

Overview

The Resolution Copper Mine project area and alternative tailings locations comprise public lands under both Federal and State jurisdiction as well as privately owned lands. Federal lands are managed by the Forest Service and the BLM, while State Trust lands are under the stewardship of the ASLD. As described in the sections that follow, approval of either the GPO-proposed mine or any of the alternatives presented in this EIS would result in the loss to public use of substantial areas of Federal and State lands, including recreational use, livestock grazing, and other uses. Some roads, fencing, range improvements, boundary markers, and other existing features would be permanently eliminated or altered.

3.16 Livestock and Grazing

3.16.1 Introduction

There are currently 17 established grazing allotments totaling approximately 462,000 acres within the analysis area on lands managed either by the Forest Service, BLM, or ASLD, or on privately owned lands. Most allotments are some combination of land management and/or ownership, where multiple grazing permits are held by a single permittee for the allotment.

Within the analysis area, all action alternatives would affect vegetation and/or water sources and cause direct or indirect impacts that would render portions of the current grazing allotments unavailable for livestock grazing. Impacts are expected throughout the full life cycle of the mine, including construction, operations, closure and reclamation, and post-closure phases.

3.16.2 Analysis Methodology, Assumptions, Uncertain and Unknown Information

3.16.2.1 Analysis Area

The analysis area for livestock and grazing includes the entirety of all allotments that overlap spatially, in full or in part, with the primary GPO-proposed mine components (East Plant Site and subsidence area, West Plant Site, MARRCO corridor, filter plant and loadout facility, Near West tailings storage facility and pipeline corridors, and transmission lines) and

each alternative tailings storage facility analyzed in this EIS (figure 3.16.2-1). Temporal analysis of impacts on livestock and grazing includes all portions of grazing allotments over the period in which mine activities could occur (50–55 years), including the construction, operations, closure and reclamation, and post-closure phases.

3.16.2.2 Methodology

This analysis documents the potential for acreages of grazing allotments to change, the potential for animal unit months (AUMs)⁷² to be reduced, and the potential for loss of grazing-related facilities (e.g., stock watering sources). Grazing allotments intersecting with the analysis area were identified through geospatial data obtained from the Tonto National Forest, BLM, and ASLD. Where necessary, the datasets were reconciled to one another and to available geospatial land ownership data, in order to make data from the different sources comparable for analysis. The total acreages of each allotment and the acres potentially impacted by project-related activities were then determined through geographic information system (GIS) spatial analysis. AUM values were calculated based on the original AUMs per acre of the entire allotment and were extrapolated to the anticipated acreage of impact to yield a proportional estimate of reduction in AUMs (e.g., 100 AUMs are allowed on a 1,000-acre allotment; if reduced by 500 acres, the available AUMs become 50). Data on ownership, lease agreements, AUMs, etc., were identified and evaluated where available.

72. An “animal unit month” metric used to identify the amount of forage required to feed one mature cow weighing approximately 1,000 pounds and a calf up to weaning age.

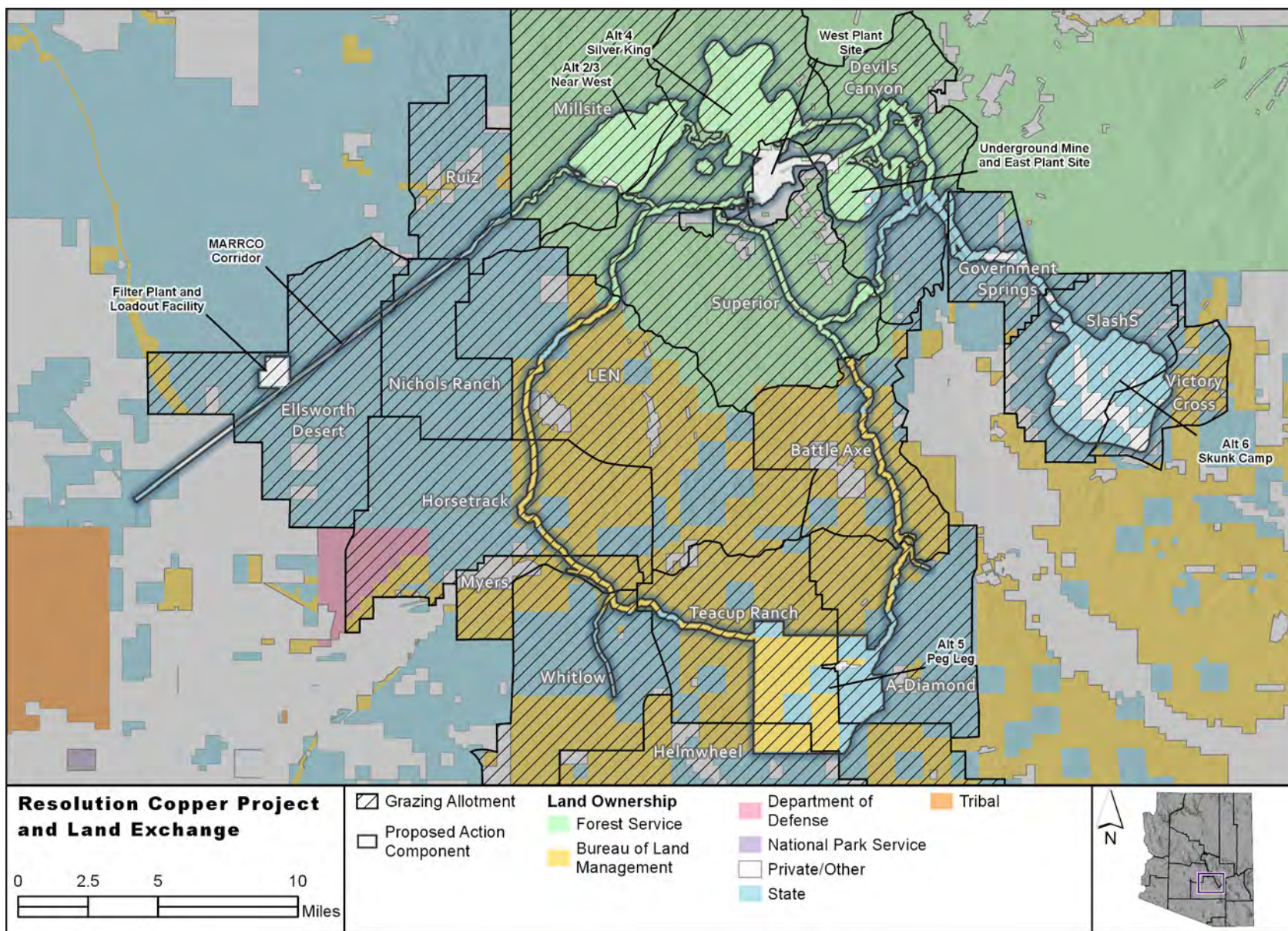


Figure 3.16.2-1. Analysis area for evaluating existing rangeland conditions and livestock grazing allotments

Primary Legal Authorities Relevant to the Livestock and Grazing Effects Analysis

- Taylor Grazing Act of 1934
- Federal Land Policy and Management Act of 1976
- Multiple-Use Sustained-Yield Act of 1960
- Tonto National Forest Land and Resource Management Plan
- Forest and Rangeland Renewable Resources Planning Act of 1974

Impacts on springs, as well as livestock and wildlife water sources, were identified by evaluation of publicly available geospatial data retrieved from several sources: Tonto National Forest, BLM Tucson Field Office, and AGFD, as well as various environmental resource surveys prepared under contract for Resolution Copper. Data on existing rangeland conditions, where available, were taken from environmental assessments and allotment management plans, but range conditions have not been recorded for most grazing allotments in the analysis area.

It should be noted that the water sources described as being lost in this section may differ from the groundwater-dependent ecosystems that are described as being impacted in section 3.7.1, but for which mitigation is anticipated to maintain or replace the water sources described in this analysis. Section 3.7.1 focuses on GDEs with persistent, perennial water tied to regional aquifers. This section focuses on water for wildlife from a variety of sources, including tanks and springs that would be directly impacted and may rely on temporary or seasonal sources of water. In addition, some impacts on livestock access from fencing may not be considered in section 3.7.1, which focuses on direct disturbance instead of loss of access.

3.16.3 Affected Environment

3.16.3.1 Relevant Laws, Regulations, Policies, and Plans

A complete listing and brief description of the legal authorities, reference documents, and agency guidance used in this livestock and grazing analysis may be reviewed in Newell (2018c).

3.16.3.2 Existing Conditions and Ongoing Trends

There are currently 17 established grazing allotments totaling approximately 462,000 acres in the analysis area. The proposed action and its alternatives intersect only about 10 percent of these allotments by area. This section summarizes existing conditions for the entirety of each allotment to the extent that existing conditions can be described.

Because of their relatively large and complex geographic areas, each grazing allotment is of varying size and varying land management; however, allotments are typically leased by a single entity that must obtain grazing rights (a permit or authorization) from each respective land manager/owner.

Rangelands in the analysis area are typically Sonoran desertscrub dominated by large cacti and tall shrubs at lower elevations (below 3,500 feet) and are chaparral dominated by dense shrub species such as oak, manzanita, and mountain mahogany above 4,000 feet. Semi-arid grasslands predominate in the transition zone between these type primary ecozones (Arizona Roadside Environments 1999).

Given the complex relationship between livestock grazing and land management, allotments are discussed in this section by land-managing agency. The level of detail provided is based on available data.

Table 3.16.3-1. Acreages of Forest Service livestock grazing leases by allotment

Allotment Name	Grazing Lease Acreage*	Livestock Type / Number	Recommended AUMs
Devil's Canyon	18,700	Cattle / 200	1,104
Millsite	44,483	Cattle / 307	4,374
Superior	56,141	Cattle / 314	5,300

Source: Livestock type/number and AUMs were taken from the Forest Service livestock grazing records.

* Acreages are estimates based on available spatial data.

Forest Service Grazing Allotments

The Forest Service manages grazing permits within three allotments in the analysis area: Devil's Canyon (18,700 acres), Millsite (44,483 acres), and Superior (56,141 acres), for a total of approximately 119,323 acres of permitted grazing on NFS lands (table 3.16.3-1). Permitted grazing uses for Forest Service grazing allotments are summarized in this section. Actual use may be less than permitted use, mainly as a result of periods of extended drought (U.S. Forest Service 2010d).

DEVIL'S CANYON ALLOTMENT

The grazing permit for the portion of the Devil's Canyon Allotment on NFS land is held by Integrity Land and Cattle, of which Resolution Copper is a principal owner. Integrity Land and Cattle operates JI Ranch and runs approximately 200 head of cattle on this allotment as of the GPO (2016d). The carrying capacity for this allotment is 1,104 AUMs.

MILLSITE ALLOTMENT

The grazing permit for the portion of the Millsite Allotment on NFS land is held by William and Lynn Martin. William and Lynn Martin own JF Ranch and are permitted to graze 307 cows/bulls year-round and 197 yearlings between January 1 and May 31. In 1983, a production-utilization study showed 36,806 acres of the Millsite Allotment as being

Table 3.16.3-2. Vegetation condition rating, Millsite Allotment, 1991–2003

Cluster Number	Pasture	Vegetation Rating and Trend
C1	Cottonwood	Very poor, stable
C2	Woodbury	Fair, stable
C3	Bear Tank	Poor, stable
C4	Millsite	Poor, downward
C5	Millsite	Poor, downward
C6	Hewitt	Fair, downward
C7	Cottonwood	Poor, stable

Source: U.S. Forest Service (2010d)

Note: Rating system given on a scale from "Poor" to "Excellent."

at full-capacity range; the remaining 6,815 acres were identified as having no capacity. As of 1983, the lessees of the Millsite Allotment were using 17,359 of the full-capacity range acreage for livestock use, or 47.7 percent of available rangeland (U.S. Forest Service 2010d). The 1983 study also estimated that, with improved management, capacity for the Millsite Allotment is 4,374 AUMs.

Sonoran desertscrub covers approximately 75 to 80 percent of the Millsite Allotment and has been heavily impacted by the area's history of livestock grazing. An analysis was performed on data collected between 1991 and 2003 at seven sample clusters in the allotment to create a vegetation condition rating (U.S. Forest Service 2010d). Overall, vegetation conditions on the allotment were poor, and nearly one-half are deteriorating (table 3.16.3-2). As a result, the Forest Service prescribed a deferred and/or rest rotation method for the Millsite Allotment Management Plan (U.S. Forest Service 2016c). Soil conditions for the allotment were evaluated in 2004, 2008, and 2009, and are shown in table 3.16.3-3.

Table 3.16.3-3. Soil condition in acres, Millsite Allotment

Condition	Acres*	Relative Percentage
Satisfactory	34,763	78
Impaired	3,565	8
Unsatisfactory-Impaired	446	1
Unsatisfactory	5,794	13
Total	44,568	100

Source: U.S. Forest Service (2010d)

Notes: The soil rating system is based on the Natural Resources Conservation Service Soil Condition Rating Guide. These ratings are defined as follows (U.S. Forest Service 1999):

Satisfactory – Indicators signify that soil function is being sustained and soil is functioning properly and normally. The ability of soil to maintain resource values and sustain outputs is high.

Impaired – Indicators signify a reduction in soil function. The ability of soil to function properly has been reduced and/or there exists an increased vulnerability to degradation.

Unsatisfactory – Indicators signify that loss of soil function has occurred. Degradation of vital soil functions results in the inability of soil to maintain resource values, sustain outputs, and recover from impacts.

* Acreages are estimates based on available spatial data.

SUPERIOR ALLOTMENT

The grazing permit for the portion of the Superior Allotment on NFS land is held by DNH Cattle Company, which is permitted to graze 314 cows/bulls throughout the year and 174 yearlings between January 1 and May 31. Most full-capacity range within this allotment is located at higher elevations. In 1961, an allotment analysis determined the carrying capacity to be 5,300 AUMs (U.S. Forest Service no date). The soil and vegetation conditions on the Superior Allotment are considered poor, especially at low elevations, resulting from improper grazing in the past, with irreversible effects in some areas. The current management practice of a 6-month pasture/6-month rest rotation schedule, outlined in the Superior Allotment management plan, intends to provide extended rest to the stressed lowland areas and allow spring/summer rest for two consecutive years out of three (U.S. Forest Service 2016c). A summary of the Superior Allotment's 2018 authorized use is presented in table 3.16.3-4 (U.S. Forest Service no date).

Table 3.16.3-4. Authorized use for Superior Allotment, 2018, DNH Cattle Company

Grazing Unit	Dates of Use	Monitoring Date	Authorized Livestock
North Side			
Montana	11/1/2017 to 4/30/2018	3/27/2018	180 cow/calf 14 bulls 22 yearlings
Silver Canyon	5/1/2018 to 10/30/2018	8/21/2018	180 cow/calf 14 bulls
88	11/1/2018 to 4/30/2019	3/14/2019	180 cow/calf 14 bulls
Silver Canyon, 88 Deferred for 2018			
South Side			
Town, North TU	3/1/2018 to 5/1/2018	4/26/2018	101 cow/calf 24 yearlings
Wildhorse	3/1/2018 to 5/10/2018	5/17/2018	5 bulls
TU Trap, Holding	5/2/2018 to 5/10/2018	5/17/2018	101 cow/calf 24 yearlings
South TU	5/10/2018 to 10/1/2018	8/23/2018	101 cow/calf 6 bulls
Town, North TU	10/2/2018 to 2/28/2019	1/29/2019	101 cow/calf 6 bulls

Source: Sando (2018)

Note: No pastures rested or deferred during 2018.

Each individual allotment management plan outlines a monitoring program with the intent of determining whether the currently prescribed management practices are properly implemented and effective for the improvement of rangeland conditions. The Tonto National Forest implements compliance monitoring to ensure livestock are distributed correctly, and to inspect improvements and maintenance, and forage utilization, among other variables, with an inspection scheduled each grazing year. Other monitored aspects are the presence of noxious weeds and riparian conditions, which may be monitored on longer time intervals (5–10 years) as needed (U.S. Forest Service 2016c). Monitoring practices may be modified if there are significant changes to livestock use patterns.

Bureau of Land Management Grazing Allotments

The BLM authorizes grazing permits within nine allotments in the analysis area totaling about 17,855 acres (see table 3.16.3-4). Detailed grazing conditions and documentation for most of these grazing permits are not available; however, the NEPA process for the Teacup and Whitlow Allotments were initiated in 2017 (Bureau of Land Management 2017a). The Land Health Evaluation for the Teacup and Whitlow grazing leases indicated that the general range conditions met the standards set for them by the BLM. BLM also suggested that Teacup could support 392 cattle under 3,058 AUMs, while Whitlow could support 136 cattle under 588 AUMs. BLM’s Rangeland Administration System data were queried for acreage and AUMs for the remaining BLM grazing leases. Table 3.16.3-5 provides acreages for the grazing permits that BLM manages in the analysis area, the number of livestock, and recommended AUMs.

Arizona State Land Department Grazing Leases

The ASLD manages grazing permits within 14 allotments in the analysis area totaling 152,042 acres. ASLD does not maintain detailed documentation on rangeland conditions for specific grazing permit areas; however, this analysis assumes that rangeland conditions for State Trust lands would be similar to those found on neighboring NFS and BLM

Table 3.16.3-5. Acreages for BLM livestock grazing leases by allotment

Allotment Name	Grazing Lease Acreage*	Livestock Type / Number	Recommended AUMs
LEN	23,742	Cattle / 357	2,964
Teacup	28,794	Cattle / 392	3,058
Helmwheel	14,856	Cattle / 119	1,428
A-Diamond	6,580	Cattle / 301	686
Victory Cross	2,862	Cattle / 163	411
Battle Axe	14,822	Cattle / 210	1,562
Horsetrack	11,218	Cattle / 102	1,224
Meyers	4,618	Cattle / 47	564
Whitlow	10,363	Cattle / 136	588

Source: Livestock type/number and AUMs were taken from the BLM Rangeland Administration System (Bureau of Land Management 2019)

* Acreages are estimates based on available spatial data.

lands. Rangeland data summarized in table 3.16.3-6 were taken from the Arizona Land Resources Information System (ALRIS), a spatial data viewer maintained by the ASLD.

Table 3.16.3-6. Acreages for ASLD grazing leases by allotment

Allotment Name	Grazing Lease Acreage*	Recommended AUMs
LEN	14,328	1,346
Teacup	12,098	1,583
Helmwheel	30,622	2,843
A-Diamond	2,441	955
Victory Cross	4,476	1,048
Battle Axe	3,270	425
Horsetrack	16,842	1,414
Whitlow	11,275	1,066
Devil's Canyon	6,605	1,104
Ellsworth Desert	6,379	2,250
Ruiz	11,561	1,246
Slash S	15,351	5,757
Nichols Ranch	11,561	1,300
Government Springs	7,233	924

Source: AUMs were taken from Arizona Land Resources Information System (Arizona State Land Department 2019a)

* Acreages are estimates based on available spatial data.

3.16.4 Environmental Consequences of Implementation of the Proposed Mine Plan and Alternatives

3.16.4.1 Alternative 1 – No Action Alternative

Under the no action alternative, no alterations would be made to current grazing access or allotments, nor would there be any direct loss of stock tanks, seeps, and springs. However, six springs in the Superior Allotment are anticipated to be impacted by continued dewatering pumping of mine infrastructure. Management would continue as outlined per the allotment management plans and rangeland conditions would improve or deteriorate contingent upon the plans' effectiveness, combined with the mounting effects of climate change. Climate change is expected to result in droughts that are more frequent and of longer duration, which could stress vegetation and require adjustments to allotment management plans in the future.

3.16.4.2 Impacts Common to All Action Alternatives

Impacts on Allotments

All action alternatives would result in direct and indirect impacts on livestock and grazing within the analysis area because all areas within project facility footprints would become inaccessible to grazing. Impacts are expected throughout the full life cycle of the mine, including the construction, operations, closure and reclamation, and post-closure phases. Direct impacts of any action alternatives include the following:

- Reduction in acreage of grazing allotments
- Reduction in available AUMs within individual grazing allotments
- Loss of grazing-related facilities (water sources or infrastructure)

All action alternatives would see impacts on grazing allotments located in the East Plant Site, subsidence area, and MARRCO corridor. An area within the East Plant Site and Oak Flat Federal Parcel would be fenced off at the commencement of the construction phase of the mine, and the perimeter would be extended every 10 years following the start of operations to account for the additional area impacted by subsidence. Presently, there is no plan to make the area within the subsidence area accessible after Resolution Copper has ownership of the parcel (Resolution Copper 2016d); this would result in a reduction of at least 1,856 acres in the Devil’s Canyon Allotment and a direct impact on Integrity Land and Cattle, which currently owns the grazing permit on that allotment. In addition, all action alternatives would see a reduction of at least 38 acres on the Millsite Allotment and some reduction in acreage on the Superior Allotment, although the amount varies by alternative. Implementation of any action alternative would result in loss of the livestock water sources identified in table 3.16.4-1.

Effects of Reclamation

The tailings storage facility represents a large area of disturbance (approximately 2,300 to approximately 5,900 acres, depending on the selected tailings storage facility location) that would be reclaimed after closure. The success of reclamation and the ability to reestablish vegetation on the tailings storage facility surface would have a large effect on the ability to sustain livestock grazing as a post-mine land use. Potential reclamation success is analyzed in detail in section 3.3. Overall, in areas where ground disturbance is relatively low, and soil resources (e.g., nutrients, organic matter, microbial communities) and vegetation propagules (e.g., seedbank or root systems to resprout) remain relatively intact, it would be expected that vegetation communities could rebound to similar pre-disturbance conditions in a matter of decades to centuries. In contrast, for the tailings storage facility, which would be covered in non-soil capping material (such as Gila Conglomerate), biodiversity and ecosystem function may never reach the original, pre-disturbance conditions even after centuries of recovery. Allowing grazing as a post-mine land use would need to be weighed against the potential sustainability of the soil and vegetation ecosystem.

Table 3.16.4-1. Livestock water sources impacted under all action alternatives

Name	Type	Nearest Project Area	Grazing Allotment
Ranch Rio Spring	Spring	Subsidence area	Devil’s Canyon
The Grotto	Spring	Subsidence area	Devil’s Canyon
Apache Leap Stock Tank	Dugout/pit tank	East Plant Site	Devil’s Canyon
Oak Flat Stock Tank	Dugout/pit tank	Subsidence area	Devil’s Canyon
Reservoir Tank 2	Stock tank, intermittent	Subsidence area	Devil’s Canyon
No Name	Tanks	MARRCO corridor	Millsite
Bitter Spring	Spring	Dewatered by pumping	Superior
Bored Spring	Spring	Dewatered by pumping	Superior
Hidden Spring	Spring	Dewatered by pumping	Superior
McGinnel Spring	Spring	Dewatered by pumping	Superior
McGinnel Mine Spring	Spring	Dewatered by pumping	Superior
Walker Spring	Spring	Dewatered by pumping	Superior
DC-6.6W	Spring	Dewatered by pumping	Devil’s Canyon
Kane Spring	Spring	Dewatered by pumping	Devil’s Canyon

Sources: WestLand Resources Inc. and Montgomery and Associates Inc. (2018); WestLand Resources Inc. (2018d)

Effects of the Land Exchange

The selected Oak Flat Federal Parcel would leave Forest Service jurisdiction, and approximately 1,856 acres of the existing Devil's Canyon Allotment on Tonto National Forest lands (presently permitted to Integrity Land and Cattle Company) would become unavailable for grazing, resulting in an overall reduction of available AUMs. This is an approximately 7 percent loss in total size of the grazing allotment.

The offered lands parcels would come under Federal jurisdiction. The Forest Service supports livestock grazing as a valuable resource to promote on the landscape, provided that it is responsibly performed and managed and does not injure plant growth. BLM's rangeland program places an emphasis in multi-jurisdictional ecosystem management in Arizona. This involves interdisciplinary resource management in consultation and coordination with other Federal, State, and local agencies and Indian Tribes. The specific management of livestock and grazing on the offered lands would be determined by the agencies upon transference of the parcels, but in general, when the offered lands enter Federal jurisdiction, the parcels would have the potential to be permitted for grazing where there currently is none. The Apache Leap South End Parcel would be exempt from grazing as it would become part of a management area that has no new grazing allowed. Allotments on the Forest Service that surround some of the offered lands parcels include Cartwright, Red Creek, and Tonto Basin, among others. Allotments managed by the BLM that surround some of the offered lands parcels are Dripping Springs and Steamboat Mountain.

Forest Plan Amendment

The Tonto National Forest Land and Resource Management Plan (1985b) provides guidance for management of lands and activities within the Tonto National Forest. It accomplishes this by establishing a mission, goals, objectives, and standards and guidelines. Missions, goals, and objectives are applicable on a forest-wide basis. Standards and guidelines are either applicable on a forest-wide basis or by specific management area.

A review of all components of the 1985 forest plan was conducted to identify the need for amendment due to the effects of the project, including both the land exchange and the proposed mine plan (Shin 2019). A number of standards and guidelines (13) were identified as applicable to livestock grazing. None of these standards and guidelines were found to require amendment to the proposed project, on either a forest-wide or management area-specific basis. For additional details on specific rationale, see process memorandum Shin (2019).

SUMMARY OF APPLICANT-COMMITTED ENVIRONMENTAL PROTECTION MEASURES

No environmental protection measures were identified as being incorporated into the design of the project that would act to reduce potential impacts on livestock grazing. However, note that a number of measures meant to reduce impacts on water resources could be applicable to livestock grazing as well. These are described primarily in sections 3.7.1 and 3.7.3.

3.16.4.3 Alternative 2 – Near West Proposed Action

Implementation of this alternative would result in the reduction of available grazing within six allotments under various management or ownership. Table 3.16.4-2 summarizes the anticipated reduction in acres of land available for livestock grazing from this alternative by allotment and by land manager/owner, and reductions in AUMs by allotment are estimated where data were available.

Under Alternative 2, approximately 8,572 acres of land currently authorized for livestock grazing use would be forfeited, with the greatest impacts occurring on the Devil's Canyon and Millsite Allotments, with relatively lesser impacts on the Ellsworth Desert and Superior Allotments, and minor impacts on the Nichols Ranch and Ruiz Allotments.

Implementation of Alternative 2 would also result in the loss of access to four or five natural springs, as well as five or six constructed stock watering and/or wildlife watering features (table 3.16.4-3).

Table 3.16.4-2. Reduction in available grazing by allotment and ownership – Alternative 2

Grazing Allotment	Private (acres)	NFS (acres) / AUMs	ASLD (acres) / AUMs	Total Grazing Reduction (acres)
Devil's Canyon	237	1,990 / 117	145 / 24	2,372
Ellsworth Desert	668	0	46 / 4	714
Millsite	65	4,196 / 413	0	4,261
Nichols Ranch	47	0	36 / 3	83
Ruiz	29	0	45 / 5	74
Superior	3	1,065 / 100	0	1,068
Total				8,572

3.16.4.4 Alternative 3 – Near West – Ultrathickened

Implementation of Alternative 3 would result in the same impacts on lands currently authorized for livestock grazing and water sources use and access as described for Alternative 2.

Table 3.16.4-3. Water sources impacted under Alternative 2

Name	Type	Nearest Project Area	Grazing Allotment
Bear Tank Canyon Spring	Spring	Tailings facility	Millsite
Benson Spring	Spring	Tailings facility	Millsite
Lower Bear Tank Canyon Spring	Spring	Tailings facility	Millsite
Perlite Spring	Spring	Tailings facility	Superior
Benson Spring	Unknown	Tailings facility	Millsite
Hackberry Tank	Dugout/pit tank	Tailings facility	Millsite
Noble Windmill	Windmill/well	Tailings facility	Millsite
Pilot Tank	Dugout/pit tank	Tailings facility	Millsite
No Name	Spring, trough	Tailings facility	Millsite
No Name	Well	Tailings facility	Millsite
Conley Spring	Spring	Tailings facility	Millsite

Sources: WestLand Resources Inc. and Montgomery and Associates Inc. (2018); WestLand Resources Inc. (2018d)

Table 3.16.4-4. Reduction in available grazing by allotment and ownership – Alternative 4

Grazing Allotment	Private (acres)	NFS (acres) / AUMs	ASLD (acres) / AUMs	Total Grazing Reduction (acres)
Devil's Canyon	237	1,990 / 117	277 / 46	2,504
Ellsworth Desert	668	0	46 / 4	714
Millsite	17	112 / 11	0	129
Nichols Ranch	47	0	36 / 3	83
Ruiz	29	0	45 / 5	74
Superior	52	5,843 / 551	0	5,895
Total				9,399

3.16.4.5 Alternative 4 – Silver King

Implementation of the Silver King alternative would result in reduction of available grazing within six allotments under various management or ownership. Table 3.16.4-4 summarizes the anticipated reduction in acres of land available for livestock grazing from this alternative by allotment and by land manager/owner, and reductions in AUMs by allotment are estimated where data were available. Implementation of Alternative 4 would also result in the loss of access to springs and other livestock and/or wildlife water sources (see table 3.16.4-4).

Under Alternative 4, approximately 9,399 acres of land currently authorized for livestock grazing would be forfeited, with the greatest impacts occurring on the Superior Allotment. Relatively moderate impacts would occur on the Devil's Canyon Allotment, with more minor impacts occurring on the Ellsworth Desert, Millsite, Nichols Ranch, and Ruiz Allotments.

Table 3.16.4-5. Water sources impacted under Alternative 4

Name	Type	Nearest Project Area	Grazing Allotment
McGinnel Mine Spring	Spring	Fence line (note this spring is already impacted by pumping)	Superior
Mud Spring 2	Spring	Fence line	Superior
Rock Horizontal Spring	Spring	Fence line	Superior
Iberri Spring	Spring	Tailings facility	Superior
McGinnel Spring	Spring	Tailings facility	Superior
Cedar Tank	Stock tank, intermittent	Fence line	Superior
Comet Tank	Stock tank, intermittent	Tailings facility	Superior
Dugan Tank	Stock tank, intermittent	Fence line	Superior
Javelina Tank	Stock tank, intermittent	Fence line	Superior
Peachville Tank	Stock tank, intermittent	Fence line	Superior
No Name	Well	Fence line	Superior

Sources: WestLand Resources Inc. and Montgomery and Associates Inc. (2018); WestLand Resources Inc. (2018d)

Implementation of Alternative 4 would also result in the loss of access to five natural springs, as well as six constructed stock watering and/or wildlife watering features (table 3.16.4-5).

3.16.4.6 Alternative 5 – Peg Leg

The Peg Leg alternative would include an east route pipeline option and a west route pipeline option. Implementation of the Peg Leg east pipeline option would result in the reduction of available grazing within 10 grazing allotments, while the Peg Leg west pipeline option would affect 13 grazing allotments. Table 3.16.4-6 summarizes the anticipated reduction in acres of land available for livestock grazing from this alternative by allotment and by land manager/owner, as well as by pipeline route, and reductions in AUMs by allotment are estimated where data were available.

Under the east pipeline option for Alternative 5, approximately 15,672 acres of land currently authorized for livestock grazing would be forfeited over 10 allotments, with the greatest impacts occurring on the Teacup Allotment. Slightly fewer acres on each of the Devil’s Canyon, A-Diamond, and Helmwheel Allotments would be affected, with relatively lesser impacts on the remaining allotments.

Under the west pipeline option for Alternative 5, approximately 16,186 acres of land currently authorized for livestock grazing would be forfeited over 13 allotments, with the greatest impacts occurring on the Teacup Allotment. Slightly fewer acres on each of the A-Diamond, Devil’s Canyon, and Helmwheel Allotments would be affected, with relatively lesser impacts on the remaining allotments.

Implementation of the Peg Leg alternative would result in the loss of access to natural springs, as well as constructed stock watering and/or wildlife watering features, but none outside those shown in impacts common to all (see table 3.16.4-1).

Constructed stock watering and/or wildlife water facilities in the tailings pipeline corridor options could be present yet are not listed. It is expected that the water source would be avoided during micro-siting or would be replaced as per water resources mitigation. Impacts associated with water sources in the tailings pipeline corridor options would be associated with construction and therefore would be short term and temporary.

Table 3.16.4-6. Reduction in available grazing by allotment, ownership, and pipeline route – Alternative 5

EAST PIPELINE OPTION					
Grazing Allotment	Private (acres)	NFS (acres) / AUMs	ASLD (acres) / AUMs	BLM (acres) / AUMs	Total Grazing Reduction (acres)
A-Diamond	144	0	2,440 / 155	188 / 20	2,772
Battle Axe	6	0	31 / 4	416 / 44	453
Devil's Canyon	237	1,990 / 117	278 / 46	0	2,505
Ellsworth Desert	668	0	46 / 4	0	714
Helmwheel	4	0	16 / 1	1,271 / 122	1,291
Millsite	17	112 / 11	0	0	129
Nichols Ranch	47	0	36 / 3	0	83
Ruiz	29	0	45 / 5	0	74
Superior	24	710 / 67	0	0	734
Teacup	3	0	1,830 / 239	5,084 / 540	6,917
Total					15,672
WEST PIPELINE OPTION					
A-Diamond	129	0	2,306 / 146	129 / 14	2,564
Devil's Canyon	237	1,990 / 117	278 / 46	0	2,505
Ellsworth Desert	668	0	46 / 4	0	714
Helmwheel	4	0	16 / 1	1,271 / 244	1,291
Horsetrack	0	0	6 / 1	311 / 34	317
LEN	0	36 / 3	88 / 8	325 / 40	449
Millsite	17	112 / 11	0	0	129
Meyers	0	0	0	138 / 17	138
Nichols Ranch	47	0	36 / 3	0	83
Ruiz	29	0	45 / 5	0	74

continued

Table 3.16.4-6. Reduction in available grazing by allotment, ownership, and pipeline route – Alternative 5 (cont'd)

EAST PIPELINE OPTION					
Superior	8	597 / 56	0	0	605
Teacup	3	0	1,893 / 495	5,311 / 1,128	7,207
Whitlow	0	0	20 / 2	90 / 5	110
Total					16,186

3.16.4.7 Alternative 6 – Skunk Camp

The Skunk Camp alternative would include a north route pipeline option and a south route pipeline option. Implementation of either pipeline route option would result in reduced grazing opportunities within the same nine grazing allotments, but with variable acres impacted. Table 3.16.4-7 summarizes the anticipated reduction in available grazing from this alternative by allotment and by land manager/owner, as well as by pipeline route, and reductions in AUMs by allotment are estimated where data were available.

Under the north pipeline option for Alternative 6, approximately 14,747 acres of existing livestock grazing would be lost over nine allotments, with the largest grazing impacts occurring on the Slash S Allotment. Slightly fewer acres on each of the Devil’s Canyon and Victory Cross Allotments would be affected, with relatively minor impacts on the remaining allotments.

Under the south pipeline option for Alternative 6, approximately 15,209 acres of existing livestock grazing would be lost over nine allotments, with the largest grazing impacts occurring on the Slash S Allotment. Slightly fewer acres on each of the Devil’s Canyon and Victory Cross Allotments would be affected, with relatively minor impacts on the remaining allotments.

Implementation of the Skunk Camp alternative would result in the loss of access to natural springs, as well as constructed stock watering and/or wildlife watering features (table 3.16.4-8).

Table 3.16.4-7. Reduction in available grazing by allotment, ownership, and pipeline route – Alternative 6

NORTH PIPELINE OPTION					
Grazing Allotment	Private (acres)	NFS (acres) / AUMs	ASLD (acres) / AUMs	BLM (acres) / AUMs	Total Grazing Reduction (acres)
Devil’s Canyon	237	2,860 / 169	627 / 105	0	3,724
Ellsworth Desert	668	0	46 / 4	0	714
Government Springs	269	0	599 / 77	0	868
Millsite	17	112 / 11	0	0	129
Nichols Ranch	47	0	36 / 3	0	83
Ruiz	29	0	45 / 5	0	74
Slash S	1,333	0	5,050 / 1,894	0	6,383
Superior	13	319 / 30	0	0	332
Victory Cross	833	0	1,607 / 376	0	2,440
Total					14,747
SOUTH PIPELINE OPTION					
Devil’s Canyon	237	2,520 / 149	853 / 143	0	3,610
Ellsworth Desert	668	0	46 / 4	0	714
Government Springs	269	0	599 / 77	0	868
Millsite	17	112 / 11	0	0	129
Nichols Ranch	47	0	36 / 3	0	83
Ruiz	29	0	45 / 5	0	74
Slash S	1,333	0	5,050 / 1894	0	6,383

continued

Table 3.16.4-7. Reduction in available grazing by allotment, ownership, and pipeline route – Alternative 6 (cont'd)

NORTH PIPELINE OPTION					
Grazing Allotment	Private (acres)	NFS (acres) / AUMs	ASLD (acres) / AUMs	BLM (acres) / AUMs	Total Grazing Reduction (acres)
Superior	24	884 / 83	0	0	908
Victory Cross	833	0	1,607 / 376	0	2,440
Total					15,209

Constructed stock watering and/or wildlife water facilities in the tailings pipeline corridor options could be present yet are not listed in table 3.16.4-8. It is expected that the water sources would be avoided during micro-siting or would be replaced in accordance with water resources mitigation. Impacts associated with water sources in the tailings pipeline corridor options would be associated with construction and therefore short term and temporary.

3.16.4.8 Cumulative Effects

The Tonto National Forest identified the following list of reasonably foreseeable future actions as likely to occur in conjunction with development of the Resolution Copper Mine, and as having potential to contribute to incremental changes in regional livestock and grazing conditions near the Resolution Copper Mine. As noted in section 3.1, past and present actions are assessed as part of the affected environment; this section analyzes the effects of any RFFAs, to be considered cumulatively along with the affected environment and Resolution Copper Project effects.

- **Ripsey Wash Tailings Project.** ASARCO mining company is planning to construct a new tailings storage facility to support

Table 3.16.4-8. Water sources impacted under Alternative 6

NORTH PIPELINE OPTION			
Name	Type	Nearest Project Area	Grazing Allotment
Weeping Spring	Spring	Access road	Government Spring
Big Spring 3	Spring	Fence line	Victory Cross
Looney Spring 2	Spring	Fence line	Slash S
Walnut Spring 4	Spring	Fence line	Slash S
Dry Spring	Spring	Tailings facility	Slash S
Haley Spring	Spring	Tailings facility	Slash S
No Name	Stock tank	Access road	Devil's Canyon
SOUTH PIPELINE OPTION			
Name	Type	Nearest Project Area	Grazing Allotment
Weeping Spring	Spring	Access road	Government Spring
Big Spring 3	Spring	Fence line	Victory Cross
Looney Spring 2	Spring	Fence line	Slash S
Walnut Spring 4	Spring	Fence line	Slash S
Dry Spring	Spring	Tailings facility	Slash S
Haley Spring	Spring	Tailings facility	Slash S
No Name	Stock tank	Access road	Devil's Canyon

Sources: WestLand Resources Inc. and Montgomery and Associates Inc. (2018); WestLand Resources Inc. (2018d)

its Ray Mine operations. The tailings storage facility is to be situated in the Ripsey Wash watershed just south of the Gila River approximately 5 miles west-northwest of Kearny, Arizona. The new tailings storage facility would be designed to replace the existing Elder Gulch tailings storage facility and would be operated with the current on-site workforce. There would be relatively minor change to existing grazing allotments, with the A-Diamond Allotment losing 2,426 acres or about 11.5 percent of area; and the Rafter Six Allotment being reduced by 149 acres, or about 0.06 percent of its area. These impacts would primarily be cumulative with Alternative 5 – Peg Leg, as the tailings storage facility would also impact another 2,564 to

2,772 acres of the A-Diamond Allotment, depending on pipeline route.

- **Ray Land Exchange and Proposed Plan Amendment.** ASARCO is also seeking to complete a land exchange with the BLM by which the mining company would gain title to approximately 10,976 acres of public lands and federally owned mineral estate located near ASARCO's Ray Mine in exchange for transferring to the BLM approximately 7,304 acres of private lands, primarily in northwestern Arizona. It is known that at some point ASARCO wishes to develop a copper mining operation in the "Copper Butte" area west of the Ray Mine; however, no specific details are currently available as to potential environmental effects resulting from this future mining operation. Under the proposed action, livestock grazing would cease on the selected lands, resulting in a reduction of 1,151 AUMs; however, the offered lands could become available for grazing under Federal jurisdiction.
- **Grazing allotments.** There are various portions of 17 discrete grazing allotments that partially overlap the proposed Resolution Copper Mine. The grazing allotments generally allow for cattle and other livestock grazing, as well as minor range improvements such as fence repair, stock watering improvements, cattle guards, etc. Approximately 40,000 acres of land authorized for livestock grazing would be affected in varying degrees by proposed project activities and its alternatives. The degree of impacts would be dependent upon the activity, e.g., proposed pipeline and transmission line corridors would not notably affect livestock access and forage would return in time, while tailings facilities and other materials processing areas would likely be lost in perpetuity.
- **APS Herbicide Use within Authorized Power Line Rights-of-Way on NFS lands.** APS has proposed to include Forest Service-approved herbicides as a method of vegetation management, in addition to existing vegetation treatment methods, on existing APS transmission rights-of-way within

the Tonto National Forest. An EA with a FONSI was published in December 2018. The EA determined that environmental resource impacts would be minimal, and the use of herbicides would be useful in preventing and/or reducing fuel buildup that would otherwise result from rapid, dense regrowth and sprouting of undesired vegetation. While some vegetation would be unavailable for grazing, the cumulative effect overall would be negligible.

- **LEN Range Improvements.** This range allotment is located near Ray Mine. Under the proposed action, upland perennial sources of water would be provided to supplement the existing upland water infrastructure on the allotment. The supplemental water sources would provide adequate water facilities for existing authorized grazing management activities. While beneficial, these water sources are located in a different geographic area than the GDEs potentially impacted by the Resolution Copper Project.
- **Millsite Range Improvements.** This range allotment is located 20 miles east of Apache Junction, on the southern end of the Mesa Ranger District. The Mesa Ranger District is proposing to add three new 10,000-gallon storage tanks and two 600-gallon troughs to improve range condition through better livestock distribution and to provide additional wildlife waters in three pastures on the allotment. Water developments are proposed within the Cottonwood, Bear Tanks, and Hewitt pastures of the Millsite grazing allotment. These improvements would be beneficial for providing water on the landscape, and are within the same geographic area where some water sources could be lost (Alternatives 2 and 3); they may offset some loss of water that would result because of the Resolution Copper Project tailings storage facility construction.

Other future projects not yet planned, such as large-scale mining, pipeline projects, power transmission line projects, and future grazing permits, are expected to occur in this area of south-central Arizona during the foreseeable future life of the Resolution Copper Mine (50–55

years). These types of unplanned projects, as well as the specific RFFAs listed here, would contribute to changes in lands available for livestock grazing use, and would affect the vegetation available as livestock forage.

3.16.4.9 Mitigation Effectiveness

The Forest Service is in the process of developing a robust mitigation plan to avoid, minimize, rectify, reduce, or compensate for resource impacts that have been identified during the process of preparing this EIS. Appendix J contains descriptions of mitigation concepts being considered and known to be effective, as of publication of the EIS. Appendix J also contains descriptions of monitoring that would be needed to identify potential impacts and mitigation effectiveness. As noted in chapter 2 (section 2.3), the full suite of mitigation would be contained in the FEIS, required by the ROD, and ultimately included in the final GPO approved by the Forest Service. Public comment on the DEIS, and in particular appendix J, will inform the final suite of mitigations.

At this time, no mitigation measures have been identified that would be pertinent to livestock grazing. Applicant-committed environmental protection measures for other resources that would also benefit livestock grazing have already been detailed elsewhere in this EIS, will be a requirement for the project, and have already been incorporated into the analysis of impacts.

Unavoidable Adverse Effects

Grazing would be impacted by a reduction in the area available for grazing (a permanent reduction for the area of the subsidence crater and tailings storage facility; a temporary reduction for the area within the perimeter fence until reclamation returns the area to a condition that is compatible with livestock grazing), and by impacts on seeps, springs, and stock tanks that are used by livestock. Water source enhancement conservation measures may offset some of the impacts on seeps, springs,

and stock tanks used by livestock on current grazing allotments. These impacts cannot be avoided or fully mitigated.

3.16.4.10 Other Required Disclosures

Short-Term Uses and Long-Term Productivity

Livestock grazing and long-term productivity would be permanently impacted within the tailings storage facility and subsidence area. Although reclamation would eventually return some level of vegetation to the tailings storage facility, productivity would be unlikely to recover to current conditions. Existing grazing around the MARRCO corridor and other linear corridors would be short-term losses, ending with reclamation at the end of mine life, with no impact on long-term productivity.

Irreversible and Irretrievable Commitment of Resources

Vegetation on the site would be continually changing as reclamation procedures are implemented. Eventually, reclamation is expected to return the site to conditions potentially suitable for post-closure land uses such as grazing. Irretrievable commitment of grazing resources would occur until reclamation has returned the site to conditions suitable for grazing. However, the subsidence area and tailings storage facility likely represent an irreversible loss of grazing land.