

Tiller Corporation
Zavoral Property
Biological Assessment
Final Report

Sections 18 and 19, T32N R19W

Scandia, Washington County, Minnesota

December 17, 2009

Prepared For:

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I. Executive Summary

Critical Connections Ecological Services, Inc. (CCES) was retained by Tiller Corporation to perform an independent biological assessment within a 113 acre property owned by the Zavoral family in Scandia, Washington County, Minnesota. The 113 acre property is located within Sections 18 and 19 of T32N R19W (**Figure 1; Appendix A**). Of these 113 acres, 60 acres are proposed to be mined and a total of 64 acres will be reclaimed.

At the recommendation of the Minnesota Department of Natural Resources' (MNDNR) Natural Heritage Program the biological assessment focused on rare plant and animal species listed as having the potential to occur on the subject property and that may be impacted by proposed project activities. The species that were the focus of the biological assessment included: Kitten-tails (*Besseyia bullii*; MN Threatened), Bog blue grass (*Poa paludigena*; MN Threatened), American ginseng (*Panax quinquefolius*; MN Special Concern), Red-shouldered hawk (*Buteo lineatus*; MN Special Concern), and Blanding's turtle (*Emydoidea blandingii*; MN Threatened).

The biological assessment of the property took place in June and July of 2009. CCES ecologists conducted field surveys of the entire 113 acre property to identify potential habitat for the rare species likely to occur within the property. Once potential habitats were identified, detailed surveys of these habitats were conducted to determine the presence or absence of rare species.

CCES detected and documented the location of a previously undocumented rare plant population on the subject property; Butternut (*Juglans cinerea*; MN Special Concern). For each Butternut tree location, a point location was collected with a sub-meter accuracy global positioning system (GPS) and incorporated within a geographic information system (GIS) using ArcGIS 9.2. None of the rare species detailed in the MNDNR's letter or from the Natural Heritage Program database query were detected. Project background, survey methods, and survey results are provided in the following report.

II. Project Background

In May 2009, CCES, a MN DNR approved surveyor, was contacted by the Tiller Corporation to conduct a biological assessment of a 113 acre property owned by the Zavoral family in Scandia, Washington County, Minnesota. A query of the MNDNR's Biotics database identified seventy (70) historic records of rare plants, animals, fishes, reptiles, mussels, and native plant community occurrences within a one mile radius of the proposed project site. Of these seventy historic records, the MNDNR Natural Heritage Program determined that the following state-listed species have the potential to occur on the subject property and may be impacted by proposed project activities. These species included: Kitten-tails (*Besseyia bullii*; MN Threatened), Bog blue grass (*Poa paludigena*; MN Threatened), American ginseng (*Panax quinquefolius*; MN Special Concern), Red-shouldered hawk (*Buteo lineatus*; MN Special Concern), Blanding's turtle (*Emydoidea blandingii*; MN Threatened), and several threatened and endangered species of mussels occurring within the St. Croix River. The MNDNR's Natural Heritage Program, in a letter dated July 21st 2008 to Sunde Engineering, LLC, recommended a rare species and significant natural features survey be conducted on the property by a MNDNR approved surveyor to determine the presence or absence of these state-listed species (see **Appendix C** for a copy of this letter).

CCES was retained by Tiller Corporation in June 2009 to complete the biological assessment for the state-listed species within the 113 acre subject property. CCES ecologists visited the property during June and July of 2009 to conduct the biological assessment. During the 2009 surveys, CCES surveyed the entire 113 acre site for the presence of the species of concern.

III. Survey Methods

June and July 2009 Biological Surveys

Field surveys for species listed in the MNDNR Natural Heritage Program letter that had the potential to occur within the property limits were conducted from June 12 to July 2, 2009. These species included: Kitten-tails (*Besseyia bullii*; MN Threatened), Bog blue grass (*Poa paludigena*; MN Threatened), American ginseng (*Panax quinquefolius*; MN Special Concern), Red-shouldered hawk (*Buteo lineatus*; MN Special Concern), and Blanding's turtle (*Emydoidea blandingii*; MN Threatened). In addition to the target species mentioned above, CCES ecologists also surveyed for federally-listed and state endangered, threatened, and special concern plant and animal species that could potentially occur on the property.

Throughout the surveys, all locations of rare species occurrences were flagged using pink ribbon flagging. Individual occurrences were located, flagged, documented, and mapped using point locations collected with a Trimble® GeoHX sub-meter accuracy global positioning system (GPS). One GPS point was collected for each rare species occurrence. Associated plant species (i.e. common plants occurring in immediate proximity to the rare species and comprising its habitat) and abiotic habitat information (slope, aspects, soils, etc.) were also noted. To confirm species identification with the Minnesota DNR, digital photographs of rare species specimens were taken, and are provided in **Appendix B** of this report. Herbarium voucher specimens were *not* collected.

CCES mobilized to the Zavoral property on June 12 2009 and began biological surveys of the property. All surveys were conducted from June 12 through July 2, 2009. CCES surveyed and documented the following natural habitats and cultural land cover types on the Zavoral property: White pine-hardwood forest, Black ash swamp seepage subtype, Maple-Basswood forest, moderate cliff with forest, and altered non-native grasslands, woodlands, and forests, as well as former gravel mining areas (see **Figure 2; Appendix A**). Once potential habitats (i.e. specific habitats that have the potential to support rare species) were identified and located, CCES conducted thorough and detailed surveys of these habitats for the presence of potential rare species.

III.A. Rare Plant Survey Methods

During June 12 through July 2, 2009, CCES surveyed all potential areas of the property for the presence of state-listed plant species, with a focus on Kitten-tails (*Besseyia bullii*; MN Threatened), and Bog blue grass (*Poa paludigena*; MN Threatened), as these state-Threatened species are protected under Minnesota Statutes 84.0895, Protection of Endangered and Threatened Species. In addition, CCES conducted surveys for American ginseng (*Panax quinquefolius*; MN Special Concern), as this species is cited in the Minnesota DNR's July 2008 letter to Sunde Engineering, LLC.

A meander survey for Kitten-tails was conducted in June of 2009. The survey conducted was primarily in the forested edges and woodland areas throughout the property where native vegetation was present. Suitable habitat for Kitten-tails typically is oak savanna, dry prairie and oak woodland within the bluffs and terraces of the St. Croix, Mississippi and Minnesota River valleys. The optimal time to survey for Kitten-tails is late May through June in Minnesota, when Kitten-tails is in flower and/or has set seed (Welby Smith, MNDNR State Botanist, personal communication).

A meander survey for Bog bluegrass was conducted in June of 2009. The survey focused on the Black ash swamp communities occurring along the eastern boundary of the property. Bog bluegrass is most often found in forested and shrub dominated wetland habitats that are fed by groundwater seeps and are dominated by Black ash and Yellow birch. The optimal time to survey for Bog bluegrass is late June through mid July in Minnesota, when Bog bluegrass has set seed (Welby Smith, MNDNR State Botanist, personal communication).

Meander surveys for American ginseng were conducted in June of 2009. The survey conducted focused on the White pine-hardwood forest and Maple-Basswood communities found in the eastern and southern parts of the property where a previously documented population was found in 1988 by a MN DNR Botanist. American ginseng is found typically in mature hardwood forests with little competition in the ground layer which is typical for the hardwood forests located on-site. A historic record in the MNDNR's Rare Features Database notes that "a few" American ginseng plants were located on the Zavoral property in September 1988 by a DNR staff botanist on an east-facing forested slope, and that the long term viability of this small population was estimated at "fair to poor". Special effort was made to attempt to relocate the historic Ginseng population discovered on the subject property in 1988 along the east-facing White pine-hardwood forest slope where it was presumed to be located. Surveys resulted in no populations being present in this area or elsewhere in the survey area.

III.B. Red Shouldered Hawk Survey Methods

CCES conducted biological surveys for a state-listed raptor species described in the MNDNR's Natural Heritage Program's letter as having potential to occur on the Zavoral property. This single raptor species was the Red-shouldered hawk (*Buteo lineatus*; MN Special Concern).

Red-shouldered hawk surveys were conducted by a project biologist during June of 2009. Surveys were conducted along three transects within forested habitats associated with the river and bluffland by listening for territorial Red-shouldered hawk calls. Suitable habitats were scanned for nest trees, adult hawks, potential nest trees, or young near potential nesting sites. Scanning took place for eight minutes at every survey location.

III.C. Blanding's Turtle Survey Methods

CCES conducted a survey for the presence of Blanding's turtle (*Emydoidea blandingii*), a state-Threatened reptile. Blanding's turtle surveys were conducted in June within potential habitats that could support Blanding's turtles and/or turtle nesting sites. A meander survey was used to determine the presence/absence of Blanding's turtles on the property. The month of June is the optimal

phenological period to survey for Blanding's turtles along the St. Croix River valley in Minnesota, as turtles are mobile and actively breeding and nesting at this time of the season. During Blanding's turtle meander surveys, CCES ecologists surveyed for the presence of mature and immature Blanding's turtles (and other turtle species) within potential habitats throughout the 113 acre site. Furthermore, CCES ecologists surveyed for evidence of turtles (e.g. turtle tracks in sand and along roads), and evidence of turtle nesting (e.g. turtle nesting sites, predated nests, eggs).

Although several rare mussel species were mentioned in the Natural Heritage Program letter as species that may be impacted by proposed project activities, biological surveys were not conducted for listed mussel species because required riverine habitats that could support these species did not occur within the property limits.

IV. Survey Results

Site Evaluation and Existing Conditions:

A variety of upland and wetland plant communities, moderate cliffs, and former gravel mining areas were documented during the June/July 2009 field surveys of the 113 acre property. Of these 113 acres surveyed 60 acres are being proposed to be mined with a total of 64 acres being reclaimed. Existing site conditions are described below and more detailed information on each community type is given throughout the results section. **Figure 2 (Appendix A)** delineates the extent of the subject property and outlines the locations of these plant communities or altered land cover type.

Areas from the bluff line down (east) to the St. Croix River are relatively undisturbed White pine-hardwood and Maple-Basswood forests that run contiguously from the north and south property boundary and extend off-site in both directions. These forest types are of a high to moderate ecological quality with a diversity of tree species found throughout including: White pine (*Pinus strobus*), Red oak (*Quercus rubra*), White oak (*Quercus alba*), Paper birch (*Betula papyrifera*), Sugar maple (*Acer saccharum*), Basswood (*Tilia americana*), Ironwood (*Ostrya virginiana*), Bitternut hickory (*Carya cordiformis*), Black ash (*Fraxinus nigra*), Butternut (*Juglans cinerea*), Hackberry (*Celtis occidentalis*), American elm (*Ulmus americana*), Big-tooth aspen (*Populus grandidentata*), and Blue beech (*Carpinus caroliniana*).

The forested area below the bluff line is included within a MNDNR designated Regionally Significant Ecological Area (RSEA) of the Twin Cities. The classification of RSEA denotes the presence of a high quality plant community with the potential to have suitable habitat for rare species located within it. On the Zavoral property the RSEA is composed primarily of the White pine-hardwood forest along the steep east-facing bluff, Maple-Basswood forest within the southernmost ravine system, and Black ash swamp seepage subtype located along the eastern boundary of the site within ravine systems adjacent to the rail road tracks. The Maple-Basswood forests within the survey area showed evidence of moderate impacts from invasive earthworms, such as reduced leaf litter and reduced leaf mold (likely due to earthworm herbivory), reduced herbaceous species cover in the ground layer, soil compaction, and soil erosion.

At the time of this survey the majority of upland area located above (west of) the bluff line was utilized for past sand and gravel mining, and was inactive. This part of the property is dominated by altered/non-native short and long grass, altered/non-native short and long grass with sparse trees, and altered/non-native forest and woodland plant communities. Many small to medium sized spoil piles occur throughout this area and are now re-vegetating with a mix of native and non-native grasses and forbs including primary and secondary noxious weeds. The primary noxious weeds found in this land cover type include: Poison ivy (*Toxicodendron radicans*), Bull thistle (*Cirsium vulgare*), and Canada thistle (*Cirsium arvense*). The secondary noxious weeds found in this plant community are Giant foxtail (*Setaria faberii*), Spotted knapweed (*Centaurea maculosa*), Common lambsquarters (*Chenopodium album*), Common milkweed (*Asclepias syriaca*), Quackgrass (*Agropyron repens*), and Annual ragweed (*Ambrosia artemisiifolia*). The Minnesota Department of Agriculture list plants as noxious weeds because they are injurious to public health, the environment, public roads, crops, livestock, and other property. Other dominant vegetation found within this area includes young Cottonwood (*Populus deltoides*) and Eastern white pine (*Pinus strobus*) saplings and trees, which are typical early successional species (i.e. species that are the first to grow back after disturbance has taken place). Very little potential habitat for the rare species of concern was found in this portion of the property.

CCES surveyors documented two Black ash seepage subtype wetlands within the survey area. These Black ash dominated plant communities were assessed to be of moderate ecological quality using the MN DNR's plant community assessment protocols. Steep ravine systems with seepage discharge areas support these streams and wetlands. Seepage wetlands and streams on the property support a diversity of native plant species and provide potential habitat for at least one of the rare species that were surveyed for; Bog blue grass (*Poa paludigena*). However, no rare species were located in the Black ash seepage wetland habitats within the property during the surveys. Along the eastern edge of the property in two ravine systems are Black ash seepage subtype wetlands that are dominated by Black ash (*Fraxinus nigra*), Yellow birch (*Betula allegheniensis*), Skunk cabbage (*Symplocarpus foetidus*) and Spotted touch-me-not (*Impatiens capensis*, see **Figure 2**).

Moderate cliff areas were found mainly in the northern half of the property. Due to the inaccessibility (i.e. steepness) of these cliff areas, many of the bedrock outcrops had not been directly disturbed by past land use practices. Herbaceous and woody plant species typical of moist cliff habitats were located in these areas including large populations of Nodding trillium (*Trillium cernuum*), Blue cohosh (*Caulophyllum thalictroides*), Smooth cliff-brake (*Pellaea glabella*), Bulbet fern (*Cystopteris bulbifera*), Wild columbine (*Aquilegia canadensis*), Sugar maple (*Acer saccharum*), Black ash (*Fraxinus nigra*), and several moss and liverwort species.

June and July 2009 Rare Species Survey Results:

Butternut (*Juglans cinerea*; MN Special Concern)

Butternut was the only state-listed species found during the June and July 2009 survey. CCES detected one (1) previously-undocumented population of Butternut (*Juglans cinerea*; MN Special Concern). Within the single population of Butternut located on-site, a total of 33 individual trees were located

during the 2009 surveys. **Figure 3 (Appendix A)** provides the GPS point locations of all individual Butternut trees documented during the survey of the subject property.

The Butternut trees located on the Zavoral property occur mainly along woodland edges throughout the property above the bluff line with several trees located within completely forested areas along steep ravines. On the Zavoral property, Butternut is typically associated with the following plant species: Red oak (*Quercus rubra*), White oak (*Quercus alba*), Sugar maple (*Acer saccharum*), Basswood (*Tilia americana*), Ironwood (*Ostrya virginiana*), Bitternut hickory (*Carya cordiformis*), Black ash (*Fraxinus nigra*), Hackberry (*Celtis occidentalis*), American elm (*Ulmus americana*), Prickly-ash (*Zanthoxylum americanum*), Chokecherry (*Prunus virginiana*), Raspberry (*Rubus* sp.), Virginia creeper (*Parthenocissus quinquefolia*), Large-flowered bellwort (*Uvularia grandiflora*), and False Solomon's seal (*Maianthemum racemosum*).

Of all of the individual Butternut trees detected throughout the site, one tree appears to be healthy and disease-free; with all other individuals affected by an introduced (i.e. non-native) fungal disease known as Butternut Canker (*Sirococcus clavigignenti-juglandacearum*). When Butternut is infected by this fungal disease, the trees form cankers along the main stem of the tree. The cankers appear as sunken bark that is dark in color that eventually girdles and kills the tree. It is estimated that this fungal disease has killed over 80-90% of the Butternut trees in some regions of the United States and has caused a steep decline in Butternut populations of larger diameter at breast height trees (DBH of greater than 12") throughout the state of Minnesota (Purdue University, 2009). Butternut is currently listed as Special Concern by the Minnesota DNR and therefore *does not require* avoidance, protection, or mitigation for taking of the plant species under Minnesota Statute 84.0895.

Butternut is typically a minor component of mesic hardwood forests that often occur along or near rivers in Minnesota. All but one of the individuals on the Zavoral property show clear signs of infection by the Butternut Canker with typical dieback and visible cankers on branches and trunks of each tree. The single tree that appears disease free is also the largest Butternut surveyed on the property. This tree has a DBH of 17.5" and appears to have a full canopy with no visible signs of active cankers along the main trunk and lower branches. This individual Butternut tree is located at the base of the bluff above the railroad tracks in the central part of the property and is relatively isolated from the other individuals found elsewhere on the property.

No occurrences of Kitten-tails (*Besseyia bullii*; MN Threatened), Bog blue grass (*Poa paludigena*; MN Threatened), American ginseng (*Panax quinquefolius*; MN Special Concern), Red-shouldered hawk (*Buteo lineatus*; MN Special Concern), or Blanding's turtles (*Emydoidea blandingii*; MN Threatened) were detected during the 2009 survey completed by CCES.

V. Conclusions

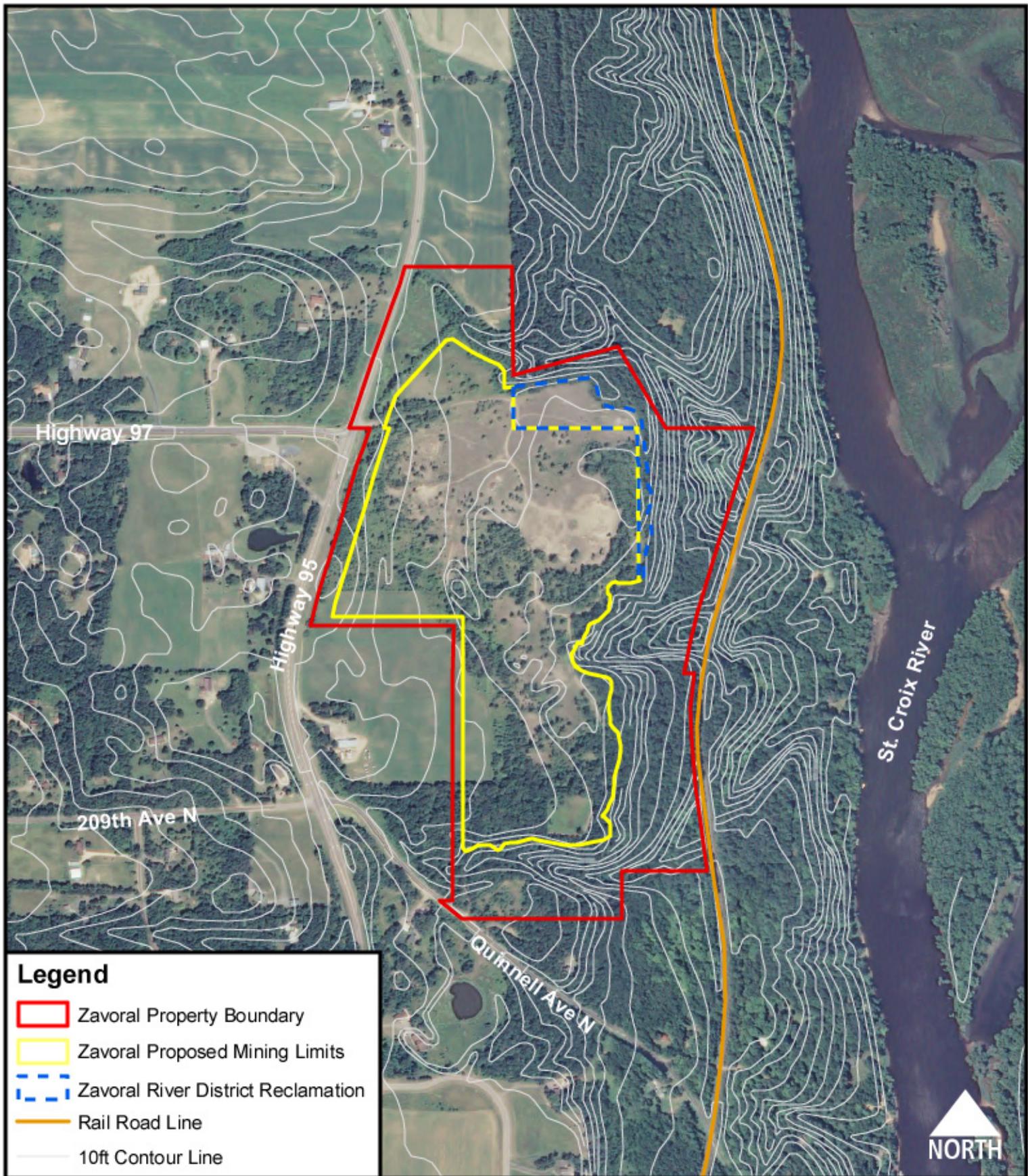
CCES located and documented one population of a state-listed plant species within the 113 acre Zavoral property during the June and July 2009 surveys. The species located was Butternut (*Juglans cinerea*; MN Special Concern). Thirty three (33) individual Butternut trees were located throughout the property.

Minnesota Special Concern species *do not require* avoidance, taking permits, or mitigation for potential impacts associated with planned development or taking. CCES recommends that a forestry stewardship plan be developed to manage the Butternut trees located on the Zavoral property to remove all diseased plants and plant material and conserve the potentially disease-resistant tree and its progeny. Without such management, the Butternut population within the subject property will likely be lost to Butternut canker.

No other state or federally listed species were detected or documented during the June and July surveys of the Zavoral property. Despite a historic record of Ginseng (1988) being located on the Zavoral property, no Ginseng was detected. Ginseng is relatively easy to detect throughout the growing season, and a concerted effort was made to relocate the historic population or any other populations of Ginseng within the subject property. The mesic hardwood forests that occur on the property and could potentially support Ginseng populations showed significant loss of vegetative diversity and soil structure due to the presence of invasive earthworms. The 1988 DNR survey of the property noted that the population size was “only a few plants”, and the estimated viability of the Ginseng population was assessed at “fair to poor”. Invasive earthworms, deer herbivory, soil erosion, and numerous other potential biotic and abiotic influences could explain the loss of the small historic Ginseng population.

Appendix A

Figures



Zavoral Property Site Location

Aerial Photo Source: 2008 FSA Color Aerial Photograph
November 24, 2009



**Critical Connections
Ecological Services, Inc.**
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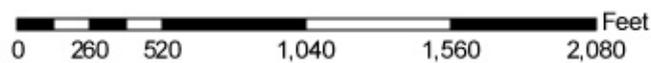
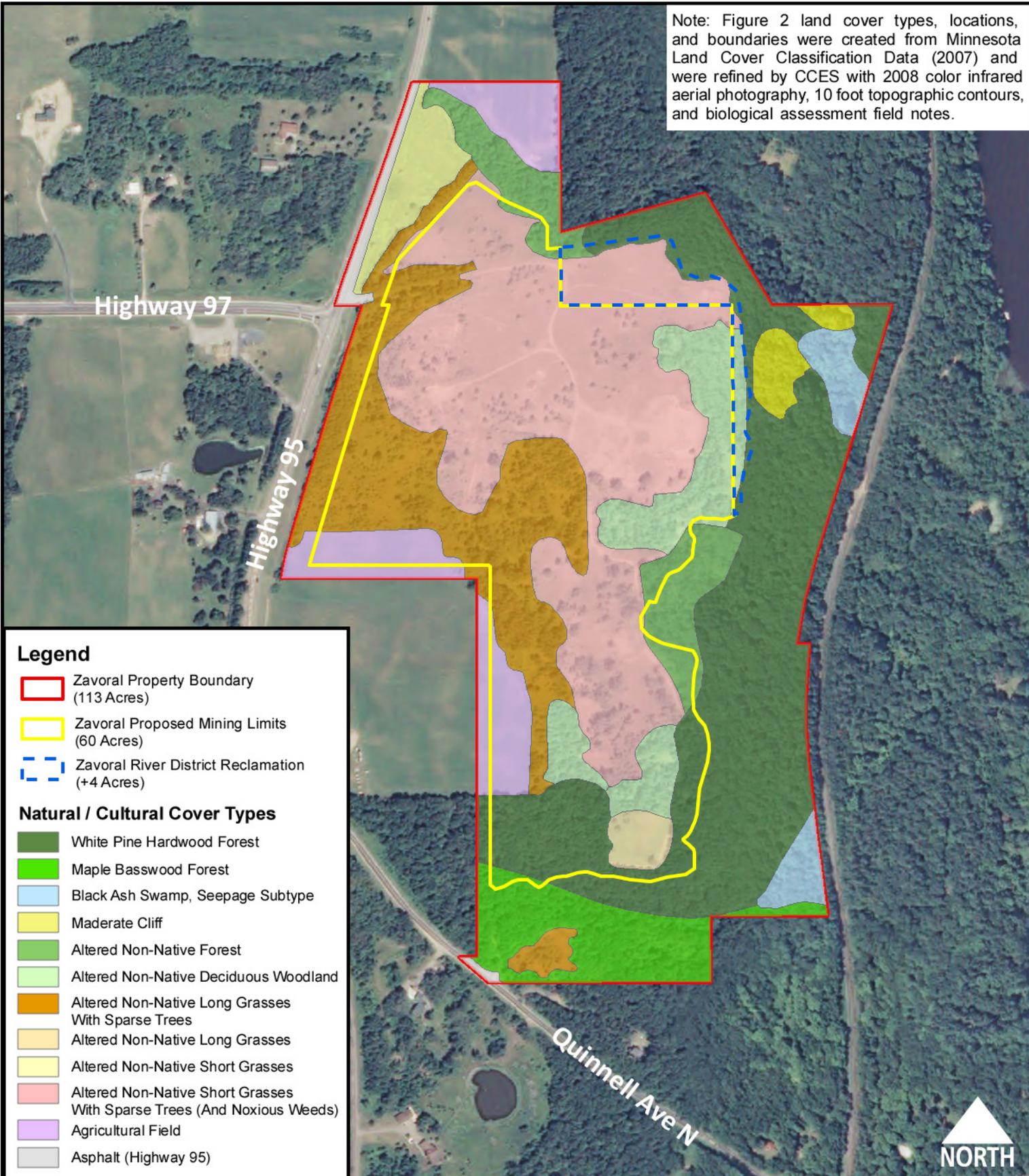


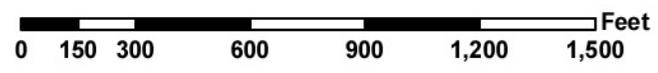
Figure 1

Note: Figure 2 land cover types, locations, and boundaries were created from Minnesota Land Cover Classification Data (2007) and were refined by CCES with 2008 color infrared aerial photography, 10 foot topographic contours, and biological assessment field notes.



Zavoral Property Cover Type Map

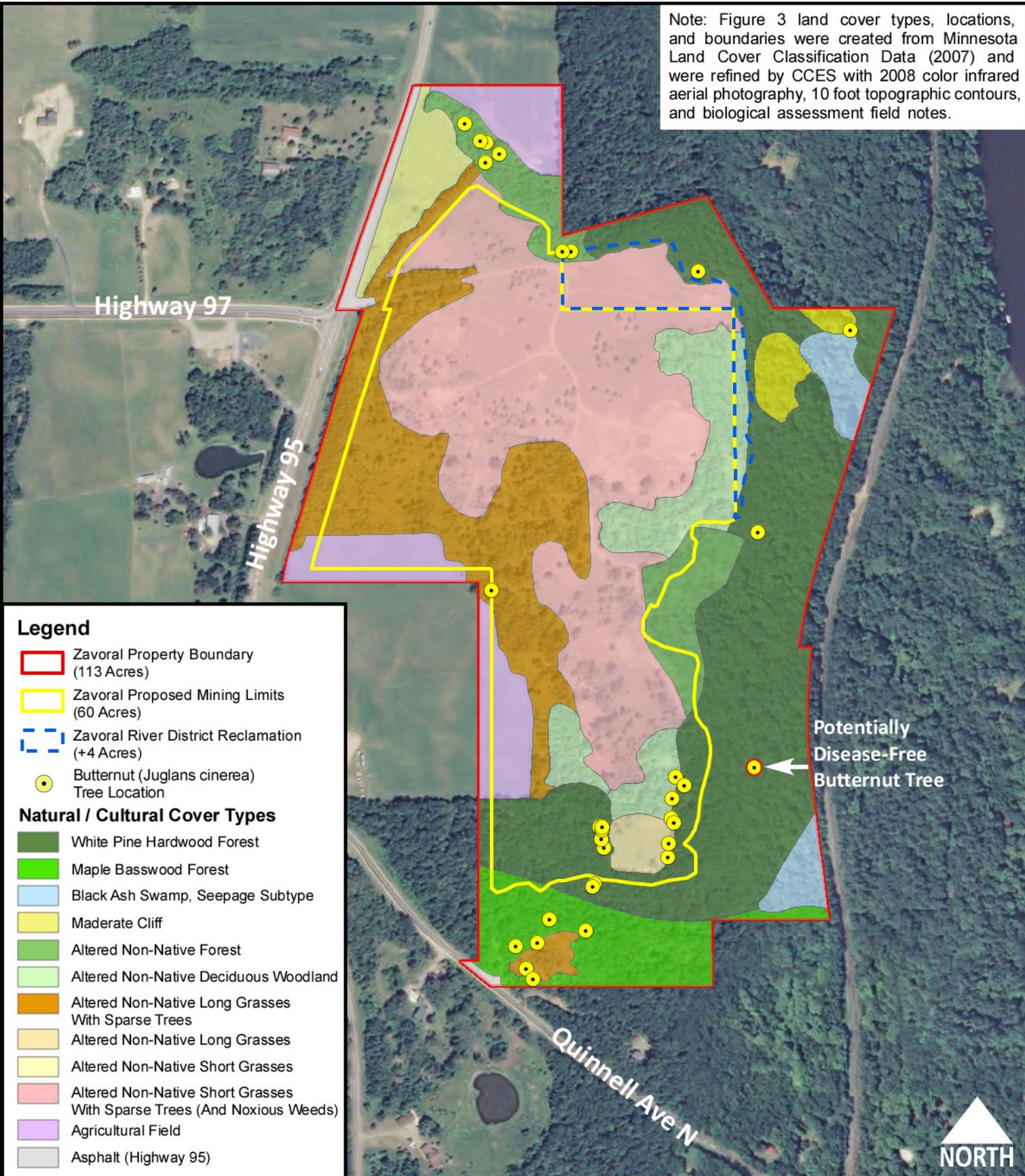
Aerial Photo Source: 2008 FSA Color Aerial Photograph
December 16, 2009



**Critical Connections
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Figure 2

Note: Figure 3 land cover types, locations, and boundaries were created from Minnesota Land Cover Classification Data (2007) and were refined by CCES with 2008 color infrared aerial photography, 10 foot topographic contours, and biological assessment field notes.



Aerial Photo Source: 2008 FSA Color Aerial Photograph
December 16, 2009

Zavoral Property Rare Species Locations

Appendix B

Photographs of Rare Species and Associated Habitat

Appendix B. Zavoral Rare Species Report Photos 2009

Butternut, *Juglans cinerea* (MN Special Concern)



17.5" dbh Butternut



Woodland edge habitat (butternut with pink flagging, lower right)



Leaflet of Butternut



Seeds of Butternut



Butternut with cankers on main trunk



Close-up of infected Butternut branch



Appendix C

Minnesota DNR Natural Heritage Program Letter

July 21, 2008



Minnesota Department of Natural Resources

Division of Ecological Resources, Box 25

500 Lafayette Road

St. Paul, Minnesota 55155-4025

Phone: (651) 259-5109 Fax: (651) 296-1811 E-mail: lisa.joyal@dnr.state.mn.us

July 21, 2008

Mr. Joe Galluzzi
Sunde Engineering
10830 Nesbitt Avenue South
Bloomington, MN 55437

Re: Request for Natural Heritage information in the vicinity of the proposed Tiller Corporation Zavoral Mine, T32N R19W Sections 18 & 19, Washington County
Correspondence # : ERDB 20080847

Dear Mr. Galluzzi,

As requested, the Minnesota Natural Heritage Information System has been queried to determine if any rare species or other significant natural features are known to occur within an approximate one-mile radius of the proposed project. Based on this query, several rare features have been documented within the search area (for details, see the enclosed database reports). Please note that the following **rare features may be impacted** by the proposed project:

- The forested area within the project site is part of a Regionally Significant Ecological Area (RSEA). **We encourage you to avoid or minimize disturbance in this area**, especially as it contains suitable habitat for rare species (see below). In 2003, the DNR Central Region, in partnership with the Metropolitan Council, conducted a landscape-scale assessment of the seven-county metro area that identified ecologically significant terrestrial and wetland areas. The mapping of RSEAs was done using two primary data sources. The first data source was native plant communities mapped by the Minnesota County Biological Survey. The remaining areas were derived using a modeling process that predicts the likelihood that high quality native animal habitats exist in a contiguous area. Shapefiles of the RSEAs are available on the DNR's data deli website at <http://deli.dnr.state.mn.us> (named "Twin Cities Metro Regionally Significant Ecological Areas"). To view pdf versions of the final maps, refer to <http://www.dnr.state.mn.us/rsea/index.html>. If you would like help interpreting the RSEA data, contact Hannah Texler, Regional Plant Ecologist for DNR's Central Region, at 651-772-7570 or hannah.texler@dnr.state.mn.us.
- Blanding's turtles (*Emydoidea blandingii*), a state-listed threatened species, have been reported from the area and may be encountered on site. If Blanding's turtles are found on the site, please remember that state law and rules prohibit the destruction of threatened or endangered species, except under certain prescribed conditions. If turtles are in imminent danger they should be moved by hand out of harms way, otherwise they should be left undisturbed.

For your information, I have attached a Blanding's turtle fact sheet that describes the habitat use and life history of this species. The fact sheet also provides two lists of recommendations for avoiding and minimizing impacts to this rare turtle. Please refer to the first list of recommendations for your project. If greater protection for turtles is desired, the second list of additional recommendations can also be implemented. The attached flyer should be given to all contractors working in the area.

- Red-shouldered hawks (*Buteo lineatus*), a state-listed species of special concern, have been documented during the breeding season in the vicinity of the project area. This species requires large, contiguous forest tracts interspersed with wetlands and prefers lowland woods and river bottoms. We recommend, to the extent possible, the retention of forest cover on the project site to help maintain habitat connectivity to other forest tracts in the area. In addition, disturbance near nests, if any, should be avoided during the critical nesting time (April and May).
- Several state-listed threatened and endangered mussel species have been documented in the St. Croix River in the vicinity of the proposed project. Because they are declining nationwide, freshwater mussels are considered one of North America's most imperiled groups of animals. In Minnesota, 25 of our 48 native mussel species are listed as either endangered, threatened, or of special concern. Mussels are particularly vulnerable to deterioration in water quality, especially increased siltation. As such, the mining project should not be allowed to negatively affect the water quality of the St. Croix River. Toward this end, a buffer of vegetation should remain between the mine and the river, and sound erosion and sediment control practices should be implemented and maintained for the duration of the project.
- Bog bluegrass (*Poa paludigena*) and kitten-tails (*Besseyia bullii*), both state-listed threatened plants, have been documented in the vicinity of the project area, and American ginseng (*Panax quinquefolius*), a state-listed plant species of special concern, has been documented within the project boundary. Minnesota's endangered species law (MS 84.0895) and associated rules (MR 6212.1800 -6212.2300 and 6134) prohibit the taking of threatened or endangered species without a permit. For plants, taking includes picking, digging, or destroying.

In Minnesota, bog bluegrass is limited to wetland habitats maintained by groundwater seeps. These may include swamps, sedge meadows, margins of small pools, or rivulets of water. Such areas are often dominated by black ash (*Fraxinus nigra*), yellow birch (*Betula alleghaniensis*), and sometimes speckled alder (*Alnus incana* subsp. *Rugosa*). The Minnesota Land Cover Classification System has identified two black ash seepage swamps within the project boundary (please see attached map). We recommend that these seepage areas be avoided. If avoidance is not feasible, we recommend that a botanical survey of these communities be conducted prior to any ground disturbance.

In Minnesota, kitten-tails is largely restricted to the bluffs and terraces of the St. Croix, Mississippi, and Minnesota river valleys. This species is primarily a species of oak savanna communities, though it also occurs in dry prairies and oak woodlands. According to the Minnesota Land Cover Classification System a significant portion of the project boundary is white pine/hardwood forest (please see attached map), which is potential habitat for this species. Again, if avoidance of this habitat is not feasible, we recommend that a botanical survey be conducted prior to any ground disturbance in this habitat.

American ginseng requires mature hardwood forests with little undergrowth and was abundant in Minnesota at the time of European settlement. Since then, however, it has been intensively exploited for its commercial uses, and is now nearly extirpated from most of its former range. Species of special concern are not protected under the state endangered species law. Nevertheless, given the potential for special concern species to become threatened due to cumulative losses, we encourage you to survey for this species and to avoid any identified populations.

Please note that all surveys should be conducted by an individual with previous experience doing rare plant surveys. I have enclosed a list of qualified contractors for your reference. **Please send me a proposed survey plan prior to any survey work.** Feel free to contact Welby Smith, the

staff botanist, at 651-259-5142 for further information on survey protocol and timing for the above species. The results of any survey work should also be sent to my attention.

- The response to Item 11b of the EAW should address the measures that will be taken to avoid or minimize negative impacts to the rare features mentioned above.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area.

The enclosed results include an Index Report and a Detailed Report of records in the Rare Features Database, the main database of the NHIS. To control the release of specific location information, which might result in the destruction of a rare feature, both reports are copyrighted.

The Index Report provides rare feature locations only to the nearest section, and may be reprinted, unaltered, in an environmental review document (e.g., EAW or EIS), municipal natural resource plan, or report compiled by your company for the project listed above. If you wish to reproduce the index report for any other purpose, please contact me to request written permission. **The Detailed Report may include specific location information, and is for your personal use only. If you wish to reprint or publish the detailed report for any purpose, please contact me to request written permission.**

Please be aware that this letter focuses only on potential effects to *rare natural features*; there may be other natural resource concerns associated with the proposed project. This letter does not constitute review or approval by the Department of Natural Resources as a whole. If you would like further information on the environmental review process, please contact your Regional Environmental Assessment Ecologist, Wayne Barstad, at (651) 259-5738.

An invoice in the amount of \$113.78 will be mailed to you under separate cover within two weeks of the date of this letter. You are being billed for the database search and printouts, and staff scientist review. Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources.

Sincerely,



Lisa Joyal
Endangered Species Environmental Review Coordinator

enc. Rare Features Database: Index Report
Rare Features Database: Detail Report
Rare Features Database Reports: An Explanation of Fields
Blanding's Turtle Fact Sheet
Map
DNR List of Surveyors

cc: Wayne Barstad

Zavoral Mine
T32N R19W Sections 18 & 19
Washington County

-  Project Boundary
- MLCCS communities
-  White pine-hardwood forest
-  Black ash swamp seepage subtype

