Prepared for:
PolyMet Mining Corporation
Hoyt Lakes, Minnesota

Threatened, Endangered, and Sensitive Species and Habitat Assessment for the Proposed PolyMet Land Exchange

Final

AECOM Environment
October 2009
Document No.: 05461-004-0400

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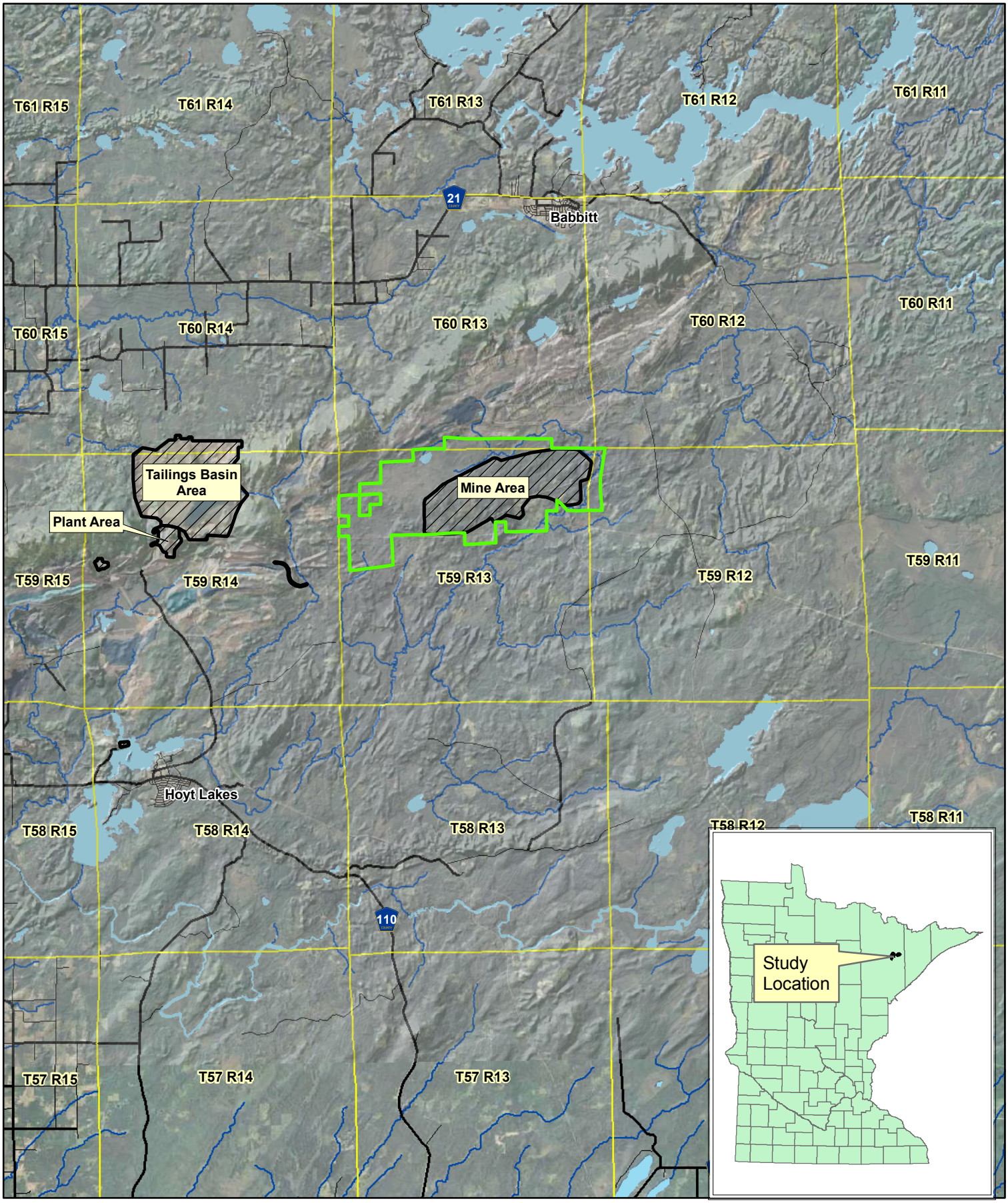
1.0 Introduction and Purpose of Report

This report provides an assessment of threatened, endangered, and sensitive (TES) species and habitat for the proposed exchange of approximately 6,621 acres of federal land for approximately 4,790 acres of private land to be purchased by Polymet Mining Incorporated (PolyMet). Federal lands involved in the exchange are U.S. Forest Service (Forest Service, federal)-administered lands located in eastern St. Louis County, while nonfederal lands are located in Cook and St. Louis counties, Minnesota (Figures 1, 2, and 3). Acreages given in this report are based on Geographic Information System (GIS) mapping and analysis.

This report is intended to be included with National Environmental Policy Act (NEPA) documentation for the proposed land exchange.



Barr Footer: Date: 4/9/2009 8:06:37 AM File: I:\Client\PolymetUsers\amm\USFS_Exchange_areaMaps\Fig 1 - Study Location.mxd User: amm

Land owned or to be obtained by PolyMet

PolyMet Project Areas

Townships

N

0 1.5 3 6

Miles

Figure 1

EXCHANGE PARCEL
STUDY LOCATION
PolyMet Mining Corporation
Hoyt Lakes, Minnesota

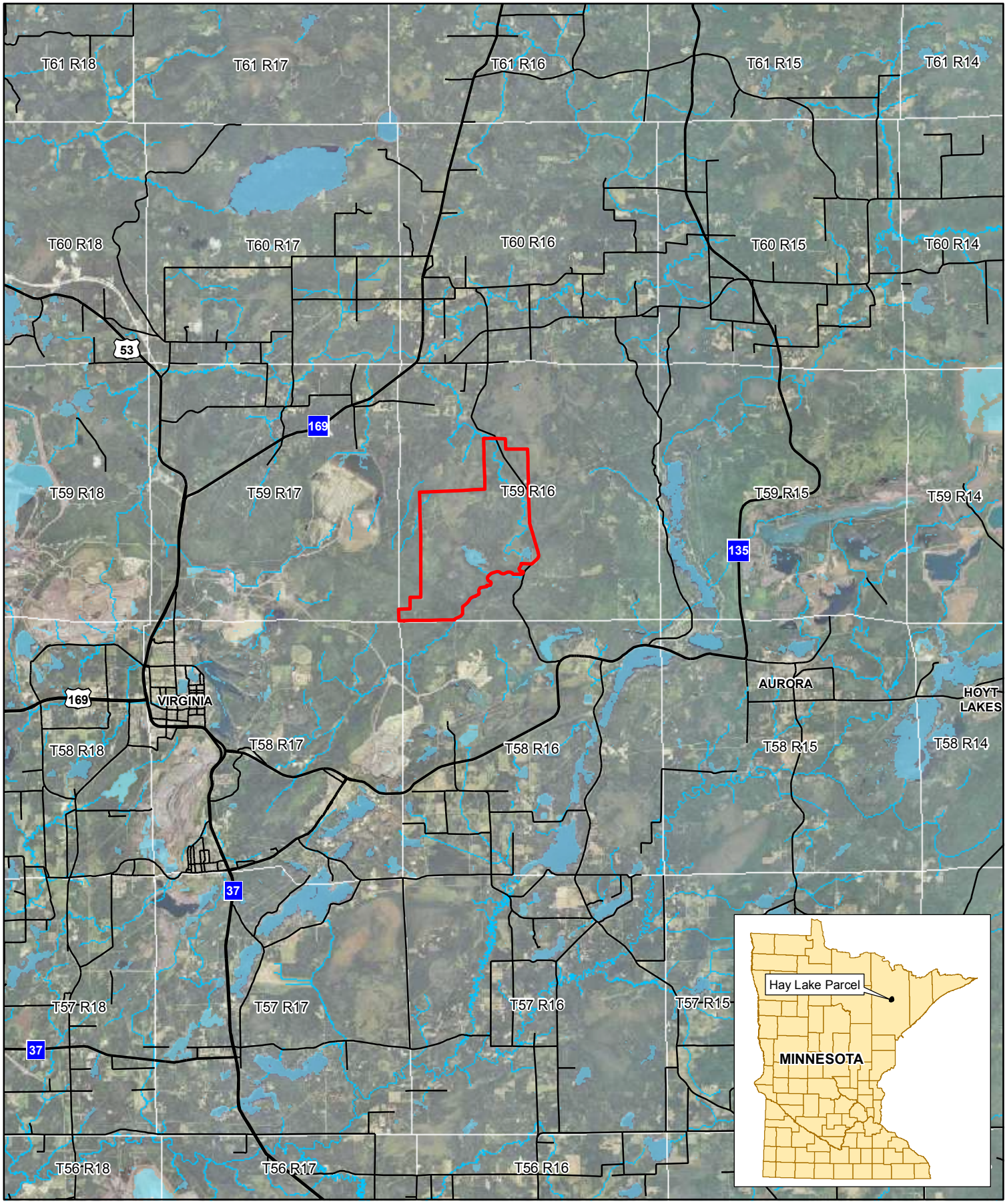
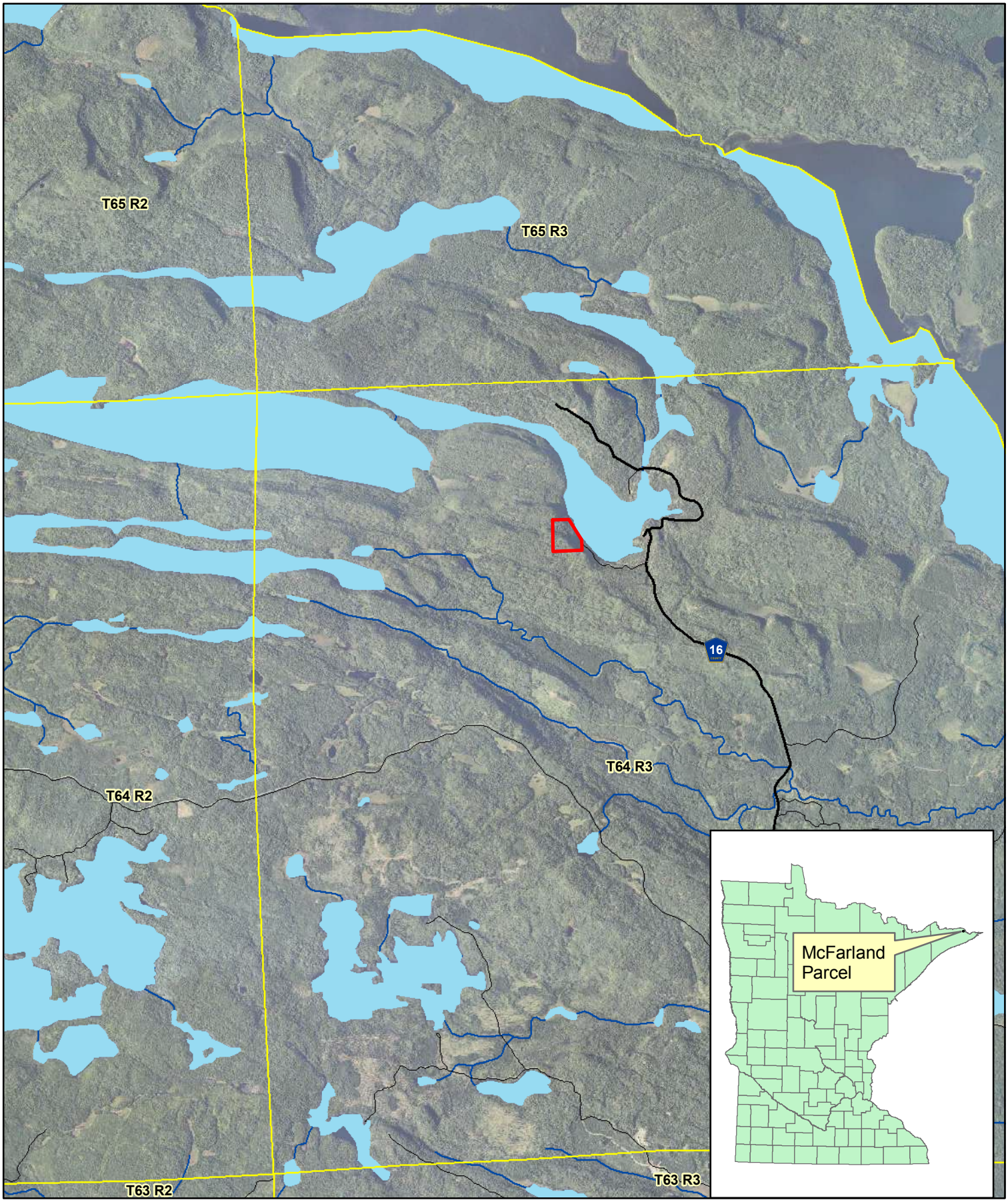


Figure 2

HAY LAKE PARCEL
LOCATION MAP
Hoyt Lakes, Minnesota



Barr Footer: Date: 8/4/2009 7:04:57 AM File: I:\Client\Polymet\Users\amm\Maps\MISC\Fig 3 - McFarland Parcel Location Map.mxd User: amm

McFarland Parcel

Townships

N

0 0.5 1 2

Miles

Figure 3

MCFARLAND PARCEL
LOCATION MAP
Hoyt Lakes, Minnesota

2.0 Findings

2.1 Net Change in TES Species and Abundance

1. **There would likely be no net change of plant species of special concern to the federal estate.** Two state endangered, two state threatened, and nine state species of special concern plant species are found on the federal parcel; nine of these species are also Forest Service Regional Forester Sensitive Species. The nonfederal parcels have been little surveyed, but based on information from the MnDNR Heritage Program, one state endangered, two state threatened, and six species of special concern have been found within 1 mile of the Hay Lake parcel. Two state threatened species were found on the McFarland Parcel, and one state threatened and three species of special concern have been found within 1 mile of the McFarland parcel.

2. **There would likely be no net change of animal species of special concern to the federal estate.** Two federally listed species, the Canada lynx (*Lynx canadensis*) and gray wolf (*Canis lupus*), have been found on or within a mile of the federal and nonfederal parcels. Species of concern found during surveys on the Forest Service parcel included northern goshawk (*Accipiter gentilis*), great gray owl (*Strix nebulosa*), ruffed grouse (*Bonasa umbellus*), spruce grouse (*Falcipennis canadensis*), belted kingfisher (*Megaceryle alcyon*), black-backed woodpecker (*Picoides arcticus*), pileated woodpecker (*Drycopus pileatus*), Swainson's thrush (*Catharus ustulatus*), pine warbler (*Dendroica pinus*), beaver (*Castor canadensis*), white-tailed deer (*Odocoileus virginiatus*), and moose (*Alces alces)*. Most of these species were seen on or near the Hay Lake and/or McFarland parcels. No fish species of concern were found on the Forest Service parcel, and none are known to occur on the Hay Lake or McFarland parcels.

2.2 Net Change in Habitat Availability

1. **There would be a net wetland acreage loss of 1,310 acres to the federal estate.** Federal land includes approximately 4,166 acres of wetland. Nonfederal land includes approximately 2,856 acres of wetland.

2. **There would likely be a net wetland function loss to the federal estate.** This net loss of function would result from the 1,310-acre net reduction in the area of wetlands under federal management.

3. **There would likely be minor loss in wetland function to the environment as a whole.** Lands on the Forest Service parcel that PolyMet proposes to acquire are currently subject to low-intensity forest management by the Forest Service. Following the land exchange, these lands would be managed by PolyMet, and about 864 acres of wetlands would be subject to higher-intensity management, resulting in wetland function loss. However, approximately 3,302 acres (79 percent) of wetlands on the Forest Service parcel would not be subject to low-intensity forest management in the future and would take on, over time, characteristics of mature, relatively undisturbed wetlands. In addition, the 2,856 acres of wetlands on nonfederal lands would be subject to low-intensity forest management by the USFS and would likely become more functional over time.

4. **There would be a net gain of 97 acres of lake habitat and a net gain of 12,289 feet of lake shoreline habitat to the federal estate.** Federal land includes approximately 32 acres of lake habitat and 4,680 feet of lake shoreline habitat associated with Mud Lake. Nonfederal land includes approximately 129 acres of lake habitat and 16,463 feet of lake shoreline habitat associated with Hay Lake, Little Rice Lake, and an unnamed lake on the Hay Lake parcel, and 506 feet of lake shoreline habitat associated with McFarland Lake and the McFarland parcel. Based on an index of number of feet of frontage, there would be an approximately 3.6-fold gain in shoreline habitat to the federal estate.

5. **There would be a net gain of 2.9 river/creek miles and a 1.3-fold increase in associated river/creek riparian habitat to the federal estate.** Federal land includes approximately 5.3 miles of river habitat associated with Yelp Creek and the Partridge River. Nonfederal land includes approximately 8.2 miles of river habitat associated with the Pike River. Based on the number of feet of frontage feet, there would be an approximately 1.3-fold increase in riparian habitat to the federal estate.

6. **There would be a net loss of 521 upland acres to the federal estate.** Federal land includes about 2,455 acres of uplands. Nonfederal lands include about 1,934 acres of uplands. Based on surveys conducted for the federal parcel and field surveys recently completed for the Hay Lake and McFarland parcels, it appears that there would be a net loss of young mature and mature forest habitat and a net gain of younger forest to the federal estate.

3.0 Recommendations Based on Current List of Parcels

3.1 Recommendations Based on Current List of Parcels

1. Any changes (additions, deletions, substitutions, etc.) to the list of parcels will render the above-listed findings no longer accurate. If such changes are made, the TES analysis should be re-done based on the revised lists of parcels.

3.2 Options to Reduce Habitat Loss for TES Species

All portions of the federal and nonfederal parcels have the potential to provide habitat for TES plants and animals. Under the proposed land exchange, there would be a loss of approximately 1,310 acres of wetland to the federal estate, including loss of One Hundred Mile Swamp. However, approximately 3,302 of the 4,166 acres of wetlands being conveyed from federal to private ownership, including One Hundred Mile Swamp, would not be disturbed by the proposed project. The exchange would also result in a net loss of wetland function to the federal estate. Loss of wetland acreage and functions could impact TES plants and animals that use wetland habitat. This loss of wetland acreage and functions, and options for reducing the size of, or the potential risk associated with, the projected net loss of approximately 1,310 wetland acres to the federal estate are discussed in the *Wetland, Lake Shoreline, Stream Frontage, and Floodplain Assessment for the Proposed PolyMet Land Exchange* report.

There would be a net loss of approximately 521 acres of upland habitat to the federal estate. Based on surveys conducted for the federal parcel (ENSR 2005, AECOM 2009a, b) and field surveys recently completed for the Hay Lake and McFarland parcels, it appears that there would be a net loss of young mature and mature forest habitat and a gain of younger forest to the federal estate. Young mature and mature upland habitat is important to several TES wildlife species, including northern goshawk, owls, other cavity nesting birds, and bats. With proper forest management, these younger forests should provide mature forest habitat within 20 to 40 years.

4.0 Analysis Area

4.1 U.S. Forest Service Lands

The U.S. Forest Service exchange lands (Exchange Lands) consist of the proposed mine site (Mine Site) and adjoining lands (Additional Parcel), and encompasses 6,621 acres in eastern St. Louis County, Minnesota. The parcel is located at the eastern end of the Mesabi Iron Range (Figure 1).

The Mine Site is 6 miles south of the village of Babbitt, Minnesota. It is 1.5 to 2 miles south of the active Northshore Mining Company open-pit taconite mine and 8.3 miles east of Cliffs Erie's former open-pit taconite mine and processing operations (Figure 1). The Mine Site is connected to the Plant Site by a private railroad and a segment of the private Dunka Road. PolyMet has acquired ownership or the right to use additional lands, trackage, and other railroad assets to secure the access between the Mine Site and the Plant Site. The Mine Site encompasses approximately 3,015 acres in all or portions of: Township 59 North, Range 13 West, Sections 1, 2, 3, 9, 10, 11, and 12 in St. Louis County, Minnesota. Approximately 2,838 acres are administered by the Forest Service. The property is zoned for mining, and PolyMet has a 100 percent leasehold interest in the property. The mineral rights are owned by RGGS Inc., and the majority of the surface is managed by the Forest Service with smaller portions owned by PolyMet, Allete, Cliffs Erie (Cleveland-Cliffs, Inc.), and the State of Minnesota. The Mine Site, which is in a previously logged forest area, is located in the Partridge River drainage, about 3 miles south of Iron Lake and the Laurentian Divide. The Partridge River is in the watershed of the East St. Louis River, which discharges into Lake Superior.

The Additional Parcel is approximately 3,888 acres and is east, west, and north of the Mine Site (Figure 1). Approximately 3,783 acres are administered by the Forest Service. The Additional Parcel includes all or portions of: Township 59 North, Range 13 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 12, 17, and 18, and Township 60 North, Range 13 West, Sections 33, 34, 35, and 36. Much of the Additional Parcel consists of wetlands, and One Hundred Mile Swamp is its dominant feature north of the Mine Site.

4.2 Private Lands

The private lands consist of the Hay Lake and McFarland parcels. The Hay Lake parcel is in central St. Louis County, approximately 3 miles east of Biwabik, Minnesota. The parcel, located at the eastern end of the Mesabi Iron Range, includes approximately 4,760 acres in all or portions of Sections 9, 16, 19, 20, 21, 27, 28, 29, 30, 31, and 32 in Township 59 North, Range 16 West (Figure 2).

The McFarland parcel consists of approximately 30 acres in Section 9, Township 64 North, Range 3 East, in Cook County, Minnesota (Figure 3). It is approximately 3 miles west of the U.S.-Canada border.

5.0 Methods Used to Determine Threatened, Endangered, and Sensitive Species Occurrence and Distribution and Habitat Availability

The occurrence and distribution of TES species was determined using federal and state agency databases of rare species occurrences, and conservation group databases, for records of TES species on Forest Service and private land parcels. In addition, we conducted field studies and reviewed reports of plant and animal assessments conducted on or near the parcels to identify TES species that may use the parcels. Species surveyed include those listed as endangered or threatened, as well as species proposed for listing, by the U.S. Fish and Wildlife Service and Minnesota Department of Natural Resources, and species listed on the Forest Service Regional Forester Sensitive Species list for the Eastern Region.

In March 2008 and July 2009, AECOM requested an updated database search for the occurrence and distribution of TES species on the federal and nonfederal parcels (Minnesota Department of Natural Resources [MnDNR] 2008, 2009). We also reviewed the Superior National Forest and MnDNR bald eagle, northern goshawk, great gray owl, and lynx databases; Wolf Conservation International (2009) wolf database; and Cougar Network (2009) database.

5.1 U.S. Forest Service Lands

Several studies have been conducted for TES plants and animals on the Forest Service parcel. Two rare plant surveys were conducted on the proposed mine project site during July 2004 (Pomroy and Barnes 2004; Walton 2004). A wide variety of habitats were surveyed and Global Positioning System (GPS) was used to record the locations of rare plant occurrences. Photographs were taken of specimens in their habitats, and representative specimens were collected, pressed, dried, and analyzed in the laboratory. Characteristics of the habitat were recorded at each location where TES plants were observed.

Surveys for moonwort, a rare fern, were conducted in July 2004 on the proposed mine project site using protocol developed by Johnson-Groh for the Forest Service (Johnson-Groh 2004). Areas with high potential for having moonworts were searched on hands and knees using the timed meander search approach.

Daniel Jones of Barr Engineering, Inc. (Barr) conducted surveys for St. Lawrence grapefern (*Botrychium rugulosum*) in late August and early September 2007. Surveys were conducted along the Dunka Road and other roads on the proposed mine project site. The majority of vegetation cover types on the site do not provide suitable habitat for St. Lawrence grapefern. Characteristics of the habitat were recorded at each location where TES plants were observed.

ENSR International (ENSR) conducted studies of wildlife use of the proposed 3,015-acre mine project area in 2000 (winter study) and 2004 (summer study; ENSR 2000, 2005). In addition to determining general wildlife use of the area during January and March 2000 and June 2004, the study also determined the presence of TES wildlife species and important habitats used by TES and other wildlife species. These studies involved: 1) reviewing federal and state agency and conservation group databases for known and historic occurrences of TES species in the proposed mine site area; 2) reviewing previous plant and animal surveys conducted on or near the proposed mine site; 3) consultation with agency and conservation group biologists; 4) field surveys to record wildlife and their habitats on the site; and 5) calling surveys for several species of raptors and wolves, included TES species. In addition, a vegetation cover type map was prepared showing the habitat types on the site, including disturbed, wetland, and upland habitats. Within the wetland and upland habitat types, open water, emergent and bog wetland, grassland, shrubland, and deciduous, mixed deciduous/coniferous, and coniferous forest habitat types were recorded.

In October 2004, David Heath conducted studies of the freshwater mussel fauna in two reaches of the Partridge River, one reach of the Embarrass River, and one reach of Trimble Creek (Heath 2004). Mussels were collected by hand using SCUBA and snorkeling equipment.

Wetlands on the Forest Service parcel were evaluated during 2004 to 2008 surveys by ENSR, Barr Engineering Company (Barr), and AECOM (formerly ENSR). Wetlands on the proposed mine project site were initially mapped in June 2004 by ENSR based on a general field survey of the area for wetland and upland habitats used by fish and wildlife (ENSR 2005). The study area was approximately 3,015 acres, and the location and boundaries of wetlands were determined based primarily on vegetative and hydrologic characteristics of the sites (wetland boundaries were not delineated using GPS). Wetland and upland plant communities were mapped on 1997 infrared aerial photographs of the site.

In August 2004, Barr visited the proposed mine site to refine the wetland mapping done by ENSR and to field characterize and map wetland boundaries on approximately 4,300 acres. These included lands surveyed by ENSR and lands that extended beyond the proposed mine project boundary. Approximately 25 percent of the area was surveyed for wetlands. Wetland boundaries were identified using the *1987 Corps of Engineers Wetland Delineation Manual* routine wetland delineation procedures (Environmental Laboratory 1987). Wetland boundaries were field-mapped using GPS, aerial photographic interpretation, topography, and soils information. In June 2005 and July 2006, Barr field verified and delineated wetlands on an additional 70 percent of the 4,300 acre mine study area using the same procedures as in 2004 (Barr 2006).

Barr used the *Minnesota Routine Assessment Method for Evaluating Wetland Functions, Version 3.0* (MnRAM 3.0) to assess wetland functions and values on the Forest Service parcel during 2005-2006 (Barr 2006). Information on the functions and values of each wetland community within the proposed 4,300-acre mine project area, which was gathered by Barr during wetland surveys in 2005 and 2006, included: 1) plant cover and types; 2) plant community diversity and interspersion; 3) outlet characteristics; 4) watershed and adjacent upland land uses and condition; 5) soil condition; 6) erosion and sedimentation; and 7) past and present human disturbance. Based on this assessment methodology, wetlands were rated high, medium, or low. In 2007, Barr used the general guidelines in the *Minnesota Routine Assessment Method for Evaluating Wetland Functions, Version 3.1* (MnRAM 3.1) to assess wetland functions and values on the portions of the Forest Service parcel outside of the proposed mine project area (Barr 2007; Minnesota Board of Water and Soil Resources 2007).

In February 2005, Dan Breneman conducted a stream and wetland biological survey of the Mine Site (Breneman 2005). The survey was conducted on four stream sites and two wetland sites. Fish and macroinvertebrate community composition, habitat characteristics, and water chemistry parameters were examined to establish biological condition at these sites. Fish were sampled by electrofishing, and in wetlands with 24-hour trap net sets. Macroinvertebrates were collected with D-fram Kick nets and Hess, Ekman, or Petite Ponar dredge sampling gear. Total number of fish and total length per species were determined within each stream reach to estimate catch per unit effort. Macroinvertebrates were identified and enumerated, and the relative abundance and taxa richness per site were determined. Stream habitat characteristics and water quality parameters at each site were summarized by point estimates along randomly spaced transects.

In 2006, ENSR conducted an assessment for Canada lynx within a 6-mile radius of the mine project area (ENSR 2006). Surveys were conducted on foot and using snowmachines and trucks to survey roads, skid trails, stream and river channels, and rights-of-way during January through March 2006. All sighting of lynx sign, including tracks, bedding sites, and scat were recorded. Scat were analyzed for DNA characteristics to determine whether the scat belonged to a lynx, the sex of the individual, and whether one or more lynx deposited scat. Characteristics of the habitat were recorded at each location where lynx sign were observed.

In 2007, Barr evaluated wetlands on approximately 2,420 acres within the Additional Parcel that were not evaluated as part of the 2004-2006 studies (Barr 2007). Wetlands in this area were identified from field studies and aerial interpretation. Along the Dunka Road and other possible transportation routes, Barr conducted field studies to determine wetland boundaries, vegetation cover types, and plant species composition of wetlands identified in this area. For areas outside of the Dunka Road and possible transportation routes, wetlands were mapped primarily based on the presence of photographic signatures with limited field truthing and GPS locating. Barr also assessed wetland functions and values for these wetlands.

In August 2008, AECOM conducted wildlife and upland and wetland habitat surveys on about 3,888 acres adjacent to the Mine Site (AECOM 2009a, b; Additional Parcel). Much of the Additional Parcel is comprised of wetlands of high value, including One Hundred Mile Swamp. Wildlife and wildlife habitat survey procedures were similar to those used in 2000 and 2004 on the Mine Site. In addition, 40 wetlands, or portions of wetlands, were evaluated for their functions and values. Wetlands and uplands were mapped based on aerial photographic interpretation and field studies.

Wetland functions and values were evaluated and rated by AECOM on the Additional Parcel in August 2008 using the guidelines in the *Minnesota Routine Assessment Method for Evaluating Wetland Functions, Version 3.2* (MnRAM 3.2; Minnesota Board of Water and Soil Resources 2008; AECOM 2009a). MnRAM considers numerous factors in determining the rating, or value, of a wetland. Sixty-three questions given in MnRAM 3.2 were addressed, and all factors were evaluated for each wetland surveyed. The Eggers and Reed (1997) classification system was used to classify wetland communities for the wetland function and value evaluation.

During the field surveys, data pertaining to the functions and values of 40 representative wetland locations within the Additional Parcel were collected. Some survey locations were for individual wetlands, while for larger wetland complexes several locations were surveyed within the wetland. An attempt was made to survey a variety of wetland types across the entire Additional Parcel.

In August 2008, Barr Engineering (sub) conducted an assessment of plant species of concern on portions of the Additional Parcel (Barr Engineering 2009).

In April 2009, AECOM conducted calling surveys for northern goshawk on the Additional Parcel (AECOM 2009b). In addition, calling surveys for owls and a survey of general wildlife use of the parcel were conducted to supplement information collected on the Additional Parcel during 2008.

5.2 Private Lands

In June 2009, AECOM evaluated wildlife and their habitats and conducted northern goshawk, owl, and gray wolf surveys on about 4,760 acres of nonfederal lands on the Hay Lake parcel and McFarland parcel (AECOM 2009c). In addition, AECOM mapped upland and wetland habitats on the parcels and evaluated wetlands for their functions and values. Survey protocols were similar to those used for the Additional Parcel and Mine Site.

6.0 TES Assessment Results

6.1 TES Species Assessment

6.1.1 U.S. Forest Service Lands

Two rare plant surveys were conducted on the proposed mine project site during July 2004 (Pomroy and Barnes 2004; Walton 2004). Pomroy and Barnes (2004) found moonworts and grapeferns, northern comandra (*Geocaulon lividum*), pedicellate bulrush (*Scirpus pedicellatus*), clustered bur-reed (*Sparganium glomeratum*), New England violet (*Viola novae-angliae*), floating marsh-marigold (*Caltha natans*), neat spike-rush (*Eleocharis nitida*), smallow yellow water crowfoot (*Ranunculus gmelinii*), lapland buttercup (*Ranunculus lapponicus*), and Torrey's manna-grass (*Torreyochloa pallida*) on the site.

A subsequent survey for rare plant species of the genus *Botrychium* identified 19 populations containing *Botrychium* species, including eight different species: *B. dissectum*, *B. matricariifolium*, *B. michiganense*, *B. multifidum*, *B. pallidum*, *B. rugulosum*, *B. simplex*, and *B. virginianum*. Populations ranged in size from one to more than 500 individuals and were typically found in old disturbance sites such as logging roads and railroad rights-of-way (Johnson-Groh 2004).

Daniel Jones of Barr Engineering, Inc., conducted surveys for St. Lawrence grapefern (*Botrychium rugulosum*) in late August and early September 2007. Surveys were conducted along the Dunka Road and other roads on the proposed mine project site. The majority of vegetation cover types on the site do not provide suitable habitat for St. Lawrence grapefern. St. Lawrence grapefern were found within the Additional Parcel.

Water bodies surrounding the NorthMet Mine site, including Trimble Creek and the Partridge and Embarrass rivers, were surveyed for rare freshwater mussels in October 2004 (Heath 2004). Two mussel species, the giant floater (*Pyganodon grandis*) and fat mucket (*Lampsilis siliquoidea*), were identified; both are considered to be widespread and common throughout the upper Midwest. A biological survey of aquatic habitats in the area, including the Partridge River, Trimble Creek, and two wetlands on the mine site, was conducted in August and September 2004 (Breneman 2005). A total of 16 species of fish and 133 genera of macroinvertebrates were identified in the survey. The macroinvertebrate and fish assemblages found in the survey were typical of other aquatic habitats in the region, and none of the fish collected in the survey were endangered or considered rare to the region.

ENSR conducted surveys of wildlife species and their habitats within the NorthMet Mine site in January and March 2000 and June 2004 (ENSR 2000, 2005). In 2000, northern goshawks (federal species of concern) responded to broadcasted calls at two calling stations, and a goshawk nest was found in the western portion of the Mine Site. Later during the spring of 2000, the Minnesota Department of Natural Resources attached a radio transmitter to one of the goshawks using the nest, but the birds abandoned the nest that year. No goshawks were detected during ENSR's summer 2004 survey, but goshawks were seen using the nest again in 2005. They were not seen at the nest during goshawk surveys in 2009.

Gray wolves (federal threatened species) were detected in both the winter 2000 survey and the summer 2004 survey (ENSR 2000, 2005). In 2000, no wolves responded to broadcasted calls, but wolf tracks were found within the Mine Site, and it was concluded that the study area comprised much of the territory of a pack of three or more individuals. In 2004, wolves responded to broadcasted calls, and were believed to be calling from south of the mine site boundary. Scat of wolves was found along the Dunka Road and several trails within the Mine Site.

Other species of concern found during the 2000 and 2004 surveys included ruffed grouse, spruce grouse, belted kingfisher, black-backed woodpecker, pileated woodpecker, Swainson's thrush, pine warbler, beaver, white-tailed deer, and moose (Superior National Forest Species of Concern).

During January through March 2006, ENSR conducted a survey for Canada lynx (federal threatened species) in and around the NorthMet Mine site (ENSR 2006). The study area extended out approximately 6 miles in each direction from the proposed mine site boundary. Lynx tracks were intercepted at 22 locations along surveyed transects, and at 37 additional locations that were not along transects. Based on DNA analysis of eight scat samples collected, three unique female lynx were identified in the study area, and a fourth female was found adjacent to the study area. ENSR concluded that suitable lynx habitat was found throughout the study area, with the exception of areas disturbed by past or present mining operations.

In August 2008, ENSR evaluated wildlife and their habitats on about 3,888 acres adjacent to the Mine Site (AECOM 2009a; Additional Parcel). Much of the Additional Parcel is comprised of wetlands of high value, including One Hundred Mile Swamp. Field surveys conducted on the Additional Parcel resulted in evidence of 4 amphibian species, 40 bird species, and at least 10 mammal species. Species of interest identified at the site during surveys included ruffed grouse, belted kingfisher, pileated woodpecker, bats, beaver, gray wolf, white-tailed deer, and moose (Superior National Forest Species of Concern).

In April 2009, AECOM conducted calling surveys for northern goshawk on the Additional Parcel. In addition, calling surveys were conducted for owls on the Additional Parcel to supplement information on wildlife use collected during 2008. One goshawk nest territory with a pair of hawks at the nest was found in the Additional Parcel, and a goshawk call was heard at a second location near the boundary of the Mine Site and Additional Parcel. A nest was also found at the second location, but was not occupied, and it may have been an old or alternate goshawk nest or nest of another raptor or common raven. The calls of at least three northern saw-whet owls(*Aegolius acadicus*) were heard, and a great gray owl (federal species of concern) and two other owls, most likely great-horned owls (*Bubo virginianus*), were seen during owl surveys.

AECOM also conducted general wildlife surveys concurrently with the April 2009 northern goshawk/owl surveys. Surveyors observed or found evidence of 1 amphibian, 31 bird, and 7 mammal species on the Additional Parcel during the 2009 surveys. Species of interest included ruffed grouse, spruce grouse, bald eagle (*Haliaeetus leucocephalus*), gray wolf, beaver, white-tailed deer, and moose.

A search of the MnDNR Natural Heritage and Nongame Research Program database of TES plants and animals revealed one animal and three rare plant species within the Exchange Parcel: wood turtle (*Clemmys insculpta*) and neat spike-rush (*Eleocharis nitida*), state-listed as threatened, and pale moonwort (*Botrychium pallidum*) and floating marsh-marigold, both state-listed as endangered (MnDNR 2008; Table 1). The database search revealed 14 additional rare species occurring within the Forest Service parcel: northern goshawk, prairie moonwort (*Botrychium campestre*), matricary grapefern (*B. matricariifolium*), Michigan moonwort (*B. michiganense*), least moonwort (*B. simplex*), northern comandra, club-spur orchid (*Platanthera clavellata*), small shinleaf (*Pyrola minor*), small yellow water crowfoot, lapland buttercup, woolgrass (*Scirpus pedicellatus*), clustered bur-reed, and Torrey's manna-grass.

A review of the Minnesota Lynx Database (Minnesota DNR 2007) found records of lynx sightings on or within a few miles of the nonfederal parcel during 2004 to 2006. A review of the International Wolf Center (2009) Minnesota Wolf Telemetry Database revealed that radio-collared wolves have been recorded on the nonfederal parcel from 1994 to 2001. No cougars have been reported near the nonfederal parcel (Cougar Network 2009).

Table 1. Endangered, Threatened, and Special Concern Plant Species Identified at the Federal Parcel.

Common Name	Scientific Name	State Status[1]	Federal Status[2]	Habitat and Location
Prairie moonwort	*Botrychium campestre*	SC	--	Dry soils along the Dunka Road.
Pale moonwort	*Botrychium pallidum*	E	RFSS	Full to shady exposure, edge of alder thicket, along Dunka Road, and railroad and powerline rights-of-way.
Ternate grape-fern	*Botrychium rugulosum (=ternatum)*	T	RFSS	Disturbed habitats, fields, open woods, forests, and along Dunka Road.
Least grapefern	*Botrychium simplex*	SC	RFSS	Full to shady exposure, edge of alder thicket, forest roads, along Dunka Road, and railroad and power line rights-of-way.
Floating marsh marigold	*Caltha natans*	E	RFSS	Shallow water in ditches and streams, alder swamps, shallow marshes, beaver ponds, and Partridge River mudflat.
Neat spikerush	*Eleocharis nitida*	T	RFSS	Full exposure, moist ditches along Dunka Road, wet areas between railroad grades, and railroad ditch.
Northern comandra	*Geocaulon lividum*	SC	--	Bog and woodland habitats.
Moon rush	*Juncus stygius*	SC	RFSS	Not provided.
Club-spur orchid	*Plantathera clavellata*	SC	RFSS	Not provided.
Small shinleaf	*Pyrola minor*	SC	RFSS	Not provided.
Lapland buttercup	*Ranunculus lapponicus*	SC	--	On and adjacent to sphagnum hummocks in black spruce stands, up to 60% shaded with alder also dominant.
Clustered bur-reed	*Sparganium glomeratum*	SC	RFSS	Shallow pools and channels up to 1.5 feet deep in sphagnum at edge of black spruce swamps, beaver ponds, wet ditches, shallow marshes.
Torrey's mannagrass	*Torreyochloa pallida*	SC	--	In muddy soil along shore and in water within shallow channels, beaver ponds, shallow marshes, along Partridge River.

Source: NorthMet Mine Draft EIS (2009); Barr (2009).
[1] E - Endangered, T - Threatened, and SC - Species of Concern.
[2] RFSS = Regional Forester Sensitive Species.

6.1.2 Private Lands

In June 2009, AECOM evaluated wildlife and their habitats and conducted northern goshawk, owl, and gray wolf surveys on about 4,790 acres of nonfederal lands on the Hay Lake parcel and McFarland parcel. Four amphibian species, 3 reptile species, 46 bird species, and at least 10 mammal species were found on the parcels. Species of interest (and their federal or state status) identified at the Hay Lake parcel during surveys included gray wolf (federal threatened), trumpeter swan (*Cygnus buccinator*; state threatened), and red-tailed hawk (*Buteo jamaicensis*), ruffed grouse, American woodcock (*Scolopax minor*), pileated woodpecker, beaver, white-tailed deer, and moose (Superior National Forest Species of Concern). Species identified at the

McFarland parcel included common loon (*Gavia immer*), ruffed grouse, pileated woodpecker, beaver, white-tailed deer, and moose (Superior National Forest Species of Concern).

A search of the MnDNR Natural Heritage and Nongame Research Program (2009) database of TES plants and animals revealed rare species within the McFarland parcel and within one mile of the Hay Lake parcel (Table 2). Rocky mountain woodsia (*Woodsia scopulina*) and encrusted saxifrage (*Saxifraga paniculata*), both state-listed threatened plant species, have been documented within the McFarland parcel, and small white water-lily (*Nymphaea leibergi*), a state-threatened species, and small-flowered woodrush (*Luzula parviflora*), leafless water milfoil (*Myriophyllum tenellum*), and elegant groundsel (*Senecio indecorus*), state species of concern, have been documented within 1 mile of the parcel boundary. Ternategrape-fern (*B. rugulosum*) and triangle moonwort (*Botrychium lanceolatum*), state threatened species, and northern goshawk, American bittern (*Botaurus lentiginosus*), white baneberry (*Actaea pachypoda*), Dragon's-mouth (*Arethusa bulbosa*), matricary grapefern, mingan moonwort (*B. minganense*), goblin fern (*B. mormo*), pale moonwort, necklace spike sedge (*Carex ormostachya*), and clustered bur-reed, state species of concern, have been documented within 1 mile of the Hay Lake parcel.

A review of the Minnesota Lynx Database (MnDNR 2007) revealed that lynx have been sighted in the townships of each parcel since 2000. A probable lynx sighting was made by a trained biologist in Section 13 of Township 59 North, Range 16 West, east of the Hay Lake parcel, in October 2003. Another lynx sighting was made one mile to the west of the Hay Lake parcel the same year. Unverified lynx sightings were made in December 2002 and January 2003 in Sections 22 and 27 of Township 64 North, 3 West, south of the McFarland parcel.

A review of the International Wolf Center (2009) Minnesota Wolf Telemetry Database revealed that radio-collared wolves have been recorded in the townships of two of the three parcels. A wolf was observed in Section 6 of Township 58 North, Range 16 West in September 1994, just south of Hay Lake. Wolves were observed in Sections 1, 19, 22, and 23 of Township 59 North, Range 16 West, in and around the Hay Lake parcel, between 1994 and 1997. There are no recorded observations of wolves in the township of the McFarland parcel (Township 64 North, Range 3 West). No cougars have been reported near the parcels (Cougar Network 2009).

6.2 TES Habitat Assessment

6.2.1 U.S. Forest Service Lands

Surveys of wildlife habitat on the USFS lands proposed for exchange were conducted in winter 2000, summer 2004, summer 2008, and spring 2009 (ENSR 2000, 2005; AECOM 2009a, b; Appendix A). Approximately 4,166 acres of wetlands and 2,455 acres of uplands comprise lands administered by the Forest Service. Wetland habitat is dominated by pole size (trees ranging in size from 5 to 11 inches diameter-at-breast-height [dbh]) conifer trees (3,094 acres; 74 percent of wetland acreage), scrub-shrub wetland (565 acres; 14 percent), mature (trees greater than 12 inches dbh) coniferous forest (148 acres; 3 percent), and palustrine emergent/bog (117 acres; 3 percent). Upland habitat is dominated by mixed (mixture of coniferous and deciduous trees) pole forest (887 acres; 38 percent), pole deciduous forest (304 acres; 13 percent), pole coniferous forest (292 acres; 13 percent), and shrubland (215 acres; 9 percent).

Table 2. Endangered, Threatened, and Special Concern Plant Species Identified at the Nonfederal Parcels.

Common Name	Scientific Name	Parcel	State Status[1]	Federal Status[2]
White baneberry	*Actaea pachypoda*	Hay Lake	SC	--
Dragon's-mouth	*Arethusa bulbosa*	Hay Lake	SC	--
Triangle moonwort	*Botrychium lanceolatum*	Hay Lake	SC	RFSS
Matricary grapefern	*Botrychium matricariifolium*	Hay Lake	SC	--
Mingan moonwort	*Botrychium minganense*	Hay Lake	SC	--
Goblin fern	*Botrychium mormo*	Hay Lake	SC	--
Pale Moonwort	*Botrychium pallidum*	Hay Lake	E	RFSS
Ternate grape-fern (St. Lawrence grapefern)	*Botrychium rugulosum (=ternatum)*	Hay Lake	T	RFSS
Necklace spike sedge	*Carex ormostachva*	Hay Lake	SC	--
Small-flowered woodrush	*Luzula parviflora* ssp. *melanocarpa*	McFarland	SC	--
Leafless water milfoil	*Myriophyllum tenellum*	McFarland	SC	--
Small white water-lily	*Nymphaea leibergii*	McFarland	T	RFSS
Encrusted saxigrage	*Saxifrage paniculata*	McFarland	T	RFSS
Elegant groundsel	*Senecio indecorus*	McFarland	SC	--
Clustered bur-reed	*Sparganium glomeratum*	Hay Lake	SC	RFSS
Rocky Mountain woodsia	*Woodsia scopulina*	McFarland	T	RFSS

Source: Minnesota Department of Natural Resources Heritage Program; Forest Service Regional Sensitive Species List.
[1] E - Endangered, T - Threatened, SC - Species of Concern.
[2] RFSS = Regional Forester Sensitive Species.

Habitat observed on the study area was typical of habitats associated with much of the Iron Range. More upland habitat was associated with the central portion of the study area, in the vicinity of the proposed Mine Site. The One Hundred Mile Swamp is the dominant feature on the landscape, located in the northern portion of the site. Yelp Creek and the Partridge River drain this swamp and flow along the northeastern and eastern boundary of the study area, before entering and leaving the southeastern portion of the study area.

Forest vegetation dominates the study area. Most forest stands contain trees that are 10 inches dbh or less, and are thus unable to provide much snow-intercept-thermal cover for deer and moose. The site can be divided into four general quadrants. The northwest quadrant is dominated by lowland black spruce (*Picea mariana*), with scattered stands of trembling aspen (*Populus tremuloides*) and balsam fir (*Abies balsamea*)/aspen. Tamarack (*Larix laricina*) is also scattered throughout these stands. Most trees are estimated to be 60 years or older (USDA Forest Service 2000). Interspersed within forest stands are brush/sapling tree stands that were recently logged and provide habitat for deer and moose. Several wetlands are found in this quadrant, with One Hundred Mile Swamp comprising most of the western and northern portions of the quadrant.

The northeast quadrant is dominated by nearly equal amounts of jack pine (*Pinus banksiana*) and spruce, with scattered aspen stands and speckled alder (*Alnus rugosa*) swamps (USDA Forest Service 2000). Although there are scattered black spruce stands containing trees greater than 60 years in age, most trees, especially jack pine, are 20 to 60 years in age. There are few recently logged areas within this quadrant. The Partridge River and several large associated wetlands are found in this area. Most shrub/sapling tree habitat is associated with these wetlands and drainages.

The southeast quadrant contains a nearly equal mix of lowland and upland spruce, jack pine, and aspen, with some balsam fir and paper birch (*Betula papyrifera*). Most tree stands are between 40 and 80+ years of age, although jack pine tree stands along Dunka Road are between 20 and 40 years of age. The Partridge River and a tributary to the river, Stubble Creek, are found in this quadrant and are dominated by sedge (*Carex* spp.) and cattail (*Typha* spp.) meadows and shrubs, including speckled alder and willow (*Salix* spp.). The powerline and Duluth Mesabi and Iron Range Railroad are also important features in this quadrant.

Aspen, black spruce, and speckled alder wetlands dominate the southwest quadrant. There is more balsam fir in this quadrant than in the other quadrants, while jack pine is rare and found only in scattered stands. Most tree stands are 60 years of age or older, with the oldest stands found near the southern boundary of the quadrant. Most jack pine stands have been harvested within the past 40 years. Clearings comprised of grasses, forbs, and shrubs are associated with the powerline right-of-way and several recently logged areas. The Partridge River is the dominant aquatic feature in this quadrant, but several wetlands are also found along the powerline route.

The recently logged areas consist of grasses and ferns with aspen saplings and speckled alder and beaked hazel (*Corylus conrnuta*). The areas of more mature upland forests consist of jack pine, balsam fir, and aspen, with lesser amounts of paper birch, red pine (*Pinus resinosa*), and white pine (*Pinus strobus*). The mature lowland areas consist mainly of black spruce and tamarack growing on a bed of sphagnum moss (*Spagnum* spp.) and club moss (*Lycopodium* spp.) with speckled alder, bog Labrador tea (*Ledum groenlandicum*), and leatherleaf (*Chamaedaphne calyculata)*. The open wetland areas consist of grasses, sedges, cattails, speckled alder, and pussywillow (*Salix discolor*).

Upland areas appear to be used by wildlife more than wetlands, especially by large mammals such as deer and moose, probably because uplands provide greater cover and more browse and other food items during winter than wetlands.

Approximately 98 percent of the wetlands within the federal parcel were rated as having high overall quality because they have minimal or no current disturbance, while disturbed wetlands accounted for less than 2 percent of all wetlands within the study area (Barr 2006, AECOM 2009a).

6.2.2 Private Lands

In June 2009, AECOM evaluated wildlife and their habitats on the Hay Lake and McFarland parcels (Appendix B). Approximately 2,856 acres of wetlands and 1,905 areas of uplands were found on the Hay Lake parcel, and less than 1 acre of wetland and 29 acres of uplands on the McFarland parcel. Thirty-three wetlands, or portions of wetlands, were evaluated for their functions and values on the Hay Lake parcel, and two wetlands on the McFarland parcel were evaluated. All wetlands were rated as having overall high values for wetland functions and values.

Most of the wetland habitat consists of pole and mature size palustrine coniferous forest dominated by black spruce and tamarack, palustrine scrub-shrub habitat dominated by speckled alder and willows, and palustrine emergent and bog wetlands dominated by sedges, cattail, bog Labrador tea, and leatherleaf. Approximately 129 acres of open water habitat, comprised of Hay Lake, Lower Rice Lake, an unnamed lake, and the Pike River, are found on the parcel. Coontail (*Ceratophyllum demersum*) and bullhead water-lily (*Nuphar luteum* ssp. *variegatum*) are dominant plants in these waters. Upland habitat is dominated by pole and young mature deciduous forest comprised primarily of trembling aspen and paper birch, with a midstory of beaked hazel and balsam fir.

7.0 References

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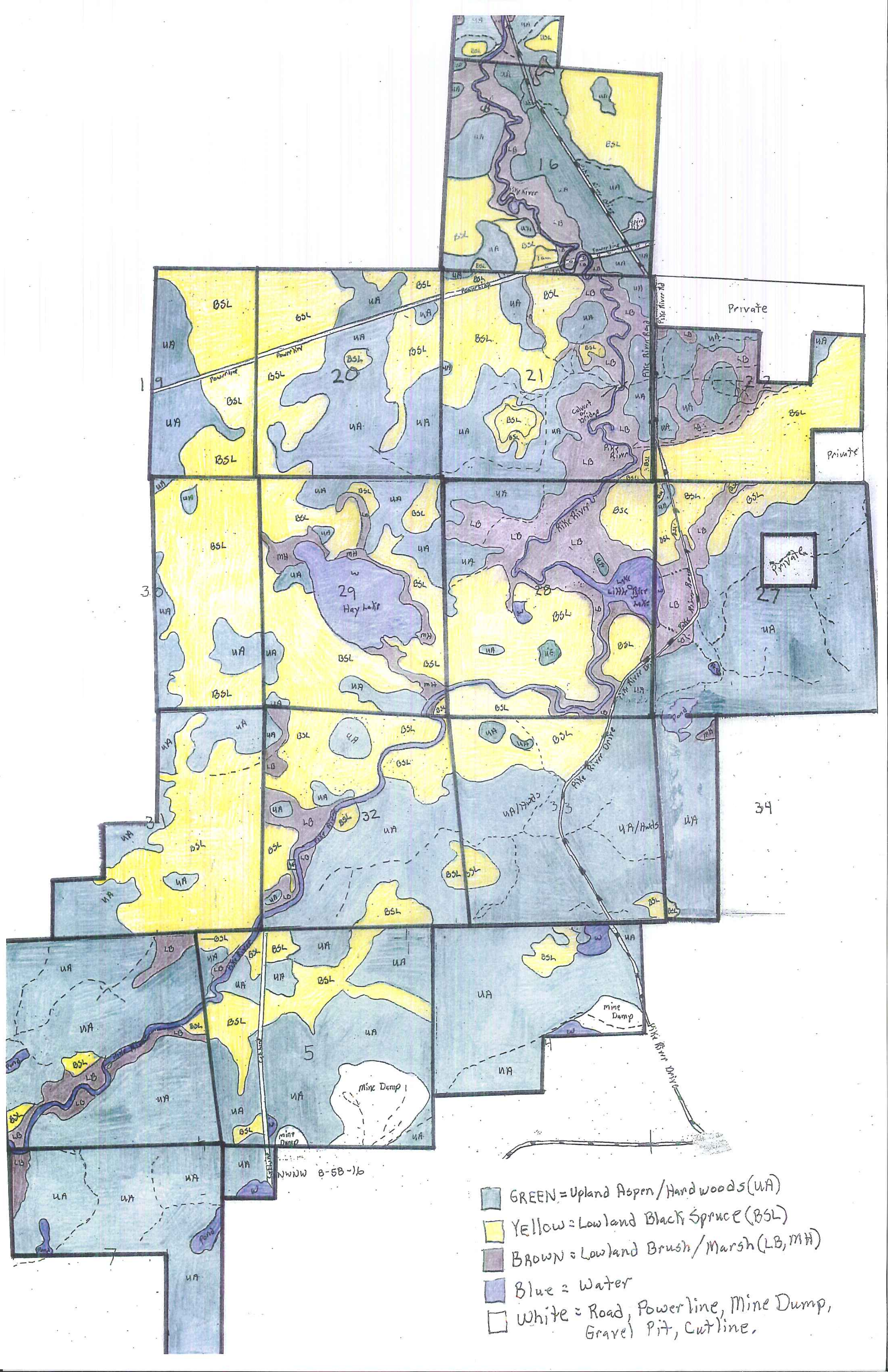
Appendix A – Habitat Mapping of the Federal Parcels (St. Louis County) Proposed for Exchange (see maps included with Wetland Assessment)

Appendix B – Habitat Mapping for the Hay Lake Parcel (Preliminary Habitat Mapping and National Wetland Inventory Mapping; St. Louis County) and for the McFarland Parcel (National Wetland Inventory Mapping; Cook County) Proposed for Exchange

[Note: More detailed mapping is being conducted for these parcels based on recent fieldwork.]


16
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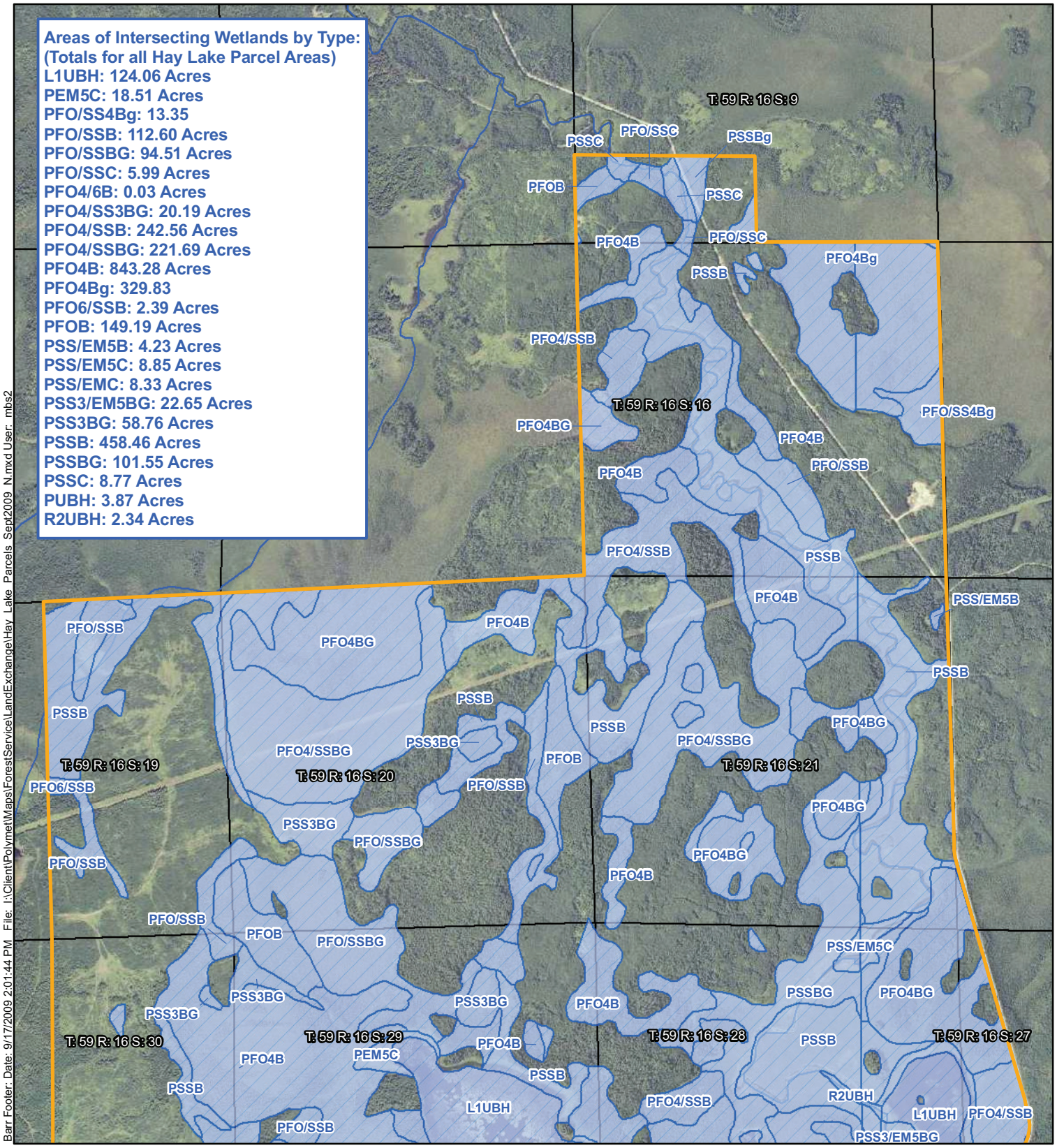
7
Private
Pike River
Pike River Road
Pike River Rd
Pike River Drive
Powerline
Culvert or bridge
Hay Lake
Little Rice Lake
Pond
Mine Dump
NWNW 8-58-16
GREEN = Upland Aspen/Hardwoods (UA)
YELLOW = Lowland Black Spruce (BSL)
BROWN = Lowland Brush/Marsh (LB, MH)
Blue = Water
White = Road, Powerline, Mine Dump, Gravel Pit, Cutline.



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Imagery Source: 2008 FSA

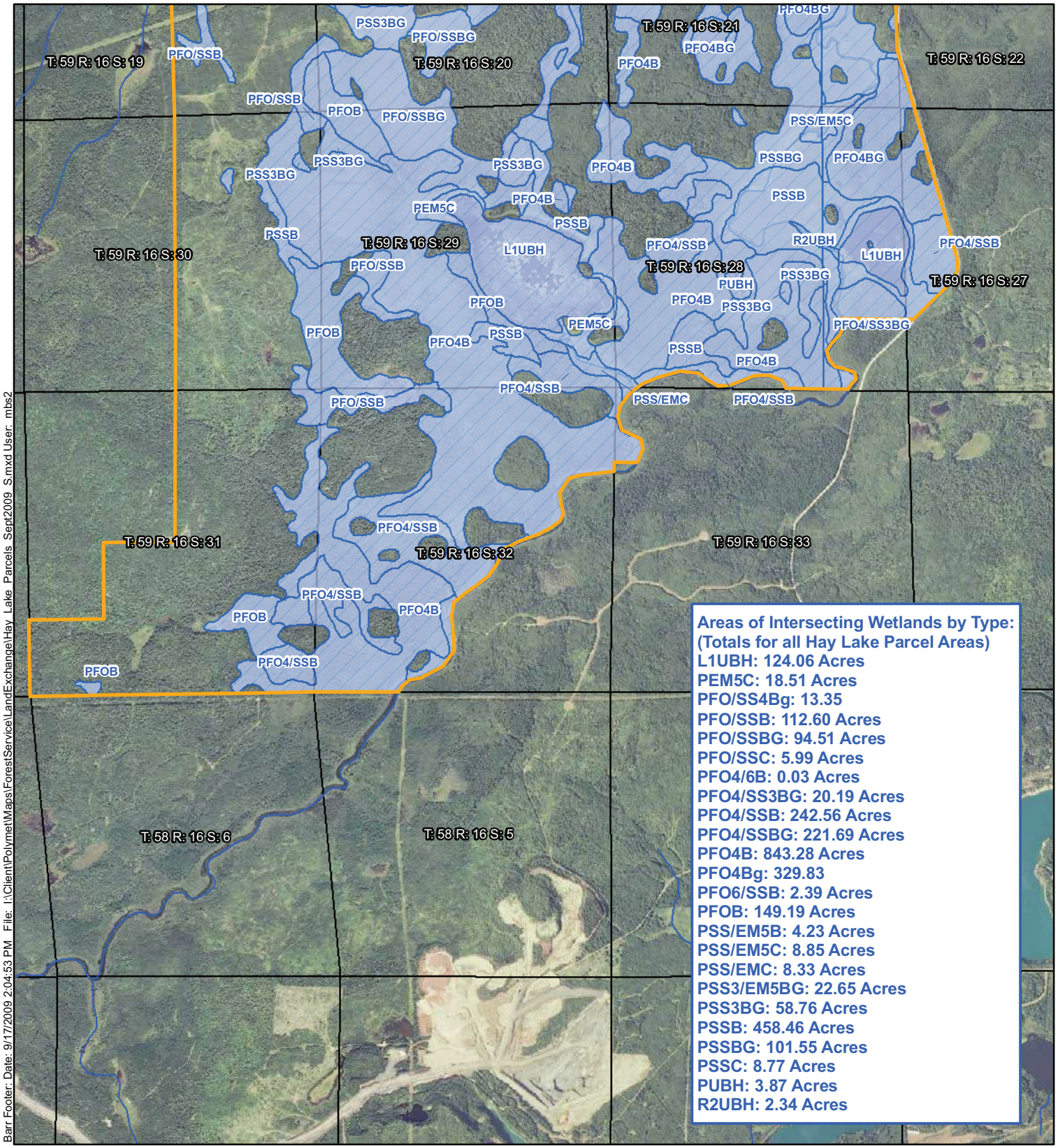
Boundary of Parcels Under Consideration

Areas of NWI Intersecting Parcel under Consideration

Feet
0 2,000 4,000

Meters
0 500 1,000 1,500

HAY LAKE PARCELS - NORTH AREA
NorthMet Project
PolyMet Mining Inc.
Hoyt Lakes, MN
September, 2009



Areas of Intersecting Wetlands by Type:
(Totals for all Hay Lake Parcel Areas)
L1UBH: 124.06 Acres
PEM5C: 18.51 Acres
PFO/SS4Bg: 13.35
PFO/SSB: 112.60 Acres
PFO/SSBG: 94.51 Acres
PFO/SSC: 5.99 Acres
PFO4/6B: 0.03 Acres
PFO4/SS3BG: 20.19 Acres
PFO4/SSB: 242.56 Acres
PFO4/SSBG: 221.69 Acres
PFO4B: 843.28 Acres
PFO4Bg: 329.83
PFO6/SSB: 2.39 Acres
PFOB: 149.19 Acres
PSS/EM5B: 4.23 Acres
PSS/EM5C: 8.85 Acres
PSS/EMC: 8.33 Acres
PSS3/EM5BG: 22.65 Acres
PSS3BG: 58.76 Acres
PSSB: 458.46 Acres
PSSBG: 101.55 Acres
PSSC: 8.77 Acres
PUBH: 3.87 Acres
R2UBH: 2.34 Acres

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Imagery Source: 2008 FSA

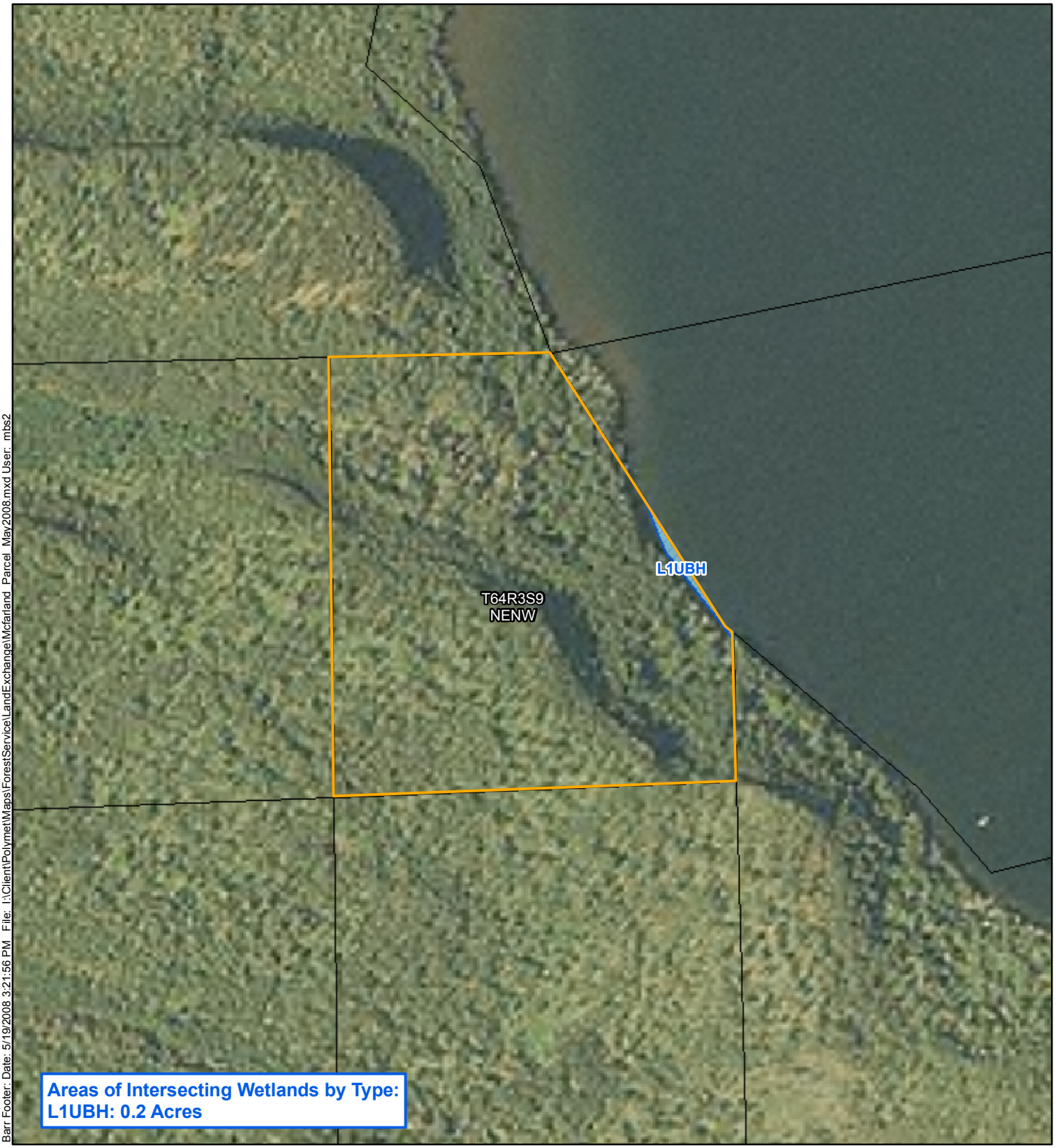
Boundary of Parcels Under Consideration

Areas of NWI Intersecting Parcel under Consideration

Feet
0 2,500 5,000

Meters
0 500 1,000 1,500

HAY LAKE PARCELS - SOUTH AREA
NorthMet Project
PolyMet Mining Inc.
Hoyt Lakes, MN
September, 2009



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Imagery Source: 2004 FSA

Boundary of Parcels Under Consideration

Area of NWI Intersecting Parcel under Consideration

N

Feet
0 400 800

Meters
0 100 200 300

MCFARLAND PARCEL
NorthMet Project
PolyMet Mining Inc.
Hoyt Lakes, MN
May, 2008