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# Revised Environmental Assessment

## Trans Superior Resources, Inc. Private Minerals Exploration in the Matchwood Tower Road Area

Bergland Ranger District, Ottawa National Forest  
Gogebic and Ontonagon Counties, Michigan

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# CHAPTER 1 PURPOSE AND NEED

This chapter provides background information on private mineral rights, the proposed mineral exploration activities, the need for this environmental assessment and the decision to be made.

## ***Background***

The Ottawa National Forest (ONF) is conducting an environmental analysis on National Forest System land to permit and/or authorize access and surface occupancy for mineral exploration on private mineral rights in the Bergland Ranger District, in the vicinity of the Matchwood Tower Road (Forest Road 6930), in Gogebic and Ontonagon Counties, Michigan. Project boundaries are located approximately ten miles southeast of Bergland and approximately 15 miles northwest of Watersmeet, in the Upper Peninsula of Michigan.

Notification of the intent to exercise private mineral rights on National Forest System land has prompted the need for this analysis. A plan of operations has been submitted by Trans Superior Resources, Inc. for exploration activities. The exploration activities include geophysical surveying and core drilling. Trans Superior Resources, Inc.'s proposal is for mineral exploration only. If development of private minerals were proposed, a separate site-specific analysis to determine stipulations for surface occupancy would be conducted.

Private minerals are classified as reserved and outstanding. Mineral reservations are mineral rights retained by a grantor in a deed conveying land to the United States. Outstanding mineral rights are those rights owned by a party other than the surface owner at the time the surface was conveyed to the United States. Regardless of the type of right, the Forest Service does not have the authority to deny exercise of a mineral reservation or outstanding mineral right. The mineral rights in the project area are reserved by the State of Michigan and a few parcels are outstanding to the State of Michigan. The Bureau of Land Management has no direct regulating authority regarding this project.

Trans Superior Resources, Inc. currently holds State leases to the mineral estates in the Matchwood Tower Road area. The State leases give them the right to conduct mineral exploration. These State leases list more than 40 potential metallic mineral targets. Refer to the Definitions section of the lease document in the project file. However, exploration is not limited to the listed minerals, in part because the uncertain nature of targeting minerals during exploration. Among the list of minerals is uranium, which Trans Superior Resources, Inc. has indicated as a target mineral. Regardless of the type of mineral being explored for the State of Michigan's Department of Natural Resources (MDNR) has requirements applicable to all potential minerals included in their lease. These requirements include adhering to regulations of the State of Michigan, Department of Environmental Quality (MDEQ), which is the regulatory agency for exploration drilling that occurs in Michigan, regardless of the type of mineral targeted.

Federal actions such as permitting and/or authorizing access and surface occupancy for the exercise of private mineral rights must be analyzed to determine potential environmental consequences pursuant to the National Environmental Policy Act of 1969 (NEPA). The Forest Service, as the surface managing agency, can work with the lessee to develop stipulations that

satisfy the Forest Service goals and objectives for surface management. In addition to their proposal, there are requirements that must be adhered to as part of their lease from the MDNR and the requirements for mineral well operations as directed by the MDEQ.

This environmental assessment describes the purpose and need for action, the decision to be made by the Forest Service, the proposed action (description of anticipated exploration activities with proposed stipulations), the no action alternative and the affected environment and environmental consequences of the alternatives.

## ***Review of consistency with the rights that are reserved***

The Forest Service Manual (FSM) 2830 for Mineral Reservations and Outstanding Mineral Rights provides direction for situations where the United States does not own the rights to minerals underlying lands in the National Forest System. In addition, the authority for the administration of mineral reservations is in previously issued Secretary of Agriculture’s Rules and Regulations for mineral rights reserved in conveyances to the United States.

Readers should be aware that “As a general rule, the Forest Service does not have authority to deny the exercise of a mineral reservation or outstanding mineral right.” (FSM 2830.1). It is policy to promptly evaluate and respond to applications. A special use permit and road use permit are the documents issued by the Forest Service permitting the access and surface occupancy on the National Forest System land in accordance with the applicable Secretary of Agriculture’s Rules and Regulations. A letter of concurrence is used for authorization where there are outstanding mineral rights.

The areas identified in the plan of operations are consistent with the rights reserved. These minerals were reserved or outstanding when the United States acquired the surface. Refer to Table 1 for definitions of mineral rights, mineral reservations and outstanding mineral rights.

<b>Table 1. Definitions at a glance (FSM 2830.5)</b>	
Mineral Rights	Generally, mineral rights include title to the mineral and the necessary authority to enter upon and use as much of the surface overlying the minerals estate as is reasonably necessary to explore for, develop, extract, and process the reserved minerals. Interpretation of mineral rights must be consistent with the terms of the deed and applicable law.
Mineral Reservations	Mineral reservations are mineral rights retained by a grantor in a deed conveying land to the United States
Outstanding Mineral Rights	Outstanding mineral rights are those rights owned by a party other than the surface owner at the time the surface was conveyed to the United States. There is usually no contractual or other legal relationship between the United States and the owner of outstanding mineral rights.

## ***Purpose and Need***

The purpose of this proposal is to implement Forest Service Policy, by documenting concerns, effects, design criteria and stipulations, and conditions of access and surface occupancy for exploration of private minerals in the analysis area. The design criteria and stipulations would be used to protect the National Forest System surface estate.

## ***Proposed Action***

The proposed action is to issue permits for surface occupancy and access that include the stipulations in Appendix A. Forest Service personnel administering the permits would refer to the design features in Chapter 2 of this EA for exploration implementation.

See the maps included in this package for a display of the project area. The area identified in the plan of operations is approximately 3,086 acres. The project area is located in Gogebic County in T47N, R41W, Sections 11, 12, 13, 14, 15, 22, 23 and 24; and in Ontonagon County in T47N, R40W, Sections 18 and 19. Table 2 shows the sections, locations and acres in the project area. There are two areas noted on the maps, the northern portion and the southern portion. Activities would be the same in both areas except that temporary road construction would occur only in the southern area. Refer to Map A.

## ***Anticipated Activities***

*Geophysical Surveys:* The plan of operations includes an estimate of up to 35 miles of geophysical survey lines, at an average width of three feet, covering a maximum of approximately 13 acres. The survey lines are marked with flagged or painted stakes, trees or brush. Survey equipment consists of cable, a portable instrument to take measurements and a small generator for energy. When survey lines diverge from the road, brush may be cut when it is too dense to carry equipment through. Seismic surveys are not included in the anticipated activities.

Survey lines would be spaced 328 or 656 feet apart. Baselines and tie lines may also be established for additional survey control. It would require some cutting of underbrush to allow straight three foot wide sight lines. Numbered pickets would be placed on 82 foot intervals along the lines. The plan of operations estimates up to 30 miles of survey lines in the southern portion of the project area, and up to five miles in the northern portion of the project area. The geophysical work in the northern portion of the project area is confined to existing roads and openings. Based on the three foot wide site lines and the 35 miles proposed the maximum expected area of disturbance is 13 acres. This calculation includes the use of existing roads and openings for sight lines.

*Core Drilling:* Approximately 50 drill sites may be completed. More than one drill hole may be drilled from each drill site. The exact location and number would be determined from previous drilling results and geophysical data collected. The maximum number of drill sites would cover a total area of approximately three acres. Drill sites cover a total area of approximately 50 by 50 feet. The drill site would be cleared of vegetation that would obstruct setting up a drill rig. The

drill rig covers an area of 20 by ten feet and is eight feet high, with a ten foot high mast. The hole, no more than a few inches in diameter, would be drilled from the rig.

Typical drilling equipment might include a skid mounted diamond drilling rig, weighing approximately 12,000 pounds. Other equipment needed at the site may include trailer hauled supplies, such as fuel, drill rods, mud and hose. Other vehicles include trucks for personnel access, ATVs, a tractor for hauling equipment, a bulldozer for digging the sump pit and water truck for transporting water.

Water is used as a lubricant in the drilling operation. A local surface water source would provide the water used in the drilling operations. Water would be pumped or hauled in a water truck. The water could be pumped directly to the drill site, or be delivered to the drill site in a water tank. When pumping water to the site, hoses may be laid from the water source to the site.

A sump pit is needed at each drill site. The pit is typically excavated with a bulldozer and may range from three to five feet deep, with an approximate surface area of ten by 20 feet. It is used to collect drill cuttings and re-circulate water for drilling. Sump pits are lined to specifications required by the MDEQ; the liners are left in place and filled immediately after completion of the drill hole, as per MDEQ.

*Access:* When possible, drill sites would be located within 150 foot wide corridors (75 feet on either side) of existing roads. The plan of operations includes the construction of up to three miles of level D road segments in the southern portion of the project area. Level D roads are designed for a single use and are dictated by topography, environmental factors, and the design and critical vehicle limitations. They represent a minimal road with little shaping or grading. The locations of the road segments would be determined following consultation with representatives from the Forest Service, State, and County. They could be short spurs or longer segments as needed. These roads would be temporary and would be obliterated when no longer needed for this project. The maximum acres of level D constructed road segments are approximately four acres. This calculation includes the potential three miles of temporary road construction, with a maximum width of 12 feet.

*Location:* The project area has been identified based on the plan of operations submitted by Trans Superior Resources, Inc. Refer to Table 2 for land descriptions of the project area.

	Section	Land Description	Acres
T47N, R41W (Gogebic County)	11	S/2	320
	12	S/2; S/2NE	400
	13	N/2; SW/4; W/2SE; NESE	600
	14	ENTIRE	640
	15	E/2SE; E/2NE	160
	22	E/2NE	80
	23	N/2	320
	24	N/2	320
T47N, R40W (Ontonagon County)	18	NWNW; S/2NW; N/SW	174
	19	N/2NW	72
Total Acres			3,086

*Anticipated Ground Disturbance:* The maximum potential disturbance from the proposed activities is estimated to be approximately 20 acres. The 20 acre estimate encompasses the maximum of 50 drill sites of approximately 50 by 50 feet each (3 acres maximum), three miles of temporary road segment construction (4 acres maximum) and the 13 acres of geophysical survey lines. Drill sites may be located within 75 feet on either side of existing roads throughout the project area and/or along temporary road segments. Temporary road segments would only occur in the southern portion.

The maximum expected potential disturbance, including geophysical surveys is less than one percent of the project area. Access and drilling would potentially effect up to a maximum of seven acres. This calculation does not account for the potential use of existing roads and other areas of previous disturbance for drill site access and locations and is therefore an extreme maximum of the potential ground disturbance.

## ***Decision Framework***

The decision maker for this project is the District Ranger of the Bergland and Ontonagon Ranger Districts. The decisions to be made are:

- What stipulations, if any, to apply to the Special Use Permit for surface occupancy and Road Use Permit for access on National Forest System land for exploration of reserved minerals
- What stipulations, if any, to include in the letter of concurrence for authorization to access National Forest System lands for the exploration of outstanding minerals
- Whether an EIS should be prepared

## ***Public Involvement***

Comments received for the Revised Environmental Assessment will be used to determine whether there are any unresolved issues which need to be considered, and if there is any new information brought forward about the proposed action that needs to be considered.

Public involvement for this project began in July, 2007 with publication of a Draft Environmental Assessment and a 30-day comment period. Sixty-eight letters were sent out and the legal notice was published on July 17, 2007 in the Ironwood Daily Globe. Four comment letters were received during this comment period. The ID Team reviewed the comments received and no issues resulting in the development of an additional alternative were determined through this review. A summary of the types of comments received and the manner in which they have been dealt follow in this document.

Comments received resulted in the clarification of what agency prescribes requirements regarding the mineral well operations, sump pits locations and liners and the treatment of water used during drilling operations. As a result of one comment, a request for chlorination of water used prior to drilling activities was forwarded on to the MDEQ. The hunting season dates for tribal members was shared with the exploration company at the request of the Natural Resources Director of the Keweenaw Bay Indian Community (KBIC). A request by the KBIC Tribal

Historic Preservation Officer led to additional heritage resource surveys conducted in the project area. Additional explanation was given on the scope of the project and how private mineral rights are handled. Refer to the Comment Review Document in the project record for more information.

We received comments concerning what the target minerals are for the proposed exploration, specifically concerned about uranium being a target mineral and the potential impact to groundwater that could result. The MDNR lists over 40 minerals that are included in a minerals lease and uranium is one of the minerals among those listed. Uranium has been confirmed by Trans Superior Resources, Inc. to be a target of this exploration. The EA contains the information relative to potential target minerals. Documents submitted by the commenters pertaining to the potential effects of uranium exploration have been reviewed by the specialists and incorporated into the effects analysis as appropriate.

## CHAPTER 2 ALTERNATIVES

This chapter describes and compares the alternatives considered for use of Federal surface estate to access reserved and outstanding mineral rights.

### ***Developing Alternatives***

Section 102 (e) of NEPA states that all Federal agencies shall, “study, develop, and describe appropriate alternatives to recommend courses of actions in any proposal which involves unresolved conflicts concerning alternative uses of available resources.” Two alternatives were developed and analyzed in detail. Alternative A was developed in response to NEPA requirements (40 CFR 1502.14 [d]) for a No Action Alternative. Alternative B is the proposed action.

The range of alternatives developed has been deemed reasonable based on the scope of decision to be made. Specifically, the fact that the Agency does not have the authority to deny access for the exercise of private mineral rights (FSM 2830.1). This decision only relates to the type of stipulations to be included in the surface occupancy permit or authorized in a letter of concurrence.

In addition to the two alternatives mentioned above and fully described on the next page, one other alternative was considered but eliminated from detailed study. Reasons for this are described below.

### ***Alternative Considered but Not Analyzed in Detail***

*Accept Plan of Operations with No Additional Stipulations:* This alternative would be to accept the plan of operations submitted by Trans Superior Resources, Inc. with no additional stipulations designed by the ONF. This alternative has been eliminated from detailed study because there would be no additional stipulations designed to provide protection for the Forest Service surface estate. The ONF believes there is a need to apply additional stipulations that alleviate concerns regarding the surface estate specific to the area of operations. In addition, a plan of operations with no additional stipulations would not meet the purpose and need for this project.

### ***Alternative A - No Action***

Under the No Action Alternative, there would be no ground disturbing activities or vegetation removal as a result of exploration drilling. This alternative serves as a baseline analysis for environmental affects analysis and fulfills the NEPA requirements described in 40 CFR 1502.14 (d). This alternative is not legal due to the private mineral rights. The Forest Service does not have authority to deny the exercise of a mineral reservation or outstanding mineral right.

## ***Alternative B (Proposed Action) Plan of Operations with Additional Stipulations***

This alternative includes the activities described under the Proposed Action in Chapter 1 and includes the design features below (to be undertaken by Forest Service personnel) and the Stipulations in Appendix A (to be undertaken by the permittee). The stipulations shown in Appendix A would be included in the surface occupancy and road use permits, and the letter of concurrence for authorization. In addition to the attached stipulations, the permittee would also follow Michigan's Mineral Well Operations Regulations, Part 625 (MDEQ, 2004) and the requirements of their MDNR lease.

### ***Design Features for Alternative B***

The Forest Service Official administering the permit would do the following when advising the permittee,

1. Minimize soil disturbance to the maximum extent practical, consistent with exploration objectives. Use existing system roads and log landings to the extent practical.
2. Use Ecological Landtype Phase (ELTP) mapping and recommended season of operations to the extent possible to locate and schedule timing of operations. Refer to Maps B and C.
3. When selecting sites for drafting water, use upland or hardened sites such as roads, or areas adjacent to water sources in order to avoid impacting wetlands, floodplains, streams and ponds, wherever possible. Do not dam or dredge streams for drafting purposes. Locate drafting in a manner that avoids dewatering the sources.
4. Locate drilling, sump construction and storage of fuel or equipment in areas beyond 100 feet of rivers, perennial or intermittent streams, ponds, seeps or springs. If questions arise consult with the Forest Hydrologist.
5. When working with the permittee on the location of road construction, maintenance or reconstruction consider the following:
  - Closed roads that are opened, or roads temporarily constructed for exploration purposes will be stabilized and maintained during use and closed after activities are completed.
  - Open roads will be maintained commensurate with the permitted use. Activities may include, but are not limited to, grading, installing or replacing road closure and erosion control or sediment capturing devices.
  - Access roads should be temporarily closed if conditions result in evidence of road damage.
  - Allow for aquatic organism passage in perennial streams unless otherwise prescribed.
  - Use clean, weed-seed free gravel and other fill materials where feasible.
6. Temporary roads include drainage structures that are temporary in nature such as hardened dips on draws with no bed or bank, or temporary culverts on streams with a bed and bank. Travel under frozen conditions may lessen the extent of drainage structures needed. After use, drainage structures should be removed, the road should be closed at the entrance with a berm or other closure device, slash may be scattered in the roadbed,

and the area may require reshaping and/or seeding. Ask the permittee to store topsoil where practical to use for rehabilitation.

7. Pulling logs and debris onto the road surface within the first 100 to 300 feet of a berm to discourage illegal Off-Highway Vehicle (OHV) use as needed.
8. Seed disturbed areas where non-native invasive species are expected to be primary colonizers (much of the project area road corridors). If non-native colonization potential is low, avoid seeding to favor natural regeneration of native herbs and shrubs.
9. Where possible, locate drill sites at areas of previous disturbance. Retain shade and native vegetation in and around exploration activities to the maximum extent possible to suppress non-native invasive plants and prevent their establishment and growth.
10. Implement seasonal restrictions to protect nests and dens of the following species, as described in Chapter 2 of the Ottawa Forest Plan: bald eagle, gray wolf, Canada lynx, northern goshawk, and red-shouldered hawk. Seasonal restrictions may be necessary if a drill site is located in proximity to active breeding areas. One nest location is known at this time.

# CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

## ***Introduction***

This chapter describes the affected environment and environmental consequences of implementing the alternatives. Summary information is presented about the affected environment, direct, indirect and cumulative effects for each resource topic. Additional information is located in specialist reports in the project file.

The plan of operations area is shown on Map A. Ground disturbing activities or vegetation removal occurs at selected locations within the general plan of operations area (project area).

## ***Analysis Assumptions***

The effects are based on implementing the alternatives as described in Chapter 1 and 2, including design features and stipulations specified for the action alternative. In addition the effects analysis, also consider the requirements from the lease from the MDNR and the MDEQ requirements for mineral well operations. The effects discussions here are focused on exploration activities only. In this chapter, the plan of operations area is also referred to as the project area.

Exploratory drilling does not automatically trigger mining. Similarly, mining is not a reasonably foreseeable action if no valuable ore body is discovered. In the past 10 years, there have been other special use permits and letters of concurrence issued for reserved and outstanding mineral rights on the ONF. These have not resulted in mining proposals. The issues and effects of occupancy and access related to developmental drilling and/or mining development cannot be considered at this time since there is no evidence that they would occur and no site-specific information available. A separate Forest Service, site-specific analysis to determine stipulations for surface occupancy would occur if mineral development is proposed.

None of the effects described in this chapter are uncertain, unique or unknown.

There are no municipal watersheds, congressionally designated wilderness areas, research natural areas, or special interest areas within the project area.

The project area falls within Management Area 1.1a as described in the Ottawa National Forest Land and Resource Management Plan (2006).

The temporary road segments that may be constructed for access to drill sites (up to three miles) would not be added to the Forest road system and would be obliterated upon project completion.

The various specialist reports in the project file include a description of the data used and field inventories conducted for this analysis. Data included ONF Geographical Information System (GIS) information, ELTP maps, and aerial photos. Field reviews occurred in the general area.

Also, in January of 2007 many of the specialists attended a field visit on similar exploration activities occurring in the area under a previous permit. They observed the use of roads, opening and later closing roads, creating a drill pad with sump pit, and extracting water from nearby streams. This field visit generated useful information for determining possible effects and developing stipulations.

## ***Overview of the Matchwood Plan of Operations Area***

The project area is located in Gogebic County in T47N R41W Sections 11, 12, 13, 14, 15, 22, 23 and 24; and in Ontonagon County in T47N R40W Sections 18 and 19; all within the Bergland Ranger District.

The project area is comprised of Land Type Association (LTA's) 19 (generally nearly level, clayey lake plain) and 9 (gently undulating and knobby, loamy ground moraine), and has a nearly continuous forest cover that is interspersed with open floodplains and impounded areas. LTA 19 comprises the majority of the project area and forest types are dominated by aspen in various size classes, spruce-fir, or spruce-fir mixed with aspen. There are also small amounts of lowland hardwoods. LTA 9 comprises a minor amount of the project area and forest types are primarily northern hardwoods with minor amounts of aspen.

The area is bisected by Forest Roads most of which are local roads maintained as either closed or for high clearance vehicles. There are no developed recreation sites or other facilities. The area experiences use for hunting in the fall.

Based on Ottawa NF cover type mapping and botany surveys in 2007, stands in the project area include red pine, white pine, mixed fir and aspen; lowland conifer and black ash wetlands; northern hardwoods; aspen and birch; lowland brush; and open wetlands and meadows, with the upland conifer accounting for approximately 4%; aspen and birch 54%; fir-spruce-aspen-birch 14%; hardwoods 10%; forested wetlands 4%, and brushy openings 12% of the land area. Open wetlands are mostly beaver ponds/sedge meadows. There are no lakes but there are a few beaver ponds associated with Bebeau Creek and other drainages. Streams in the project area are Sisson-Lilley Creek, Bebeau Creek, and several unnamed streams. Rock outcrops and cliffs are absent in this project area.

Because this project area lies wholly within Management Area 1.1a the habitat is largely aspen of various ages, managed for high densities of game species like grouse, deer and bear. As a consequence there is abundant early successional forest to benefit species needing that kind of habitat. Conversely, there is relatively little late-seral forest that has not been recently managed for timber production. Evidence of recent logging occurs throughout the project area, including clearcut and partial harvesting as recently as 2001 (South Bebeau and Tenmile Timber Sales). A small percentage of the project area is in mature, uneven-aged conditions representative of climax forest types (primarily forest wetlands). There are several stands where large diameter white pine have been reserved during salvage logging of mature aspen and fir, creating an open canopy dominated by scattered large white pine. Successional pathways for most ELTPs in the project area tend toward conifer, including white pine, hemlock, spruce and fir. Active management of the existing aspen stands has perpetuated aspen across much of the project area. A small percentage of the project area is in northern hardwoods, with stands primarily in over-stocked second growth condition.

# ***Vegetation***

## **Affected Environment**

Although the plan of operations area is 3,086 acres, the area where vegetation could be affected is only within the immediate vicinity of exploration activities. For example vegetation could be impacted along the geophysical survey lines; the temporary road locations and the clearings for drilling and associated equipment.

Any merchantable trees cut would have a value determined by the Forest Service and paid for by the permittee, as required by the Secretary of Agriculture's Rules and Regulations that govern the exercise of reserved mineral rights.

## **Direct and Indirect Effects**

The affected environment encompasses only the vegetation directly impacted by the anticipated prospecting activities. These being clearing sight lines for geophysical surveys; mechanized activities within 150 foot wide corridors along existing roads, construction of temporary roads for drilling pad access; sump pit development; and constructing of clearings for drilling equipment and associated equipment operations.

Direct effects to the vegetation would include cutting of commercial and non-commercial timber and other vegetation; and/or physical injury to residual trees, brush, and ground vegetation. Indirect effects would be damaging the soils or sites to an extent that would prevent future regeneration of that vegetation.

### **Alternative A**

No direct or indirect impacts to the existing ground or overstory vegetation would occur.

### **Alternative B**

Direct and indirect effects to the vegetation would include cutting of a very small amount of commercial and non-commercial timber and other vegetation; and/or physical injury to residual trees, brush, and ground vegetation.

*Geophysical Surveys* - Generally, only brush and smaller non-merchantable trees less than five inches diameter at breast height (DBH) would need to be cut for surveys. Areas with dense vegetation would be impacted the most, as more trees and brush would need to be cut. Some areas with sparse vegetation or mature trees would need very little removal. Complete vegetative regeneration of any cut lines is expected, as only foot traffic would traverse them and soil properties and productivity would not be affected.

*Access Routes to Core Drilling Sites* - No effects on the vegetation would occur when current roads or log landings are used for access. However, there may be brush or tree removal to create a drill site within 75 feet on either side of existing roads. In addition, temporary road-building

activity through undisturbed vegetation would require a certain amount of understory and overstory vegetation removal to clear the roadbed.

The cleared temporary roadways and short use corridors off existing roads would likely be discernible for many years; however, the cut vegetation should regenerate and brush in quickly. Re-vegetation would take considerably longer on the roadbed if compaction and rutting occur. These types of soil damage have a higher possibility of occurring if road building and road use operations occur outside of the recommended ELTP seasons of operation. Working within the ELTP recommended seasons of operation will limit potential impacts.

Additionally, any leveling, shaping, or otherwise disturbing of the surface soil layers for roadbed and drainage improvement could damage the soils and reduce its productivity for vegetation and forest growth. Stipulations that require temporary roads be returned to original ground surface contours, drainage patterns restored, topsoil stockpiled on-site if removed and replaced over the roadbed when closed, and road corridors effectively blocked to prevent future motorized use reduce the potential for negative impacts.

Some residual damage to nearby trees and vegetation may occur. This residual damage would have no long-term effect to the area.

*Sump Pit Development* - No effects on the vegetation would occur when current roads or log landings are used for sump pit development. Excavation of the sump pit on undisturbed ground would require some removal of small vegetation. Large tree removal is unlikely due to the flexibility of location and small size of the sump pit, which is about 200 square feet.

State regulations require leaving the plastic liner in place when filling in the pit. This liner would likely create a small, impeded drainage area and increase the time it takes the area to revegetate but the overall effect on abundance of these species would be negligible. Tree growth would also be restricted due to the shallow rooting depth to the liner. Separation of the topsoil during construction and replacing it over the surface when filling the pit would reduce the impacts. As the small area would likely blend in with the natural spacing of trees, these small areas of reduced soil productivity should have no effect on the total forested area.

*Drill Pad and Associated Equipment Operations* - No effects on the vegetation would occur when current roads or log landings are used for drilling pad operations. Core drilling on undisturbed areas would require an opening about 50 by 50 feet square and may occur on temporary roads or 75-foot use corridors on either side of an existing road. The maximum number of drill sites would be 50 with about three acres total affected. This activity would necessitate removing both the large and small vegetation on the drill site. The total amount of ground vegetation and timber removed would depend on the number of core drilling sites constructed on undisturbed areas and vegetation density and structure.

The drill pad clearing would likely be discernible for several years; however, the cut vegetation should regenerate and brush in quickly. Creating drill pad sites during the ELTP operating seasons recommended in the stipulations will help prevent rutting and compaction that could occur on these soils. Re-vegetation would take considerably longer on the drill site if site pads are created outside of the recommended ELTP seasons of operation. Stipulations that require drill pads be returned to the original ground surface contours, drainage patterns restored, and

topsoil stockpiled on-site if removed and replaced over the area when closed would reduce these impacts. Some residual damage to nearby trees and vegetation may occur. This residual damage would have no long-term effect to the area.

**Northern Portion of Project Area** - Effects on this portion of the project area are expected to be less because no temporary roads would be constructed and all other activities would take place on existing roads, landings and other disturbed areas, or and within 75 feet either side of existing roads.

## **Conclusion for Direct and Indirect Effects**

Activities associated with the above prospecting activities are not expected to change stand structure or composition, basal areas, canopy cover, or long-term future conditions of the stands in the project area. Most short-term potential vegetative effects are confined directly to the area of disturbance and can be reduced or eliminated through Design Criteria or Stipulations.

It is anticipated there would be no long lasting or widespread damaging effects to the timber or vegetative resources from activities related to and within the scope of what is presently proposed for this exploration project. All effects are expected to be minor.

## **Cumulative Effects**

The general area has had periodic mineral exploration within the past ten years. Forest management activities within the last 15 years included the Ten Mile and South Bebeau Vegetation Management Projects and were covered under other Environmental Assessments. These past projects have been completed and the areas affected have either regenerated successfully or are in the process of regenerating successfully, and no long-term detrimental vegetative impacts have occurred. There are currently no timber sales ongoing on National Forest System Lands within the project boundary. Roadwork may occur in the future such as road construction, reconstruction, maintenance, obliterations, and closures. Recreational use of the road system will also continue. As the scope and intensity of the proposed exploration projects will be very confined and minor compared to recent timber harvesting activities, there should be no cumulative effects to the vegetative resources.

## ***Cultural Resources***

### **Background**

Previous Cultural Resource Reconnaissances (CRRs) for Matchwood Private Minerals Exploration were conducted in accordance with the National Historic Preservation Act of 1966 and fall within the guidelines of NHPA Section 106. The Ottawa National Forest meets the requirements of Section 106 of the NHPA through a program designed to inventory lands that may be affected by any project meeting the definition of "federal undertaking" (NHPA Section 301(7)). This inventory combines background research, records searches, and use of historic

aerial photographs in combination with field survey; under the direction of a qualified archaeologist to identify heritage resources within the scope of effects of the proposed project.

## **Affected Environment**

There are six previously recorded heritage resource properties identified within the proposed project area.

## **Direct and Indirect Effects**

### **Alternative A**

Implementation of Alternative A would result in the continuance of existing conditions at all sites for the foreseeable future. Conditions at each of these sites would change through natural aging processes and potentially unintended damage by forest visitors. There would be no impacts to heritage resources under Alternative A relative to this proposal.

### **Alternative B**

Sites were evaluated and flagged for avoidance. No adverse effects are anticipated under Alternative B, since stipulations would be followed during implementation. Stipulations are in place to respond to any new sites discovered by permittee during implementation.

## **Cumulative Effects**

There are no direct and indirect effects and therefore no cumulative effects.

## ***Aquatic Resources***

### **Background Information**

The following is a brief explanation of how water would be used and disposed of for this project. Drilling and use of water follows processes identified by Michigan's Mineral Well Operations Regulations, Part 625. Michigan Department of Environmental Quality (MDEQ) regulates all wells drilled for mineral exploration in the State of Michigan. The paragraphs below are our understanding of how water is used at the site and are not intended to replace the actual regulation language.

Water is drawn from a local surface water source (creek, lake, or pond) and transported in a water truck. If the drill site is located near enough to a water source it is pumped directly with a small combustion engine pump. At the drill site the drill rig is set up and a sump pit is created with a dozer. The sump pit is lined with a plastic liner to specifications required by the Michigan's Mineral Well Operations Regulations, Part 625 (MDEQ, 2004). The water is transported from the truck to the sump pit and then used in the drill hole during drilling to keep the drill bit lubricated and cooled. Once the water leaves the truck, all water used for drilling stays on site in the lined sump and is recirculated. As the drilling continues downward the water

travels down and back up the drill hole and into the sump pond, recirculating continuously. Casings are placed around the drill hole as the drill bit travels through glacial drift so that the water remains in the hole. Casings are used through the glacial drift and several feet into the bedrock. Below the glacial drift, bentonite or other appropriate sealant is added to the drill hole instead of casings. Bentonite is a naturally occurring clay mineral that has the property of expanding when mixed with water. The drill bit cuts into the rock, creating a solid rock core that is transferred up the drill hole and then is recorded and analyzed for physical and chemical properties. The ground up rock around the core is what constitutes the drill cuttings. The sump pit contains water mixed with the ground up rock transported through the continuous recirculation. The drill casings and bentonite limit the potential for water from the truck to enter any aquifer encountered by the drill. It also helps prevent cross aquifer movement if more than one aquifer is encountered during the drilling operations. Upon completion of a mineral well the drill hole is cemented completely and the casings are removed.

After the drilling is complete the sump pond remains lined, the contents are stiffened with clean fill material (such as natural soil, bentonite, or cement) and covered with the topsoil that was originally removed to develop the sump pit. The drill hole is cemented from bottom to top to specifications provided by the direction in Michigan's Mineral Well Operations Regulations, Part 625 (MDEQ, 2004). If chemical assays of the core indicate a need to excavate and remove the cuttings from the drill sites, the contents and liners would be removed and disposed of at an appropriate location. Michigan's well drilling program has regulations in place to protect water quality, which include locating mineral wells to prevent waste, protect environmental values, and not compromise public safety (MDEQ, 2004). As stated in the *Uranium in Michigan Report to the Governor*: "The radiation associated with uranium exploration does not pose a health risk to general public. If proper drilling procedures are employed, the chance of groundwater contamination is very remote. Reclamation of the mud pits with the drill cuttings by covering with topsoil will reduce and contain any radiological emissions within background levels." (MDNR, 1982).

## **Affected Environment**

The analysis area for water quality direct and indirect effects is the hydrologic system within the project area, which includes terrestrial connectivity to aquatic features through drainways and areas within close proximity to aquatic features since these areas have the greatest potential to influence water quality. The analysis area for the riparian direct and indirect effects is the riparian ecotones within the project area since this is the area where riparian structure and function occurs. Additional maps and area descriptions are located in the project file and in the Aquatics specialist report.

### **Streams, Lakes, and Wetlands within the Project Area**

Perennially flowing Bebeau and Sisson-Lilley Creeks pass through the project area. Several small intermittently flowing un-named streams also pass through the project area, some of which flow into the project area perennial streams and some flow into Ten Mile Creek, which is located outside the project boundary. There are numerous small un-named ponds, which are associated with beaver activity in the streams. Many more beaver ponds that are not identified in the GIS

database can be located on aerial photos and some of them are readily found in the field. Therefore, the acreage is a low estimate derived exclusively from the GIS database. There are about 540 acres of wetlands within the project area, located mostly near streams. The following table displays the project area stream miles, lake/pond acres and wetland acres.

**Table 3. Project Area Streams, Lakes, and Wetlands by Watershed**

Subwatershed	Perennial Stream (miles)	Intermittent Stream (miles)	Lakes/Ponds (acres)	Wetlands (acres)
Tenmile Creek	6	10	11	540

All figures in the table above are estimates from Ottawa NF GIS database.

**Current Water Quality within the Project Area**

The State of Michigan sets water quality parameters for all waters within the State. Designated uses for all surface waters of the state include, at a minimum, the following uses: agriculture, navigation, industrial water supply, warmwater fishery, other indigenous aquatic life and wildlife, partial body contact recreation, fish consumption, total body contact recreation from May 1 to October 31 (MDEQ 2006 pA59-A60). None of the small ponds in the project area are designated and protected for coldwater fisheries as specified in “Coldwater Lakes of Michigan” and “Designated Trout Lakes and Regulations” (MDEQ 2006 pA60, MDNR 1976, MDNR 1997). Sisson-Lilley and its tributaries, which include Bebeau Creek, are listed as designated trout streams (MDEQ 2007) and are therefore designated and protected for coldwater fisheries (MDEQ 2006 pA60). Designated uses applicable for wetlands include fisheries, aquatic life, and wildlife as well as fish consumption (MDEQ 2006 p84-85).

Although the State has not assessed the streams within the project area for water quality (MDEQ 2004), they are thought to be meeting State standards since water quality analyzed nearby meets State standards and there are few road interactions.

Ground water quality is likely good and Michigan’s online groundwater mapping project (MDEQ 2007a) indicates there is one well recorded within the project area, which was created for the Forest Service as a test well (MDEQ 2007b). The mapping project also indicates the estimated depth of the water table below the ground surface is shallow, ranging between 0 and 15 feet for most of the area. This is also evident in the Forests soil mapping. The groundwater mapping project estimated baseflows for perennial streams within the project area at 1 to 5 cubic feet per second (cfs) for Bebeau Creek and 5 to 20 cfs for Sisson-Lilley Creek. These represent fairly low stream flows and indicate little available stream water during low flow periods such as late summer and winter.

**Existing Project Area Road Interactions with Streams and Wetlands**

There are 17 road/stream crossings within the plan of operations area. Culverts at stream crossings locally alter stream physical dynamics including width and depth upstream and downstream from the culvert. They are also potential sources for sedimentation and risk failure during high events.

Most roads have some effect on hydrology since they are generally designed with inboard ditches. Ditches route water along the roadways instead of allowing runoff to follow natural flowpaths through surface and subsurface routing. They often route sediment laden water into streams at road/stream crossings making them hydrologically connected to the streams and increasing channel sediment.

There is currently one mile of road within 100 feet of streams within the plan of operations area, which is where the hydrologic connectedness and sedimentation potential is the greatest. With few exceptions, most of the locations within 100 feet of streams are at stream crossings, although a few road segments closely parallel streams. Roads closely paralleling streams or located within close proximity to streams alter physical dynamics by constraining channel migration, restricting woody material recruitment, increasing sedimentation and intercepting subsurface flow. The riparian plant community is often altered which can result in reduced stream shading and litterfall. This can alter channel temperature and nutrients.

There is one mile of road within wetlands within the plan of operations area. Roads within wetlands alter the wetland hydrology to some degree. Roads can impound water in wetlands and contribute sediment to them.

## **Direct and Indirect Effects**

### **Alternative A**

Water quality and State designated beneficial uses are not expected to change over time and would continue to meet State standards. While some aquatic resources are adversely influenced by roads, the existing condition would continue and therefore not change water quality.

### **Alternative B**

As stated in the vegetation section above the vegetative composition, basal area, and stand structure (including snags and down woody debris) would not be affected by this project. The soils section describes localized effects along newly constructed temporary access roads at drill pad sites and sump ponds. However, vegetative disturbance, tree cutting, compaction and rutting are localized to a relatively small number of acres.

Stipulations, which are direction to the permittee, and design features, which are direction to Forest Service personnel administering the permit, have been incorporated into this project that would further protect water quality as well as aquatic and riparian resources. Streams would not be adversely impacted from drafting activities with the implemented stipulations and design features. The perennial streams within the project area have low baseflows, making them particularly vulnerable to adverse impacts from drafting. Stipulations and design features guide drafting practices to prevent dewatering areas. Stipulations to dispose of un-used water in upland areas prevent the possibility of transferring nonnative invasive aquatic organisms. Any affect to wet areas is expected to be localized and very minor.

Newly constructed temporary roads (up to three miles) and use of existing roads with improper drainage or within or adjacent to wetlands have the potential to increase sedimentation. Road

impacts associated with the temporary road construction would be minimized through the implementation of stipulations and design features (see also the Soils section of this chapter). Impacts to aquatic features from sedimentation related to temporary roads are expected to be localized and minor under Alternative B. Existing sedimentation from existing roads may continue but would not be increased in a measurable way by the exploration activities.

Water quality and State designated uses are not expected to change over time and would continue to meet State standards. Michigan's well drilling program has regulations in place to protect water quality (Michigan's Mineral Well Operations Regulations, Part 625).

Ground water quality would not be adversely impacted from the proposed exploration with implementation of Michigan's well drilling regulations and the stipulations and design features of this Alternative. When proper drilling procedures are adhered to the possibility of groundwater contamination is unlikely.

### **Cumulative Effects**

The area of analysis for cumulative effects is the plan of operations area. A period of ten years was chosen because most immediate sedimentation effects from road disturbance occur within that timeframe.

The general area has had periodic mineral exploration within the past ten years through 2006. When Forest Service surface occupancy and access permits or letters of concurrence were provided there were stipulations similar to this project which avoided equipment use in riparian areas and State regulations for water quality were also followed. The effects of road use may overlap in time and space with the effects of this project. It is possible that the operator would re-visit previous drill sites for additional exploration.

Two timber sales occurred in the area and portions of these sales were active in 2001. Future vegetation management projects are not currently planned for this area.

Recreational driving of ATV's has occurred in the past ten years over existing roads and cross country and this activity caused sedimentation effects. In 2006 the Forest amended the Land and Resource Management Plan, prohibiting cross country ATV travel and a national strategy for motorized vehicle use was established requiring Forests to determine designated routes for ATVs. In 2007 the Forest has identified existing designated trails for ATVs and these are displayed in a Motorized Vehicle Use Map (MVUM). Most trails are existing roads with current conditions suitable for ATV use. Distributing the MVUM and educating the public is in the beginning stages and unauthorized use is expected as the public learns about the maps and designated trail locations. Unauthorized use of roads with ATVs is expected to reduce with time but some local, minor impacts to water resources from ATVs traveling through water and wetlands is expected. The impacts of ATV use may overlap in time and space with the sedimentation effects of the exploration activities.

## **Conclusion**

When the localized and minor direct and indirect effects of this project are combined with the effects of the activities described above, minor cumulative impacts are anticipated.

## ***Wild and Scenic Rivers***

There are no Wild and Scenic River Corridors in the project area.

The aquatics resource effects described above do not impact designated rivers through tributaries.

## ***Soil Resources***

Additional information is located in the Soils Specialist Report in the project file.

## **Affected Environment**

The project area is comprised of LTA's 19 and 9, and has a nearly continuous forest cover that is interspersed with open floodplains and ponded areas. LTA 19 comprises 91 percent of the project area and forest types are dominated by aspen (47 percent cover) in various size classes, and spruce-fir or spruce-fir mixed with aspen (30 percent cover). There are small amounts of lowland hardwoods (3 percent cover). LTA 9 comprises 9 percent of the project area and forest types are primarily northern hardwoods (82 percent cover) with minor amounts of aspen or mixed aspen and conifer (8 percent cover). The entire area consists of about 16 percent lowland openings, swamps, and floodplains.

## **Direct and Indirect Effects**

The bounds of analysis for determining direct and indirect effects of proposed activities would be the portions of the proposed permit areas that are directly affected by ground surveys, site access, and drilling operations. Potential direct and indirect effects of erosion, compaction, rutting, and site productivity are reasonably confined to the soil directly beneath where the disturbance factors are taking place (such as machinery operations).

## **Alternative A**

For Alternative A, since there would be no exploration and associated ground disturbing activities and no additional erosion potential would be created by this alternative. No soil compaction would occur. Since there would be no exploration and associated ground disturbing activities within the project area, no rutting of any kind associated with proposed activities would occur. There would be no impact to forest site productivity.

## **Alternative B**

### **Southern Portion of Project Area**

***Geophysical Surveys*** - No anticipated detrimental soil effects are expected to occur from this activity. Only minimal foot traffic, with no motorized wheeled equipment on the survey lines is anticipated. There may be some short duration or one time use by ORV's to access the start of a survey line within 75 feet from an existing road. No soil compaction or rutting should occur however, especially if done within the ELTP recommended season of operations. This activity is expected to affect up to 11 acres.

***Access Routes to Core Drilling Sites*** - No effects on the soil would occur if current system roads or log landings are used for access. Permanent roads and landings are not considered part of the soil resource, as they are dedicated to other, non-biological uses. This is not the case for temporary roads.

Up to 3 miles of temporary low standard roads may be constructed for prospecting activities (up to 4 acres). Temporary road-building activity in previously undisturbed soil areas has a high potential to compact the soil roadbed surface from heavy machinery traffic; create ruts from wheeled machinery; use on wet soils or soils with low bearing capacity when moist; and cause erosion if the temporary road is on steep slopes. Any or all of these effects may reduce the soil productivity and inhibit or delay normal re-vegetation of the roadbed. Operating outside of the ELTP recommended season of operations would further increase the likelihood for these types of detrimental effects, however given the large scope of the project area, these effects would encompass a minimal area (less than 1%) and be localized to the immediate areas of activity.

Any or all of these detrimental effects may reduce the soil productivity and delay the natural re-vegetation of the road clearing for a few years. Eventually the area would re-colonize with trees if the soil surface has minimal disturbance. Constructing these roads during dry soil conditions, within the ELTP recommended season of operations, on gently sloping areas, leaving intact the soil surface and ground vegetation, and leaving topsoil stockpiled on-site if removed and replaced over the area when closed would reduce these impacts. Permanent closure/obliteration of these roadbeds is also necessary to protect the soil resource as open roads invite ORV use, which can compact or rut the soil and prevent re-vegetation.

***Sump Pit Development*** - No effects on the soil would occur if current dedicated forest openings such as log landings or system roads are used. Excavation of the sump pit in undisturbed soil however would alter the natural soil properties, soil layering, and soil structure in the actual sump pit and spoil area thus reducing soil productivity in these areas. State regulations require leaving the plastic liner in place when filling in the pit. This would likely create a small, impeded drainage area and further reduce the soil productivity within it. Minute amounts of contaminants may be deposited in the sump water and splash or seep out into the surrounding soil but these should be negligible. It may take a few years for ground vegetation to re-colonize the 200 square foot disturbed pit area. The small area with the liner in place would likely never grow commercial trees again. Leaving topsoil stockpiled on-site if removed and replaced over the area when closed will reduce these impacts. Total area affected by this activity would be less than 1 acre.

***Drill Pad and Associated Equipment Operations*** - No effects on the soil would occur if current dedicated forest openings such as log landings or system roads are used and they are large enough for prospecting needs. However, creating openings in previously undisturbed soil areas has a high potential to cause detrimental soil effects. There is the potential to compact the soil, disrupt/mix the soil surface in the opening, create ruts from wheeled machinery use on wet soils or soils with low bearing capacity when moist; and cause erosion if the opening is on steep slopes. Operating outside of the ELTP recommended season of operations would further increase the likelihood for these types of detrimental effects, however given the size of the project area, these effects would encompass a minimal area (less than 1%) and be localized to the immediate areas of activity. There is also the potential of petroleum-based contaminants accidentally spilling from different sources. Any or all of these effects may reduce the soil productivity and delay the natural re-vegetation of the opening for a few years. Eventually the site would re-colonize with trees if the soil surface has minimal disturbance. This activity is expected to affect up to 3 acres.

Use of an absorbent pad to catch petroleum spills, constructing and operating in these openings during dry soil conditions, within the ELTP recommended season of operations, on gently sloping areas, leaving intact the soil surface and ground vegetation, and leaving topsoil stockpiled on-site if removed and replaced over the area when closed would reduce these impacts.

***Transporting Water from a Local Source to the Drill Sites*** - There is a very low chance of any soil effects from this activity. A small petroleum spill from water pump use may occur however, use of an absorbent pad would minimize this possibility. Water truck use on temporary roads may also add to the potential for roadbed soil damage. A hose lay, if done by hand with no altering of the microtopography that the hose lays on would have no effect on the soil surface underneath it.

***Northern Portion of Project Area*** - Effects on this prospecting area are expected to be significantly less because no temporary roads would be constructed and all other activities would take place on existing roads, landings and other disturbed areas or within 75 feet of existing roads.

### **Conclusion for Direct and Indirect Effects**

Most, if not all potential effects can be reduced or eliminated through Design Criteria and Stipulations that the permittee may agree to follow during exploration. These stipulations, practices, standards, and guidelines for reducing detrimental effects to the soil from management activities have been successfully employed on similar past management activities on the ONF.

With implementation of all the stipulations referred to above, it is anticipated there would be no long lasting or widespread damaging effects to the soil resource from activities related to and within the scope of what is presently anticipated for this minerals exploration project.

## **Cumulative Effects**

There are currently no timber sales ongoing on National Forest Lands within the project boundary. Forest management activities within the last 15 years include the Ten Mile and South Bebeau Vegetation Management Projects that are covered under other Environmental Assessments. Mineral exploration has also previously occurred in this area within the last several years over less than 1% of the area. All of these activities were in or near the project area within the same LTA's. Similar soil protection stipulations were implemented during these past projects. The projects were successfully completed and the areas affected have either regenerated successfully or are in the process of regenerating successfully, and no long-term soil impacts have occurred. As the scope and intensity of the proposed prospecting projects are anticipated to be very localized and encompass minimal acres compared to recent timber harvesting activities, there should be no cumulative effects to the soil resources.

## ***Recreation Opportunity and Visual Quality Objective***

Forest Plan direction for MA 1.1 describes big game and upland game bird hunting as common recreation activities. Dispersed access for hunting is also available within this management area. The management area is moderately roaded environment with both open and closed roads provide a mix of motorized and non-motorized recreation opportunities.

## **Affected Environment**

The project area lies within areas of Roaded Natural recreation setting. Hunting is the predominating recreational use. Motorized access, and dispersed camping opportunities support this use in the project area. No highly sensitive sites such as developed recreation areas occur in the plan of operations area.

## **Direct and Indirect Effects on Recreation**

### **Alternative A**

This alternative would perpetuate the existing condition for recreation activities. No effects are anticipated. The existing recreation settings and naturally appearing landscape would continue.

### **Alternative B**

**Southern Portion of Project Area** - The road system currently in place provides roaded natural opportunity, and no additional opportunities for motorized travel will occur with any construction of temporary roads. All roads constructed by the permittee will be closed to motorized use after the project is completed. These closed road prisms would allow some travel corridors for non-motorized recreational users.

**Northern Portion of Project Area** - Roaded natural opportunity is provided by the road system currently in place. No additional opportunities for motorized travel will occur in the North portion because the permittee will only be using existing roads to access the project area.

## **Cumulative Effects on Recreation**

Vegetation management projects completed in the past no longer have equipment use or noise factors occurring so there is not overlap in effects from these past projects.

Noise from equipment used for exploration could happen at the same time as noise from recreation vehicle use. Exploration activities are not expected to displace recreation use as the exploration sites are small and use is temporary. Cumulative effects are negligible.

## **Visual Quality Objective**

The area of analysis for the direct and indirect effects to the visual quality objective is limited to the project area.

Visual Quality Objectives are used to plan for the management of National Forest lands within the context of projects that affect visual quality and public perception. The VQO's vary depending upon the amount of visual variety in a landscape (variety class), and the level of use (sensitivity level) along travel routes, use areas and water bodies. Maps depicting variety classes, sensitivity levels, and the Visual Quality Objective boundaries within the project area are located in the project file.

## **Affected Environment**

A review of VQO objectives map for the project area shows the areas with VQO's for Modification, and Maximum Modification. The Modification designations are predominately on the north three quarters of the project area, including both north and south of the Matchwood Tower Road 6930. Maximum Modification area is located on the southern tier of the project area. This area is removed from any foreground location of the Matchwood Tower Road 6930, and is dissected by Level 1 & 2 roads closed to large vehicle traffic.

## **Direct Effects and Indirect Effects on Visual Quality**

### **Alternative A**

No effects are anticipated. The existing recreation settings and naturally appearing landscape would continue.

### **Alternatives B**

Alternative B would change the landscape character in a minor way, because the size of drill pads, and the number of temporary roads would not change the visual characteristic of the project area.

## **Cumulative Effects on Visual Quality**

All proposed activities are consistent with the visual quality objectives for modification (M), and maximum modification (MM) classes found in the project area. In comparing the proposed alternatives with the past, present and reasonably foreseeable future actions, none of the visual quality objectives will be affected by the cumulative effects of these activities in the project area or adjacent to the project area.

## ***Threatened/Endangered/Sensitive Species (Wildlife and Plants)***

Threatened and endangered species are examined for this project at two different levels. These levels include Federal Listed Species and USDA Forest Service Eastern Region Regional Forester's Sensitive Species (RFSS). A biological evaluation is located in the project file.

## **Affected Environment**

The biological evaluation for this project contains discussion of expected effects of mineral exploration upon threatened, endangered and sensitive species. A pair of goshawks successfully fledged young in the project area in 2007. Wolf sign is abundant in the project area, as expected due to the high prey densities in MA 1.1a, though no dens or rendezvous sites were found. Wood turtles are nesting in the project area, utilizing Sisson-Lilly Creek. Suitable habitat exists for Canada lynx, though none are expected to occur in the project area. Suitable habitat also exists for red-shouldered hawk, trumpeter swan, Connecticut warbler and black-backed woodpecker (see biological evaluation) though none were found during field reviews. These species may be present.

## **Direct, Indirect and Cumulative Effects**

### **Alternative A**

No impacts/no effects to any species are expected from the no action alternative. The current condition of the project area provides suitable habitats for some listed species. Taking no action would not impair the suitability of these habitats.

### **Alternative B**

#### **Vertebrates:**

Only about 20 acres of (less than 1% of the project area) habitat alteration is expected to result from the proposed exploration activities, mostly in the southern portion of the project area. Habitat effects, therefore, are expected to be very minor. The larger issue for vertebrate wildlife is the amount of human-caused disturbance resulting from the proposed exploration. Wildlife disturbance resulting from 35 miles of geophysical surveys and up to 50 drill sites scattered across 3,086 acres could be of some consequence to wildlife. The project area is relatively small, and this amount of concentrated activity would lead to displacement of individuals of

many vertebrate species but likely only for a few hours to a few days at any given location. Wildlife in this Management Area is accustomed to lots of hunter traffic on foot, on ATVs and snowmobiles and in passenger vehicles. Return of normal habitat use patterns would be expected within a few days of ceasing the activities.

Most of the activity would occur outside breeding season, though would be allowed with Forest Service approval (see Stipulation 10 in Appendix A). The Forest has recommended ELTP-based operating restrictions due to soils concerns. In general, we expect exploration activities to begin after July 1<sup>st</sup> (see Map C and Stipulations in Appendix A), thereby avoiding most of the breeding season for most vertebrate wildlife species in the project area. If exploration activities begin prior to July 1<sup>st</sup>, there will be more opportunity for disruption of breeding activities, and therefore, more adverse effects to wildlife. Despite this potential, any effects would be minor, localized, and temporary, and not expected to result in loss of any species within the project area.

Wildlife-based seasonal restrictions to protect breeding activities by bald eagles, gray wolves, Canada lynx, northern goshawks and red-shouldered hawks, if present, will be implemented to minimize disruption of these selected rare species. These 5 species have been selected since the Ottawa Forest Plan contains specific direction to protect their breeding sites during breeding season. Other species will simply have to adapt or move away from the disturbances. Disturbance concerns have resulted in determinations of “May Impact Individuals” for gray wolf, northern goshawk, Connecticut warbler and wood turtle. Additionally, the potential for crushing wood turtles with heavy equipment prompted the “May Impact Individuals” determination for wood turtle. Overall, disturbances and habitat alterations resulting from proposed exploration are not expected to result in loss of viability across the Forest, nor a trend toward federal listing, of any vertebrate species.

#### Invertebrates:

Habitat exists for several RFSS invertebrates within the plan of operations area. Creek heelsplitter mussels were found in Bebeau and Sisson-Lilley creeks on 7/13/2005. There is little or no habitat for most of the terrestrial invertebrates (e.g. northern blue butterfly, vertigo snails, West Virginia white butterfly, or the northern barrens tiger beetle) in the project area. The footprint of the exploration and drilling operations is small. Much of the exploration activity would be confined to already disturbed areas (i.e. roads), but some new road construction would occur, as well as minor brush clearing during the geophysical surveys. This could potentially disturb existing tawny crescent habitat as well as creating new habitat by removing brush. Any effects to terrestrial habitat for the terrestrial invertebrates would be expected to be minor and of limited duration.

A relatively small amount of water would be required from local streams or ponds, for use during drilling, but design criteria and stipulations guide drafting locations so they would be limited in sensitive areas, or not remove a sufficient quantity of water to negatively impact the habitat for aquatic species (creek heelsplitter, rapids clubtail, pygmy snaketail, and forcipate emerald). Water used during drilling would go into a sump hole and would not carry sediment, or other contaminants, back to the waterbody of origin. Stipulations (e.g. equipment washing, no back-flushing of water tanks, etc.) would be in place to reduce the risk that invasive organisms, such as *Heterosporis* sp., viral hemorrhagic septicemia (VHS), spiny waterflea, New Zealand mudsnail, exotic earthworms, or whirling disease would be introduced or spread between

waterbodies. Because of these factors, no impacts are expected on any of the aquatic invertebrate species.

Plants:

The biological evaluation determined that due to the lack of documented rare plant occurrences; generally low priority habitats for rare plants in the project area; temporary nature of disturbance related to geophysical surveys; small footprint for drill pads; small overall area of disturbance; and resource-protecting stipulations and project design criteria, Alternative B is not expected to have impacts on most rare plants. A “may impact individuals” determination is reached for two moss species since no surveys were conducted for these plants and they could occur in habitats which could be impacted.

Determinations:

The following paragraphs summarize the determinations in the biological evaluation for species that occur or have habitat within the project area.

The paragraphs below list the threatened, endangered and sensitive species determinations for those that have habitat or species documented in the project area. The project file contains the BE with the full list of the threatened, endangered and sensitive species determinations.

A determination of May Impact Individual Regional Forester sensitive species, but is not likely to cause a trend to federal listing or loss of viability was made for the Grey Wolf, Northern Goshawk, Connecticut Warbler, Wood Turtle, Creek Heelsplitter, Rapids Clubtail Dragonfly, Tawny Crescent, Forcipate Emerald Dragonfly, and the following plants *Orthotrichum ohioense*, *Pylaisiadelphina tenuirostris*.

A determination of No Effect to threatened species was made for the Canada Lynx.

A determination of No Impact to Regional Forest sensitive species was made for the Red Shouldered hawk, Trumpeter Swan, and the following plants, *Armoracia lacustris*, *Astragalus canadensis*, *Astragalus neglectus*, *Bidens discoidea*, *Botrychium hesperium*, *Botrychium lunaria*, *Botrychium minganense*, *Botrychium mormo*, *Botrychium oneidense*, *Botrychium pallidum*, *Botrychium rugulosum*, *Calamagrostis lacustris*, *Calypso bulbosa*, *Cardamine (Dentaria) maxima*, *Carex backii*, *Crataegus douglasii*, *Cypripedium arietinum*, *Cystopteris laurentiana*, *Disporum hookeri*, *Eleocharis olivacea*, *Erythronium albidum*, *Galearis spectabilis*, *Huperzia selago*, *Juglans cinerea*, *Juncus stygius*, *Littorella uniflora*, *Malaxis brachypoda*, *Mimulus guttatus*, *Moehringia (Arenaria) macrophylla*, *Muhlenbergia uniflora*, *Myriophyllum farwellii*, *Nuphar pumila*, *Orobanche uniflora*, *Oryzopsis canadensis (Piptatherum canadense)*, *Panax quinquefolius*, *Petasites sagittatus*, *Phegopteris hexagonoptera*, *Polygonum careyi*, *Potamogeton confervoides*, *Pterospora andromedea*, *Pyrola asarifolia*, *Pyrola minor*, *Ranunculus gmelinii*, *Ranunculus rhomboideus*, *Salix pellita*, *Silene nivea*, *Thelypteris noveboracensis*, *Utricularia geminiscapa*, *Tiarella cordifolia*, *Vaccinium cespitosum*, *Viola novae-angliae ssp. grisea*, *Viola novae-angliae ssp. novae-angliae*, *Anzia colpodes*, *Caloplaca parvula*, *Cetraria aurescens*, *Stereocaulon pileatum*, *Sticta beauvoisii*, *Usnea longissima*, *Frullania selwyniana*, and *Schistostegia pennata*.

## **Cumulative Effects for Animals**

The area of analysis for cumulative effects for animals is the plan of operations area. A period of ten years was chosen because that period of time covers recent timber harvesting and mineral exploration activities.

This Management Area is managed to produce high numbers of game species, and is a roaded, motorized recreation area. As such, it receives high use by hunters during the autumn months. Wildlife is accustomed to avoiding human activity in this area, as a consequence.

The general area has had periodic mineral exploration within the past ten years through 2006. When Forest Service surface occupancy and access permits or letters of concurrence were provided there were stipulations similar to this project. Effects of road use and habitat alterations may overlap in time and space with effects of this project. It is possible that the operator would re-visit previous drill sites for additional exploration.

Two timber sales occurred in the area and portions of these sales were active in 2001. No timber sale activity is occurring on federal lands in this area at the present time. Future vegetation management projects are not currently planned for this area.

Recreational driving of ATV's has occurred in the past ten years over existing roads and cross country and this activity caused sedimentation effects. In 2006 the Forest amended the Land and Resource Management Plan, prohibiting cross country ATV travel and a national strategy for motorized vehicle use was established requiring Forests to determine designated routes for ATVs. In 2007 the Forest has identified existing designated trails for ATVs and these are displayed in a Motorized Vehicle Use Map (MVUM). Most trails are existing roads with current conditions suitable for ATV use. The impacts of ATV use may overlap in time and space with the sedimentation effects of the exploration activities.

## **Conclusion**

When the localized and minor direct and indirect effects of this project are combined with the effects of the activities described above, no cumulative impacts are anticipated.

## **Cumulative Effects for Rare Plants**

Since no direct or indirect effects are expected for most plants, there would be no cumulative effects from the proposed action except possibly for the two mosses. The analysis area for cumulative effects for the nonvasculars is the forested part of the Ottawa since forested habitat suitable for them occurs across the Forest and populations are so sparse and widely scattered. The timeframe for cumulative effects to rare plants is the early 1900s, when the industrial logging era changed the Ottawa landscape and had major impacts on plant populations and habitat, through the present and into the reasonably foreseeable future, about 15 years ahead. Since few historical population data exist, and the Ottawa currently has very few populations of any of the Sensitive plants, it is difficult to present a quantitative cumulative effects analysis.

Activities potentially affecting rare plants include vegetation management by the Forest; land management activities by private entities and other agencies; habitat loss due to permanent development, including homes, roads, and other construction; forest pests and disease; climate change; and toxins and pollutants. Although there possibly could be small impacts on individual bryophytes of two species from the proposed actions, the likelihood is low since the nearest known sites are miles away. Since the likelihood is low, and available habitat would persist, this project is not expected to contribute cumulative effects to long term persistence of these plants on the Forest.

## ***Management Indicator Species***

The Management Indicator Species (MIS) for the Ottawa Forest Plan are American Marten, Ruffed Grouse, Cutleaf Toothwort and the Ephemeroptera/Plecoptera/Tricoptera Insect group.

### **Affected Environment**

Management Area 1.1a is managed for high densities of ruffed grouse, and several hens with broods were sighted during field reviews. Management Area 1.1a generally is not good habitat for American marten due to the dominance of aspen forest type and the frequency of clearcut harvesting. Marten do best where old forest conditions, including large diameter snags and live cavity trees are abundant, and where large downed logs are abundant. Sisson-Lilly and Bebeau Creeks are potential habitat for the 3 orders of benthic invertebrates that comprise the Ephemeroptera/Plecoptera/Tricoptera group. Cutleaf toothwort typically inhabits northern hardwoods and occasionally rocky areas. Northern hardwoods represent about 10% of the minerals project area; rocky areas are absent.

### **Direct and Indirect Effects**

#### **Alternative A**

No exploration activities would occur, thus occupied and potential habitat would remain available, and any existing populations would not be disturbed.

#### **Alternative B**

Ruffed grouse: Management Area 1.1a is managed for high densities of ruffed grouse, and several hens with broods were sighted during field reviews. Little direct effect is expected from habitat alteration resulting from exploration activities. However, exploration activities, due to their extent and duration, will likely result in disturbance and displacement of individual grouse. Exploration activities may result in breeding activities being disrupted. If individual hens were disrupted during breeding season, the percentage of females actually displaced is expected to be minor. Enough young would probably still be produced to replenish the population.

American marten: Management Area 1.1a generally is not good habitat for marten due to the dominance of aspen forest type and the frequency of clearcut harvesting. Marten do best where old forest conditions, including large diameter snags and live cavity trees, are abundant and where large downed logs are abundant. Little direct effect is expected from habitat alteration resulting from exploration activities. An exception would be if a marten den were located at a site cleared for a drilling. Any marten living near (within ~300 feet) drill pads and roads used by heavy equipment would be disturbed and likely displaced temporarily.

Ephemeroptera/Plecoptera/Tricoptera suite: Sisson-Lilly and Bebeau Creeks are habitat for the 3 orders of benthic invertebrates that comprise the Ephemeroptera/Plecoptera/Tricoptera group. Due to Design Criteria and Stipulations, only minor direct effects to streamflow, water quality (sediment or temperature) or streamside vegetation is expected. Roads and drill pads are to be located greater than 100' from these creeks. Indirect effects are not expected either, as these species are not disturbed by equipment noise and traffic in the same way that vertebrate wildlife are.

Cutleaf toothwort: Prospecting activities are not expected to disturb much of the hardwoods, since they only represent about 10% of the minerals project area, and since the total disturbance area is expected to be about 20 acres. Geophysical surveys and drilling could occur when cutleaf toothwort is present, if there is any in the project area—none was recorded in field surveys. Geophysical surveys would likely have minor and short term impacts, mostly by slightly opening the canopy and stimulating growth of more aggressive plants than toothwort. Drill pad sites would destroy any plants or habitat, but the likelihood is very low since little of the hardwoods would be disturbed and no toothwort was observed. Habitat would persist for toothwort to colonize subsequent to exploration activities.

### **Conclusion**

Direct and indirect effects to MIS species are expected to be very minor, as explained above. No detectable changes to populations of MIS wildlife within the project area are expected to result from exploration activities.

### **Cumulative Effects for Animal MIS**

The area of analysis for cumulative effects is the plan of operations area. A period of ten years was chosen because that period of time covers recent timber harvesting and mineral exploration activities.

This Management Area is managed to produce high numbers of game species, and is a roaded, motorized recreation area. As such, it receives high use by hunters during the autumn months. Wildlife is accustomed to avoiding human activity in this area, as a consequence.

The general area has had periodic mineral exploration within the past ten years through 2006. When Forest Service surface occupancy and access permits or letters of concurrence were provided there were stipulations similar to this project. Effects of road use and habitat

alternations may overlap in time and space with effects of this project. It is possible that the operator would re-visit previous drill sites for additional exploration.

Two timber sales occurred in the area and portions of these sales were active in 2001. No timber sale activity is occurring on federal lands in this area at the present time. Future vegetation management projects are not currently planned for this area.

Recreational driving of ATV's has occurred in the past ten years over existing roads and cross country and this activity caused sedimentation effects. In 2006 the Forest amended the Land and Resource Management Plan, prohibiting cross country ATV travel and a national strategy for motorized vehicle use was established requiring Forests to determine designated routes for ATVs. In 2007 the Forest has identified existing designated trails for ATVs and these are displayed in a Motorized Vehicle Use Map (MVUM). Most trails are existing roads with current conditions suitable for ATV use. The impacts of ATV use may overlap in time and space with the sedimentation effects of the exploration activities.

### **Conclusion**

When the localized and minor direct and indirect effects of this project are combined with the effects of the activities described above, no cumulative impacts are anticipated.

### **Cumulative Effects for Plant MIS**

The analysis area for cumulative effects for cutleaf toothwort is hardwoods on the Ottawa National Forest, since this is the primary habitat for cutleaf toothwort. The timeframe for analysis is from the early 1900s when the sharp increase in commercial timber harvesting began to have discernible effects on hardwood habitats, through the present and into the reasonably foreseeable future, about 15 years ahead.

#### **Past actions**

Much of the Ottawa NF and surrounding areas were heavily logged in the early 1900s. Clearcutting and other harvest methods and burning in hardwoods likely extirpated many cutleaf toothwort plants as well as decreasing the total acreage of northern hardwoods. Ongoing disturbance and slow recolonization rates common to forest herbs (Verheyen et al. 2003) may have prevented this species from returning to its historical population levels.

Subsequent timber harvest, road building, OHV use, and other Forest uses in hardwood stands also may have destroyed some toothwort plants. Past stand management designed to restore mature forest structure (for example, down woody debris) and composition likely benefited toothwort and other spring ephemerals. Natural succession in early seral stands such as aspen results in some gradual conversions to hardwoods. Parcelization of private lands within the Ottawa National Forest boundary may have resulted in declines of cutleaf toothwort as these hardwood stands are logged off or exotics introduced. However, much of the Forest is still hardwood-dominated, providing habitat for cutleaf toothwort.

### Present actions

Numerous harvests occur in northern hardwoods on the Forest but many stands are left untreated. The harvests have the potential to reduce cutleaf toothwort populations as do other Forest land uses, as discussed above. Some management on the Forest is designed to convert stands to hardwoods, creating more toothwort habitat. Much of the hardwood harvest on Forest is conducted in winter when impacts to toothwort are minimized.

### Reasonably foreseeable future actions

Timber management, forest opening creation, potential prospecting on USA minerals tracts and elsewhere, introduction of competing species, and other land uses are expected to continue, potentially affecting the abundance and distribution of cutleaf toothwort. Hardwood reserve areas and winter logging are expected to continue to provide unaffected toothwort habitat. MIS monitoring should provide more information on toothwort needs.

Since most of the hardwoods in the minerals project areas would not be disturbed, most habitat effects would be short-term, and no toothwort is documented in the project area, no cumulative effects are anticipated.

## ***Nonnative and Invasive Plants***

### **Affected Environment**

The direct and indirect effect analyses for invasive plants were conducted at the project area scale, because this is where these impacts would occur.

The Ottawa NF database of mapped non-native invasive plant infestations (November 2006) shows a few infestations in the project area, mostly along FR 6930. Complete surveys have not been conducted, and there may be more infestations in the project area. Mapped infestations include medium priority sweet clover and spotted knapweed, and low priority smooth brome and Queen Anne's lace. Surveys in 2007 recorded orange hawkweed, bull thistle, Canada thistle, and a few exotic bush honeysuckles. None of these infestations is a high priority for treatment since there are either few plants, or not high priority species.

### **Direct and Indirect Effects**

#### **Alternative A**

NNIP management direction in the 2006 Forest Plan would be followed. This includes treating priority NNIP infestations with a focus on areas with high potential for establishment and spread or for serious environmental effects. No prevention actions or weed treatment are scheduled for the project area. Existing roadside infestations are expected to continue to slowly spread, into disturbed areas where the existing native plant community does not repel these invaders. If the infestations become very large, they could become treatment sites at a later date, separate from this project. Other NNIP could establish in the project area, spread by wind, animals, or human

activities. Since there would be no ground disturbance, there is low potential for invasive plant spread.

### **Alternative B**

Non-native invasive plant species could be introduced or spread by exploration activities. Geophysical surveys present a very low risk, since there is little ground disturbance or vegetation removal. Drill pad sites and new road construction areas represent a higher risk, since there would be areas of exposed soil following the drilling or construction. This threat is lessened by the stipulation for cleaning of off-road equipment prior to entry onto the Forest and seeding to establish new vegetation where the potential for invasive plants to colonize is high. However, movement of equipment within the project area and bare soil exposure could result in new spot infestations, such as of the medium and low priority invaders already present in the area, for example, sweet clover. Spotted knapweed, sweet clover and other weeds are expected to persist along roadsides in the area, as in Alternative A.

### **Cumulative Effects**

The analysis area for cumulative effects is the western Upper Peninsula of Michigan and northern Wisconsin along the Michigan border, and the Lake Superior coast. This area was chosen because it is the area most likely to be a source of invasives for the Ottawa, or to receive invasive species from the Ottawa. The chronological bounds of analysis start in the late 1990s when NNIP began to be a concern to land managers and extend through the present and into the reasonably foreseeable future, about 15 years ahead.

Past land use actions that contributed to the spread of NNIP include seeding for erosion control (deliberate introductions and accidental inclusions in seed mixes); road and trail construction/maintenance activities using NNIP-contaminated fill and mulch materials; residential plantings of NNIP on and near the Forest; recreation including ATV use, boating, fishing, hiking when propagules are moved from one site to another; logging activities that moved propagules and created favorable settings for infestations; exploration activities; road and trail use. Natural vectors operating in the past and contributing to the spread of NNIP include wildlife, wind, and water. Finally, there was very little awareness of invasive species as an important issue; this was probably the main factor in the introduction and spread of invasive species because little, if anything, was done to prevent them.

### **Present actions**

Introductions of invasive species continue. Many of the past actions that spread invasive species continue. There is much more awareness of the invasive species problem, both in the agency and by the general public. Many actions by state, federal, tribal, county, other governmental agencies and private organizations have focused on learning more about and stopping the introduction and spread of invaders. Efforts include public education, equipment cleaning, biological and chemical controls, and new legislation.

Some treatment actions have occurred on the Forest to slow the spread of NNIP. These include actions such as herbicide treatment of glossy buckthorn, crown vetch, Eurasian watermilfoil, and

Japanese knotweed; hand pulling garlic mustard, purple loosestrife, and Eurasian watermilfoil; brush cutting and digging Japanese barberry, glossy and common buckthorns, and exotic honeysuckles; and mowing/lopping leafy spurge. Treatment actions have occurred off Forest as well, on nearby lands. For example, the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) has a program for raising and releasing purple loosestrife biocontrol beetles in the area and has conducted herbicide treatments on NNIP. Local homeowners have begun chemically treating giant hogweed in the western Upper Peninsula.

The Forest has taken prevention actions, placing NNIP alert signs at boat ramps, and providing public presentations and educational materials. Some NNIP survey has occurred. Timber sale contracts now include language directing cleaning of off-road equipment under specific circumstances, to slow the spread of NNIP. The Forest has worked with 13 partner groups to establish the Western Upper Peninsula Cooperative Weed and Pest Management Area, to better treat infestations across boundaries. The Forest has prepared programmatic environmental effects analysis to allow more streamlined treatment of NNIP sites. Other groups such as GLIFWC, Michigan State University Extension, Sigurd Olson Environmental Institute and the Master Gardeners of the area also conduct prevention and education programs.

### **Reasonably foreseeable future actions**

Continued introductions of invasive plants are expected, as is continuance of activities that spread them. Across the Forest, there are numerous ground disturbing activities planned and proposed, such as timber sales, road construction, possible prospecting on USA minerals tracts, and gravel pit use. These activities can create favorable conditions for the establishment of NNIP. There are also ongoing activities that can spread NNIP, both natural processes and human-assisted (e.g. ATV riding). NNIP treatment by the Forest is likely to increase, particularly now that the programmatic analysis is completed, allowing more rapid response to infestations. Awareness of the problem should also continue to increase and should somewhat offset continuing introductions.

The Forest is addressing the NNIP problem and it is reasonable to assume that coordinated action would occur in the foreseeable future, since NNIP are an emerging issue and tribal, state, federal and other agencies are giving increasing attention to the problem.

In the project area, there is lowered potential to establish new weed infestations due to the small area of disturbance, cleaning of equipment, and seeding. However, some new small infestations are possible at drill pad sites from windblown seed or seed brought in on equipment that does not have to be cleaned or seed picked up in the project area following cleaning. Thus there may be small cumulative effects of a few new medium or low priority weed infestations.

## CHAPTER 4 LIST OF PREPARERS

The following list of specialists participated during the development of this environmental assessment:

**ID TEAM MEMBERS:**

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## **Appendix A - Stipulations for Exploration Drilling – Matchwood Tower Road Area**

*Note to Reader: Additional information that the FS Official would use when administering the permit is located in the design features section of the EA.*

### **Project Coordination**

1. As stated in the plan of operations the permittee will coordinate with Forest Service officials for the following; location of road construction, location of drill sites, and location of water sources to be used for drafting. The Forest Service would provide guidelines that considers the following; soil resources, heritage sites, water quality, wetlands, NNIS, TE&S and safety.

### **Cultural Resources**

2. Surveys have been conducted for this project area and any known sites will be avoided by ground disturbing activities. Protection measures will be developed by the Forest Archaeologist, through collaboration with the State Historic Preservation Officer/Tribal Historic Preservation Officer (SHPO/THPO), to alleviate any adverse effects to heritage resource properties that may be caused during exploration. Expense and implementation of protection measures will be the responsibility of the permittee.
3. If additional heritage resources are discovered during the implementation of exploration activities, the project at that site shall halt and the Forest Archaeologist shall be notified and the Forest Archaeologist shall also notify the THPO.

### **Wetlands (as defined by ONF ELTP), Floodplains, and Streams**

4. Wetlands are identified as sites dominated by poorly or very poorly drained soils as defined by and depicted by Ecological Landtype Phase (ELTP) mapping (Refer to Map B). A Forest Service Official will determine if any other site-specific analysis is needed for wetland determination.
5. No dredging or permanent placement of fill will be permitted within a wetland.
6. If temporary fill is needed in a wetland, filter fabric will be used as a base, and necessary permits will be obtained. Fill material and fabric would be removed upon completion of drilling.
7. No fuel will be stored in wetlands or floodplains.

### **Wildlife and Plants**

8. Threatened, Endangered or Sensitive plant and animal protection needs will be handled on a site by site and species by species basis.

### **Roads and Drilling Pad Construction**

9. The Forest Service Official will approve the location and standards for road maintenance, construction or reconstruction based on Forest Service road management policy. Temporary roads would be constructed, used and then restored to the landscape. Remove and store topsoil to be used in rehabilitation after use.

### **Operations**

10. Use ELTP recommended seasons of operations to the extent possible during ground-disturbing activities. This may include operating in frozen soil, winter only, or dry summer conditions depending on the ELTP mapping unit. Operating outside of ELTP recommended seasons of operations would be allowed with approval from a Forest Service Official on a case by case basis (See Map C).
11. The topsoil, typically the upper six inches of soil, shall be removed and stockpiled separately when constructing the sump pits. Stockpile topsoil where leveling temporary roads deeper than six inches. The reserved topsoil shall be replaced over the disturbed area as the final step in returning the surface or roadbed to its original contour. Use proper erosion control methods as needed for the stockpiles.
12. Absorbent mats or other absorbent materials will remain under the drill rig and other equipment, in case of oil or hydraulic leaks during the operations and be available for on-site refueling and servicing of all the machinery used in the operation. Additional absorbent materials, such as a standard spill kit, shall be on-site as directed by the Forest Service Official.
13. Any spills or releases of oils, fuels, or other toxic or hazardous materials must be reported and remediated per applicable State and Federal Laws.
14. Drilling bits, etc. shall be cleaned prior to arriving on the Forest in order to avoid cross-contamination of aquifers.
15. All residues created from exploration activities, such as slash, shall be removed from water bodies, trails and road clearing limits, except where requested to be placed for road closure. Additional residue shall be treated as required by a Forest Service Official.
16. Remove stakes, garbage, hose or other materials from the sites and survey lines upon completion of the project.
17. Trees five inches in diameter or greater to be cut shall be designated and marked in advance by a Forest Service Official. Any merchantable trees cut would have a value determined by the Forest Service and paid for by the permittee, as required by the Secretary of Agriculture's Rules and Regulations that govern the exercise of reserved mineral rights.

### **Revegetation and Invasive Species**

18. Drafting equipment shall be cleaned prior to arriving at the Forest. Drafting equipment shall be cleaned prior to use in a new waterbody in order to avoid transporting aquatic invasive species. Cleaning the drafting equipment may include bleaching, drying five days in the sun or high-pressure spray.
19. There will be no back-flushing water from the draft tank back into water source to avoid cross-contamination of aquatic invasive species. If there is a need to empty the draft tank, it may be permitted in an upland area, where these invasives would not persist.
20. Use reasonable measures to make sure each piece of equipment that will work off an existing road is visually free of soil, seeds, vegetative matter or other debris that could contain or hold seed, eggs or other propagules (pieces that could start a new infestation) prior to arriving at the Forest. Reasonable measures shall not require the disassembly of equipment components or use of any specialized inspection tools. Equipment shall be considered free of soil, seeds, and other such debris when a visual inspection does not disclose such material.
21. The permittee's designated representative must advise a Forest Service Official of measures taken to clean equipment and arrange for Forest Service inspection prior to

- such equipment being placed in service. Forest Service shall have two days, excluding weekends and Federal holidays, to inspect equipment after it has been made available for inspection. After inspection or after two days, prospecting activities may proceed.
22. If the permittee desires to clean equipment on National Forest System land, such as at the end of a project or prior to moving to a new site that is free of invasive species of concern, the designated representative and Forest Service shall agree on locations for the cleaning and control of off-site impacts, if any.
  23. As Plan of operations states, additional re-seeding or re-planting will only be done at the request of the Forest Service. Forest Service shall provide guidance on the type of seed to use.

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