a	
Four-Wing Saltbush	Clay Basin	028BY023NV	28B
	Droughty Loam 5-8"P.Z.	028BY078NV	28B
Greasewood	Sodic Dunes	024XY066NV	24
	Sodic Flat 6-8"P.Z.	024XY011NV	24
	Sodic Flat 8-10" P.Z.	024XY008NV, 028BY069NV	24, 28B
	Sodic terrace 6-8"P.Z.	024XY003NV	24
	Sodic Terrace 8-10"P.Z.	024XY022NV	24
	Alkali flat	028BY057NV	28B
	Clay Dune	028BY101NV	28B
	Sodic Dunes	028BY021NV	28B

Ecological System[1]	ESD Name	ESD ID	MLRA
	Sodic Flat 5-8"P.Z.	028BY020NV	28B
	Sodic Terrace 5-8"P.Z	028BY074NV	28B
	Sodic Terrace 8-10"P.Z.	028BY028NV	28B
Limber Pine Woodland	ABCOC-PIFL2-PILO WSG:4R0101	028BY049NV	28B
	ABCOC-PIFL2-PILO WSG:5R0101	028BY063NV	28B
	PILO-PIFL2	023BY107NV	28B
Low Sagebrush	Claypan12-16" P.Z.	025XY017NV	25
	Clay Seep	025XY047NV	25
	Clayey 12-14”P.Z.	025XY054NV, 028BY037NV	25, 28B
	Claypan10-12P.Z.	025XY018NV	25
	Cobbly Claypan 8-12"P.Z.	025XY022NV	25
	Clay Slope 8-12"P.Z.	025XY083NV	25
	Eroded Claypan 12-16"P.Z.	025XY051NV	25
	Mountain Ridge	025XY024NV	25
	Mountain Ridge 12-14"P.Z.	028BY034NV	28B
	Channery Hill (atypical)	024XY057NV	24
	Calcareous Claypan	028BY092NV	28B
	Cobbly Claypan12-14"P.Z.	028BY039NV	28B
	Mountain Ridge 12-14+"P.Z.	028BY034NV	28B
	Mountain Ridge 14+"P.Z.	028BY038NV	28B
Low Sagebrush Stepp	Claypan 16+"P.Z.	025XY032NV	25
	Claypan14+" P.Z.	028BY036NV	28B
Mine-Active	n/a	n/a	
Mine-Inactive	n/a	n/a	
Mixed Salt Desert	Alkali Silt Flat	028BY097NV	28B
	Droughty Loam 5-8"P.Z.	024XY068NV	24
	Dunes 6-10"P.Z.	024XY001NV	24
	Gravelly Loam 5-8"P.Z.	024XY065NV	24
	Loamy 5-8"P.Z.	024XY002NV	24
	Loamy Slope 5-8"P.Z.	024XY025NV	24

Ecological System[1]	ESD Name	ESD ID	MLRA
	Saline Terrace 6-8"P.Z.	024XY012NV	24
	Sandy 5-8"P.Z. (atypical)	024XY055NV	24
	Shallow Silty 5-8" P.Z.	024XY067NV,028BY073NV	24, 28B
	Shallow Silty 8-10"P.Z.	024XY067NV,028BY009NV	24, 28B
	Coarse Gravelly Loam 6-8"P.Z.	028BY075NV	28B
	Saline Terrace 5-8"P.Z.	028BY047NV	28B
Moist Floodplain	Saline Terrace 8-10"P.Z.	028BY065NV	28B
Montane Riparian	Moist Floodplain	025XY001NV, 028BY081NV	25, 28B
	POAN3 WSG:6W1410	025XY053NV	25
	POBAT WSG:6W1610	025XY074NV	25
	Stream Terrace	025XY062NV	25
	Streambank	025XY079NV	25
	Streambank 12+"P.Z.	028BY103NV	28B
Montane Sagebrush Steppe-subalpine	Loamy Slope 16+P.Z.	025XY012NV	25
	Shallow Loam 16+"P.Z.	025XY076NV	25
	Calcareous Loam 16+P.Z."	028BY085NV	28B
	Loamy 16+P.Z.	028BY029NV	28B
	Loamy Slope 20+"P.Z.	028BY104NV	28B
	Shallow Loam 16+"P.Z.	025XY076NV	25
	Mountain Loam 16+P.Z.	028BY070NV	28B
Montane Sagebrush Steppe-upland	Calcareous Loam 14-16" P.Z.	028BY088NV	28B
	Clay Seep	025XY047NV	25
	Gravelly clay 12-14"P.Z.	028BY087NV	28B
	Gravelly Clay 14+P.Z.	08BY033NV	28B
	Loamy 12-14"P.Z.	024XY021NV,025XY027NV	24, 25
	Loamy 14-16"P.Z.	025XY056NV	25
	Loamy Fan 12-16"P.Z.	028BY082NV	28B
	Loamy slope 12-16"P.Z..	024XY032NV,025XY012NV	24, 25
	Pocket Meadow (atypical)	025XY063NV	25
	Shallow Loam 14-16"P.Z.	025XY042NV	25

Ecological System[1]	ESD Name	ESD ID	MLRA
	South Slope 12-14"P.Z.	025XY009NV	25
	South Slope 14-18"P.Z.	025XY016NV	25
	Steep North Slope (atypical)	025XY010NV	25
	Stony Loam 12-14"P.Z.	025XY082NV	25
	North Slope 14+P.Z.	024XY023NV	24
	Shallow Loam 10-14" P.Z.	028BY079NV	28B
	South Slope 12-16"P.Z.	024XY029NV	24
	Loamy 12-16"P.Z.	028BY030NV	28
	Loamy Slope 12-16"P.Z.	028BY015NV	28
Mountain Shrub	Bouldery Loam	025XY058NV	25
	Ceanothus Thicket	025XY052NV	25
	Fractured Stony Loam 14+"P.Z.	025XY046NV, 028BY026NV	25, 28B
	Gravelly Claypan 12-16"P.Z.	025XY023NV	25
	Gravelly Loam 16+"P.Z.	025XY072NV	25
	Snowfield	025XY080NV	25
	Stony Loam14+"P.Z..	024XY034NV	24
	Gravelly Calcareous Loam 12-14" P.Z.	028BY096NV	28B
	Gravelly Calcareous Loam 14+P.Z.	028BY091NV	28B
	Gravelly Claypan 14+"P.Z.	028BY035NV	28B
	Gravelly Loam12-14"P.Z.	028BY046NV	28B
Pickleweed	n/a	n/a	
Pinyon-Juniper Woodland	JUOS WSG:0X0404	028BY083NV	28B
	PIMO WSG:0R0601	028BY076NV	28B
	PIMO-CELE3 WSG:1R1101	028BY058NV	28B
	PIMO-JUOS WSG:0R0501	028BY062NV	28B
	PIMO-JUOS WSG:0R0502	028BY061NV	28B
	Shallow Calcareous Hill 14+"P.Z.	028BY090NV	28B
	PIMO-JUOS WSG:0R0503	028By064NV	28B

Ecological System[1]	ESD Name	ESD ID	MLRA
	PIMO-JUOS WSG:0R0504	028BY060NV	28B
Roads-Local	n/a	n/a	
Roads-Paved	n/a	n/a	
Saline Meadow	Saline Meadow	024XY009NV	24
	Sodic Floodplain	024XY010NV	24
	Wet Sodic Flat	024XY044NV	24
	Saline Meadow	028BY002NV	28B
	Wet Alkali Meadow	028BY099NV	28B
	Wet Clay Terrace	028BY031NV	28B
	Wet Saline Meadow	028BY012NV	28B
	Wet Sodic Bottom	028BY050NV	28B
Subalpine-Upper Montane Grassland	Snowpocket	025XY028NV, 028BY051NV	25, 28B
Water	Subalpine Snowpocket	025XY077NV	25
Wet Meadow-bottomland	Wet Meadow 6-8" P.Z.	024XY043NV	24
	Wet Clay Basin	028BY098NV	28B
Wet Meadow-montane	Dry Meadow	025XY006NV	25
	Wet Meadow	025XY005NV	25
	Dry Meadow 6-10"P.Z.	028BY100NV	28B
	Dry Meadow 12-16"P.Z.	028BY095NV	28B
	Wet Meadow 10-14"P.Z.	028BY001NV	28B
	Wet Meadow14+P.Z.	028BY022NV	28B
Wetland	Wetland	028BY044NV	28B
Winterfat	Coarse silty 4-8"P.Z.	024XY014NV	24
	Silty 4-8"P.Z.	024XY004NV	24
	Silty 8-10"P.Z.	024XY059NV	24
	Coarse Silty 6-8"P.Z.	028BY084NV	28B
	Silty 5-8"P.Z.	028BY018NV	28B
	Silty 8-10"P.Z.	028BY013NV	28B
	Silty Clay 8-10" P.Z.	028BY071NV	28B

Source: ERM 2017c

[1] Based on TNC Methodology ESD = Ecological Site Description, MLRA = Major Land Resource Area, n/a = Not Available