

General Hard-Rock Mining Avoidance and Mitigation Measures

- Potential impact: Project footprint, or the surface area occupied by the mine and its components including: open pits, supporting infrastructure (buildings, processing facilities, pipelines), waste stockpiles, disposal areas, etc.
 - A&M: Impacts may be reduced by minimizing project footprint to the degree possible (e.g. underground mining, backfilling) and siting structures to avoid sensitive environmental and cultural features.
- Potential impact: Transportation including shipping, all-season roads, rail. Shipping may impact marine mammals through noise and strikes; disruption of migratory routes; introduction of aquatic invasive species (ballast water); sediment; ports (footprint, drilling, vibration), etc. All-season roads and rail: Removal of riparian habitat, construction and operation of watercourse crossings, disruption to migratory routes, introduction of aquatic invasive species, sediment, angling pressure. (see also more detailed Pathways of Effects)
 - A&M: Siting to select route of least impact, avoiding sensitive habitats; buffer zones and speed limits for noise; monitoring to avoid ship strikes (e.g. on-board, drones); ballast water sampling and exchange at sea; appropriately constructed crossings; erosion and sediment control; timing windows for sensitive periods. Minimize the use of explosives and conduct blasting operations outside of sensitive periods; adhere to best practices for fish salvage and relocation, maintain flows to avoid impacting fish passage.
- Potential impact: Water Management. Mine pit dewatering typically requires groundwater suppression, which can dewater nearby waterbodies. Groundwater may be highly saline. Surface water extraction may be used for processing and or camp facilities. Wastewater may not be of suitable quality even for industrial use. Destruction of waterbodies may occur, as well as stream and runoff diversion around mine sites. See also more detailed Pathways of Effects)
 - A&M: Augmentation of flows in streams impacted by dewatering during biologically sensitive periods. Water treatment and recycling to reduce requirement for fresh process water and need for wastewater storage. Construct stream diversion channels with features to promote development of aquatic habitat.(Potential impact: Materials and waste management. Removal of surface features and creation of waste material piles can result in landscape and drainage alterations, as well as introduce deleterious substances. Overburden: timber from site clearing may be utilized. Soil may be stockpiled for future use in reclamation. Waste rock: may be stockpiled or used to backfill mine pits, or for road fill (see also more detailed Pathways of Effects).
 - A&M: Siting in non fish-bearing waterbodies or water bodies not connected to major systems, land-based options or redesign e.g. encapsulation, dry covers. Water quality must meet regulatory requirements prior to any release.

- Potential impact – Pit Lakes, reclamation. Open pit and underground may be backfilled with water, resulting in a large and deep hole, typically unsuitable for the establishment of productive ecosystems due to morphology and/or toxicity. Capping waters can be deeper than 100 m and are intended to prevent mixing of toxic materials from the bottom of the lake through the formation of a stable halocline.
 - A&M: Offsetting may be applied for residual effects (e.g. restoration, replacement, remediation, enhancement, habitat creation/construction, stocking, translocation, complementary measures, etc.). Offsetting is typically required to provide a benefit to the affected fisheries