

2.8.2 Vegetation Productivity and Utility

The primary land uses in the vegetation study area are livestock grazing (rangeland) and hay production (Lowland Altered Grassland). The NRCS (2003) presents recommended stocking rates for the applicable soils in Meagher County, relative to good-excellent condition in the perceived “Historic Climax Plant Community”. Additionally, NRCS (2003) gives long-term irrigated and non-irrigated hay yields by soils mapping unit that can be expected under a high level of management. (Appendix H) (Westech, 2017b) summarizes information pertinent to the vegetation study area.

2.8.3 Vegetation Species List / Montana Natural Heritage Program- Listed Species

The 2015 inventory of the vegetation study area identified a total of 398 vascular plant taxa during, with forbs (278 species) comprising the majority (70%). Forbs included 235 perennial taxa (213 native, 16 introduced, and 6 fern allies), and 43 annual/biennial taxa (31 native and 12 introduced). The 82 grasses and grass-like plants identified (21% of the total plant taxa), included 78 perennial taxa (66 native and 12 introduced), and 4 annual taxa (2 native and 2 introduced). The 38 woody plant taxa (9% of the total plant taxa) recorded in the study area included 31 shrubs and vines, and 7 tree species.

No federally listed or proposed endangered or threatened plant species are known to occur in the vicinity of the Project area, and the 2015 baseline vegetation inventory recorded none. A search of the MTNHP (2015) website for plant SOC in Meagher County found that one had previously been identified in the vegetation study area, *Cirsium longistylum* (long-styled thistle).

2.8.4 Weeds

State-listed noxious weeds are given on the “Montana Noxious Weed List, Effective December, 2015” (Montana Department of Agriculture, 2015). The baseline vegetation inventory encountered four State-listed weed species (all Priority 2B), and one Priority 3 regulated plant species (*Bromus tectorum*, cheatgrass) in the study area. Noxious weeds in the vegetation study area included *Centaurea maculosa* (spotted knapweed), *Cirsium arvense* (Canada thistle), *Cynoglossum officinale* (common houndstongue) and *Leucanthemum vulgare* (oxeye daisy).

Another potentially problematic weed species recorded (but not listed as noxious), *Carduus nutans* (musk thistle), was more common than the listed noxious weed species, occurring in almost every vegetation physiognomic type present in the study area, occasionally in dense patches.

2.9 Cultural Resources

2.9.1 Cultural Resources Introduction and Methods

Prior to submitting an application to the Montana DEQ for an amendment to its Montana Exploration License in 2011, DEQ encouraged Tintina to conduct cultural resource inventories of areas targeted for mine disturbance. Even though cultural resource inventories are not required on private property, Tintina contracted Tetra Tech, Inc. (Tetra Tech) to conduct these inventories in support of Tintina’s Mine Operating Permit Application (this document). Appendix I (Tetra Tech, 2015a) presents a complete technical baseline Cultural Resource Inventory report to this Application. Previous cultural assessment data from work associated with a nearby road improvement project (Wood, 1994) and a Central Montana Communications buried cable project (Brumley, 2010 and 2011) also support the current studies.

Project archaeologists used a Trimble GeoXT to ensure they accurately followed inventory boundaries. The Trimble also recorded locations of cultural resources and Tetra Tech staff differentially corrected this data with Pathfinder Office software at the Tetra Tech office. All cultural properties identified were

recorded on Montana Cultural Resources Information (CRIS) forms. The surveyors collected no artifacts in the field.

2.9.2 Cultural Resources Inventoried and Study Area

Cultural resource inventories examined a total of 1,500 acres (607 ha) in the Project area and documented 14 prehistoric and 6 historic sites (Figure 2.27 and Table 2-29). Prehistoric sites consist of 13 lithic scatters (a surface scatter of cultural artifacts and debris that consists entirely of lithic (i.e., stone) tools and chipped stone debris). The proposed mine facilities will likely impact three lithic scatters (24ME164, 24ME165, and 24ME1109). Additionally, disturbance may occur at four lithic scatters (24ME162; 24ME1105; 24ME1107; 24ME1110), as these sites occur 25 to 65 feet (8 to 20 m) from proposed mine facilities.

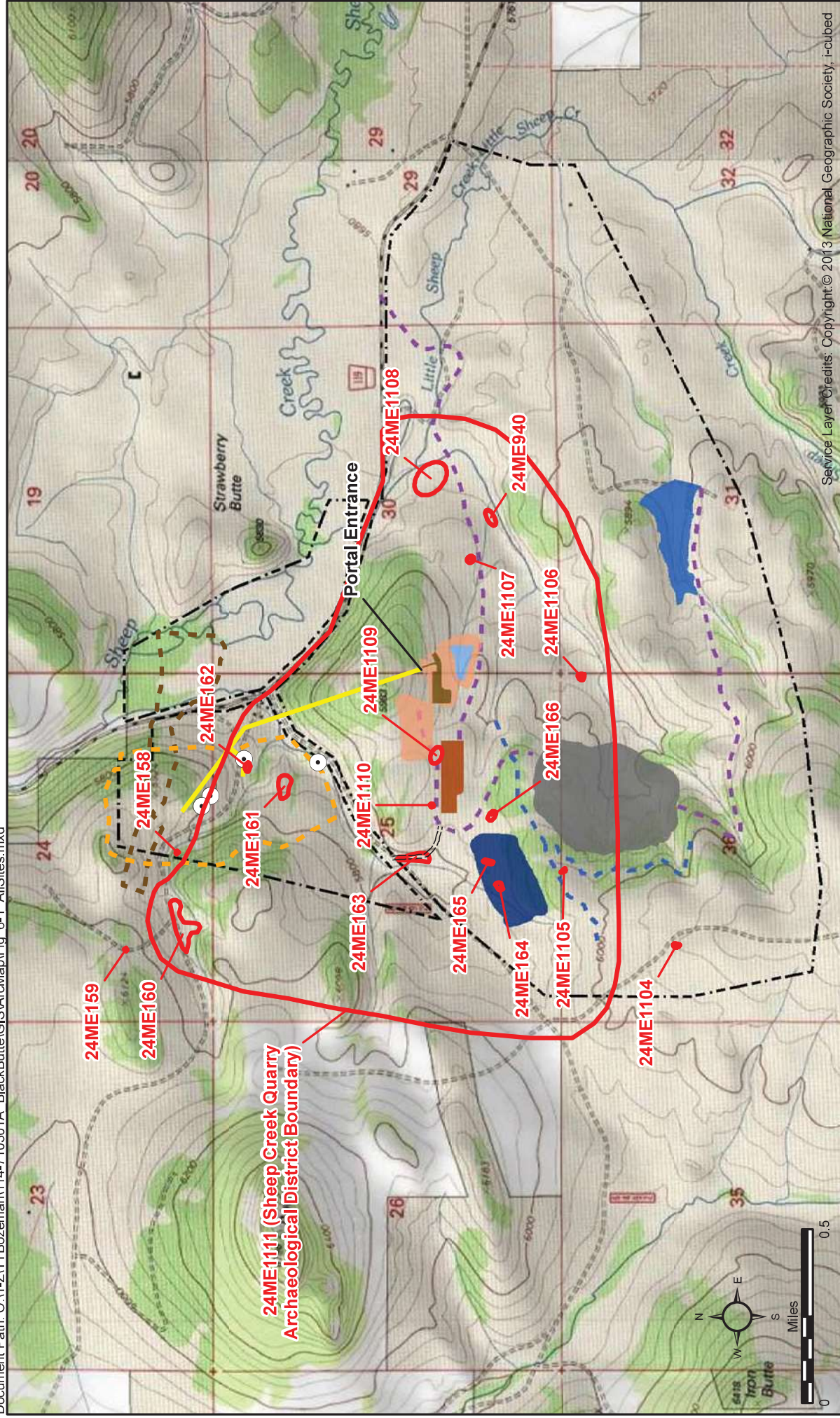
In 2012, lithic scatter at site 24ME163 was tested by archaeological excavation prior to the proposed construction of an exploration road project. This testing identified the existence of an intact, subsurface cultural deposit, and 24ME163 archaeologists recommended this site as eligible to the National Register of Historic Places (NRHP) (Tetra Tech, 2015a). However, they did not excavate or further study this site since road modification work within the site boundary consisted of laying down a layer of fill material, thus avoiding any project impacts.

In addition, one of the lithic scatters previously identified as being potentially impacted, Site 24ME1108, occurs on a terrace along Brush Creek and was bisected by the proposed mine access road. The 2015 cultural resource report recommended Site 24ME1108 be tested for National Register eligibility if access road construction would disturb this site. However, as a result of the USACE tribal consultation process and site visits, Tintina voluntarily moved the access road crossing location on Brush Creek and the nearby buried alluvial conveyance pipeline to avoid this cultural site (Addendum to Appendix I, Tetra Tech 2017). This revised crossing location slightly decreased the amount of fill within wetlands (<0.01 acres: <0.004 ha) at Brush Creek. Tintina Resources has subsequently realigned the proposed access road which now passes 100 feet south of Site 24ME1108 (see Figure 1.3 and Figure 2.27). This distance should protect the integrity of Site 24ME1108 and testing is no longer recommended as the site will be avoided by the proposed access road (Addendum to Appendix I; Tetra Tech, 2017).

Historic properties identified in the Project area include a log structure, a mining site, two roads, a homestead, and a sheepherder's rock cairn. With the exception of the sheepherder's cairn, this study recommends historic sites (24ME158, 24ME159, 24ME925, 24ME936, and 24ME940) as not eligible for NRHP listing, and recommends no further work. This study recommends the sheepherder's cairn, 24ME1104, as eligible for NRHP listing under Criterion C. This feature lies approximately ¼-mile (400 m) from the nearest proposed mine feature, suggesting avoidance of this cairn is possible. SHPO response letters are included at the end of Appendix I.

2.9.3 Cultural Resource Recommendations

Mining construction should avoid any site determined NHRP eligible, or if this is not possible, site impacts should be mitigated through archaeological excavation and the recovery of cultural material that will broaden the understanding of prehistoric lifeways along Sheep Creek. (Figure 2.27) shows the locations of the cultural resources in relation to the proposed facility construction areas. Tintina has indicated some mine features may be moved to avoid cultural sites. If avoidance is not possible, sites not previously tested, should receive evaluation for NRHP eligibility, and if recommended eligible, impacts should be mitigated through archaeological excavation and recovery of cultural material. To date, only sites 24ME163 and 24ME1104 were tested and found NRHP eligible.



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Legend

- Vent Raise
- Mine Access Road
- Proposed Mine Diversion Channel
- Proposed Mine Access/Service Road
- Proposed Adit
- Cultural Resource
- Johnny Lee Lower Zone of Copper
- Johnny Lee Upper Zone of Copper
- Mine Permit Boundary
- Cemented Tailings Facility
- Contact Water Pond
- Mill Pad
- Non-Contact Water Reservoir
- Portal Pad
- Process Water Pond
- Temporary Waste Rock Storage

Figure 2.27
Cultural Resources in the
Black Butte Mine Area
Tintina Resources, Inc.
Meagher County, Montana

Table 2-29. Cultural Resources in the Black Butte Copper Project Area

Site Number	Site Type	Possible Mine Feature/Facility Disturbance	NRHP Recommendations
24ME158	Historic Log Structure	None	Not eligible under Criteria A-D.
24ME159	Historic Mining	None	Not eligible under Criteria A-D.
24ME160	Lithic Scatter	None	Archaeological testing to determine eligibility under Criterion D.
24ME161	Lithic Scatter	None	Archaeological testing to determine eligibility for Criterion D.
24ME162	Lithic Scatter	A vent raise (16-ft. in diameter) is planned for the vicinity of 24ME162. Site avoidance is possible.	Archaeological testing to determine eligibility under Criterion D.
24ME163	Lithic Scatter	No mine features are proposed to date. If this changes, 24ME163 needs to be avoided or mitigated.	Site tested and recommended eligible to the NRHP.
24ME164	Lithic Scatter	Located within the Process Water Pond boundary.	Archaeological testing to determine eligibility/ Criterion D.
24ME165	Lithic Scatter	Located within the Process Water Pond boundary.	Archaeological testing to determine eligibility/ Criterion D.
24ME166	Lithic Scatter	None; site occurs 50 meters (164 ft.) from Access Road and 75 meters (246 ft.) from Process Water Pond boundary.	Archaeological testing to determine eligibility under Criterion D.
24ME925	Historic Road- Sheep Creek	None	Not eligible under Criteria A-D.
24ME936	Historic Road- Butte Creek	None	Not eligible under Criteria A-D.
24ME940	Historic Homestead	None	Not eligible under Criteria A-D.
24ME1104	Historic Shepherd's Cairn	None; Diversion Channel and Cemented tailings Facility approximately ¼ mile to the east.	Eligible under Criterion C.
24ME1105	Lithic Scatter	Disturbance is possible as 24ME1105 lies 20 meters (66 feet) from the Process Water Pond Diversion channel. Tintina may relocate channel to avoid this site.	Archaeological testing to determine eligibility under Criterion D.
24ME1106	Lithic Scatter	None; 300 meters (984 ft.) from Cemented tailings Facility.	Archaeological testing to determine eligibility under Criterion D.

Site Number	Site Type	Possible Mine Feature/Facility Disturbance	NRHP Recommendations
24ME1107	Lithic Scatter	Disturbance is possible as Main Access Road lies 10 meters south of 24ME1107. Tintina may alter road alignment to avoid this site.	Archaeological testing to determine eligibility under Criterion D.
24ME1108	Lithic Scatter	Main Access Road moved to avoid 24ME1108.	Archaeological testing to determine eligibility under Criterion D.
24ME1109	Lithic Scatter	An Access Road bisects this site. Additionally, the Mill Pad and Temporary Storage of Waste Rock will likely disturb 24ME1109.	Archaeological testing to determine eligibility under Criterion D.
24ME1110	Lithic Scatter	Disturbance is likely as Access Road occurs eight meters (26.3 ft.) south of 24ME1110.	Archaeological testing to determine eligibility under Criterion D.
24ME1111	Sheep Creek Surface Stone District	District area will be disturbed with construction of the Adit, Mill Pad, Temporary Waste Rock Storage, Portal Pad, Ventilation Raises, Cemented tailings Facility, Contact Water Pond, Process Water Pond, and Access Roads.	Presence of intact, subsurface cultural deposit at 24ME163 suggests NRHP eligibility under Criterion D.