

## 1.0 INTRODUCTION

### 1.1 OVERVIEW

The Minnesota Department of Natural Resources (MDNR), the U.S. Army Corps of Engineers (USACE), and the U.S. Forest Service (USFS), in cooperation with the U.S. Environmental Protection Agency (USEPA) Region 5, Bois Forte Band of Chippewa (Bois Forte), Grand Portage Band of Lake Superior Chippewa (Grand Portage), and the Fond du Lac Band of Lake Superior Chippewa (Fond du Lac) have prepared a joint state-federal Supplemental Draft Environmental Impact Statement (SDEIS) for the proposed NorthMet Mining Project (NorthMet Project) and Land Exchange (Figure 1-1).

The SDEIS supersedes the Draft Environmental Impact Statement (DEIS), which was published in October 2009 (see Chapter 2 for more information on the SDEIS development).

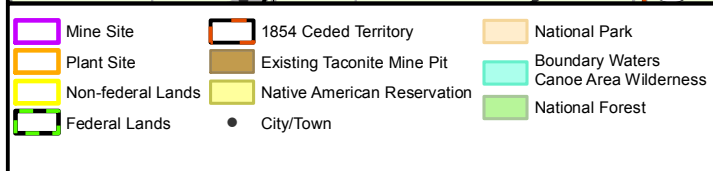
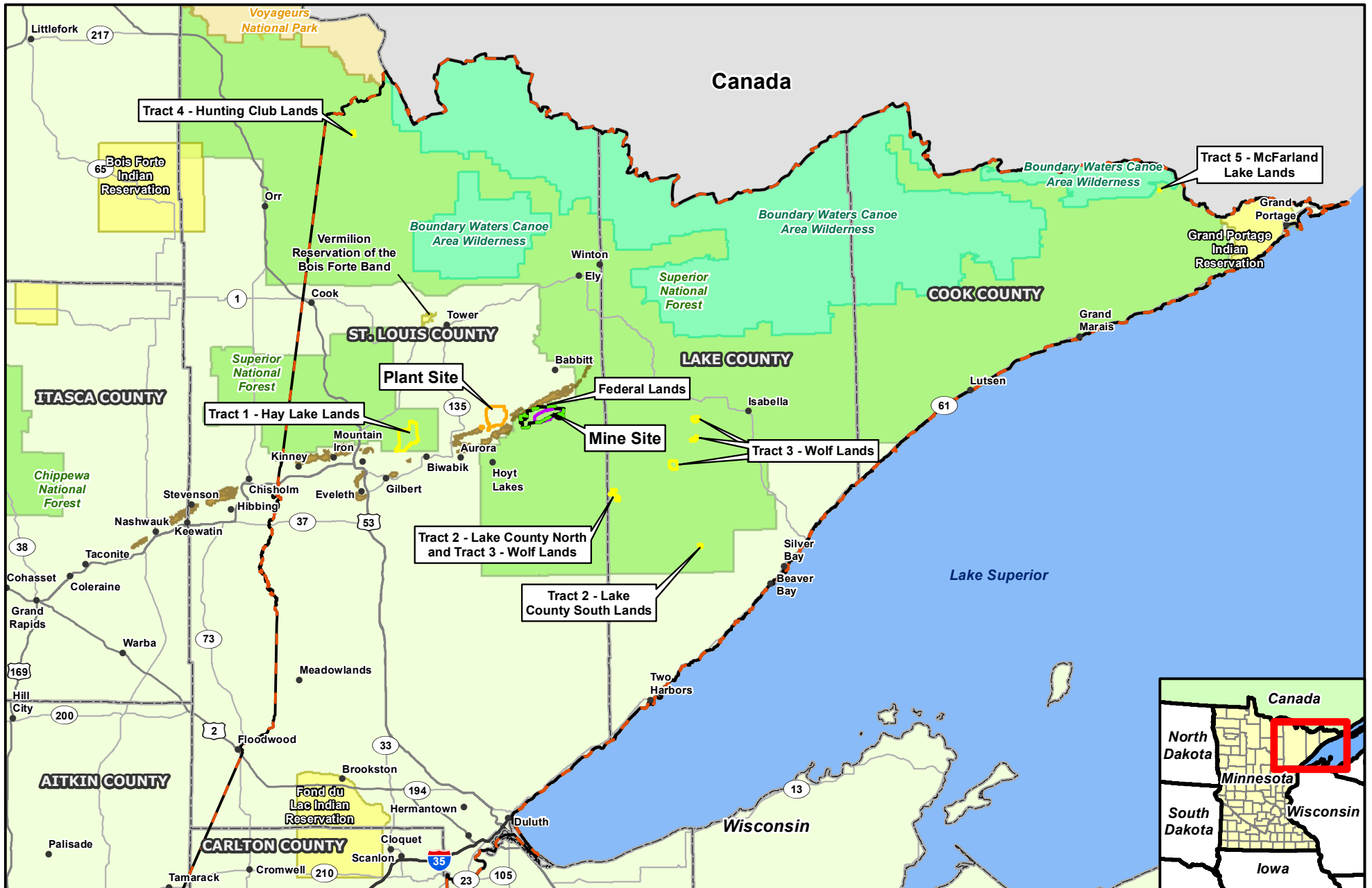
The Land Exchange has been proposed by the USFS, while the mining and processing have been proposed by PolyMet Mining Corporation (PolyMet). The Land Exchange is a connected action to the NorthMet Project and is included in the analysis of environmental effects as part of the overall proposal.

The Proposed Action has two major components (Figure 1-1):

- The NorthMet Project consisting of:
  - Mine Site: A new surface mine, which includes development of mine pits, permanent and temporary waste rock stockpiles, an overburden storage and laydown area, a Wastewater Treatment Facility (WWTF), water collection and conveyance pipelines, a Central Pumping Station (CPS), and a rail transfer hopper.
  - Transportation and Utility Corridor: Expansion of an existing right-of-way (ROW) to connect the Mine Site and the Plant Site to the transportation and utility infrastructure and upgrades to Dunka Road. New ROW and infrastructure to be constructed include railroad spurs, water pipelines, and transmission lines.
  - Plant Site: Existing facilities remaining from the former LTV Steel Mining Company (LTVSMC), which closed in 2001, would be refurbished and reused. Two new facilities would be constructed, one for beneficiation and one for hydrometallurgical processing. Associated with these would be the expansion of the existing LTVSMC Tailings Basin to accommodate NorthMet Project tailings, construction of a Hydrometallurgical Residue Facility, and construction of a new Wastewater Treatment Plant (WWTP).
- A Land Exchange consisting of:
  - USFS conveyance of Superior National Forest lands encompassing the proposed Mine Site and the lands surrounding the Mine Site.
  - USFS acquisition of up to 5 tracts of private land that lie within the Superior National Forest proclamation boundary to be acquired by PolyMet.

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This PSDEIS document is a Co-lead Agency provisional draft intended for internal review only. Corrections, revisions, and changes will be made prior to the release of the SDEIS for public review and comment.

**Figure 1-1**  
**Project Vicinity Map**  
 NorthMet Mining Project and Land Exchange PSDEIS  
 Minnesota

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### **1.1.1 NorthMet Project**

The NorthMet Project area, including the Mine Site, Plant Site, and connecting infrastructure, would be located in St. Louis County, Minnesota and situated at the eastern end of the Mesabi Iron Range (Figure 1-2). The Mine Site is an area of the Superior National Forest that has not previously been mined, located approximately 6 miles south of the City of Babbitt and directly south of the Northshore Mining Company's Northshore Mine, which is an active taconite/iron mine.

The Plant Site would be approximately 6 miles north of the city of Hoyt Lakes at the former LTVSMC processing plant. This facility would be refurbished and would include a new Beneficiation Plant and Hydrometallurgical Plant.

When operational, surface mining and processing of copper-nickel-platinum group element (PGE) ore would take place over an approximately 20-year mine life and have the following outputs:

- approximately 73,068 tons per day (tpd) of rock, including up to 32,000 tpd of ore from a surface mine with three pits (i.e., East Pit, Central Pit, and West Pit);
- approximately 15 million tons of waste rock annually; and
- tailings from the Beneficiation Plant and residues from the Hydrometallurgical Plant.

After operations end, the NorthMet Project facilities would be closed and reclaimed. These actions would include: vegetative and watershed restoration of the waste rock stockpiles and Tailings Basin, building and infrastructure demolition, and monitoring and maintenance of the closure activities.

### **1.1.2 Land Exchange**

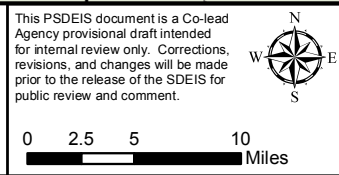
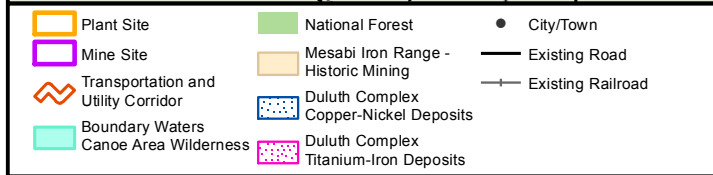
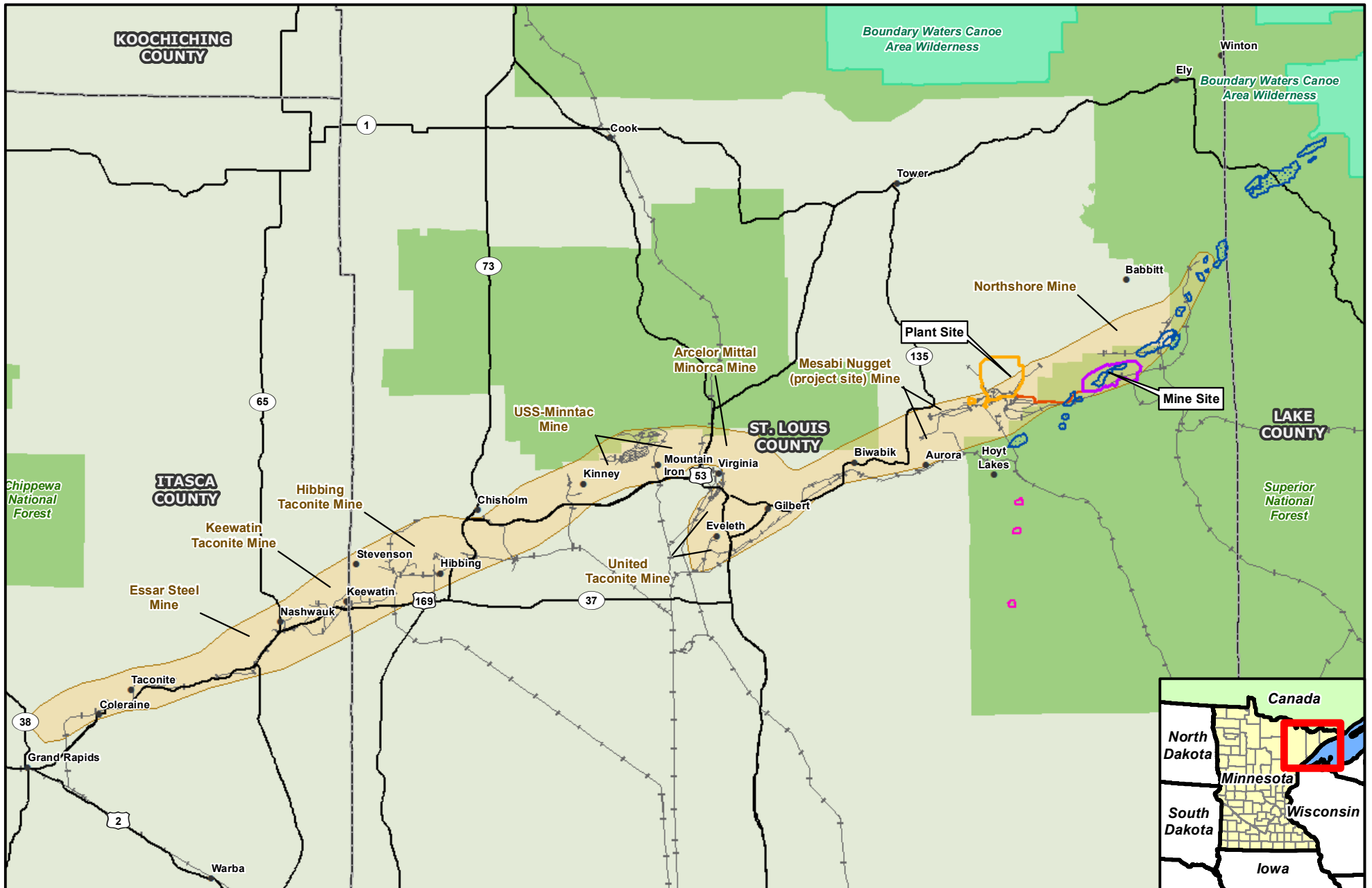
The Land Exchange is considered a "connected action" to the NorthMet Project (40 Code of Federal Regulations [CFR] part 1508.25). It is included in the analysis of environmental effects as part of the overall Proposed Action. The proposed NorthMet Mine Site would affect federal lands for which PolyMet leases the private sub-surface mineral rights. The area affected by the Mine Site was acquired by the United States, for National Forest purposes, under the authority of the Weeks Act of 1911 (16 United States Code [USC] 515) and is managed by the USFS.

The Land Exchange would involve the transfer of approximately 6,650 acres (General Land Office [GLO]) of federal lands from public to private ownership, and up to approximately 6,722 acres (GLO) of land from private to public ownership, depending on the results of the environmental analysis and real estate appraisals.

The Land Exchange would allow use of parts of the federal lands for the NorthMet Project mining activities. PolyMet has indicated that management of the exchanged federal lands outside of the proposed mining development could include some upland timber management to enhance wildlife habitat; however, there are no current proposed disturbances to this area. There are no activities proposed on the non-federal lands as part of the Land Exchange.

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**Figure 1-2**  
**Proposed Location**  
 NorthMet Mining Project and Land Exchange PSDEIS  
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## **1.2 EIS ROLES AND RESPONSIBILITIES**

### **1.2.1 Co-lead Agencies**

Since both USACE and USFS have federal actions pertaining to the NorthMet Project and Land Exchange, these agencies have elected to become Co-lead federal Agencies for the implementation of the National Environmental Policy Act (NEPA) and the preparation of the SDEIS. Under the Clean Water Act (CWA), Section 404 (33 USC § 1344), the USACE is responsible for determining if a project is adequate before issuing the section 404 permit. The Proposed Action also requires preparation of a mandatory State Environmental Impact Statement (EIS) under the Minnesota Environmental Policy Act (MEPA) and *Minnesota Rules*, part 4410.4400(8)(C), which designate the MDNR as the Responsible Governmental Unit (RGU) or lead state agency.

MDNR, USACE, and USFS are Co-lead Agencies for the joint state-federal EIS and, therefore, are responsible for the content of the SDEIS and Final Environmental Impact Statement (FEIS) and have final authority over the language used in the documents.

### **1.2.2 Cooperating Agencies**

Per the Council on Environmental Quality (CEQ) regulations 40 CFR 1504.1(b), the Clean Air Act (CAA) Section 309 (42 USC § 7609) authorizes the USEPA to review federal EIS documents. Under shared authority with the USACE for the CWA, Section 404 (33 USC § 1344), USEPA has the authority and obligation to review all federal EIS documents and publish its review in the public record.

The USEPA submitted comments on the DEIS on February 18, 2010 and assigned the DEIS a rating of EU-3 (Environmentally Unsatisfactory – Inadequate Information). Following the DEIS, USEPA agreed to become a Cooperating Agency pursuant to NEPA for the development of the SDEIS in order to participate in resolving issues identified in USEPA's comment letter on the NorthMet Project's initial DEIS.

Along with the USEPA, Bois Forte, Grand Portage, and Fond du Lac (the Bands) have been invited by the Co-lead Agencies to participate as Cooperating Agencies. The Mine Site, Plant Site, federal lands, and non-federal Land Exchange lands are all located within the 1854 Treaty Authority Ceded Territory where the Bands reserve usufructuary rights (hunting, fishing, and gathering). The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) and the 1854 Treaty Authority have assisted the Bands in addressing issues with the NorthMet Project and Land Exchange.

### **1.2.3 Other Agencies**

While not Co-lead or Cooperating Agencies, other federal and state agencies have important roles on the project. The Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Health (MDH) are assisting the MDNR pursuant to *Minnesota Rules*, part 4410.2200. The United States Fish and Wildlife Service (USFWS) is also involved with review of project materials and the Biological Assessment and will provide a Biological Opinion.

### **1.3 PURPOSE AND NEED**

#### **1.3.1 Applicant's Purpose and Need Statement**

The applicant's stated purpose of the NorthMet Project is to exercise PolyMet's mineral lease to continuously mine, via open pit methods, the known ore deposits (NorthMet Deposit) containing copper, nickel, cobalt, and platinum group metals to produce base and precious metal precipitates and flotation concentrates by uninterrupted utilization of the former LTVSMC processing plant.

The purpose of the proposed Land Exchange is to consolidate the surface and mineral ownership of the lands involved at the Mine Site. PolyMet has a lease to mine the minerals on its NorthMet Deposit, which is surrounded by active and abandoned taconite mines in the mining district near Hoyt Lakes. The surface of these lands is owned by the United States.

The need for the NorthMet Project is driven by domestic and global demand of these products. Demand continues to rise for these metals due to the expansion of the green economy and rising demand from developing countries like India, China, and Brazil. Based on the closure of LTVSMC and other job losses in northeastern Minnesota, there is also a need for jobs and economic development in the area.

#### **1.3.2 Co-lead Agencies' Purpose and Need Statements**

##### **1.3.2.1 NorthMet Project and Land Exchange Purpose and Need Statement**

The purpose of the Proposed Action is:

- For PolyMet to utilize its leased mineral rights and recover commercial quantities and quality of semi-refined metal concentrates, hydroxides, and precipitates from the NorthMet ore body in northern Minnesota, and to process the recovered ore by reutilizing the former LTVSMC processing plant.
- To extract metals in a safe, environmentally responsible, energy-efficient, and economically feasible manner subject to mitigation measures designed to avoid or minimize environmental effects to the extent practicable.
- To extract and process metals in a technically and economically feasible manner, such that there would be sufficient income to cover: operating cost (which includes but is not limited to the cost of mining, processing, transportation, and waste management), capital cost (needed to build and sustain facilities), an adequate return to investors, reclamation, and closure costs and taxes.
- To exchange land within the Superior National Forest with land that has equal or greater value and help the USFS meet its management objectives by eliminating conflicts and consolidating land ownership.

##### **1.3.2.2 United States Forest Service**

PolyMet believes its private mineral rights include the right to develop an open pit mine on the proposed Mine Site. Most of the lands involved in the NorthMet Project were acquired by the United States under the authority of the Weeks Act of 1911 (16 USC 515). The USFS has taken the position that the mineral rights, which were reserved, do not include the right to surface mine

as proposed by PolyMet. The USFS is not willing or able to authorize such private, surface mining operations on lands of the Superior National Forest. The USFS's purpose and need is to resolve this conflict between the United States and the private mineral estate. This action is supported by Forest Plan direction as stated in D-LA-1 (Forest Plan, page 2-51) and minerals D-MN-2 (Forest Plan, page 2-9).

### **1.3.2.3 United States Army Corps of Engineers**

The purpose and need of the Proposed Action is to produce base and precious metals precipitates and flotation concentrates from ore mined at the NorthMet Deposit by uninterrupted operation of the former LTVSMC processing plant. The processed resources would help meet domestic and global demand by sale of these products to domestic and world markets.

### **1.3.2.4 Minnesota Department of Natural Resources**

The purpose of the Proposed Project is to act on state policy that provides for the diversification of the state's mineral economy through long-term support of mineral exploration, evaluation, environmental research, development, production, and commercialization (Minnesota Statute 93.001).

## **1.4 REGULATORY FRAMEWORK**

### **1.4.1 National Environmental Policy Act**

#### **1.4.1.1 Overview**

NEPA requires that federal agencies consider the potential environmental consequences of proposed actions in their decision-making process. The law's intent is to protect, restore, or enhance the environment through well-informed federal decisions. The CEQ was established under NEPA for the purpose of implementing and overseeing federal policies as they relate to this process.

In 1978, the CEQ issued regulations for implementing the procedural provisions of NEPA (40 CFR parts 1500-1508). Section 102(2)(c) of NEPA mandates that the lead federal agency prepare a "detailed statement for legislation and other major federal actions significantly affecting the quality of the human environment." Such projects include: any actions under the jurisdiction of the federal government or subject to federal permits; actions requiring partial or complete federal funding; actions on federal lands or affecting federal facilities; continuing federal actions with effects on land or facilities; and new or revised federal rules, regulations, plans, or procedures. Any significant action with the potential for significant effects requires the preparation of an EIS and a Record of Decision (ROD). Pursuant to NEPA, the USACE will use the FEIS to support its ROD for intent to issue a CWA Section 404 Wetland Permit as needed for the Proposed Action to proceed. Likewise, the USFS will use the FEIS to support its ROD for the proposed Land Exchange action.

The USACE, during its review of PolyMet's permit application, determined that the NorthMet Project would require the preparation of an EIS in accordance with the requirements of NEPA and the CEQ regulations. To comply with other relevant environmental statutes described below,

in addition to NEPA, the decision-making process for the NorthMet Project and Land Exchange involves a thorough examination of all pertinent environmental issues per 40 CFR 1505.

### **1.4.1.2 Alternatives**

NEPA requires that a "range of alternatives" must be discussed in the environmental documents prepared for a proposed action (40 CFR 1502.14). This includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them. The emphasis is on what is "reasonable" rather than on whether a proponent or applicant prefers or is itself capable of carrying out a particular alternative. NEPA also requires consideration of the No Action Alternative, in which the proposed project would not proceed.

## **1.4.2 Minnesota Environmental Policy Act**

### **1.4.2.1 Overview**

In addition to the NEPA process, *Minnesota Statutes*, Chapter 116D requires environmental review. The MEPA environmental review process is an information collection and disclosure tool for state agencies. It informs the subsequent permitting and approval processes and describes mitigation measures that may be available. The MEPA process operates according to rules adopted by the Minnesota Environmental Quality Board (MEQB). However, the actual reviews are usually conducted by a local governmental unit or a state agency. The organization responsible for conducting the review is referred to as the RGU. The MEQB staff advises the RGU and state agencies on the proper procedures for environmental review and monitors the effectiveness of the process in general. By rule, the MDNR is the designated RGU for the NorthMet Project. Pursuant to MEPA, the RGU will determine the adequacy of the FEIS. If a determination of adequacy is issued, then final decisions can be made by the appropriate governmental units on state permits.

*Minnesota Rules*, part 4410.4400, subpart 8 dictates that an EIS shall be prepared because the NorthMet Project exceeds the threshold listed for construction of a new metallic mineral mining and processing facility. Under MEPA, the SDEIS must be consistent with *Minnesota Rules*, part 4410.0200 to part 4410.7800 and the scoping determination. The adequacy of the FEIS is governed by *Minnesota Rules*, part 4410.2800.

### **1.4.2.2 Alternatives**

MEQB statutes and rules (*Minnesota Statutes*, chapter 116D, sections 04 and 045; and *Minnesota Rules*, part 4410, subpart 0200 through 7500) require that an EIS include at least one alternative in each of the following categories (in addition to the No Action Alternative):

- alternative sites,
- alternative technologies,
- modified designs or layouts,
- modified scale or magnitude, and

- alternatives incorporating reasonable mitigation measures identified through comments received during the comment periods for EIS scoping or for the DEIS.

If no alternative is included for any given category, an explanation must be provided in the EIS. An alternative may be excluded if it fails to meet the underlying need for or purpose of the project, is unlikely to have any significant environmental benefit compared to the project as proposed, or another alternative would likely have similar environmental benefits but substantially less adverse economic, employment, or sociological effects.

### **1.4.3 Land Exchange Requirements**

Most of the public lands involved in the NorthMet Project were acquired by the United States under the authority of the Weeks Act of 1911, which restricts the USFS from allowing, by decision, surface mining as proposed by PolyMet. Other authorities that govern the Land Exchange between PolyMet and the United States include the Federal Land Policy and Management Act of 1976 and the Federal Land Exchange Facilitation Act of 1988.

Under the Federal Land Policy and Management Act of 1976 (43 USC 1716, 1717; FSM 5430.12), a land exchange involves the transfer of equal valued land. If land values are not equal, the balance can be paid up to an amount of 25 percent of the land exchange value. The land exchange must also comply with Executive Order (EO) 11990, which requires “that the exchange preserve wetland functions with no net loss to the Federal estate (FSH 5409.13, 33.43c)...” (EO 11990). In addition, a land exchange must also comply with EO 11988, which requires “that the exchange not increase flood hazards to the non-Federal estate (FSH 5409.13, 33.43c)...” (EO 11988).

To satisfy the requirements of EO 11990 and EO 11988, the USFS uses a balancing test such that, as much as practicable, the number of wetland and floodplain acres on the non-federal land to be acquired is equal to, or greater than, the number of wetland and floodplain acres on the federal land to be exchanged. When balancing wetlands, the agency makes no distinction between type and/or quality of wetlands. If the number of wetland and floodplain acres on the non-federal estate cannot be made equal to the acres on the federal estate, the USFS may retain reservations or restrictions on the unbalanced portion of the wetlands and floodplains, so long as the land exchange is in the public interest.

The USFS is also required, by EO 11988 and EO 11990, to reference in a conveyance those uses that are restricted under identified federal, state, or local wetland and floodplain regulations. In Minnesota, the CWA (USACE/MPCA), Protected Waters Permit Program (MDNR), and the Wetland Conservation Act (WCA) Board of Water and Soil Resources all regulate wetland modifications. Floodplain management ordinances are administered at the local (county) level.

The Land Exchange and associated current and future land use must be consistent with the conditions, goals, and guidelines outlined in the *2004 Superior National Forest Land and Resource Management Plan* (Forest Plan). Additionally, the USFS must analyze whether the Land Exchange meets the goals set forth in the *USDA Forest Service Strategic Plan FY 2007-2012 Goals* (Strategic Plan). The Land Exchange is intended to address four of the seven strategic goals, including: provide and sustain benefits to the American people; conserve open space; sustain and enhance outdoor recreation opportunities; and maintain basic management capabilities of the USFS (United States Department of Agriculture [USDA] 2007c).

The Land Exchange would be designed to be consistent with the remaining goals and objectives of the Forest Plan (USDA 2007c). The non-federal lands for Land Exchange would need to be incorporated within the adjacent federal ownership and managed in accordance with the Forest Plan direction for the particular Management Area.

The Forest Supervisor, as the Responsible Official for the Superior National Forest, will decide whether to proceed with the proposed Land Exchange and this decision will be documented in a ROD. The EIS will serve as the basis for the decision.

### 1.4.4 Other Permits and Requirements

In accordance with *Minnesota Rules*, part 4410.3900, which seeks to reduce duplication to the fullest extent between the Minnesota Statutes and NEPA, a joint state-federal EIS has been prepared to comply with both NEPA and MEPA regulations. In addition, PolyMet must obtain the required federal, state, and local permits and approvals summarized below (Table 1.4-1).

**Table 1.4-1 Government Permits and Approvals for the Proposed Action**

Agency	Permit/Approval	Reason Permit or Action is (or May be) Needed
<b>Federal</b>		
USACE	Section 404 Individual Permit	For affected wetlands within the jurisdiction of the USACE under the Clean Water Act, 40 CFR Part 230; Section 404(b)(1)
	Section 106 Consultation (Minnesota Historic Preservation Office)	Necessary due to the NorthMet Project and Land Exchange being a federal undertaking, 36 CFR Part 800
USFWS	Section 7 Endangered Species Act (ESA) Consultation	Necessary due to the NorthMet Project and Land Exchange being a federal undertaking, 50 CFR 402
USFS	Land Exchange	If there will be surface disturbance on federal land holdings
	Section 106 Consultation (Minnesota Historic Preservation Office)	Necessary due to the NorthMet Project and Land Exchange being a federal undertaking, 36 CFR Part 800
<b>State</b>		
MDNR	Permit to Mine	Required for all nonferrous metallic mining operations, <i>Minnesota Rules</i> , chapter 6132
	Endangered Species Taking Permit (if required)	If there are state-listed species that may be taken by the NorthMet Project, <i>Minnesota Rules</i> , parts 6212.1800-6212.2300 and 6134
	Water Appropriations Permit for plant make-up water	For withdrawal of water from Colby Lake for plant make-up water; For mine dewatering; For stream augmentation

<b>Agency</b>	<b>Permit/Approval</b>	<b>Reason Permit or Action is (or May be) Needed</b>
	Dam Safety Permit	For the Tailings Basin, Hydrometallurgical Residue Facility, and potentially the water retention dikes at the Mine Site (e.g., water treatment plant pond dikes), <i>Minnesota Rules</i> , parts 6115.0300-6115.0520
	Permit for Work in Public Waters	For possible modifications and diversions of local streams in constructing the West Pit outfall
	Wetland Replacement Plan approval under WCA	For affected wetlands within the scope of the WCA or that constitute “public wetlands”
	Burning Permit (if required)	If vegetative material would need to be burned on-site during times with no snow cover
MPCA	Section 401 Water Quality Certification/Waiver	State permit required in conjunction with the USACE Section 404 Permit Application
	National Pollutant Discharge Elimination System and State Disposal System (NPDES/SDS) Permits	For construction and industrial activity that would disturb one acre or more of land, the management of construction and industrial stormwater and the discharge to surface or groundwater
	Solid Waste Permit	For construction debris
	Air Emissions Permit	For emissions of regulated air pollutants
	Waste Tire Storage Permit	For storage of waste tires generated from NorthMet Project-related vehicles (if required)
	General Storage Tank Permit	For multiple NorthMet Project aboveground storage tanks (ASTs)
MDH	Radioactive Material Registration	For measuring instruments
	Permit for Non-Community Public Water Supply System and a Wellhead Protection Plan (if proposed)	Existing Plant Site potable water treatment plant to be refurbished
	Permit for Public On-site Sewage Disposal System	For sewage waste generated during construction and operation that would be disposed on-site
<b>Local</b>		
City of Hoyt Lakes	Zoning Permit	To acknowledge NorthMet Project is an allowable use within the zoned Mining District
City of Babbitt	Building Permit	New construction would occur on areas of the NorthMet Project within the incorporated limits of the City of Babbitt
St. Louis County	Zoning Permit	To acknowledge NorthMet Project is an allowable use within the zoned district

### **1.4.5 Financial Assurance**

Financial assurance is required by state law. *Minnesota Rules* part 6132.1200 requires that before a Permit to Mine can be granted, financial assurance instruments covering the estimated cost of reclamation should the mine be required to close for any reason at any time must be submitted and approved by the MDNR. Financial assurance is discussed in further detail in Sections 2.5 and 3.2.2.4.

## **1.5 PURPOSE OF THE SDEIS**

The scope of the DEIS was limited to analysis of effects resulting from the NorthMet Project and to propose possible mitigation measures. The purpose of this SDEIS, which supersedes the DEIS, is still to provide an analysis of effects resulting from the NorthMet Project and propose mitigation measures, but also to incorporate the Land Exchange, and to consider USEPA concerns and public comments, evolving state and federal guidance, and PolyMet's project refinements identified since the DEIS. The SDEIS discusses key themes, which include air, wetlands, geotechnical stability, socioeconomics, water resources, cultural resources, and alternatives. Additionally, the SDEIS will be used to solicit public comment and help the Co-lead Agencies develop the FEIS.

## **1.6 ORGANIZATION OF THE SDEIS**

This SDEIS follows the CEQ's recommended organization (40 CFR part 1502.10) and MEPA content requirements (*Minnesota Rules*, part 4410.2300).

Chapter 1.0 (Introduction) provides an overview and descriptions of the purpose of and need for the NorthMet Project and Land Exchange, regulatory framework, agency roles and responsibilities, and the organization of the SDEIS.

Chapter 2.0 (EIS Development) describes the DEIS development process for the NorthMet Project and the SDEIS development process for the NorthMet Project and Land Exchange. Discussion includes scoping, identification of issues, development of the NorthMet Project Proposed Action and Land Exchange Proposed Action and alternatives, public and agency participation, consultation and coordination undertaken to prepare the SDEIS, incorporation of the Land Exchange, reevaluation of DEIS alternatives, and impact analysis process.

Chapter 3.0 (Proposed Action and Project Alternatives) describes the NorthMet Project Proposed Action and Land Exchange Proposed Action and alternatives including the No Action Alternative and Alternatives Considered but Eliminated from detailed consideration.

Chapter 4.0 (Affected Environment) summarizes the existing conditions of the NorthMet Project and the surrounding environment and the Land Exchange parcels including the land and its physical, biological, cultural, socioeconomic, and recreational resources.

Chapter 5.0 (Environmental Consequences) presents the direct and indirect environmental consequences of the NorthMet Project and associated alternatives and the direct and indirect environmental consequences of the Land Exchange Proposed Action and associated alternatives.



Chapter 6.0 (Cumulative Effects) describes the cumulative effects on the surrounding environment and uniquely affected communities with regard to the Proposed Action for the NorthMet Project and the alternatives for the Land Exchange.

Chapter 7.0 (Comparison of Alternatives and Other Considerations) contains a comparison of the NorthMet Project and Land Exchange Proposed Action and alternatives, and also addresses other NEPA considerations.

## ***1.7 POLLUTANTS OF INTEREST***

Key pollutants of interest are discussed in various chapters of the SDEIS. Below is a list of the major pollutants referenced within this SDEIS. A number of additional pollutants were also analyzed; however, this list represents those that are of most significance to the SDEIS. The definitions below do not describe potential effects from the NorthMet Project and Land Exchange Proposed Action or alternatives.

- Carbon monoxide (CO): May cause fatigue, chest pain, headaches, confusion, nausea, and dizziness.
- Greenhouse gases (GHG): Increased GHG in the atmosphere can change climate conditions.
- Hazardous Air Pollutants (HAPs): Group of toxic constituents known or suspected to cause significant health effects, such as cancer.
- Mercury, mercury compounds (Hg): Elemental metal, high-level exposure may harm the brain, gastrointestinal tract, nervous system, and kidneys. The Bands identified mercury and mercury compounds as an issue for consideration in the EIS.
- Metals/Metalloids (arsenic, cobalt, copper, nickel, antimony): Depending on constituent and exposure, can affect the skin, heart, kidneys, liver, and/or gastrointestinal tract.
- Methylmercury: Organic mercury, bioaccumulates in fish and animals, can be transmitted to humans that consume contaminated fish and game, may harm the fetal nervous system and brain. The Bands identified methylmercury, or organic mercury, as an issue for consideration in the EIS.
- Nitrogen dioxide (NO<sub>2</sub>): May cause respiratory effects.
- Nitrogen oxides (NO<sub>x</sub>): May form nitric acid and create acid rain, which can alter water and soil pH. May also affect regional visibility conditions (haze).
- Particulate matter (PM): Particles smaller than 10 micrometers (PM<sub>10</sub>) may enter the lungs or bloodstream, particles smaller than 2.5 micrometers (PM<sub>2.5</sub>) affect regional visibility conditions (haze).
- Sulfate (SO<sub>4</sub>): Can contribute to methylation of mercury, may affect wild rice. The Bands identified sulfate as an issue for consideration in the EIS.
- Sulfur dioxide (SO<sub>2</sub>): Acute exposure may cause respiratory effects such as bronchoconstriction or increased asthma symptoms. May also affect regional visibility conditions (haze).

Table 1.7-1 below describes the SDEIS chapters in which the above pollutants and related topics are discussed.

**Table 1.7-1 Pollutants of Interest Discussed in the SDEIS**

<b>Pollutant</b>	<b>Topic</b>	<b>SDEIS Section</b>
Carbon monoxide (CO)	Air emissions effects	5.2.7.1.3, 6.2.3.8.4
Greenhouse gases (GHG)	Air emissions effects	5.2.7.2.4, 5.2.7.4.2
	Climate change – cumulative effects	6.2.3.8.13
Hazardous Air Pollutants (HAPs)	Air emissions effects	5.2.7.1.3, 6.2.3.8.5
Mercury, mercury compounds (Hg)	Air emissions effects	5.2.7.2.5, 6.2.3.8.6
	Mercury balance, TMDL, offsets	5.2.6.2.3, 5.2.7.2.5, 5.2.7.4.1
	Aquatic species/bioaccumulation effects	5.2.7.2.5, 5.2.2.3.4, 6.2.3.8.6
	Wild rice/water effects	5.2.2.1, 5.2.2.3.4
Metals/Metalloids (Arsenic, Cobalt, Copper, Nickel, Antimony)	Air emissions effects	5.2.7.2.3
	Surface and ground water effects	5.2.2.3.2, 5.2.2.3.3
Methylmercury	Aquatic species/bioaccumulation effects	5.2.6.2.3
Nitrogen dioxide (NO <sub>2</sub> )	Air emissions effects	5.2.7.1.3, 5.2.7.2.3, 6.2.3.8.5
Nitrogen oxides (NO <sub>x</sub> )	Air emissions effects	5.2.7.1.3, 5.2.7.2.3, 6.2.3.8.5
Particulate matter (PM)	Air emissions effects	5.2.7.1.3, 5.2.7.2.1, 6.2.3.8.4
	Class I and Class II areas – regional haze effects	5.2.7.1.4, 5.2.7.2.1, 5.2.7.2.2, 6.2.3.8.9
Sulfate (SO <sub>4</sub> )	Air emissions/deposition effects	5.2.7.2.1, 6.2.3.8.5, 6.2.3.8.11
	Surface and ground water effects	5.2.2.1, 5.2.2.2.2, 5.2.2.3.1, 5.2.2.3.2, 5.2.2.3.3
	Effects to wild rice	5.2.2.1.2, 5.2.2.3.2, 5.2.2.3.3, 5.2.2.3.4
	Aquatic species effects	5.2.6.2.1, 5.2.6.2.3, 6.2.3.7.4
	Mercury methylation effects	5.2.3.2.3
Sulfur dioxide (SO <sub>2</sub> )	Air emissions effects	5.2.7.2.1

TMDL = Total Maximum Daily Load