4. CUMULATIVE, UNAVOIDABLE, IRREVERSIBLE AND IRRETRIEVABLE, AND SECONDARY IMPACTS AND REGULATORY RESTRICTIONS

4.1. METHODOLOGY

Cumulative impacts described in this section are changes to resources that can occur when incremental impacts from one project combine with impacts from other past, present, and future projects. Montana defines cumulative impacts as "the collective impacts on the human environment within the borders of Montana of the proposed action when considered in conjunction with other past, present, and future actions related to the proposed action by location or generic type," (§ 75-1-220, MCA). Cumulative impacts can result from state or non-state (private) actions that, "have occurred, are occurring, or may occur that have impacted or may impact the same resource as the proposed action," (Montana EQC 2017).

The cumulative impacts analysis for this Project was conducted in accordance with MEPA by completing the following:

1. Identifying the location or geographic extent for each resource potentially impacted by the Project;
2. Determining the timeframe in which the potential impacts of the Project could occur;
3. Identifying past, present, and future actions or projects that overlap the Project's spatial and temporal boundaries and that, in combination with the Project, could impact a particular resource; and
4. Analyzing the potential for cumulative impacts for each resource identified.

The cumulative impacts analysis for each potentially impacted resource is presented in Section 4.2.

4.1.1. Identification of Geographic Extent

The geographic extent of potential cumulative impacts includes the area or location of resources potentially impacted by the Project. For many resources (e.g., soil, vegetation, and geology), the geographic extent used to assess direct and secondary impacts, such as the Project footprint, is the same area used to assess cumulative impacts. However, for other resources (e.g., noise and air quality), the geographic extent is more expansive. MEPA requires the use of reasonable and rational spatial boundaries (e.g., hydrologic unit codes, wildlife management units, sub-basins, areas of unique recreational opportunity, viewshed) that will result in a meaningful and realistic evaluation (Montana EQC 2017). **Table 4.1-1** below describes the geographic extent where cumulative impacts from past, present, and future projects and actions could potentially impact each relevant resource.

Table 4.1-1
Cumulative Impacts Assessment Areas

Resource	Assessment Area
Air Quality	31-mile radius from the Project (modeling domain)
Groundwater Hydrology	Upper 2/3 of the Sheep Creek watershed
Surface Water Hydrology	Sheep Creek watershed, tributaries that feed Sheep Creek, and Black Butte Creek (Upper 2/3 of the Sheep Creek watershed)
Transportation	Meagher, Park, and Broadwater counties
Vegetation	3,317 acres = MOP Application Boundary (1,888 acres) + 1,429 surrounding acres
Wetlands	Project leased area (7,684 acres) = MOP Application Boundary (1,888 acres) + 5,796 surrounding acres
Wildlife	5,290 acres = MOP Application Boundary (1,888 acres) + 3,402 surrounding acres (identified by WESTECH [2015] surveys)
Socioeconomics	Meagher County, City of White Sulphur Springs, and School District #8 White Sulphur Springs K-12. Employment and income analyses extend to Broadwater, Cascade, Gallatin, Judith Basin, Lewis & Clark, Park, and Wheatland counties
Aquatic Biology	Sheep Creek watershed, tributaries that feed Sheep Creek, and Black Butte Creek

4.1.2. Identification of Timeframes

The timeframe in which potential Project impacts could be expected to occur includes the duration of both construction and operations (i.e., the overall Project lifespan). The Project lifespan is estimated as 19 years inclusive of construction, operations, reclamation, and closure (2018 to 2037). An analysis of cumulative impacts must also take into account past actions.

There is no history of industrial development on the proposed site. Mineral exploration started in the Project area in 1894 with small-scale underground copper mineralization development projects (see Section 1.3, Project Location and History). Homestake Mining Company started exploring for non-ferrous metals in the Project area in 1973 and 1974. No mining is known to have occurred within the Project area prior to 1973. Therefore, the timeframe for which potential cumulative impacts from past, present, and future projects and actions are to be assessed is from 1973 to 2037, which is approximately 64 years.

4.1.3. Identification of Past, Present, and Future Projects/Actions

Past, present, and future projects or actions that could impact individual resources when carried out in combination with the Project are included in this analysis. Permanent impacts as a result of past and present projects and actions since mining began in the vicinity of the proposed Project (circa 1894) were considered as part of the existing baseline conditions for each resource addressed in Chapter 3, Affected Environment and Environmental Consequences. As such, potential impacts from past projects and actions are already included in the evaluation of direct and secondary impacts. Related future actions may have an impact on a resource when combined with the Project. However, future actions "may only be considered when these actions are under concurrent consideration by any agency through pre-impact statement studies, separate impact

statement evaluations, or permit processing procedures" (§ 75-1-208(11), MCA). This EIS refers to such projects as pending.

The following actions were completed to obtain information regarding present and pending actions and projects in the mine area:

- Contacting government staff at agencies with potential projects or actions in the area;
- Reviewing the EIS scoping comments for this Project; and,
- Independently researching nearby projects and activities.

Future actions are defined as those that are related to the proposed action by location or generic type. Related future actions were considered in the cumulative impact analysis only if they met one of the following criteria in accordance with § 75-1-208(11), MCA:

- The project is currently under consideration by any agency through pre-impact studies;
- The project is currently under consideration by any agency through separate impact statement evaluations; or,
- The project is currently under consideration by any agency through a permit processing procedure.

Present and pending projects or actions that, in combination with the Project, could potentially result in cumulative impacts are described in the section below.

4.2. CUMULATIVE IMPACTS

MEPA requires an analysis of cumulative environmental impacts of the proposed Project. Cumulative impacts are collective impacts of a project or action on the human environment within the borders of Montana when added to other past, present, and future actions. These impacts can result in individually minor but collectively significant impacts.

4.2.1. Present Projects and Actions

Actions identified for evaluation of potential cumulative impacts during the scoping process (see Section 1.6) and during this analysis include water withdrawals, remediation sites, new industrial activity along the Missouri River corridor, existing mines, and reclamation of abandoned mines. Potential cumulative impacts related to the listed projects and actions are discussed in the following sections. As discussed in Section 1.3, the Proponent also conducts surface exploration activities on the Project site under Exploration License No. 00710. These activities are considered under the existing conditions of the site.

4.2.1.1. Water Withdrawals

Resources listed in **Table 4.1-1** were evaluated for cumulative impacts related to water withdrawals. Potential cumulative impacts were identified for groundwater and surface water hydrology resources, and are discussed below. Cumulative impacts were not identified for the remaining resources.

Water withdrawals from the Project in combination with water withdrawals from nearby groundwater supply wells would impact groundwater and potentially nearby perennial streams. Section 3.4, Groundwater Hydrology, provides a discussion about how dewatering of the mine would result in a consumptive use of water by the Project. While developing a regional groundwater model, Hydrometrics (2015) completed a search of Montana's Groundwater Information Center database (maintained by the Montana Bureau of Mines and Geology). Several wells listed in that database were identified to be present within the model's domain (Hydrometrics 2015, Figure 2-5). Only five of those wells are present within the Project Hydrogeology RSA, as defined in Section 3.4.1.2 and shown on **Figure 3.4-2**: 5740, 5780, 5828, 5838, and 5847.

If the five wells are used for production of groundwater, the impacts of the mine dewatering upon groundwater levels in those wells would likely be limited. As **Figure 3.4-9** shows, all five wells are outside of the groundwater model-predicted mine dewatering cone of depression as defined by a drawdown of more than 10 feet. With limited overlap, cumulative impacts would be minimal.

In addition, the Proponent would acquire water rights under lease agreements with landowners, as stated in the MOP Application (Tintina 2017). As part of these water rights, the Proponent's water rights mitigation plan would offset stream depletion in Sheep Creek, Coon Creek, and Black Butte Creek, if necessary, by mitigating flows at a rate equal to the consumptive use of the Project. Flows would be mitigated by pumping water from the NCWR into the headwaters to maintain flows within 15 percent of the average monthly flow.

4.2.1.2. Remediation Sites

There are no known existing remediation sites that overlap with the Project, with the exception of the Livingston rail superfund site. The Livingston rail superfund site (i.e., the Burlington Northern Livingston Shop Complex) in Livingston, Montana, is currently undergoing remediation under a consent decree between Burlington Northern Santa Fe Railway and DEQ (Montana.gov 2018). The Livingston rail superfund site is located at the Montana Rail Link rail yards in Livingston almost 100 miles south of the Project. The only overlapping activities of the proposed Project with the remediation site would be the transport and transfer of shipping containers.

The Project would use sealed shipping containers on trucks to transport the copper concentrate to rail facilities in Livingston and/or Townsend. The truck transport route would include portions of Sheep Creek Road, U.S. Route 89, U.S. Route 12, I-90, and local roads in Livingston and Townsend. The concentrate would be transferred in the sealed containers to rail cars at the Montana Rail Link rail yards in Livingston and/or Townsend and shipped via rail in the same sealed containers to end markets via the Montana Rail Link mainline and Burlington Northern Santa Fe Railway mainline tracks in Montana. The transport and transfer of shipping containers at the rail yard is not expected to result in any cumulative impact on resources listed in **Table 4.1-1**.

4.2.1.3. New Industrial Activity along the Missouri River Corridor

Resources listed in **Table 4.1-1** were evaluated for cumulative impacts related to new industrial activity along the Missouri River Corridor, which extends 725 miles across Montana and passes through 14 counties. The upper reach of the Missouri River Corridor is the stretch nearest to the Project area. Potential cumulative impacts were identified for air quality, transportation, and socioeconomics resources, and are discussed below. Cumulative impacts were not identified for the remaining resources.

The air quality impacts of regional industrial activity were accounted for in a general manner in the air dispersion modeling analysis for the Proposed Action. Following DEQ guidance, monitored ambient air background concentrations are added to the modeled impacts of the Project-related impacts as described in Section 3.2, and these combined impacts are compared to federal and state ambient air standards (DEQ 2007). In this approach, the combined impacts of the surrounding projects and actions are represented in the selected background data and results described in Section 3.2. Appropriate ambient data would be that collected at a monitoring station in an area of similar characteristics of the region being modeled. The Proponent utilized background data from several sources that were approved by DEQ to ensure that the background was representative and conservative (Tintina 2018).

As stated in Section 3.12.3, the transportation analysis in Chapter 3 assumes that traffic on the transportation assessment area roads would increase by about 20 percent over the life of the mine, consistent with typical MDT assumptions. This background traffic increase includes new industrial activity along the Missouri River Corridor. Potential cumulative impacts, therefore, are included in the baseline data and results described in Section 3.12.3.

The upper reach of the Missouri River Corridor encompasses four counties within the socioeconomic assessment area, including Broadwater County, Cascade County, Gallatin County, and Lewis and Clark County. The Helena and Great Falls areas have experienced a boost in industrial activity, which has benefitted the local economy, driven by expansions in 2014 at companies like Lowenbro (an industrial construction and service company) and ADF Group (a fabrication and module assembly company). The Montana Business Assistance Connection (MBAC) developed a 2014 to 2019 Comprehensive Economic Strategy for the Helena Tri-County Region (i.e., Broadwater County, Lewis and Clark County, and Meagher County), which highlights how the regional economy is anchored by state and federal employment in Helena, with diminishing economic activities in peripheral counties (MBAC 2014). In Meagher County, livability issues and the need for quality jobs were identified as important concerns (MBAC 2014). The most significant economic threats to the region are considered to be continued historical trends of an aging population, a shrinking labor pool, and stagnating or decreasing incomes. For this reason, the Project along with growth in aerospace manufacturing are identified as the most significant economic opportunities across the Helena tri-county region (MBAC 2014). The Project combined with the expansion of aerospace manufacturing would significantly contribute to the area's economic development goals, delivering benefits to Meagher County and the regional economy through job creation, investment, purchasing, and tax payments.

4.2.1.4. Existing Mines

Individual resources listed in **Table 4.1-1** were evaluated for cumulative impacts related to the operation of existing mines. Potential cumulative impacts were identified for air quality, transportation and wildlife, and are discussed below. Cumulative impacts were not identified for the remaining resources.

Mining has been a historical industry in Meagher County and adjacent counties such as Broadwater County and Lewis and Clark County. Graymont Western currently operates a limestone quarry and processing facility in Broadwater County (Operating Permit No. 00105), producing hydrated lime and quick lime. The quarry and processing facility are located approximately 45 miles southwest of the Proposed Action area. The Black Butte Mine (Operating Permit No. 00071) is an open-pit mine that supplies iron ore as an ingredient for cement production, and it is located approximately 2.5 miles southwest of the Proposed Action area.

The air quality impacts of existing mines in the region was accounted for in a general manner in the air dispersion modeling analysis for the Proposed Action. Following DEQ guidance, monitored ambient air background concentrations are added to the modeled impacts of the Project-related impacts as described in Section 3.2, and these combined impacts are compared to federal and state ambient air standards (DEQ 2007). In this approach, the combined impacts of the operation of existing mines are represented in the selected background data and results in Section 3.2.

The Black Butte Mine is the only existing mine located within the wildlife cumulative impacts assessment area; with a surface disturbance area of approximately 6 acres, it does not occupy a large footprint. The wildlife species observed by WESTECH (2015) in the Project wildlife analysis area were present adjacent to the Black Butte Mine; therefore, the combined impacts of the operations of existing mines are represented in the background data and results presented in Section 3.15.

4.2.1.5. Reclamation of Abandoned Mines

Individual resources listed in **Table 4.1-1** were evaluated for cumulative impacts related to reclamation of abandoned mines. Potential cumulative impacts were identified for air quality and transportation, and are discussed below. Cumulative impacts were not identified for the remaining resources.

The air quality impacts of reclamation of abandoned mines in the region were accounted for in a general manner in the air dispersion modeling analysis for the Proposed Action. Following DEQ guidance, monitored ambient air background concentrations are added to the modeled impacts of the Project-related impacts as described in Section 3.2, and these combined impacts are compared to federal and state ambient air standards (DEQ 2007). In this approach, the combined impacts of the reclamation operations are represented in the selected background data and results presented in Section 3.2.

As stated in Section 3.12.3, the transportation analysis in Chapter 3 assumes that traffic on the transportation assessment area roads would increase by about 20 percent over the life of the mine, consistent with typical MDT assumptions. This background traffic increase would incorporate some new traffic associated with reclamation of abandoned mines, but would not include large-scale mine reclamation, such as multiple new reclamation projects or a single very large reclamation project.

4.2.2. Related Future Actions

Future projects and actions identified for evaluation of potential cumulative impacts include:

- Gordon Butte Pumped Storage Project (Federal Energy Regulatory Commission Project No. 13642-003);
- Castle Mountains Restoration Project; and
- Portable aggregate crushing and screening operation in Great Falls, Cascade County (Montana Air Quality Permit #5186-00).

These future projects or actions that, in combination with the Project, were identified as having a potential to result in cumulative impacts are described in the sections below.

Comments during the scoping process also requested that the Project EIS evaluate cumulative impacts from possible future expansion of the proposed mine and expansion of other mines in the area. This EIS does not address the potential for mine expansion or development of a mining district of multiple projects, as neither of these options are currently proposed or under consideration by any agency.

4.2.2.1. Gordon Butte Pumped Storage Project

The Gordon Butte Pumped Storage Project developed by Absaroka Energy, LLC, would be located on private land in Meagher County, Montana, 36 miles southeast of the Proposed Action. This project is proposed to have upper and lower closed-loop reservoirs connected by an underground concrete and steel-lined hydraulic shaft. Gordon Butte construction could begin in 2018, and operations could begin in 2022; this project's 3-year construction period could overlap with the 3-year construction period of the Proposed Action (GB Energy Park 2018). Potential cumulative impacts for air quality, transportation, and socioeconomic resources were identified for the 3-year period, and are discussed in more detail below.

Air Quality

Impacts on air quality resulting from the Gordon Butte Pumped Storage Project would consist primarily of transient impacts during the construction phase. Earthmoving equipment, material handling, and other construction-related activities would result in emissions of tailpipe emissions (primarily NO_X, CO, VOC, and $PM_{2.5}$), and fugitive dust emissions (primarily PM_{10}). During operations, the additional air quality impacts would be minimal, comprised of emissions from vehicle operation on unpaved roads for employee travel to and around the facility. Due to the

distance from the Project and low-level of emissions, cumulative impacts are not expected to occur.

Groundwater Hydrology

The Gordon Butte Pumped Storage Project would be located 36 miles southeast of the Project in the Musselshell River watershed, which drains east past the town of Martinsdale, Montana. The Gordon Butte project is outside of the hydrogeology RSA, as defined in Section 3.4. The RSA is an area where secondary impacts of the Project (i.e., groundwater impacts to surface water) could occur; beyond the RSA boundary, secondary impacts are not expected. Because the proposed Project and the Gordon Butte project are 36 miles apart and in different watersheds, DEQ does not expect any cumulative impacts on groundwater hydrology.

Surface Water Hydrology

The Gordon Butte Pumped Storage Project is located 36 miles southeast of the Project and is outside the surface water assessment area, as defined in Section 3.5. Because the proposed Project and the Gordon Butte project are 36 miles apart and in different watersheds, DEQ does not expect any cumulative impacts to surface water hydrology (quantity or quality).

Transportation

Gordon Butte is 38 road miles east of White Sulphur Springs via U.S. Route 294 and U.S. Route 12. Gordon Butte would likely add construction traffic to U.S. Route 12/89 in White Sulphur Springs during its 3-year construction period. Peak construction traffic for this project would occur during Year 2, when 350 employees would be present on site. Gordon Butte construction traffic would be temporary and would not overlap with the period of greatest traffic volume from the proposed Black Butte Copper Mine. The Proposed Action would generate its highest levels of traffic during mine operations, beginning in or after 2021, whereas Gordon Butte Pumped Storage Project construction could begin in 2018 and operations in 2022 (Borgquist et al. 2017).

The Gordon Butte project developer has proposed to implement a traffic management plan, provide bus service for project personnel, and schedule work shifts and deliveries to limit traffic during school bus traffic times (FERC 2016). As noted in Section 3.12.3.2 and the Proponent's traffic study, current traffic is significantly below the roadway capacity for U.S. Route 12 and U.S. Route 89 south of White Sulphur Springs (Abelin Traffic Services 2018). The highways have sufficient capacity to handle the temporary, cumulative traffic, although the addition of Gordon Butte traffic may further strain the capacity of the Main Street/3rd Avenue intersection in White Sulphur Springs (see Section 3.12.3.2). Overall, the cumulative impact of construction and operation of the Project and the Gordon Butte project on road transportation would be minimal.

Vegetation

The Gordon Butte Pumped Storage Project is located 36 miles southeast of the Project and would be outside of the vegetation and T&E analysis area, as defined in Section 3.13. The vegetation and T&E analysis area is an area where secondary impacts of the Project could occur; beyond

this analysis area, secondary impacts are not expected. Because the Project and the Gordon Butte project are 36 miles apart, DEQ does not expect any cumulative impacts on vegetation.

Wetlands

The Gordon Butte Pumped Storage Project is located 36 miles southeast of the Project and would be outside of the wetlands assessment area, as defined in Section 3.14. The Project would permanently impact 0.85 acre of emergent and scrub/shrub wetlands within the MOP Application Boundary in the Sheep Creek watershed. Because the Project and the Gordon Butte project are 36 miles apart and in different watersheds, DEQ does not expect any cumulative impacts on wetlands or associated waterbodies.

Wildlife

The Gordon Butte Pumped Storage Project is located 36 miles southeast of the Project and would be outside of the wildlife analysis area, as defined in Section 3.15. Because of the distance between the two projects, potential impacts within the wildlife analysis area are not expected to overlap with potential impacts from the Gordon Butte project. Cumulative impacts on wildlife species with large home ranges (e.g., grizzly bear, Canada lynx, wolverine, big game species) or highly mobile species that may travel seasonally between the two project areas (e.g., migratory bird species) are possible. Given the distance between the projects and the abundant suitable habitat for wildlife species in the area, cumulative impacts are expected to be minimal on these species. Small mammals, upland game birds, reptiles, and amphibians are unlikely to migrate between the two areas and are not expected to be impacted. An increase in traffic due to a cumulative increase in employees, support vehicles, or trucks along existing main roads between the two project areas would likely represent the largest potential impact to transient wildlife species due to potential wildlife-vehicle collisions or avoidance behavior. However, given that the cumulative impacts on transportation activities described above are expected to be minimal, the cumulative impacts on potential wildlife-vehicle collisions or avoidance behavior are also expected to be minimal.

Aquatic Biology

The Gordon Butte Pumped Storage Project is located 36 miles southeast of the Project in a different drainage basin and would be outside of the aquatic biology assessment area, as defined in Section 3.16. Secondary impacts of the Project (i.e., impacts to fisheries) are not expected. Because the Project and the Gordon Butte project do not share aquatic habitat that could potentially be impacted by both projects, DEQ does not expect any cumulative impacts on fisheries between these two projects.

4.2.2.2. Castle Mountains Restoration Project

The Castle Mountains are about 15 to 20 miles south of the proposed Black Butte Copper Mine, situated east of the city of White Sulphur Springs and south of U.S. Highway 12 in Meagher County. The Castle Mountains Restoration Project would restore many forest and grassland ecosystems to minimize the potential for high intensity fires to occur within the Willow Creek

municipal watershed and other valued areas within the Castle Mountains. Prescribed fire treatments are being proposed to meet the goals of this project. This project has the potential to impact wildlife habitat, big-game winter ranges, and migration routes, and there is potential for increased grazing due to the thinning resulting from prescribed burns (USDA 2018).

Air Quality

Impacts on air quality resulting from the Castle Mountains Restoration Project would be limited to transient impacts during the active periods for controlled burns, revegetation, and other habitat treatments. Vehicle travel in any given management area would be limited in duration, and no new permanent unpaved roads are planned. Controlled burns can create significant local air pollution during and immediately after the fire, consisting primarily of NO_X, CO, VOC, and PM. Burn Plans would be in place to mitigate these emissions to the extent practical and reduce impacts by conducting the fires during periods when weather patterns tend to reduce the impact to local residents and resources (USDA 2018). While the short-term, localized air quality impacts of restoration project activities—in particular the controlled burns—can be substantial, these impacts should not result in cumulative air quality impacts with respect to the Project. This is because of the distance to the restoration project area and the temporary nature of the air emissions from restoration activities.

Groundwater Hydrology

The Castle Mountains Restoration Project would be located about 15 to 20 miles south of the Project and outside of the hydrogeology RSA, as defined in Section 3.4. The RSA is an area where secondary impacts of the Project (i.e., groundwater impacts to surface water) could occur; beyond the RSA boundary, secondary impacts are not expected. Because the Project and the Castle Mountain Restoration Project are 15 miles apart and in different watersheds, DEQ does not expect any cumulative impacts on groundwater hydrology.

Surface Water Hydrology

The Castle Mountain Restoration Project would be located about 15 to 20 miles south of the Project and outside the surface water assessment area, as defined in Section 3.5. No impacts to surface water hydrology (quantity or quality) are expected beyond the assessment area. Because the Project and the Castle Mountain Restoration Project are 15 miles apart and in different watersheds, DEQ does not expect any cumulative impacts on surface water hydrology (quantity or quality).

Transportation

Traffic would be generated during implementation of the restoration project, when equipment and personnel would reach the project area by traveling on U.S. 12 or U.S. 89 east and south of White Sulphur Springs. The project-generated traffic would be temporary and would travel on roads that have substantial capacity for additional traffic, according to the Proponent's traffic study (Abelin Traffic Services 2018). As a result, the Castle Mountains Restoration Project,

when combined with the Proposed Action, would have a negligible cumulative impact on road transportation.

Vegetation

The Castle Mountains Restoration Project would be located about 15 to 20 miles south of the Project and outside of the vegetation and T&E analysis area, as defined in Section 3.13. The vegetation and T&E analysis area is an area where secondary impacts of the Project could occur; beyond this area, secondary impacts are not expected. Because the Project and the Castle Mountains Restoration Project are 15 miles apart, DEQ does not expect any cumulative impacts on vegetation.

Wetlands

The Castle Mountains Restoration Project would be located about 15 to 20 miles south of the Project and outside of the wetlands assessment area, as defined in Section 3.14. There are no anticipated cumulative impacts due to this related future action. Because the Project and the Castle Mountains Restoration Project are 15 miles apart and in different watersheds, DEQ does not expect any cumulative impacts on wetlands or associated waterbodies.

Wildlife

The Castle Mountains Restoration Project would be located about 15 to 20 miles south of the Project and outside of the wildlife analysis area, as defined in Section 3.15. Because of the distance between the two projects, potential impacts within the wildlife analysis area are not expected to overlap with potential impacts from the restoration project. Cumulative impacts on wildlife species with large home ranges (e.g., grizzly bear, Canada lynx, wolverine, big game species) or highly mobile species that may travel seasonally between the two project areas (e.g., migratory bird species) are possible. The restoration project would restore some habitat types for wildlife, but the impact and benefit would vary by species. Given the distance between the projects and the abundant suitable habitat for wildlife species in the area, cumulative impacts are expected to be minimal on these species. Small mammals, upland game birds, reptiles, and amphibians are unlikely to migrate between the two areas and are not expected to be impacted. In addition, given that the cumulative impacts on transportation activities described above are expected to be minimal at most, the cumulative impacts on potential wildlife-vehicle collisions or avoidance behavior are also expected to be minimal.

Aquatic Biology

The Castle Mountains Restoration Project would be located about 15 to 20 miles south of the Project and would be outside of the aquatic biology assessment area, as defined in Section 3.16. Secondary impacts of this project (i.e., impacts to fisheries) are not expected. Because the Project and the Castle Mountains Restoration Project do not share aquatic habitat that could potentially be impacted by both projects, DEQ does not expect any cumulative impacts on fisheries between these two projects.

4.2.2.3. Portable Aggregate Crushing and Screening Operation in Great Falls, Cascade County

The portable aggregate crushing and screening operation will be located within a gravel pit in Belt, Montana, about 40 miles north of the Proposed Action along U.S. Route 89. This operation will be owned by and operated in Cascade County. The equipment will be used to crush and sort gravel and sand materials used for construction. Material is fed through a primary and secondary crusher; after separations, materials are stored in load out piles (DEQ 2017b).

Air Quality

The Cascade County aggregate crushing, screening, and storage facility is subject to a number of federal and state regulations to curb particulate emissions and reduce the potential for cumulative impacts. As examples, the crusher is not to exhibit an opacity (a measure of the portion of natural light obscured by airborne dust) in excess of 12 percent (40 CFR 60, Subpart OOO), and other equipment sources are to not exhibit opacity of 20 percent or greater (ARM 17.8.304). The facility is prohibited from operating more than two crushers and two screeners at a time. Further, state regulations require the operation of water sprays and implementation of reasonable precautions on unpaved roads and parking lots to control airborne particulate matter (ARM 17.8.308 and ARM 17.8.752). The dust mitigation measures and resulting low rate of daily and annual emissions indicate that there is at most a minor contribution to air quality cumulative impacts. Further, the facility in Great Falls is located about 40 miles from the Project site, so there is no potential for overlapping air quality impacts.

Groundwater Hydrology

Portable Aggregate Crushing and Screening Operation would be located about 40 miles north of the Project and outside of the hydrogeology RSA, as defined in Section 3.4. Because the Project and the aggregate crushing operations are located about 40 miles apart and in different watersheds, DEQ does not expect any cumulative impacts on groundwater hydrology.

Surface Water Hydrology

The Portable Aggregate Crushing and Screening Operation will be located about 40 miles north of the project and outside the surface water assessment area, as defined in Section 3.5. Because the Project and the aggregate crushing operations are located about 40 miles apart and in different watersheds, DEQ does not expect any cumulative impacts on surface water hydrology (quantity or quality).

Transportation

Aggregate equipment would be moved as needed within Cascade County, north of Meagher County, and would initially be operated within the gravel pit. Traffic impacts would be limited to travel by employees who would operate the equipment. Although some aggregate equipment could travel to Meagher County, most activity would be on roads north of the Proposed Action, which are not anticipated to handle substantial traffic volume associated with the Proposed

Action. Accordingly, the Portable Aggregate Crushing and Screening Operation would have no cumulative impacts on road transportation when combined with the Proposed Action.

Vegetation

The portable aggregate crushing and screening operations would be located about 40 miles north of the Project and outside of the vegetation and T&E analysis area, as defined in Section 3.13. Because the Project and the aggregate crushing operations are located about 40 miles apart, DEQ does not expect any cumulative impacts on vegetation.

Wetlands

The portable aggregate crushing and screening operation would be located about 40 miles north of the Project and outside of the wetlands assessment area, as defined in Section 3.14. Because the Project and the aggregate crushing operations are about 40 miles apart and in different watersheds, DEQ does not expect any cumulative impacts on wetlands or associated waterbodies.

Wildlife

The portable aggregate crushing and screening operation would be located about 40 miles north of the Project and outside of the wildlife analysis area, as defined in Section 3.15. Cumulative impacts on wildlife species with large home ranges (e.g., grizzly bear, Canada lynx, wolverine, big game species) or highly mobile species that may travel seasonally between the two project areas (e.g., migratory bird species) are possible. Given the distance between the projects, the limited species traveling between these two project areas, and the abundant suitable habitat for wildlife species in the areas, cumulative impacts are expected to be minimal.

Aquatic Biology

The portable aggregate crushing and screening operation would be located about 40 miles north of the Project and outside of the aquatic biology assessment area, as defined in Section 3.16. Because the Project and the aggregate crushing operations do not share aquatic habitat that could potentially be impacted by both projects, DEQ does not expect any cumulative impact on fisheries between these two projects.

4.3. UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts are discussed below for each resource where they were identified during the impact evaluation described in Chapter 3, Affected Environment and Environmental Consequences. Unavoidable adverse impacts were not identified for the remaining resources evaluated in Chapter 3.

4.3.1. Groundwater Hydrology

Dewatering associated with the proposed underground mine operations would cause lowering of groundwater levels and some loss of base flow in the streams near the mine during mining and for some years after the mine is closed. Disposal of treated water to the alluvial UIG would

partially offset the impacts from dewatering. Mine-related water discharged to the alluvial UIG would be treated and required to meet water quality standards and nondegradation criteria prior to discharge. Impacts on base flow in nearby streams, primarily Sheep Creek and Coon Creek, as a result of mine dewatering is expected to be negligible. These impacts are unavoidable, except under the No Action Alternative.

4.3.2. Vegetation

Unavoidable adverse impacts related to vegetation would include disturbance to vegetation communities through clearing, filling, and construction activities. Upon reclamation and closure, all affected areas would be regraded and revegetated to vegetation communities with comparable stability and utility as the original conditions, but the impacts would be unavoidable in the short term.

4.3.3. Wetlands

There would be unavoidable adverse impacts related to wetlands within the Project area through filling or excavation activities. Construction of access roads, service roads, the wet well, and the CTF would result in approximately 0.85 acre of permanently impacted wetlands from fill and dredging activities. The Proponent has obtained approval to impact the above wetlands via both a USACE Section 404 Permit and a DEQ Section 401 Water Quality Certification (Permit # NOW-2013—1385-MTH and MT4011018, respectively). As a condition of the USACE Permit, and before impact to the site wetlands can occur, the Proponent would be required to purchase 1.275 acres of advanced or pre-certified wetland credits or purchase 0.85 acre of certified wetland credits from the MARS In-lieu Fee Program.

4.3.4. Wildlife

Unavoidable adverse impacts related to the wildlife analysis would primarily include habitat removal. Terrestrial wildlife habitat would be removed where it overlaps Project features and would not be reclaimed to a similar functionality and value for several years. Grassland and shrubland communities reclaimed on various Project feature areas would be available for wildlife use within three to five growing seasons, offering a similar level of habitat as currently exists. However, forest communities could take decades to provide a similar habitat structure to pre-mining conditions. Additionally, noise from construction, operations, and reclamation activities would be unavoidable and would likely affect wildlife within 1 to 2 miles of the Project.

4.3.5. Aquatic Biology

Unavoidable adverse impacts related to aquatic biology would include disturbance to aquatic communities due to changes in the hydrology of streams and water quality and loss of aquatic habitat. As stated in Section 4.3.1, Groundwater Hydrology, dewatering associated with the proposed underground mine operations would cause some loss of base flow in the streams near the mine during mining and for some years after the mine is closed. Changes in water quantity would impact aquatic life in the Project area with most of the impacts limited to the aquatic life in Coon Creek (defined as AES type D001 - Headwater Stream System), which is projected to be

reduced by approximately 70 percent of the steady state base flow observed in the stream during operations due to mine dewatering. As stated in the environmental consequences subsection of Section 3.16.3, Aquatic Biology, in order to mitigate this predicted impact, water from the NCWR would be pumped into the headwaters of Coon Creek to augment flows within 15 percent of the average monthly flow (Hydrometrics 2018).

Construction of the mine access road crossings of Brush and Little Sheep Creek would permanently impact 0.1 acre of riparian wetlands and 154 feet of streams. These construction activities could directly impact areas that aquatic life use for food, shelter, and nursery areas as well as potentially introduce sediment into the streams, which could affect aquatic life, particularly fish that are resident or spawn in the area. BMPs would be implemented to reduce impacts on these features, including the use of half-culverts spanning the channels of Brush Creek and Little Sheep Creek where the main access road intersects them, and the use of a directional utility installation drill to avoid impacts during the installation of underground pipelines.

Impacts on water quality from surface runoff and construction activities would not extend out of the immediate area (see Section 3.5, Surface Water Hydrology). However, increased sedimentation in the streams due to runoff or construction activities could cause some aquatic life, such as fish, to move to areas of the creeks with more favorable habitat conditions. To reduce the volume of contact storm water runoff in the disturbance area, storm water control and management BMPs would be implemented as required for the Storm Water Pollution Prevention Plan. BMPs are provided in the MOP Application (Tintina 2017) and include the construction of surface water diversion ditches to convey the non-contact water around the Project facilities.

4.4. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

MEPA requires a detailed statement on any irreversible and irretrievable commitments of resources that would be involved in the proposed action if it is implemented (§ 75-1-201(b)(iv)(F), MCA). Irreversible resource commitments generally refers to impacts on or a permanent loss of a resource, including land, air, water, and energy, that cannot be recovered or reversed. Examples include the loss of cultural resources, or conversion of wetlands to another use. Irreversible commitments are usually permanent, or at least persist for a long time. Irretrievable resource commitments involve a temporary loss of the resource or loss in its value such as a temporary loss of vegetation while the land is being used for another purpose. The loss of habitat during this period is irretrievable, but the loss of the resource is not irreversible.

Irreversible or irretrievable commitments of resources are described below for those resources where they were identified during the impact evaluation described in Chapter 3, Affected Environment and Environmental Consequences. Irreversible or irretrievable commitments of resources were not identified for the remaining resources.

4.4.1. Vegetation

Irretrievable impacts on vegetation could include the temporary loss of vegetation communities during construction and operations. Although this loss of vegetation would be temporary and

reversible (upon reclamation and closure), it would take decades to re-establish relatively mature trees.

4.4.2. Wetlands

There would be an irreversible impact related to wetlands within the Project area through filling or excavation activities. Construction of access roads, service roads, and the CTF would result in approximately 1 acre of permanently impacted wetlands from fill and dredging activities, and would convert the wetlands there to a different use.

4.4.3. Wildlife

Irreversible impacts on wildlife could include direct mortality from wildlife-vehicle collisions. The increase in traffic in the Project area could increase the risk of direct mortality for small species to big game animals.

Irretrievable impacts on wildlife could include the temporary loss of habitat during construction and operations. Although this loss of habitat would be reversible and temporary (i.e., it would be revegetated during the reclamation phase), it would take decades to re-establish the habitat created by relatively mature trees.

4.4.4. Aquatic Biology

There would be an irreversible impact related to aquatic habitat within the Project area through construction activities. Construction of the mine access road crossings of Brush and Little Sheep Creek would permanently impact 0.1 acre of riparian wetlands and 154 feet of streams from the construction of culverts.

4.5. REGULATORY RESTRICTIONS

MEPA requires an evaluation of regulatory restrictions imposed on private property rights as a result of major actions of state agencies, including an analysis of alternatives that reduce, minimize, or eliminate the regulation of private property (§ 75-1-201(1)(b)(iv)(D), MCA). This includes alternatives and mitigation measures that are designed to protect environmental, cultural, visual, and social resources, but may also add to the cost of the project. Alternatives and mitigation measures either required by state or federal laws and regulations to meet minimum environmental standards or consented to by the Proponent do not need to be evaluated for private property rights implications.