3.14. WETLANDS

This section addresses the affected environment and potential impacts to wetland resources within the Project area, which includes the proposed MOP Application Boundary.

3.14.1. Analysis Methods

3.14.1.1. Analysis Area

The outermost perimeters of the lands leased for the Project are known collectively as the "Project leased area" and encompass 7,684 acres (Tintina 2017). The analysis area for the wetland and waterbody baseline surveys (i.e., wetland analysis area) includes the resources located within the Project leased area (**Figure 3.14-1**).

3.14.1.2. Information Sources for Wetlands

The baseline wetland and waterbody surveys were conducted by WESTECH in August and September 2014, and were summarized in the "Baseline Wetland Delineation and Waterbody Survey" report (WESTECH 2015a) as included as Appendix C-1 of the MOP Application (Tintina 2017). The wetlands within the wetland analysis area were delineated using the methods described in the 1987 USACE Wetland Delineation Manual (USACE 1987).

The baseline survey report summarized the existing wetland and waterbody resources located within the wetland analysis area and informed the MOP Application (Tintina 2017), the USACE Section 404 Permit Application, and the associated Jurisdictional Determination (JD) Report (USACE 2017).

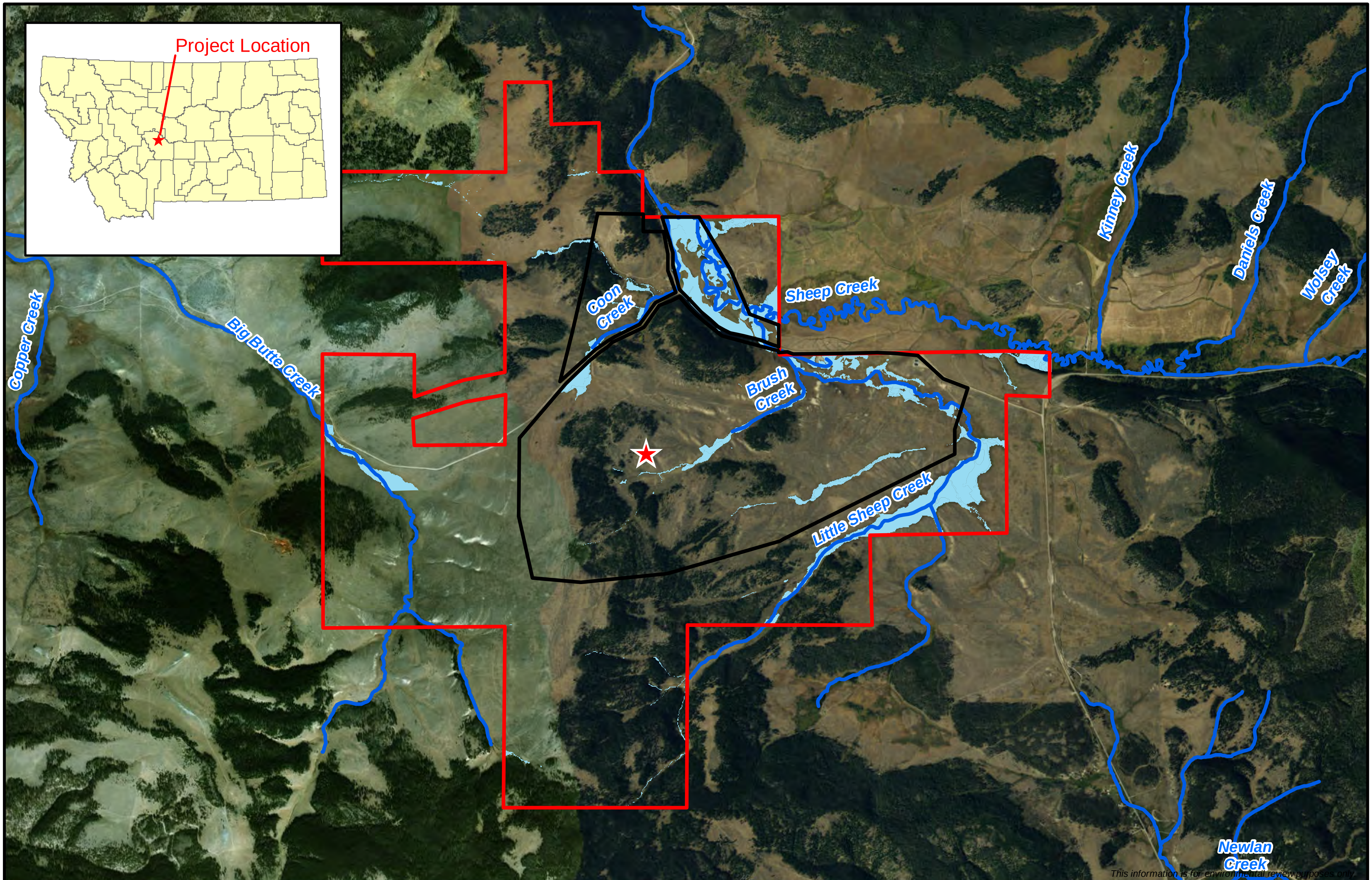
The Project wetlands that were surveyed and delineated by WESTECH in 2014 were evaluated for wetland function and values pursuant with methods developed by Montana DOT and DEQ (MDT 2008). The Project wetland functions assessment was summarized in 2015 by WESTECH in the "Functional Assessment Report" (WESTECH 2015b) and included as Appendix C-2 of the MOP Application (Tintina 2017).

The following sections analyze the wetland resources within the wetland analysis area; however, the associated surface water features, also summarized in the above-referenced documents, are discussed in Section 3.5, Surface Water Hydrology.

3.14.2. Affected Environment

3.14.2.1. Wetlands

The 2014 wetland and waterbody baseline survey identified 328.8 acres of wetlands within the wetland analysis area (**Figure 3.14-1**). The largest wetlands and wetland complexes were associated with the herbaceous meadows and shrub wetlands within the riparian areas surrounding Sheep Creek and Little Sheep Creek (WESTECH 2015a). Smaller, and sometimes isolated wetlands, were associated with the headwaters of the wetland analysis area wetlands and waterbodies.



Project Location
Wetland Analysis Area
Project Area
Perennial NHD Stream
Surveyed Wetlands

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Figure 3.14-1
Black Butte Copper Project
Surveyed Wetlands
Meagher County, Montana

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The hydrology for most of the Project wetlands is groundwater-driven. Drainage features and/or streams within the vicinity of most wetlands are present, but their water sources appear to be springs and likely are not primarily dependent on precipitation or snowmelt (WESTECH 2015a).

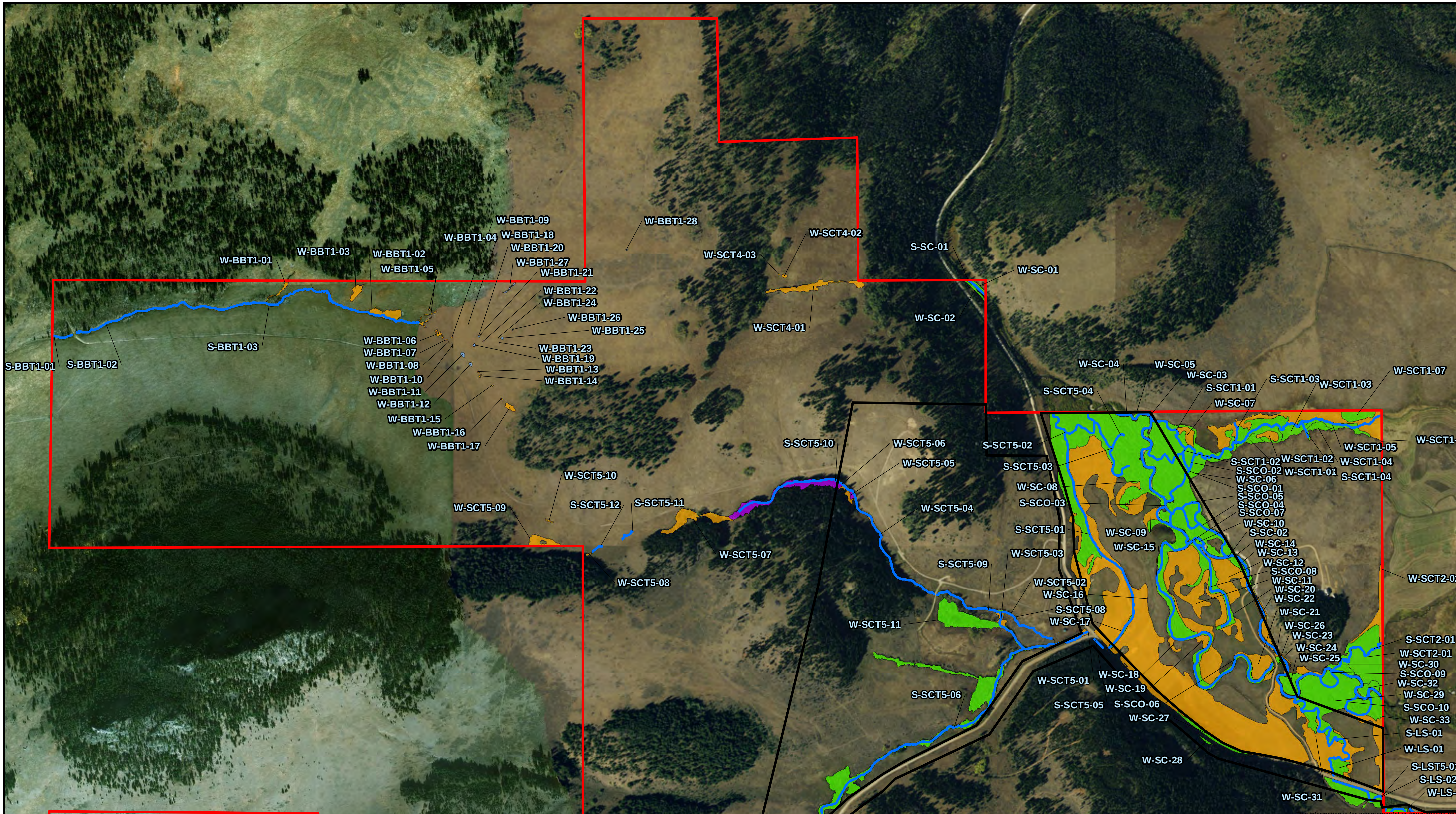
The wetland acreage and classifications for wetlands within the wetland analysis area are summarized in **Table 3.14-1**. The wetlands observed during the surveys are shown on **Figures 3.14-2** through **3.14-5**.

Approximately half of the Project wetlands exhibit scrub-shrub characteristics, with various willow species or shrubby cinquefoil as the dominant vegetation. Most other Project wetlands exhibit emergent wetland features with sedges or grasses dominating the herbaceous vegetative stratum. One small palustrine forested wetland is dominated by Engelmann spruce. Three of the wetlands contain fen-like characteristics and are of high quality compared to the other Project wetlands (WESTECH 2015a). Fens are uncommon, but widely distributed in western Montana, and are generally described as exhibiting alkaline, waterlogged substrates that promote the accumulation of peat (DEQ 2017).

Table 3.14-1
Wetland Acreage by Cowardin Classification and Watershed

Project Watershed	Cowardin Classification [a]					Total Area by Watershed (acres)
	Palustrine Emergent	Palustrine Scrub-Shrub (willow dominant)	Palustrine Scrub-Shrub (shrubby cinquefoil dominant)	Palustrine Forested	Palustrine Unconsolidated Bottom	
Black Butte Creek	10.7	7.9	1.6	0.0	0.0	20.2
Black Butte Creek Tributaries	2.8	0.2	0.0	0.0	0.1	3.1
Little Sheep Creek	51.0	5.2	63.0	0.0	0.1	119.2
Little Sheep Creek Tributaries	24.6	7.4	8.9	0.0	0.4	41.2
Sheep Creek	52.8	53.9	0.0	0.0	0.0	106.6
Sheep Creek Tributaries	10.7	16.4	9.5	1.9	0.0	38.5
Total	**152.6**	**90.8**[b]	**82.8**[b]	**1.9**	**0.6**	**328.8**

Notes:
[a] See Cowardin 1979 for classification descriptions. Palustrine forested have a dominant tree stratum, palustrine scrub-shrub have a dominant shrub stratum, palustrine emergent have a dominant herbaceous vegetative stratum, and palustrine unconsolidated bottom have limited vegetation and substrate is dominated by mud and/or silt.
[b] Acreage total is more than reported due to rounding.



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Feet

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N

- Stream
- Wetland Analysis Area
- Project Area
- Palustrine Emergent
- Palustrine Forested
- Palustrine Scrub-Shrub
- Palustrine Unconsolidated Bottom

Figure 3.14-2
Black Butte Copper Project
Surveyed Wetland Classifications Area 1
Meagher County, Montana

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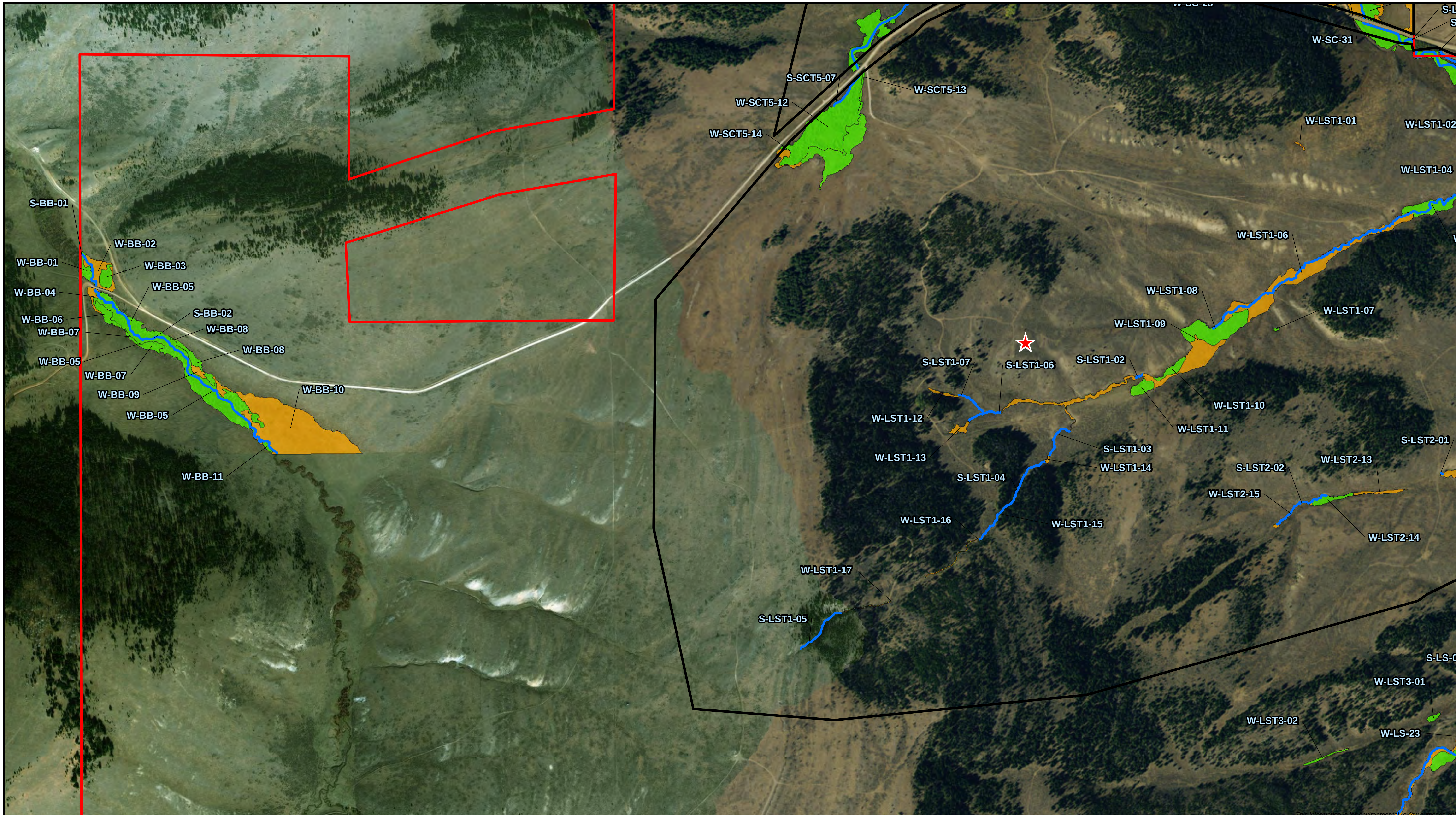

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Stream

Wetland Analysis Area

Project Area

Palustrine Emergent

Palustrine Scrub-Shrub

Figure 3.14-3

Black Butte Copper Project

Surveyed Wetland Classifications Area 2

Meagher County, Montana

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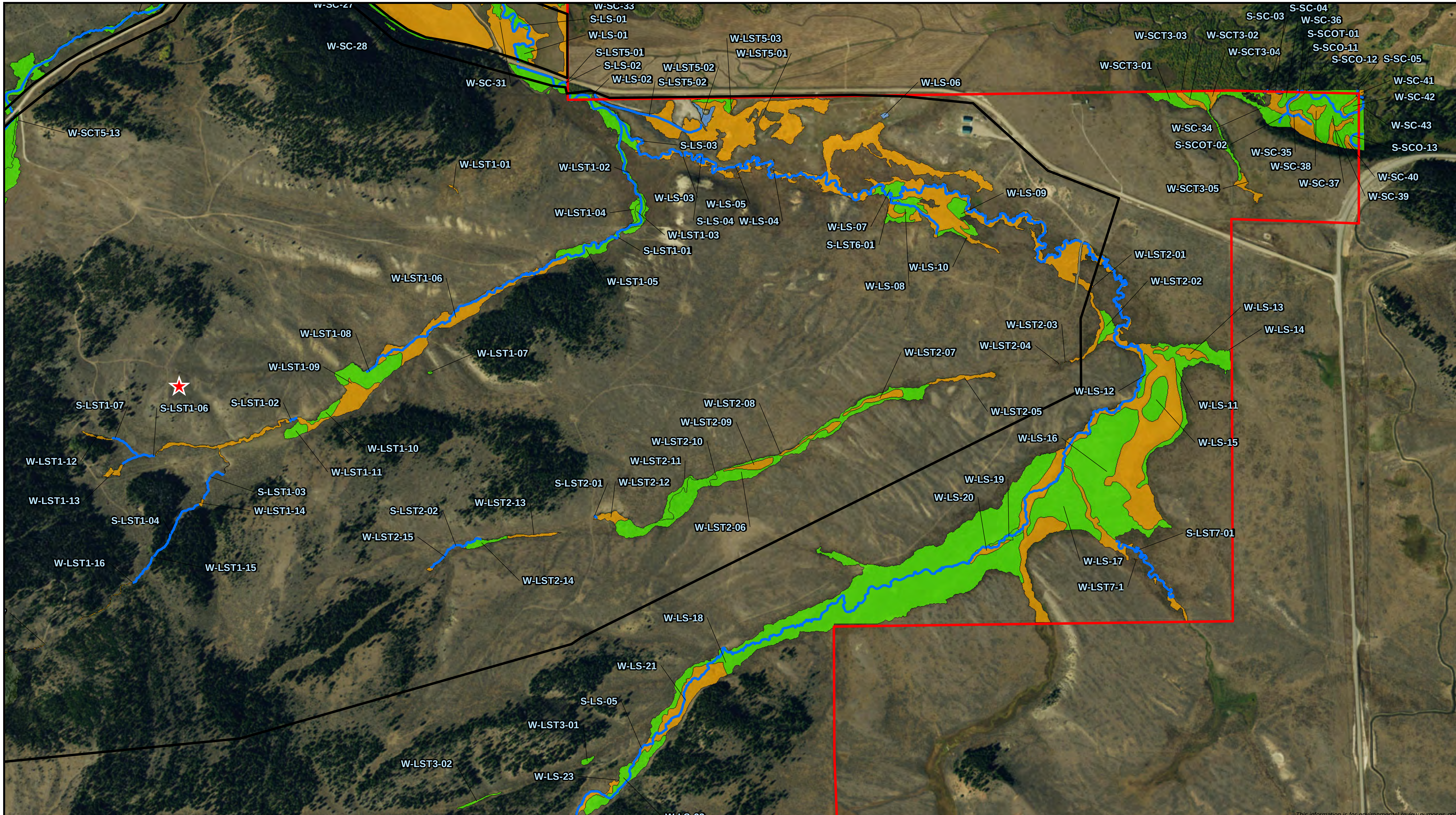

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Feet

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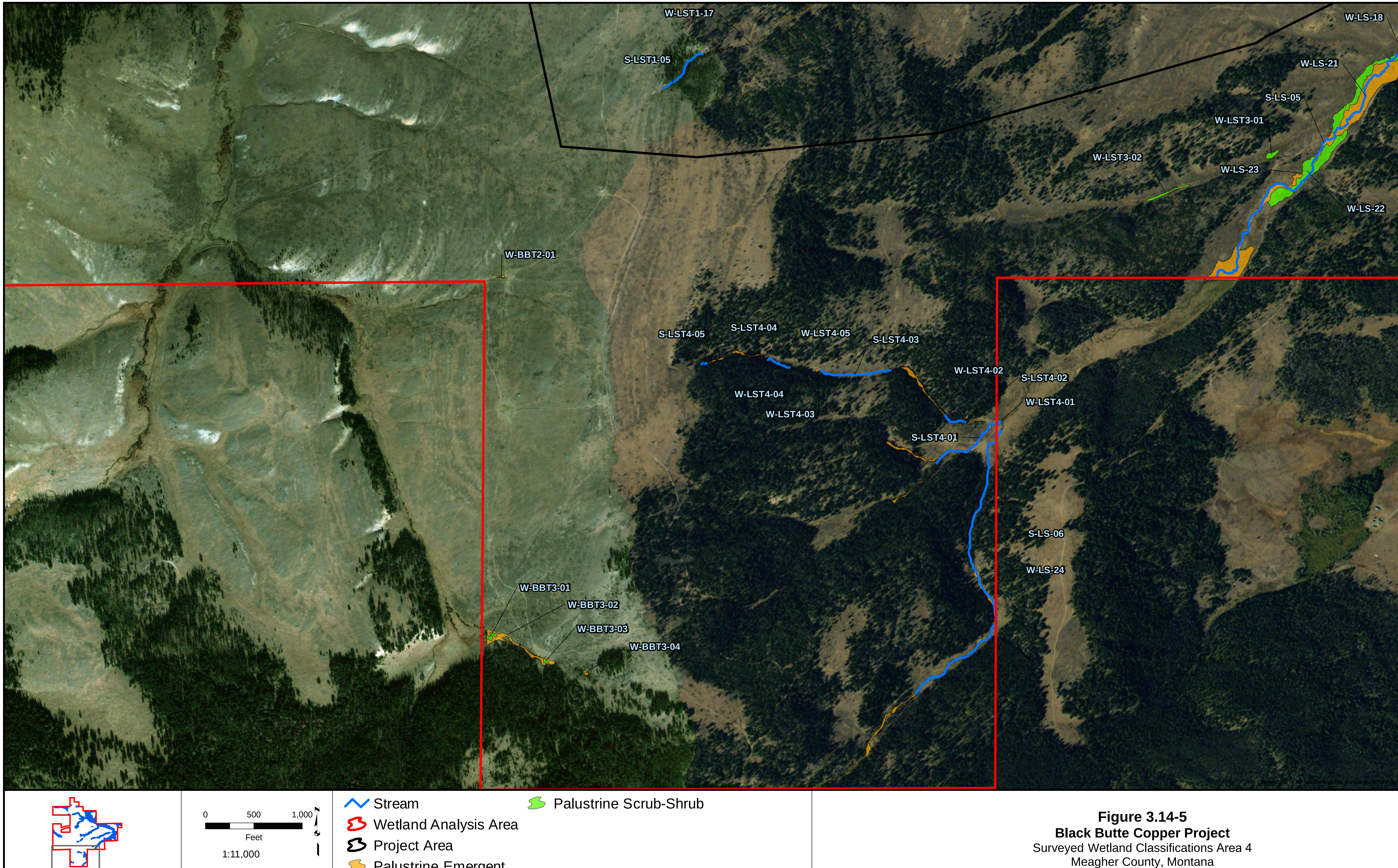
- Stream
- Wetland Analysis Area
- Project Area
- Palustrine Emergent
- Palustrine Scrub-Shrub
- Palustrine Unconsolidated Bottom

Figure 3.14-4
Black Butte Copper Project
Surveyed Wetland Classifications Area 3
Meagher County, Montana



Stream

Wetland Analysis Area

Project Area

Palustrine Emergent

Palustrine Scrub-Shrub

Figure 3.14-5
Black Butte Copper Project
Surveyed Wetland Classifications Area 4
Meagher County, Montana

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3.14.2.2. Wetland Functional Assessment

Wetlands can serve many functions, including groundwater recharge/discharge, flood storage and alteration/attenuation, nutrient and sediment removal/transformation, toxicant retention, fish and wildlife habitat, wildlife diversity/abundance for breeding migration and wintering, shoreline stabilization, production export, aquatic diversity/abundance, vegetative diversity/integrity, and support of recreational activities. Montana uses the Montana DOT Montana Wetland Assessment Method (MDT 2008) to evaluate wetland function. The U.S. Environmental Protection Agency determined it to be one of the seven best rating systems in the country to use as a model for development of functional assessment methods (WESTECH 2015b). The functional assessment categories include Category I, II, III, and IV:

- Category I wetlands are high quality wetlands and are generally uncommon and provide potential habitat for listed species.
- Category II wetlands are more common than Category I, provide potential habitat for listed species or high quality fish or wildlife habitat, and have high values for wetland functions.
- Category III wetlands are more common than Category I and II and are less diverse than Category II wetlands.
- Category IV wetlands are generally small or isolated wetlands that lack diversity and provide little wildlife habitat (WESTECH 2015b).

During the 2014 surveys conducted for the wetland analysis area by WESTECH, the primary wetland functions were rated using the Montana Wetland Assessment Method rating system and the wetland function was evaluated based on a review of the following:

- Habitat for federally listed or proposed threatened or endangered species;
- Habitat for Montana Natural Heritage Program S1, S2, or S3 SOC;
- General wildlife habitat;
- General fish habitat;
- Flood attenuation;
- Surface water storage;
- Sediment/nutrient/toxicant retention/removal;
- Sediment/shoreline stabilization;
- Production export/terrestrial and aquatic food chain support;
- Groundwater discharge/recharge;
- Uniqueness; and
- Recreation/education potential.

WESTECH divided the wetland analysis area into multiple assessment areas, delineated by drainage basins, hydrologic connectivity, proximity to other wetlands, and type of wetland to evaluate each of the above functional characteristics.

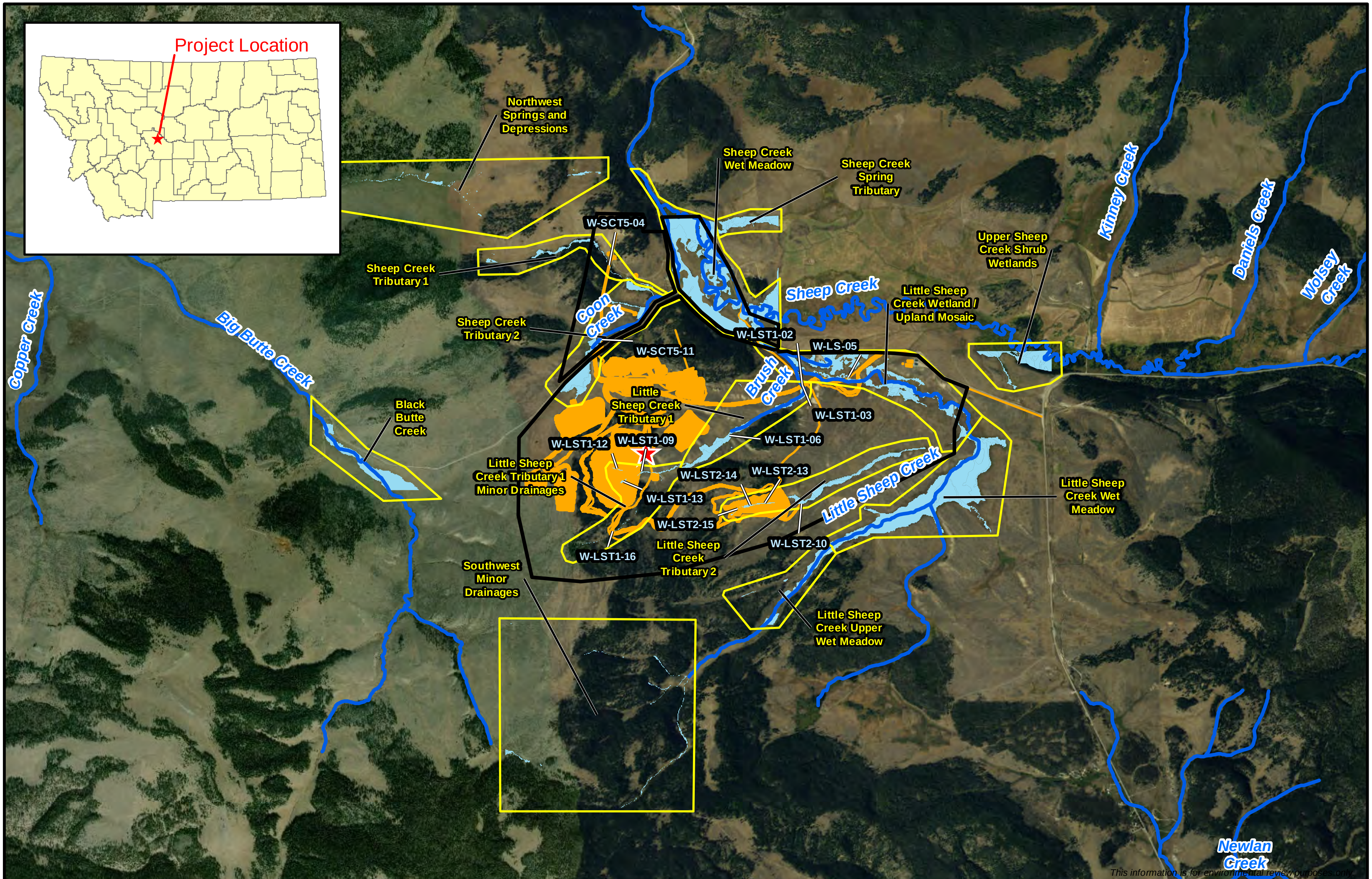
The results of the functional assessment are summarized in **Table 3.14-2** and indicate that 14 assessment areas are rated as Category I, II, or III. The associated area locations are shown on **Figure 3.14-6**. The Little Sheep Creek Wet Meadow and the Sheep Creek Spring Tributary assessment areas are rated as Category I, primarily because of the fen features located within these assessment areas. The six Category II assessment areas are rated as Category II rather than Category I because of the lack of fen features within these wetlands. The six Category III assessment areas are rated in this category primarily due to their decreased function compared to the other categories, which lowered their rating.

Table 3.14-2
Black Butte Project Wetland Rating by Assessment Areas

Assessment Area	Category Rating
Black Butte Creek Wetlands	II
Little Sheep Creek Wet Meadow	I
Little Sheep Creek Upper Wet Meadow	II
Little Sheep Creek Wetland/Upland Mosaic	II
Little Sheep Creek Tributary 1	II
Little Sheep Creek Tributary 1 Minor Drainages	III
Little Sheep Creek Tributary 2	III
Sheep Creek Wet Meadow	II
Sheep Creek Tributary 1	III
Sheep Creek Tributary 2	III
Sheep Creek Spring Tributary	I
Upper Sheep Creek Shrub Wetlands	II
Northwest Springs and Depressions	III
Southwest Minor Drainages	III

3.14.2.3. Jurisdictional Determination

The Proponent requested an Approved JD from the USACE as part of the Section 404 permitting process. The October 3, 2017 Approved JD determined that most of the wetlands delineated within the analysis area were jurisdictional (a total of 327.4 acres) and, therefore, would require authorization via Section 404 of the Clean Water Act for any proposed dredge or fill impacts to these wetlands. The Approved JD also determined that the small, isolated wetlands W-LST3-02, W-LST3-01, W-BBT2-01, W-SCT4-01, W-BBT1-28, and W-LST-01, which totaled approximately 1.3 acres, were not jurisdictional and, therefore, would not require Section 404 permit authorization to impact these wetland features (USACE 2017).



Project Location
Perennial NHD Stream
Project Area
Surveyed Wetlands
Wetland Functional Assessment Areas
Facilities Footprint

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Figure 3.14-6
Black Butte Copper Project
Impacted Wetlands
Meagher County, Montana

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3.14.2.4. Wetland Hydrology

The wetlands delineated within the analysis area exhibit hydrology that is primarily groundwater-dependent. Few, if any, of these wetlands are dependent on precipitation or stream flow. The wetland areas within the Little Sheep Creek, Black Butte Creek, and Sheep Creek riparian areas encompass too large of a surface area to exhibit wetland hydrology that is dependent on stream flow (WESTECH 2015a).

Hydrologic modeling was completed for the analysis area. The modeling used available regional data, groundwater monitoring wells, and piezometers to surmise that groundwater generally flows eastward, across the analysis area, toward the Little Sheep Creek and Sheep Creek surface waterbodies, and that groundwater generally discharges from the riparian wetland features, from the alluvial groundwater system, and to the surrounding Project site tributaries (Tintina 2017).

3.14.3. Environmental Consequences

3.14.3.1. No Action Alternative

The No Action Alternative would not change the existing landscape or groundwater flow and therefore, would not disturb or affect the wetlands.

3.14.3.2. Proposed Action

This section describes the potential environmental consequences of the Project to wetland resources, including the potential direct and secondary impacts. This section also describes actions that would be taken to avoid or mitigate wetland impacts, proposed wetland mitigation options, and wetland monitoring plans. The potential environmental consequences for the Project-associated streams and drainage features are included in Section 3.5.3.

Direct Impacts

Surface Fill and Dredge

The area of analysis for the direct impacts includes the area where the mining infrastructure would be installed, which is within the Project area (i.e., the MOP Application Boundary of approximately 1,888 acres). A geographic information system analysis of the areas that would be directly disturbed by mining infrastructure and operations identified potential direct wetland impacts from the Project Proposed Action. Potential impacts include construction of the access and/or service roads, the cement tailings facility, and the wet well proposed to be constructed for diverting and piping Sheep Creek spring runoff water.

Filling or excavation of wetlands would result in permanent direct impacts to wetlands. The wetland impact analysis identifies wetland type (according to the Cowardin Classification system), total acres of direct impact, percent of analysis area, and the wetland name to be affected by the Project.

Installation of the cement tailings facility, the wet well for the Sheep Creek water diversion, and associated mine facility access and service roads would result in approximately 0.85 acre of permanently impacted wetlands from fill and dredging activities. **Table 3.14-3** summarizes, by wetland community type, the directly impacted wetlands. **Figures 3.14-7** through **3.14-10** provide the locations of the wetland impacts.

Table 3.14-3
Total Projected Wetland Impacts at the Black Butte Copper Mine Site

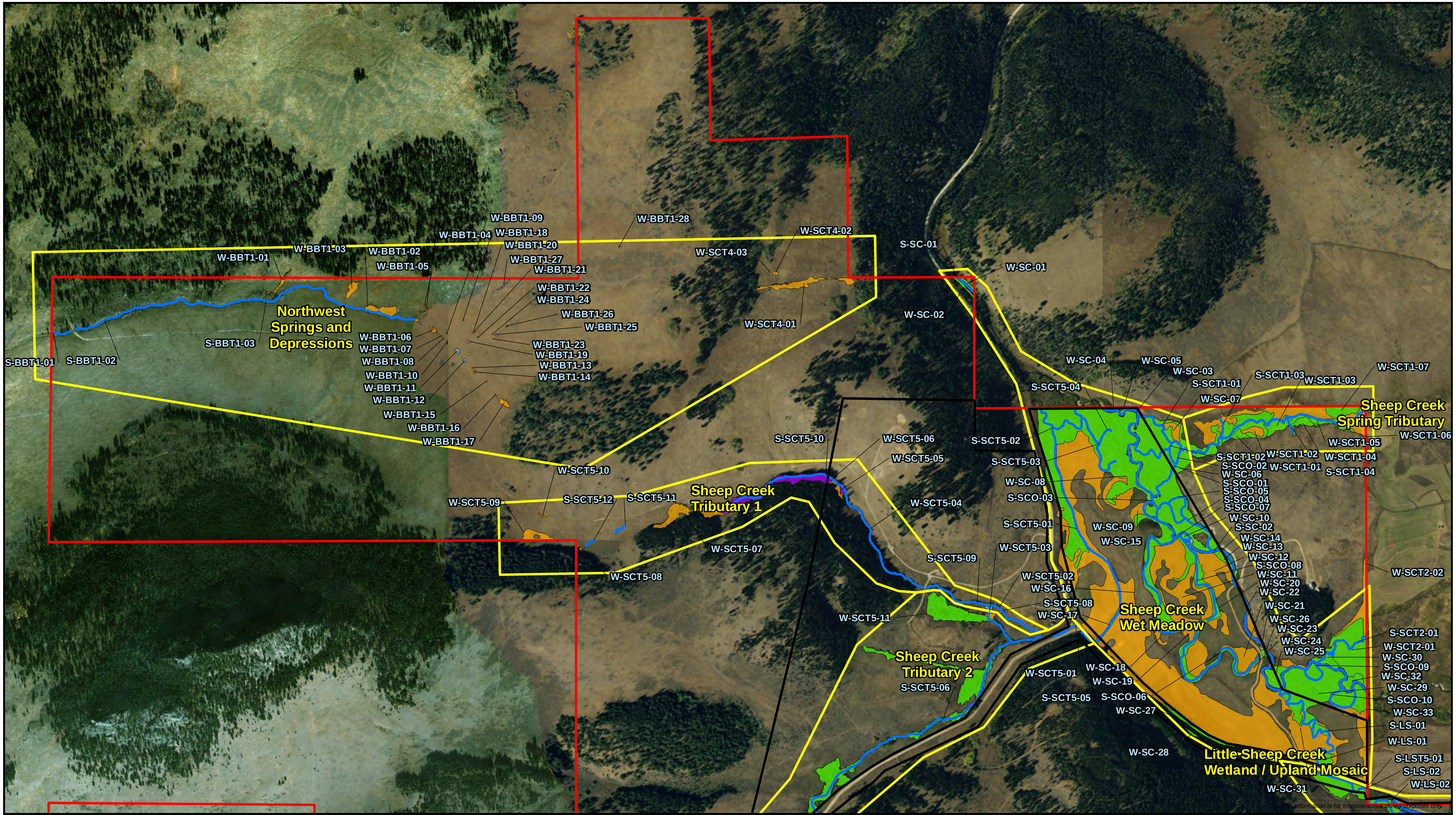
		Directly Impacted Wetlands		
Wetland Community Type [a, c]	**Project Facility**	**Acres**	**Percent of Analysis Area [b]**	**Wetland ID**
PSS6B	Access road	0.03	<1	W-LST1-02
PSS1B	Access road	0.03	<1	W-LST1-03
PEM1E	Access road	0.06	<1	W-LS-05
PEM1B	Cement Tailings Facility	0.27	<1	W-LST1-13
PEM1B	Cement Tailings Facility	0.16	<1	W-LST1-12
PEM1B	Cement Tailings Facility	0.29	<1	W-LST1-09
PEM1A	Service road	0.01	<1	W-LST1-16
PSS1E	Wet well	<0.001	<1	W-SC-31
Total		**0.85**	**<1**	

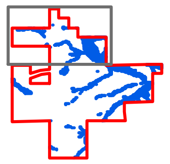
Notes:
[a] Cowardin 1979
[b] Wetland analysis area wetlands totaled 327.4 acres (Tintina 2017).
[c] PSS wetlands are palustrine scrub-shrub wetlands, PEM wetlands are palustrine emergent, herbaceous wetlands.

In addition to the direct permanent impacts to the specific wetlands listed in **Table 3.14-3**, permanent impacts to functional assessment areas would occur. The majority of direct impacts to wetland functional assessment areas, totaling 0.7 acre of PEM wetlands, would occur within the Little Sheep Tributary Minor Drainages Class II AA. The remaining 0.2 acre of direct wetland impacts occur in Little Sheep Creek Tributary 1, Brush Creek, Little Sheep Creek Wetland/Upland Mosaic, and Sheep Creek Wet Meadow. Each is classified as a Category II assessment area.

<u>Regulatory Setting</u>

Discharges of dredged or fill material into water of the United States or jurisdictional wetlands are regulated by statute under both the USACE 404 and DEQ 401 Water Quality Certification permitting processes. Impacts to jurisdictional wetlands would require both a USACE 404 and DEQ 401 Water Quality Certification permit prior to Project initiation. The Proponent submitted permit applications for both and received authorization in January 2017 through the federal and state regulatory process via the USACE 404 Permit NOW-2013-01385-MTH and DEQ 401 Permit MT4011018, respectively. An amended DEQ 401 Water Quality Certification was received on July 3, 2019, to include the additional 200 square feet of temporary wetland disturbance associated with the Sheep Creek water intake construction.





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- Stream
- Wetland Analysis Area
- Project Area
- Wetland Functional Assessment Area
- Palustrine Emergent
- Palustrine Forested
- Palustrine Scrub-Shrub
- Palustrine Unconsolidated Bottom

Figure 3.14-7
Black Butte Copper Project
Wetlands Functional Assessment Area 1
Meagher County, Montana

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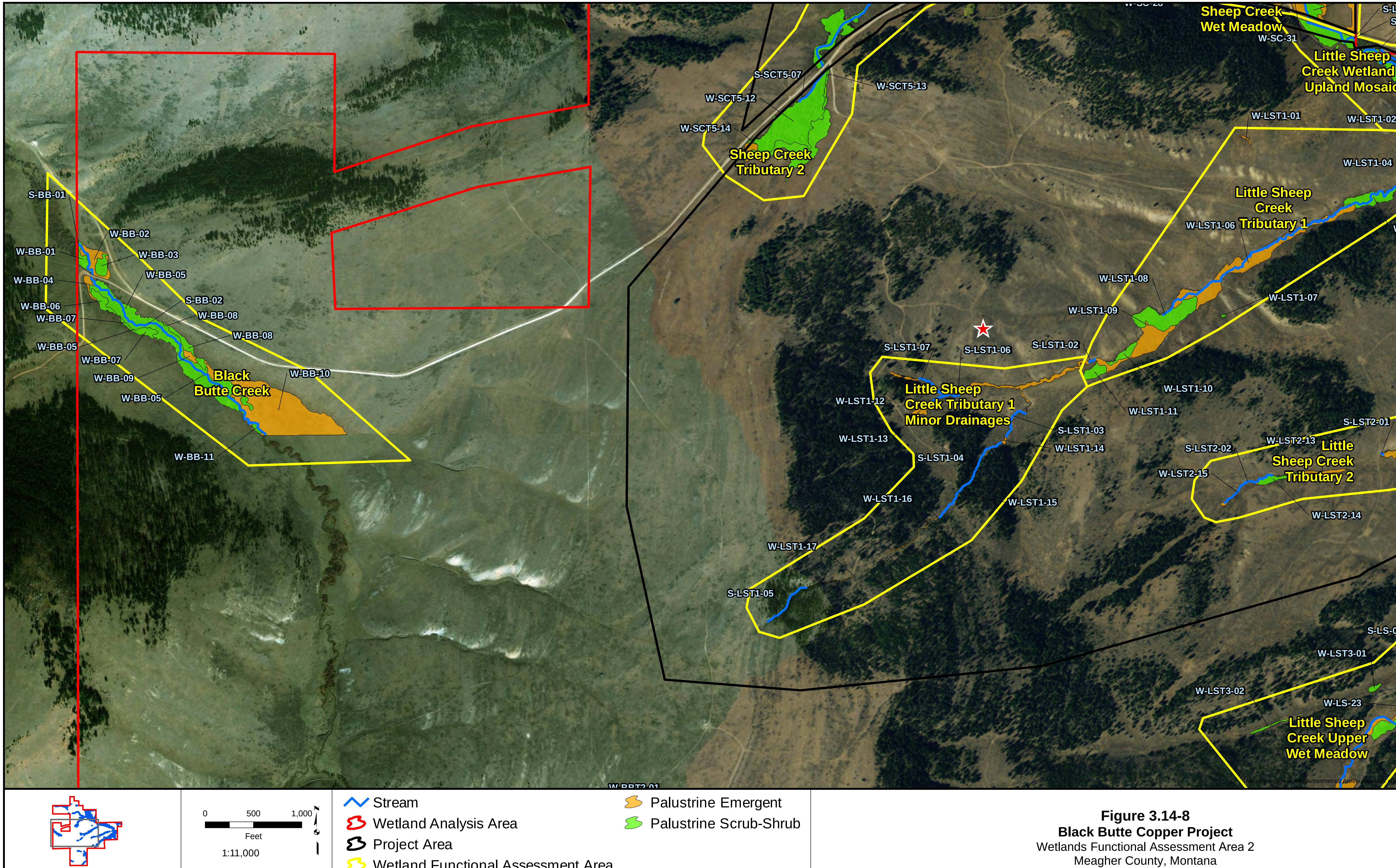

Figure 3.14-8
Black Butte Copper Project
Wetlands Functional Assessment Area 2
Meagher County, Montana

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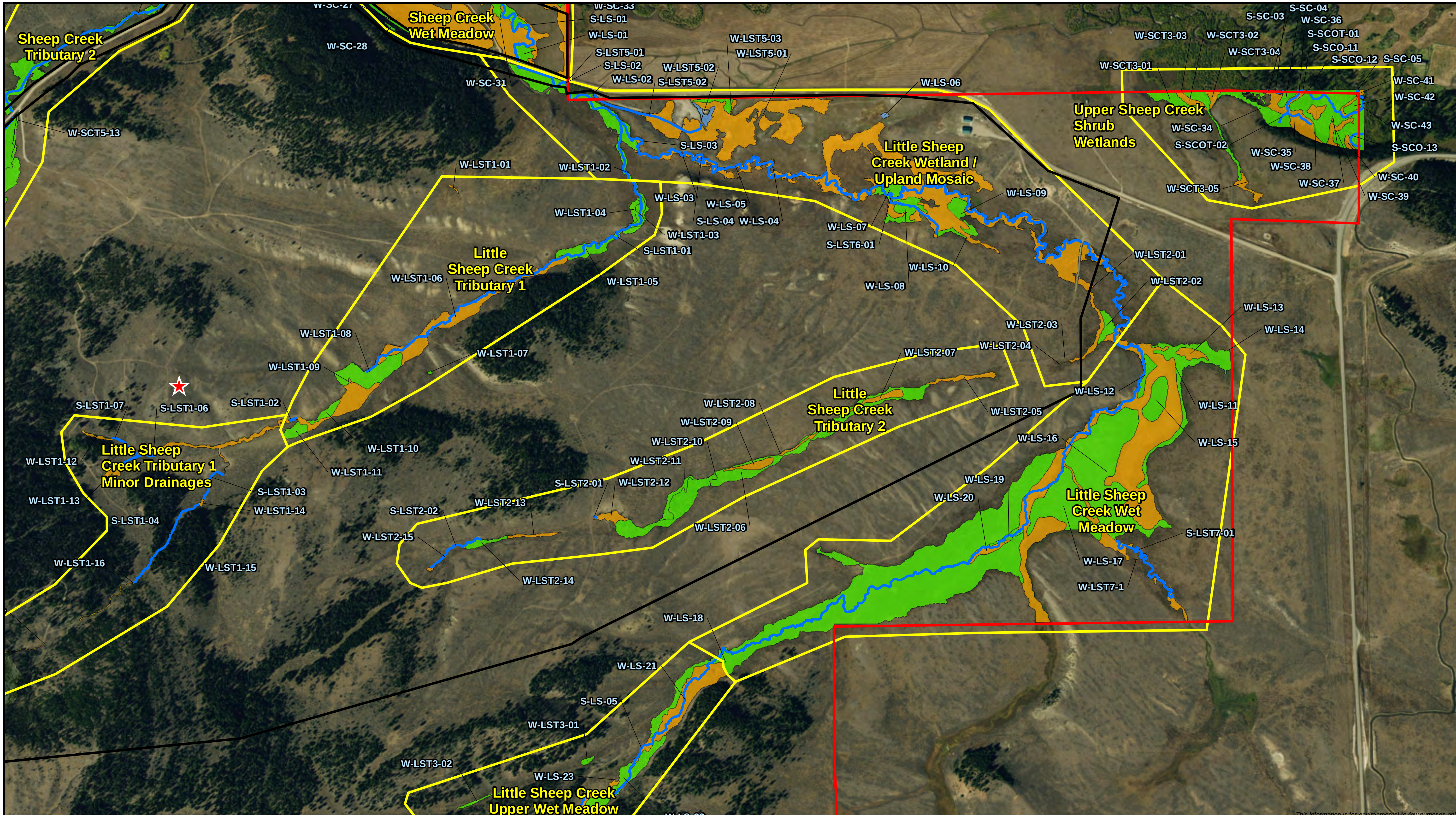

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Feet

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- Stream
- Wetland Analysis Area
- Project Area
- Wetland Functional Assessment Area
- Palustrine Emergent
- Palustrine Scrub-Shrub
- Palustrine Unconsolidated Bottom

Figure 3.14-9
Black Butte Copper Project
Wetlands Functional Assessment Area 3
Meagher County, Montana

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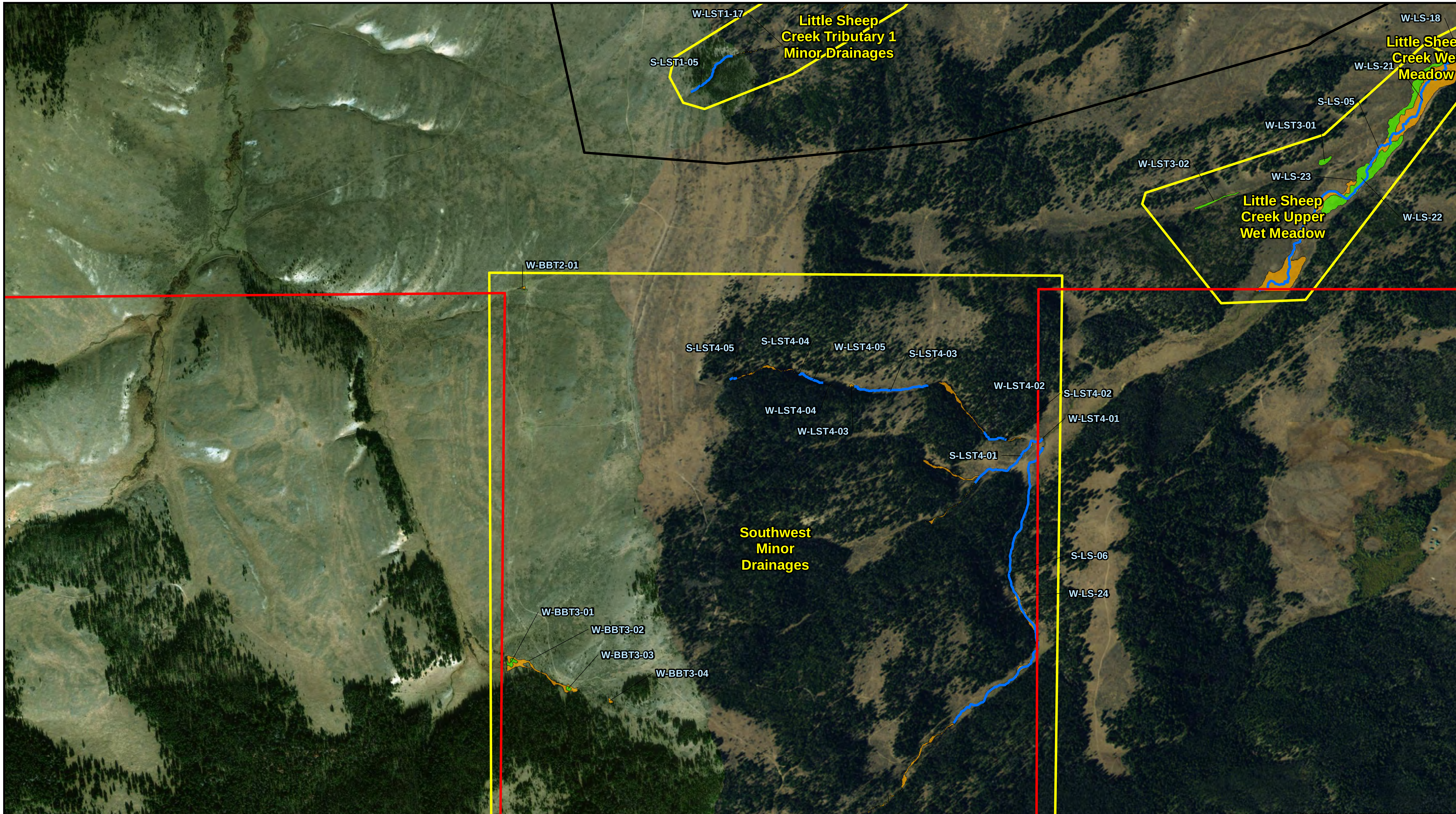

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Feet
1:11,000

- Stream
- Wetland Analysis Area
- Project Area
- Wetland Functional Assessment Area
- Palustrine Emergent
- Palustrine Scrub-Shrub

Figure 3.14-10
Black Butte Copper Project
Wetlands Functional Assessment Area 4
Meagher County, Montana

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Mitigation

To compensate for the 0.85 acre of direct wetland impacts and functional assessment areas, the Proponent would be required to purchase 1.3 acres of wetland mitigation credits from an approved wetland mitigation bank or In-Lieu Fee (ILF) program. If an ILF is not a viable option for mitigation, then the Proponent would be required to address compensatory mitigation requirements through a permittee-responsible mitigation to the satisfaction of the USACE.

Further avoidance of direct impacts to wetlands would be minimized by assuring that all Project wetlands are marked prior to construction proximal to all proposed construction areas (Tintina 2017). Based upon these factors, the direct impacts to wetlands from the Proposed Action would be reduced with the use of appropriate mitigation measures.

Secondary Impacts

Multiple factors could affect whether a wetland would experience secondary impacts from the Proposed Action. This section assesses the potential secondary wetland impacts from the Proposed Action that may result from one of the following six factors: (1) wetland fragmentation; (2) changes to watershed and surface flow; (3) changes in groundwater hydrology from mine operations; and (4) changes in wetland water quality related to atmospheric deposition of dust or changes in groundwater associated with the Project operations. The potential secondary impacts are discussed, below.

Wetland Fragmentation

A wetland may be fragmented as the result of direct impacts that split a wetland resource area into multiple parts. These fragmented parts could be isolated from other wetlands and therefore would no longer have the same adjacent upland watershed area. This would result in the loss of wetland function. While a wetland may be fragmented by direct impacts, this does not necessarily mean the remaining fragmented part of the wetland resource area would be affected. Criteria used to evaluate secondary impacts caused by fragmentation include primarily the size of the direct impacts. Due to the small size of the Project direct impacts, measurable secondary impacts from wetland fragmentation associated with the Project mining operations would be negligible.

Furthermore, there would likely be no measurable secondary impacts to wetland functions associated with the functional assessment areas described above due to the small size of wetland surface area fragmentations resulting from the Project. Based upon these factors, the secondary impacts to wetlands due to fragmentation would be diminutive.

Changes to Watershed and Surface Flow

Surface water flow is not a factor for evaluating wetland impacts in the wetland analysis area because the wetlands' primary source of hydrology is groundwater. Therefore, secondary impacts to wetlands from watershed or surface water changes are not likely. However, if secondary impacts from changes in surface water flow were present, these would be negligible due to the designed surface water and groundwater mitigation proposed in the MOP Application.

The Project design plans during post-closure would return any surface water flow changes back to the pre-Project conditions.

Changes in Groundwater Hydrology

The majority of the analysis area wetlands are groundwater-dependent (WESTECH 2015a). If left unmitigated, and no perched water table is present, lowering groundwater elevations for Project operations could result in a reduction of the primary water source for these wetlands. Section 3.4, Groundwater Hydrology, indicates that groundwater is generally in direct contact with the alluvial system under the wetlands and that there is a general upward movement of groundwater to the alluvial system, to the seeps within the wetland analysis area, and to the riparian wetlands adjacent to the wetland analysis area surface water features. Section 3.4 also describes that the Sheep Creek system acts as a groundwater sink with the exception of periods of peak surface water flow during the spring, where the surface water recharges the groundwater through the alluvial system under the wetlands.

Although mine operations could result in lowering of groundwater, modeling indicates that water inputs back to the groundwater and surface water from underground injection and the NCWR would mitigate these potential impacts (Tintina 2017). In instances where small, isolated wetlands exist outside of the area affected by the underground injection of groundwater, and no perched water table is available, reduction in available groundwater could cause these wetlands to dry up. If this scenario occurs, these wetland areas would likely become dominated by upland vegetation during this drawdown timeframe. However, they likely would revert back to a wetland vegetation-dominated wetland after mining ceases and the water table rises to the baseline levels. Section 3.4.3, Environmental Consequences, describes this in detail. Therefore, if Project operations are functioning as designed, measureable impacts to most wetlands from lowering groundwater elevations would not be likely. Based upon the above, the secondary impacts to wetlands due to changes in groundwater hydrology would be negligible.

Water Quality

Mine operations are not expected to affect wetland water quality within the analysis area. The potential impacts from fugitive dust, groundwater inputs, or surface water inputs would be controlled, as described in the MOP Application and below.

In general, the fine milling and separation steps are wet processes that generate little, if any, dust to be controlled. The dust generated from the crushing and grinding operations would be captured by the fugitive dust collection system from various areas inside the process plant. Air quality monitoring would be conducted to help assess impacts to flora or fauna during operations. In addition, air quality rules require reasonable precautions to be taken to prevent emission of airborne particulate matter. The Proponent would be required to obtain a Montana Air Quality Permit under the Montana Clean Air Act that specifies requirements for applicable State and Federal air quality standards (Tintina 2017).

Important components of the dust control plan that would offer protection from fugitive dust include:

- Minimizing exposed soil areas to the extent possible by prompt revegetation of un-reclaimed areas;
- Establishing temporary vegetation on inactive soil and sub-soil stockpiles that would be in place for 1 year or more;
- Utilizing chemical dust control products on access and trucking road surfaces;
- Applying water to access roads and active haul roads during dry periods;
- Enclosing screens, crushers, and copper-enriched rock and waste transfer points;
- Covering conveyor belts; and
- Utilizing fabric filter dust collectors at crushing, screening, transfer, and loading points.

Degradation to water quality in the alluvial system from the discharge of RO treated water through the alluvial UIG would be negligible. The models produced for comparing WTP discharge in this alluvial system to the non-degradation standards indicated that, after its initial mixing with groundwater, the discharge water total nitrogen could reach values above the non-degradation criteria for surface water in Sheep Creek, with an estimated average concentration of 0.32 mg/L (standard limit = 0.12 mg/L). Therefore, the Proponent proposes to store this water in the TWSP between July 1 and September 30 (when the seasonal effluent limit for nitrogen applies). From October 1 to June 30, treated water stored in the TWSP would be pumped back to the WTP, where it would be mixed with other WTP effluent. The blended water would be sampled prior to being discharged to the alluvial UIG per the MPDES permit.

Potential sources of contamination from surface water flows into the existing wetlands would be controlled by the dust collection system and the storm water management plan detailed in the MOP Application. Water discharged from the WTP to the alluvial UIG would meet water quality standards. Based upon the above, there would be no secondary impacts to wetlands due to changes in water quality from surface water discharges.

Wetland Monitoring

The MOP Application describes plans to monitor for secondary impacts in accordance with the USACE 404 permit and DEQ 401 certification conditions. The MOP Application summarizes the plan to monitor wetlands during construction, operations, and closure. The Proponent plans to compare existing baseline data with data from four reference site wetlands as well as from four Project area wetlands to determine whether secondary impacts to Project area wetlands are occurring. The Proponent identified four reference site wetlands and four Project area wetlands for this study and began collecting baseline data for all eight wetlands in 2016. Data would be collected by vegetative monitoring plots, piezometers, and transducer data loggers to show the status and trends at each wetland which would aid in identifying any secondary impacts, should they occur (Tintina 2017). The Proponent proposes to grout the bedrock fractures where the development decline ramp passes, approximately 90 feet under Coon Creek and its associated wetlands and/or the Proponent would augment flows to the wetlands from water stored in the NCWR (Tintina 2019).

In addition, wetland monitoring would continue after closure to identify potential impacts and continue until such time that DEQ determines that the frequency and number of sampling sites for each resource can be reduced or that closure objectives have been met and monitoring can stop (Tintina 2017).

Smith River Assessment

The Smith River is located approximately 12 miles (19 river miles) west of the Project area. The potential wetland and wetland functions impacts from the Proposed Action are expected to be localized to the immediate Project area and would be relatively small in size. Therefore, the Proposed Action would not likely affect the wetlands or water quality of the Smith River riparian wetland complexes. Based upon this, the impacts to wetlands near the Smith River from the Proposed Action Alternative would be immeasurable.

3.14.3.3. Agency Modified Alternative

The AMA modifications identified would result in impacts similar to those described for the Proposed Action. The additional backfill component of the AMA would not affect any additional wetlands because the surface disturbance footprint would not change. As a result, any potential impacts to wetlands would be similar to the Proposed Action.

Smith River Assessment

The AMA modifications would result in impacts to wetlands near the Smith River similar to those described for the Proposed Action. Therefore, impacts to wetlands or water quality of the Smith River riparian wetland complexes from the AMA would be negligible.