WETLAND DELINEATION REPORT

Prepared for the Red Lake Band Of Chippewa for the Thunder Lake Road East Connection Proposed Road Corridor

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SECTION I

Intent of report

The intent of this report is to describe the wetland resources found within the area of interest during the field visits in October 2023. This report displays the data found and describes the areas of wetland resources and the upland transition areas around these wetlands and how this transition line was determined.

Area of Interest

The area of interest is comprised of three sections with the first consisting of an approximately 2-mile long, 250-foot-wide corridor, starting a half mile west of the Old Nebish Road (Route 16) and extending east to the point of tangent of the curve along Indian Service Route 18, just north of the intersection with IRR 40. The second section of the area of interest was comprised of a 200-foot-wide corridor that stretched north from the point of curvature along the aforementioned curve, intersecting the first area of interest perpendicularly along will all of the curve along Indian Service Route 18. The final section of the area of interest consists of an approximately 300 foot wide, half mile long corridor following IRR 40 to the northwest from the intersection with Indian Service Route 18 (please see wetland delineation map for visual reference).

Current Use

The area of interest is mostly comprised of undeveloped upland forest with wetland basins intermixed throughout. The forest land is currently managed for timber resources. Forest roads and two track trails bisect the proposed corridor periodically through the undeveloped forest. The only development present is in the form of IRR 40 and Indian Service Route 18 at the east end of the area of interest. The portions of the roads within the corridor are used as throughway travel only, with no residential use present along these sections of road.

Vegetation

The vegetation within the upland areas at the sample locations were comprised of *Populus tremuloides* (Quaking Aspen), *Betula papyrifera* (Paper Birch), *Ostrya virginiana* (Ironwood), *Quercus macrocarpa* (Bur Oak), *Acer rubrum* (Red Maple), *Pinus resinosa* (Red Pine), *Fraxinus nigra* (Black Ash), *Populus balsamifera* (Balsam Poplar), *Tilia americana* (Basswood), *Abies balsamea* (Balsam Fir), *Ulmus americana* (American Elm) and *Acer saccharum* (Sugar Maple) in the tree stratum, *Corylus americana* (American Hazelnut), *Populus tremuloides* (Quaking Aspen), *Cornus sericea* (Red Osier Dogwood), *Fraxinus nigra* (Black Ash), *Acer saccharum* (Sugar Maple), *Salix bebbiana* (Bebb's Willow), *Populus balsamifera* (Balsam Poplar), *Cornus rugosa* (Round-leaved Dogwood), *Betula papyrifera* (Paper Birch), *Abies balsamea* (Balsam Fir), *Rosa blanda* (Smooth Wild Rose), *Acer saccharum* (Sugar Maple) and *Ostrya virginiana* (Ironwood) in the shrub stratum and *Dievilla lonicera* (Northen Honeysuckle), *Pteridium aquilinum* (Bracken Fern), *Thalictrum dioicum* (Early Meadow-Rue), *Abies balsamea* (Balsam Fir), *Eurybia macrophylla* (Large-leaved Aster), *Bromus ciliatus* (Fringe Brome), *Oryzopsis asperifolia* (Rough-leaved Rice Grass), *Anemone americana* (Round-lobed Hepatica), *Fragaria virginiana* (Wild Strawberry), *Bromus inermis* (Smooth Brome), *Melilotus officinalis* (Yellow Sweet Clover), *Phleum pratense* (Timothy), *Agrostis perennans* (Autumn Bentgrass), *Centaurea stoebe* (Spotted Knapweed), *Pastinaca sativa* (Wild Parsnip), *Carex pensylvanica* (Pennsylvania Sedge), *Athyrium filix-femina* (Lady Fern), *Trifolium repens* (White Clover), *Taraxacum officinale* (Common Dandelion), *Acer rubrum* (Red Maple), *Quercus macrocarpa* (Bur Oak), *Maianthemum racemosum* (False Solomon's Seal), *Cornus rugosa* (Round-leaved Dogwood), *Pyrola elliptica* (Shinleaf), *Galium triflorum* (Fragrant Bedstraw), *Equisetum pratense* (Meadow Horsetail) and *Osmorhiza claytonii* (Sweet Cicely) in the herb stratum.

The vegetation within the wetland areas was comprised of *Salix bebbiana* (Bebb's Willow), *Fraxinus nigra* (Black Ash), *Populus tremuloides* (Quaking Aspen) and *Acer rubrum* (Red Maple), in the tree stratum, *Salix petiolaris* (Meadow Willow), *Fraxinus nigra* (Black Ash), *Spiraea alba* (White Meadowsweet), *Salix bebbiana* (Bebb's Willow), *Cornus sericea* (Red Osier Dogwood), *Populus tremuloides* (Quaking Aspen), *Alnus incana* (Speckled Alder) and *Populus balsamifera* (Balsam Poplar) in the shrub stratum and *Carex lacustris* (Lake Sedge), *Scirpus cyperinus* (Woolgrass), *Fragaria virginiana* (Wild Strawberry*), Calamagrostis canadensis* (Canada Bluejoint), *Glyceria striata* (Fowl Manna Grass), *Plantgo Major* (Common Plantain), *Abies balsamea* (Balsam Fir), *Phalaris arundinacea* (Reed Canary Grass), *Typha angustifolia* (Narrowleaf Cattail), *Symphyotrichum lanceolatum* (Panicled Aster), *Taraxacum officinale* (Common Dandelion), *Pastinaca sativa* (Wild Parsnip), *Cirsium arvense* (Canada Thistle), *Bromus inermis* (Smooth Brome), *Toxicodendron radicans* (Eastern Poison Ivy), *Salix petiolaris* (Meadow Willow), *Equisetum pratense* (Meadow Horsetail), *Petasites frigidus* (Sweet Coltsfoot), *Equisetum praealtum* (Scouring Rush), *Rubus idaeus* (Wild Red Raspberry), *Carex tuckermanii* (Tuckerman's Sedge), *Persicaria lapathifolia* (Nodding

Smartweed), *Lathyrus ochroleucus* (Cream Pea), *Ranunculus pensylvani*ca (Pennsylvania Buttercup), *Carex atherodes* (Slough Sedge), *Cardamine pensylvanica* (Pennsylvania Bittercress), *Bidens frondosa* (Devil's beggarticks) and *Bromus ciliatus* (Fringe Brome) in the herb stratum.

Description of the Area

The area of interest is comprised of a proposed road corridor along with sections of two existing road corridors. The proposed road corridor is approximately 2 miles long, extending west from Indian Service Route 18, just north of the intersection of Indian Service Route 18 and IRR 40. This area is comprised mostly of upland forest with wetland basins located in low points throughout. The topography within this area is moderately rolling with several large deep basins and a stream corridor that runs bisects the corridor. The land is undeveloped with the primary use of the area being forestry with an emphasis of logging (evidence of past logging was found in the form of landscape alterations from large equipment as well as areas of different aged forest.) There are two track roads that cross throughout the area, used by local residents for hunting and other forest access. A section of Indian Service Route 18 and a section of IRR 40 are encompassed within the area of interest. There is no residential use along these sections of road, with the use being strictly for through traffic.

Weather

The weather over the past three months prior to visiting the site was considered **dry.** There was less than normal amounts of precipitation the month prior to the visit, less than normal amounts of precipitation two months prior to the visit and less than average amounts of precipitation three months prior to the visit. Surface water was present within most of the wetland basins during the site visit.

Hydrology

The Upper/Lower Red Lake watershed # 09020302, covers 1,263,678 acres. Located in Northern Minnesota, this watershed is home to Upper and Lower Red Lakes, the two largest bodies of water within the state. The watershed is by both flow volume and surface area the largest drainage basin of the Red River. Its major tributaries are the Red Lake River and Grand Marais Creek, which empty directly into the Red River, and the tributaries of the Red Lake River (the Thief, Clearwater, Hill, Lost, and Poplar Rivers).

Methods

Prior to a site visit, the National Wetland Inventory Mapper was used to check for any known wetlands located within the area of interest. The Web Soil Survey was used to look for soil types and possible changes that occurred on the site. And contours were gathered from the Beltrami County GIS Mapping website to help indicate all areas that needed to be investigated within the area of interest.

Sites were inspected for the three parameters described in the 1987 Corps of Engineers Wetlands Delineation manual. The delineation was also performed based on the guidance laid out within the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region. A representative area was located for each wetland and field notes, samples and photos were collected at these spots. The wetland was flagged with purple flagging and plot sites were marked with lath and purple flagging.

SECTION II

Wetland Descriptions

Wetland 100 is a palustrine scrub-shrub broad-leaved deciduous seasonally flooded/saturated wetland (PSS1E). The wetland is located is large basin that is several feet lower in elevation than the surrounding topography. The area around the basin has been logged in the past and it appears that heavy equipment left ruts and depression around the edge of the wetland in places that it has expanded into. The vegetation within the wetland plot was comprised of *Salix bebbiana* (Bebb's Willow) and *Fraxinus nigra* (Black Ash) in the tree stratum, *Salix petiolaris* (Meadow Willow), *Fraxinus nigra* (Black Ash), *Spiraea Alba* (White Meadowsweet) and *Salix bebbiana* (Bebb's Willow) in the shrub stratum and *Carex lacustris* (Lake Sedge) in the herb stratum. Wetland soils within the sample plot consisted of eleven inches of 10YR 2/1 loam followed by three inches of 95% 10YR 4/2 sandy clay with 5% 10YR 5/8 concentrations within the matrix. The hydric soil indicator was Depleted Below Dark Surface (A11). The upland vegetation at the sample plot consisted of *Populus tremuloides* (Quaking Aspen), *Betula papyrifera* (Paper Birch) and *Ostrya virginiana* (Ironwood) in the tree stratum, *Corylus americana* (American Hazelnut) in the shrub stratum and *Dievilla lonicera* (Northen Honeysuckle), *Pteridium aquilinum* (Bracken Fern), *Thalictrum dioicum* (Early Meadow-Rue), *Abies balsamea* (Balsam Fir), *Eurybia macrophylla* (Large-leaved Aster) and *Bromus ciliatus* (Fringe Brome) in the herb stratum. The upland soils consisted of seven inches of 10YR 2/2 sandy loam followed by five inches of 10YR 3/4 sand followed by two inches of 10YR 3/4 clay. The wetland was flagged based on a shift from an upland based plant community to a wetland based plant community with a shift from *Corylus americana* (American Hazelnut), *Eurybia macrophylla* (Large-leaved Aster) and *Pteridium aquilinum* (Bracken Fern) to *Salix bebbiana* (Bebb's Willow) and *Fraxinus nigra* (Black Ash) used as an indicator of this shift. This shift correlated closely with the toe of the subtle slope leading down to the wetland edge for the surrounding upland.

Wetland 101 is a palustrine emergent persistent temporarily flooded wetland (PEM1A). The wetland is located in a slight depression within the surrounding upland and based on the sharp edges and indentations within the depression, it appears that it may have been formed when heavy logging equipment created ruts and compacted soils during the last time the area was logged. The vegetation within the wetland plot was comprised of *Salix bebbiana* (Bebb's willow) in the tree stratum, *Cornus sericea* (Red Osier Dogwood) and *Fraxinus nigra* (Black Ash) in the shrub stratum and *Scirpus cyperinus* (Woolgrass), *Fragaria virginiana* (Wild Strawberry*), Calamagrostis canadensis* (Canada Bluejoint), *Glyceria striata* (Fowl Manna Grass), *Plantgo Major* (Common Plantain) and *Abies balsamea* (Balsam Fir) in the herb stratum. Wetland soils within the sample plot consisted of three inches of 10YR 3/4 loamy sand followed by eleven inches of 50% 10YR 5/3 and 15% 10YR 3/4 clay with 5% 10YR 5/2 pockets of sand and 30% 10YR 5/8 concentrations within the matrix. The hydric soil indicator was Stripped Matrix (S6). The upland vegetation at the sample plot consisted of *Populus tremuloides* (Quaking Aspen), *Betula papyrifera* (Paper Birch) and *Ostrya virginiana* (Ironwood) in the tree stratum, *Corylus americana*

(American Hazelnut) in the shrub stratum and *Dievilla lonicera* (Northen Honeysuckle), *Pteridium aquilinum* (Bracken Fern), *Thalictrum dioicum* (Early Meadow-Rue), *Abies balsamea* (Balsam Fir), *Eurybia macrophylla* (Large-leaved Aster) and *Bromus ciliatus* (Fringe Brome) in the herb stratum. The upland soils consisted of seven inches of 10YR 2/2 sandy loam followed by five inches of 10YR 3/4 sand followed by two inches of 10YR 3/4 clay. The wetland was flagged based on the distinct edge where the subtle depression began. This correlated closely with the shift from and upland based plant community to a wetland based plant community, with a shift from *Corylus americana* (American Hazelnut), *Eurybia macrophylla* (Large-leaved Aster) and *Pteridium aquilinum* (Bracken Fern) to *Salix bebbiana* (Bebb's Willow) and *Scirpus cyperinus* (Woolgrass) used as an indicator of this shift. The vegetation shift was used to flag areas where the edge of the depression was more subtle and obscure.

Wetland 102 is a palustrine emergent persistent seasonally flooded/saturated wetland (PEM1E). The wetland is located within a large basin and appears to be hydrologically connected to wetland 104 through a centerline culvert under Indian Service Route 18. The wetland drains to the northwest into wetland 109 through a wetland complex with a shallow, seasonal creek flowing through middle of it. The vegetation within the wetland plot was comprised of no vegetation within the tree and shrub stratums and *Carex lacustris* (Lake Sedge), *Phalaris arundinacea* (Reed Canary Grass), *Typha angustifolia* (Narrowleaf Cattail) and *Symphyotrichum lanceolatum* (Panicled Aster) in the herb stratum. Wetland soils consisted of seventeen inches of 10YR 2/1 mucky loam followed by three inches of 10YR 4/1 coarse sand. The hydric soil indicator was Loamy Mucky Mineral (F1). The upland vegetation at the sample plot consisted of *Quercus macrocarpa* (Bur Oak), *Acer rubrum* (Red Maple), *Populus tremuloides* (Quaking Aspen), *Ostyra virginiana* (Ironwood) and *Betula papyrifera* (Paper Birch) in the tree stratum, *Populus tremuloides* (Quacking Aspen), *Cornus sericea* (Red Osier Dogwood), *Fraxinus nigra* (Black Ash), *Corylus americana* (American Hazelnut) and *Acer saccharinum* (Sugar Maple) in the shrub stratum and *Pteridium aquilinum* (Bracken Fern), *Oryzopsis asperifolia* (Rough-leaved Rice Grass), *Anemone americana* (Round-lobed Hepatica), *Fragaria virginiana* (Wild Strawberry), *Eurybia macrophylla* (Large-leaved Aster) and *Thalictrum dioicum* (Early Meadow-rue) in the herb stratum. The upland soils consisted of six inches of 10YR 2/2 sand/fine sand followed by five inches of 60% 10YR 4/3 and 40% 10YR 2/2 sand/fine sand followed by three inches of 10YR 4/3 sand/fine sand. The wetland was flagged based on the shift from an upland based plant community to a wetland based plant community with a shift from *Corylus americana* (American Hazelnut), *Pteridium aquilinum* (Bracken Fern) and *Oryzopsis asperifolia* (Rough-leaved Rice Grass) to *Typha angustifolia* (Narrowleaf Cattail) and *Carex lacustris* (Lake Sedge) used as an indicator of this shift. This was in conjunction with the toe of the surrounding slopes, which correlated closely to this shift.

Wetland 103 is a palustrine emergent persistent temporarily flooded wetland (PEM1A). The wetland is located in a the bottom of a ditch along Indian Service Route 18. It appears that the ditch is graded flat and that the approach culvert that would allow the water to flow through the ditch is partially blocked and installed too high, resulting in water ponding in this portion of the ditch frequently enough to create

wetland soils and support hydrophytic vegetation. The vegetation within the wetland plot was recently mowed prior to the site visit and was comprised of no vegetation within the tree stratum, *Salix bebbiana* (Bebb's Willow) and *Salix petiolaris* (Meadow Willow) in the shrub stratum and *Carex lacustris* (Lake Sedge), *Plantago major* (Common Plantain) and *Taraxacum officinale* (Common Dandelion) in the herb stratum. Wetland soils consisted of three inches of 10YR 2/1 fine sandy loam followed by fifteen inches of 63% 10YR 5/2 clay with 20% 10YR 5/6 and 2% 2.5YR 4/8 concentrations within the matrix and 15% 10YR 7/1 depletions within the matrix. The hydric soil indicator was Depleted Below Dark Surface (A11). The upland vegetation at the sample plot consisted of *Pinus resinosa* (Red Pine), *Populus tremuloides* (Quaking Aspen) and *Betula papyrifera* (Paper Birch) in the tree stratum, *Salix bebbiana* (Bebb's Willow) in the shrub stratum and *Bromus inermis* (Smooth Brome), *Melilotus officinalis* (Yellow Sweet Clover), *Phleum pratense* (Timothy), *Agrostis perennans* (Autumn Bentgrass), *Centaurea stoebe* (Spotted Knapweed) and *Pastinaca sativa* (Wild Parsnip) in the herb stratum. The upland soils consisted of seven inches of 10YR 2/2 followed by seven inches of 55% 10YR 6/3 and 5% 10YR 2/2 sand with 30% 10YR 4/6 and 10% 10YR 5/8 coated sand grains within the matrix. The wetland was flagged based on the shift from an upland based plant community to a wetland based plant community with a shift from *Bromus inermis* (Smooth Brome) to *Carex lacustris* (Lake Sedge) used as an indicator of this shift. The wetland boundary was a little higher than the toe of the ditch and with the elevation of the wetland boundary remaining relatively consistent around the entire wetland.

Wetland 104 is a palustrine forested broad-leaved deciduous/emergent persistent seasonally flooded wetland (PFO1/EM1C). The wetland is located on the east side of Indian Service Route 18 in a depressional bowl. There is a swale or channel on the east side of the depression that the wetland follows before expanding into a larger area offsite. There is a centerline culvert that hydrologically connects wetland 102 with wetland 104. The adjacent ditch to the wetland possesses wetland characteristics due to minimal slope and elevation similarities and was included in the boundary of the wetland since there was no way to distinguish the original wetland from potential incidental characteristics created within the ditch. The vegetation within the wetland plot was comprised of *Fraxinus nigra* (Black Ash) in the tree stratum, no vegetation within the shrub stratum and *Phalaris arundinacea* (Reed Canary Grass), *Carex lacustris* (Lake Sedge), *Typha angustifolia* (Narrowleaf Cattail), *Pastinaca sativa* (Wild Parsnip) and *Symphyotrichum lanceolatum* (Panicled Aster) in the herb stratum. Wetland soils consisted of five inches of 10YR 2/1 mucky loam followed by nine inches of 80% 10YR 2/1 mucky loam and 20% 10YR 4/2 coarse sand. The hydric soil indicator was Loamy Mucky Mineral (F1). The upland vegetation at the sample plot consisted of *Fraxinus nigra* (Black Ash), *Populus balsamifera* (Balsam Poplar), *Populus tremuloides* (Quaking Aspen) and *Quercus macrocarpa* (Bur Oak) in the tree stratum, *Corylus americana* (American Hazelnut*), Fraxinus nigra* (Black Ash) and *Populus balsamifera* (Balsam Poplar) in the shrub stratum and *Carex pensylvanica* (Pennsylvania Sedge), *Eurybia macrophylla* (Large-leaf Aster) and *Athyrium filix-femina* (Lady Fern) in the herb stratum. The upland soils consisted of six inches of 10YR 2/1 sand followed by eight inches of 60% 10YR 4/3 and 30% 10YR 3/2 clay with 5% 10YR 4/6 sand and 5% 10YR 5/8 concentrations within the matrix. The wetland was flagged based on evidence of frequent hydrology with water-stained leaves and some water marks used as indicators of

this. This was in conjunction with the shift from an upland based plant community to a wetland based plant community with a shift from *Carex lacustris* (Lake Sedge), *Phalaris arundinacea* (Reed Canary Grass) and *Fraxinus nigr*a (Black Ash) to *Carex pensylvanica* (Pennsylvania Sedge) and *Corylus americana* (American Hazelnut) used as an indicator of this shift. This correlated closely to the toe of the slopes surrounding the wetland basin.

Wetland 105 is a palustrine scrub-shrub broad leaved deciduous seasonally flooded wetland (PSS1C). The wetland is located on the north side of Indian Service Route 18 in a shallow depression that extends north of the area of interest. The adjacent ditch to the wetland possesses wetland characteristics due to minimal slope and elevation similarities and was included in the boundary of the wetland since there was no way to distinguish the original wetland from potential incidental characteristics created within the ditch. The vegetation within the wetland was comprised of *Fraxinus nigra* (Black Ash) and *Populus tremuloides* (Quaking Aspen) in the tree stratum, *Populus tremuloides* (Quaking Aspen), *Cornus sericea* (Red Osier Dogwood), *Fraxinus nigra* (Black Ash), *Alnus incana* (Speckled Alder), *Salix bebbiana* (Bebb's Willow) and *Populus balsamifera* (Balsam Poplar) in the shrub stratum and *Carex lacustris* (Lake Sedge), *Calamagrostis canadensis* (Canada Bluejoint), *Pastinaca sativa* (Wild Parsnip) and *Cirsium arvense* (Canada Thistle) in the herb stratum. Wetland soils consisted of nine inches of 10YR 2/1 of sandy loam followed by five inches of 80% 10YR 5/3 sandy clay with 15% 10YR 5/8 concentrations and 5% 10YR 7/1 depletion within the matrix. The hydric soil indicator was Depleted Below Dark Surface (A11). The upland vegetation at the sample plot consisted of no vegetation within the tree and shrub stratums and *Trifolium repens* (White clover), *Bromus inermis* (Smooth Brome), *Melilotus officinalis* (Yellow Sweet Clover), *Pastinaca sativa* (Wild Parsnip), *Plantago major* (Common Plantain) and *Taraxacum officinale* (Common Dandelion) in the herb stratum. The upland soils consisted of an inch of 10YR 3/2 sand followed by thirteen inches of 70% 10YR 4/6 fine sandy loam and 30% 10YR 2/1 coarse sand. The wetland was flagged based on the shift from an upland based plant community to a wetland based plant community with a shift from *Bromus inermis* (Smooth Brome) and *Trifolium repens* (White Clover) (along with to *Corylus americana* (American Hazelnut) in other areas around the wetland) to *Carex lacustris* (Lake Sedge), *Fraxinus nigra* (Black Ash) and *Salix bebbiana* (Bebb's Willow) used as an indicator of this shift. This correlated closely with the toe of the ditch along with the roadway and subtle rises of elevation as the wetland extended away from the road into the adjacent wooded area.

Wetland 106 is a palustrine emergent persistent seasonally flooded wetland (PEM1C). The wetland is located in a moderate sized basin, surrounded by upland with no hydrological connection to any adjacent wetlands. A portion of the wetland extends into the ditch of IRR 40. It appears that historically, the wetland used to flow into wetland 102 when water elevations within the basin exceeded a certain level but the construction of IRR 40 has since cut off that overland flow connection. The vegetation within the wetland plot was comprised of *Acer rubrum* (Red Maple), *Fraxinus nigra* (Black Ash), *Salix bebbiana* (Bebb's Willow) and *Populus tremuloides* (Quaking Aspen) in the tree stratum, *Spiraea alba* (White Meadow Sweet), *Fraxinus nigra* (Black Ash), *Populus tremuloides* (Quaking Aspen) and *Cornus*

sericea (Red Osier Dogwood) in the shrub stratum and *Carex lacustris* (Lake Sedge), *Calamagrostis canadensis* (Canada Bluejoint) and *Scirpus cyperinus* (Woolgrass) in the herb stratum. Wetland soils consisted of six inches of 10YR 2/1 mucky sand followed by eight inches of 75% 10YR 5/3 and 20% 10YR 3/2 loamy sand with 5% 10YR 5/8 concentrations within the matrix. The hydric soil indicator was Sandy Mucky Mineral (S1). The upland vegetation at the sample plot consisted of *Tilia americana* (Basswood), *Acer rubrum* (Red Maple) and *Ostrya virginiana* (Ironwood) in the tree stratum, *Corylus americana* (American Hazelnut) and *Cornus rugosa* (Round-leaved Dogwood) in the shrub stratum and *Carex pensylvanica* (Pennsylvania Sedge), *Acer rubrum* (Red Maple), *Quercus macrocarpa* (Bur Oak), *Abies balsamea* (Balsam Fir), *Anemone americana* (Round-lobed Hepatica), *Maianthemum racemosum* (Canada Mayflower) and *Oryzopsis asperifolia* (Rough-leaved Rice Grass) in the herb stratum. The upland soils consisted of seven inches of 10YR 2/1 sand followed by two inches of 60% 10YR 4/3 and 40% 10YR 2/1 sand followed by five inches of 10YR 4/3 sand. The wetland was flagged based on the shift from an upland based plant community to a wetland based plant community with a shift from *Carex pensylvanica* (Pennsylvania Sedge) and *Corylus americana* (American Hazelnut) to *Carex lacustris* (Lake Sedge), *Calamagrostis canadensis* (Canada Bluejoint) and *Fraxinus nigra* (Black Ash) used as an indicator of this shift. This correlated closely with the toe of the surrounding slopes and toe of the ditch where the wetland abuts IRR 40.

Wetland 107 is a palustrine emergent persistent temporarily flooded wetland (PEM1A). The wetland is located in the bottom of a ditch alongside IRR 40. It appears that the ditch is poorly graded with no proper outlet in place to allow water to flow away from it before ponding and inundation occurs. Proper grading and an approach culvert installed at the proper elevation under the approach to the northwest of the wetland would allow water to flow into wetland 106, as it appears was the original intent for the drainage. The vegetation within the wetland was comprised of no vegetation within the tree and shrub stratums and *Carex lacustris* (Lake sedge), *Typha angustifolia* (Narrowleaf Cattail), *Bromus inermis* (Smooth Brome), *Cirsium arvense* (Canada Thistle), *Taraxacum officinale* (Common Dandelion) and *Toxicodendron radicans* (Eastern Poison Ivy) in the herb stratum. Wetland soils consisted of thirteen inches of 93% 10YR 2/2 loamy sand with 5% 10YR 3/6 concentrations and 2% 2.5Y 7/2 depletions within the matrix followed by three inches of 70% 10YR 6/2 sandy clay with 30% 10YR 5/8 concentrations within the matrix. The hydric soil indicator was Sandy Redox (S5). The upland vegetation at the sample plot consisted of *Populus tremuloides* (Quaking Aspen) in the tree stratum, *Corylus americana* (American Hazelnut), *Populus tremuloides* (Quaking Aspen) and *Cornus rugosa* (Round-leaved Dogwood) in the shrub stratum and *Bromus inermis* (Smooth Brome), *Cornus rugosa* (Round-leaved Dogwood), *Carex pensylvanica* (Pennsylvania Sedge) and *Anemone americana* (Round-lobed Hepatica) in the herb stratum. The upland soils consisted of eight inches of 10YR 2/2 loamy sand followed by six inches of 10YR 4/4 sand. The wetland was flagged based on the shift from an upland based plant community to a wetland based plant community with a shift from *Bromus inermis* (Smooth Brome) to *Carex lacustris* (Lake Sedge) and *Typha angustifolia* (Narrowleaf Cattail) used as an indicator of this shift. This correlated closely to the toe of the inslope and backslope of the ditch.

Wetland 108 is a palustrine emergent persistent seasonally flooded/saturated beaver influenced wetland (PEM1Eb). The wetland is located between the toe of the surrounding slopes and a small/medium sized creek that flows north towards Lower Red Lake. Hydrology within the wetland is impacted both by precipitation as well as beaver activity that appears to occur frequently along the stream corridor. The vegetation within the wetland was comprised of no vegetation within the tree stratum, *Salix petiolaris* (Meadow Willow) and *Alnus incana* (Speckled Alder) in the shrub stratum and *Carex lacustris* (Lake Sedge), *Salix petiolaris* (Meadow Willow), *Equisetum pratense* (Meadow Horsetail), *Phalaris arundinacea* (Reed Canary Grass), *Bromus ciliatus* (Fringed Brome), *Symphyotrichum lanceolatum* (Panicled Aster) and *Petasites frigidus* (Sweet Coltsfoot) in the herb stratum. Wetland soils consisted of seven inches of 10YR 2/1 mucky sand followed by nine inches of 10YR 4/1 coarse sand. The hydric soil indicator was Sandy Mucky Mineral (S1). The upland vegetation at the sample plot consisted of *Abies balsamea* (Balsam Fir), *Populus tremuloides* (Quaking Aspen), *Betula papyrifera* (Paper Birch) and *Ulmus americana* (American Elm) in the tree stratum, *Corylus americana* (American Hazelnut), *Cornus rugosa* (Round-leaved Dogwood), *Betula papyrifera* (Paper Birch), *Fraxinus nigra* (Black Ash), *Populus tremuloides* (Quaking Aspen), *Abies balsamea* (Balsam Fir) and *Rosa blanda* (Smooth Rose) in the shrub stratum and *Carex pensylvanica* (Pennsylvania Sedge), *Bromus inermis* (Smooth Brome), *Abies balsamea* (Balsam Fir), *Pyrola elliptica* (Shinleaf) and *Galium triflorum* (Fragrant Bedstraw) in the herb stratum. The upland soils consisted of eleven inches of 10YR 2/2 sand followed by five inches of 10YR 3/3 sand. The wetland was flagged based on the shift from an upland based plant community to a wetland based plant community with a shift from *Corylus americana* (American Hazelnut) and *Carex pensylvanica* (Pennsylvania Sedge) to *Alnus incana* (Speckled Alder), *Salix petiolaris* (Meadow Willow) and *Carex lacustris* (Lake Sedge) used as an indicator of this shift. The shift in vegetation correlated closely to the toe of the surrounding slopes.

Wetland 109 is a palustrine emergent persistent seasonally flooded/saturated beaver influenced wetland (PEM1Eb). The wetland is located between the toe of the surrounding slopes and a small/medium sized creek that flows north towards Lower Red Lake. Hydrology within the wetland is impacted both by precipitation as well as beaver activity that appears to occur frequently along the stream corridor. The vegetation within the wetland was comprised of no vegetation within the tree stratum, *Cornus sericea* (Red Osier Dogwood), *Salix petiolaris* (Meadow Willow) and *Fraxinus nigra* (Black Ash) in the shrub stratum and *Calamagrostis canadensis* (Canada Bluejoint), *Carex lacustris* (Lake Sedge), *Petasites frigidus* (Sweet Coltsfoot), *Equisetum praealtum* (Scouring Rush), *Rubus idaeus* (Wild Red Raspberry) and *Symphyotrichum lanceolatum* (Panicled Aster) in the herb stratum. Wetlands soils consisted of six inches of 10YR 2/1 mucky fine sand followed by eight inches of 98% 2.5Y 4/1 fine sandy clay with 2% 10YR 3/6 concentrations within the matrix. The hydric soil indication was Sandy Mucky Mineral (S1). The upland vegetation at the sample plot consisted of *Acer saccharum* (Sugar Maple) and *Quercus macrocarpa* (Bur Oak) in the tree stratum, *Acer saccharum* (Sugar Maple) and *Corylus americana* (American Hazelnut) in the shrub stratum and *Carex pensylvanica* (Pennsylvania Sedge), *Equisetum pratense* (Meadow Horsetail) and *Oryzopsis asperifolia* (Rough-leaved Rice Grass) in the herb stratum. The upland soils consisted of three inches of 10YR 2/1 sand followed by thirteen inches of 10YR

4/3 sand/ fine sand. The wetland was flagged based on the shift from an upland based plant community to a wetland based plant community with a shift from *Corylus americana* (American Hazelnut) and *Carex pensylvanica* (Pennsylvania Sedge) to *Fraxinus nigra* (Black Ash), *Salix petiolaris* (Meadow Willow) and *Carex lacustris* (Lake Sedge) used as an indicator of this shift. The shift in vegetation correlated closely to the toe of the surrounding slopes.

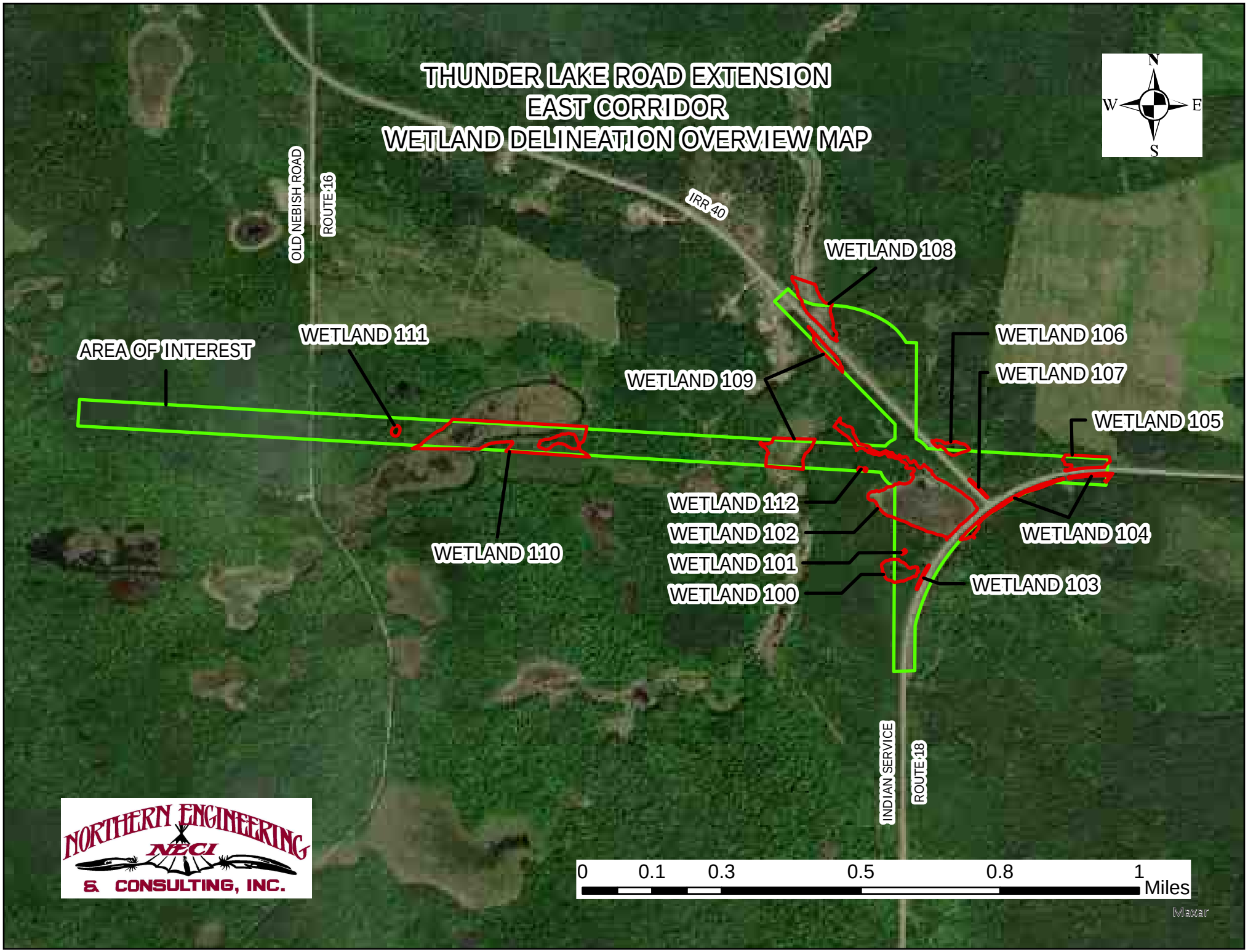
Wetland 110 is a palustrine emergent persistent/ scrub-shrub broad-leaved deciduous seasonally flooded/saturated wetland (PEM1/SS1D). The wetland is located in a large sprawling basin that is at the center of a large wetland complex. There is active beaver activity around the edge of the wetland, with standing water present. The center of the wetland appears to be comprised of sedge and cattails mixed with some *Larix laricina* (Tamarack). The vegetation within the first wetland plot was comprised of *Salix bebbiana* (Bebb's Willow) in the tree stratum, *Alnus incana* (Speckled Alder), *Salix bebbiana* (Bebb's Willow) and *Cornus sericea* (Red Osier Dogwood) in the shrub stratum and *Carex tuckermanii* (Tuckerman's Sedge) and *Carex lacustris* (Lake Sedge) in the herb stratum. Wetland soils within the first sample plot consisted of nine inches of 10YR 2/1 mucky fine sand followed by seven inches of 60% 10YR 5/1 and 40% 10YR 3/1 fine sandy clay. The hydric soil indicator was Sandy Mucky Mineral (S1). The vegetation within the second wetland plot was comprised of *Salix bebbiana* (Bebb's Willow) in the tree stratum, *Spiraea alba* (White Meadowsweet), *Cornus sericea* (Red Osier Dogwood) and *Fraxinus nigra* (Black Ash) in the shrub stratum and *Carex lacustris* (Lake Sedge), *Calamagrostis canadensis* (Canada Bluejoint), *Equisetum praealtum* (Scouring Rush), *Persicaria lapathifolia* (Nodding Smartweed) and *Lathyrus ochroleucus* (Cream Pea) in the herb stratum. Wetland soils within the second sample plot consisted of five inches of 10YR 3/1 mucky peat followed by eleven inches of 10YR 4/1 sand. The hydric soil indicator was 5cm Mucky Peat or Peat (S3). The upland vegetation at the first sample plot consisted of *Acer saccharum* (Sugar Maple), *Tilia americana* (Basswood) and *Ostrya virginiana* (Ironwood) in the tree stratum, *Acer saccharum* (Sugar Maple), *Corylus americana* (American Hazelnut) and *Ostrya virginiana* (Ironwood) in the shrub stratum and *Eurybia macrophylla* (Large-leaved Aster), *Oryzopsis asperifolia* (Rough-leaved Rice Grass), *Carex pensylvanica* (Pennsylvania Sedge) and *Anemone americana* (Round-lobed Hepatica) in the herb stratum. The upland soils at the first sample plot consisted of four inches of 10YR 2/1 sand followed by thirteen inches of 10YR 5/3 sand. The upland vegetation at the second sample plot consisted of *Acer saccharum* (Sugar Maple), *Ostrya virginiana* (Ironwood), *Tilia americana* (Basswood), *Betula papyrifera* (Paper Birch) and *Quercus macrocarpa* (Bur Oak) in the tree stratum, *Acer saccharum* (Sugar Maple) and *Corylus americana* (American Hazelnut) in the shrub stratum and *Carex pensylvanica* (Pennsylvania Sedge), *Oryzopsis asperifolia* (Rough-leaved Rice Grass) and *Anemone americana* (Round-lobed Hepatica) in the herb stratum. The upland soils at the second sample plot consisted of three inches of 10YR 2/1 loamy fine sand followed by nine inches of 70% 10YR 5/4 and 30% 10YR 5/6 clay. The wetland was flagged based on evidence of hydrology, which was present in the form of subtle erosion created by annual rising and receding water levels. This correlated closely with the toe of the surrounding slopes and was in conjunction with the shift from an upland based plant community to a wetland based plant community with a shift from *Carex pensylvanica* (Pennsylvania

Sedge), *Oryzopsis asperifolia* (Rough-leaved Rice Grass) and *Corylus americana* (American Hazelnut) to *Carex lacustris* (Lake Sedge) and *Salix bebbiana* (Bebb's Willow) used as an indicator of this shift.

Wetland 111 a palustrine emergent persistent temporarily flooded wetland (PEM1A). The wetland is located in a small, clay lined basin located within an upland ridge. The vegetation within the wetland was comprised of *Fraxinus nigra* (Black Ash) in the tree stratum, *Fraxinus nigra* (Black Ash) in the shrub stratum) and *Persicaria lapathifolia* (Nodding Smartweed), *Ranunculus pensylvanicus* (Pennsylvania Buttercup), *Carex atherodes* (Slough Sedge), *Cardamine pensylvanica* (Pennsylvania Bittercress) and *Bidens frondosa* (Devil's Beggarticks) in the herb stratum. Wetland soils consisted of five inches of 10YR 2/1 mucky peat/organic duff followed by ten inches of 10YR 4/1 fine sandy clay. The hydric soil indicator was 5 cm Mucky Peat or Peat (S3). The upland vegetation at the sample plot consisted of *Acer saccharum* (Sugar Maple), *Ostrya virginiana* (Ironwood), *Tilia americana* (Basswood), *Betula papyrifera* (Paper Birch) and *Quercus macrocarpa* (Bur Oak) in the tree stratum, *Acer saccharum* (Sugar Maple) and *Corylus americana* (American Hazelnut) in the shrub stratum and *Carex pensylvanica* (Pennsylvania Sedge), *Oryzopsis asperifolia* (Rough-leaved Rice Grass) and *Anemone americana* (Round-lobed Hepatica) in the herb stratum. The upland soils at the sample plot consisted of three inches of 10YR 2/1 loamy fine sand followed by nine inches of 70% 10YR 5/4 and 30% 10YR 5/6 clay. The wetland was flagged based on evidence of hydrology with watermarks on trees and water-stained leaves used as indicators. This correlated closed with a shift from an upland based plant community to a wetland based plant community with a shift from *Corylus americana* (American Hazelnut) and *Carex pensylvanica* (Pennsylvania Sedge) to *Fraxinus nigra* (Black Ash) used as an indicator of this shift.

Wetland 112 a palustrine emergent persistent temporarily flooded wetland (PEM1A). The wetland is located in a small, clay lined subtle depression located within an upland ridge. When water levels exceed a certain elevation, water flows overland into an adjacent ravine and flows down to wetland 109. The vegetation within the wetland was comprised of *Populus tremuloides* (Quaking Aspen) and *Fraxinus nigra* (Black Ash) in the tree stratum, *Fraxinus nigra* (Black Ash) in the shrub stratum and *Bromus ciliatus* (Fringed Brome) in the herb stratum. Wetland soils consisted of five inches of 10YR 2/2 loamy sand followed by nine inches of 65% 10YR 5/3 loamy sand with 20% 10YR 5/8 and 15% 10YR 3/6 coated sand grains within the matrix. The hydric soil indicator was Stripped Matrix (S6). The upland vegetation at the sample plot consisted of *Populus tremuloides* (Quaking Aspen), *Ostrya virginiana* (Ironwood), *Tilia americana* (Basswood) and *Fraxinus nigra* (Black Ash) in the tree stratum, *Fraxinus nigra* (Black Ash) in the shrub stratum and *Carex pensylvanica* (Pennsylvania Sedge), *Oryzopsis asperifolia* (Rough-leaved Rice Grass), *Eurybia macrophylla* (Large-leaved Aster), *Thalictrum dioicum* (Early Meadow Rue), *Bromus ciliatus* (Fringed Brome) and *Osmorhiza claytonii* (Sweet Cicely) in the herb stratum. The upland soils at the sample plot consisted of eleven inches of 10YR 2/2 loamy sand followed by five inches of 98% 10YR 5/3 loamy sand with 2% 10YR 5/8 coated sand grains within the matrix. The wetland was flagged based on a shift from an upland based plant community to a wetland based plant community with a shift from *Carex pensylvanica* (Pennsylvania Sedge) and *Oryzopsis asperifolia* (Rough-leaved Rice Grass) to *Fraxinus*

nigra (Black Ash) used as an indicator of this shift. This correlated closely with signs of hydrology, with of the perimeter of the sparsely vegetated concave surface and water-stained leaves used as indicators for hydrology.


THUNDER LAKE ROAD EXTENSION
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TYPE 3
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THUNDER LAKE ROAD EXTENSION
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THUNDER LAKE ROAD EXTENSION
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THUNDER LAKE ROAD EXTENSION
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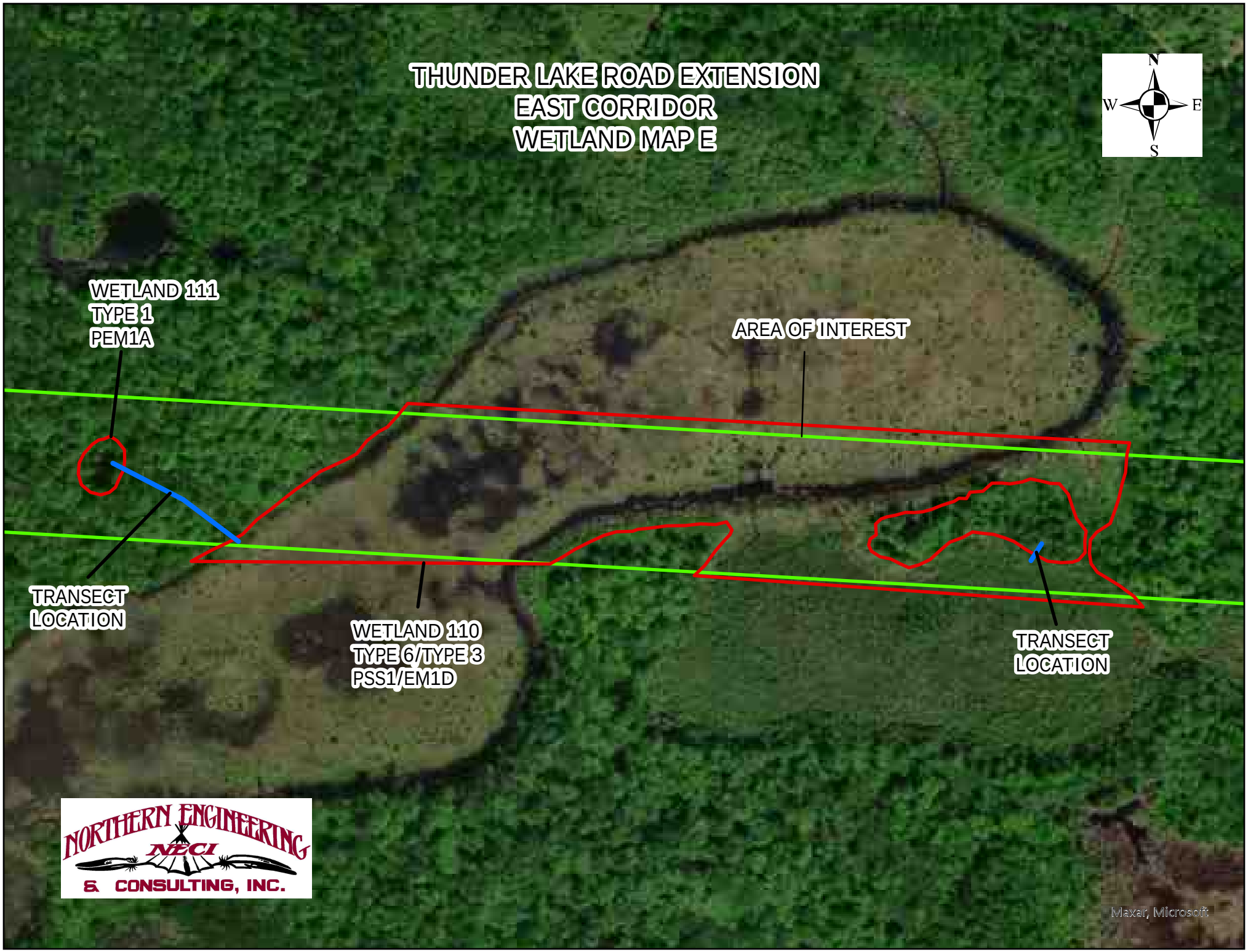
THUNDER LAKE ROAD EXTENSION
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TYPE 1
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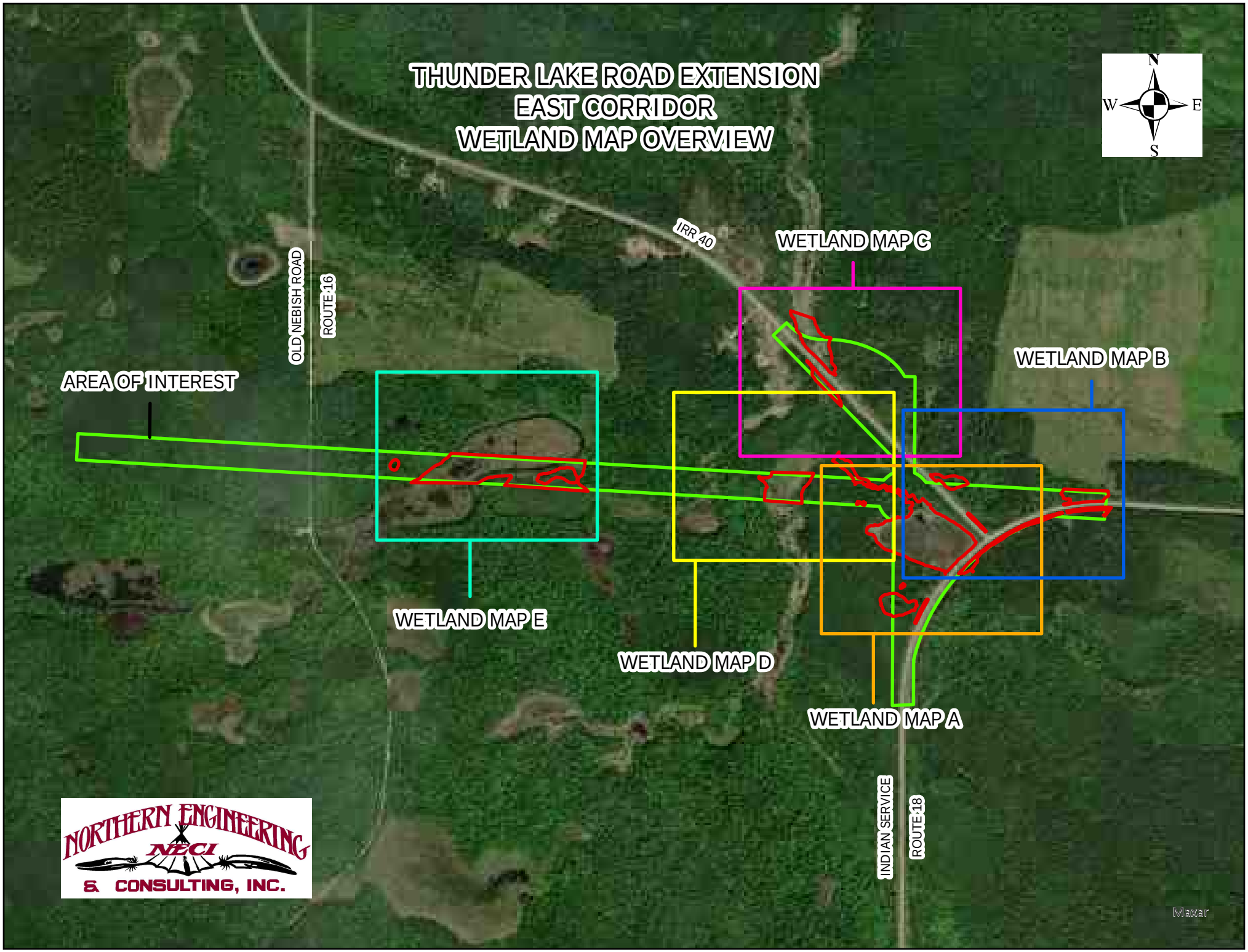
THUNDER LAKE ROAD EXTENSION
EAST CORRIDOR
WETLAND MAP OVERVIEW
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IRR 40
WETLAND MAP C
OLD NEBISH ROAD
ROUTE 16
WETLAND MAP B
AREA OF INTEREST
WETLAND MAP E
WETLAND MAP D
WETLAND MAP A
INDIAN SERVICE
ROUTE 18
NORTHERN ENGINEERING
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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W100P1

Investigator(s): Patrick Reardon Section, Township, Range: 34/35, 151, 33

Landform (hillside, terrace, etc.): Subtle Upland Rise Local relief (concave, convex, none): Convex Slope (%): 10

Subregion (LRR or MLRA): LRR K Lat: 47.849454 Long: -94.849836 Datum:

Soil Map Unit Name: Egglake-Spooner, till substratum complex, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -
Water Table Present?	Yes ____	No X	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W100P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus tremuloides*	80	Yes	FAC
2. *Betula papyrifera*	15	No	FACU
3. *Ostrya virginiana*	5	No	FACU
4.			
5.			
6.			
7.			
	100	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Corylus americana*	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Diervilla lonicera*	80	Yes	UPL
2. *Pteridium aquilinum*	15	No	FACU
3. *Thalictrum dioicum*	10	No	FACU
4. *Abies balsamea*	10	No	FAC
5. *Eurybia macrophylla*	10	No	UPL
6. *Bromus ciliatus*	10	No	FACW
7.			
8.			
9.			
10.			
11.			
12.			
	135	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	90	x 3 =	270
FACU species	60	x 4 =	240
UPL species	90	x 5 =	450
Column Totals:	250 (A)		980 (B)

Prevalence Index = B/A = 3.92

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W100P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/2	100					Loamy/Clayey	
7-12	10YR 3/4	100					Sandy	
12-14	10YR 3/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W100P2

Investigator(s): Patrick Reardon Section, Township, Range: 34/35, 151, 33

Landform (hillside, terrace, etc.): Shallow, Depressional Basin Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR or MLRA): LRR K Lat: 47.849454 Long: -94.849836 Datum:

Soil Map Unit Name: Egglake-Spooner, till substratum complex, 0 to 2 percent slopes NWI classification: PEM1D

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	Wetland 100

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	X Water-Stained Leaves (B9)	
___ High Water Table (A2)	___ Aquatic Fauna (B13)	
X Saturation (A3)	___ Marl Deposits (B15)	
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)	
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
X Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
X Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
X Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	-
Water Table Present?	Yes ____	No X	Depth (inches):	-
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	12

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: W100P2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix bebbiana*	30	Yes	FACW
2. *Fraxinus nigra*	15	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	45	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Salix petiolaris*	40	Yes	FACW
2. *Fraxinus nigra*	10	No	FACW
3. *Spiraea alba*	10	No	FACW
4. *Salix bebbiana*	5	No	FACW
5.			
6.			
7.			
	65	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Carex lacustris*	80	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	110	x 2 =	220
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	190 (A)		300 (B)

Prevalence Index = B/A = 1.58

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W100P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-11	10YR 2/1	100					Loamy/Clayey	Soils heavily coated in Organics
11-14	10YR 4/2	95	10YR 5/8	5	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W101P1

Investigator(s): Patrick Reardon Section, Township, Range: 34/35, 151, 33

Landform (hillside, terrace, etc.): Subtle Upland Rise Local relief (concave, convex, none): Convex Slope (%): 10

Subregion (LRR or MLRA): LRR K Lat: 47.849856 Long: -94.849616 Datum:

Soil Map Unit Name: Egglake-Spooner, till substratum complex, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -
Water Table Present?	Yes ____	No X	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W101P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus tremuloides*	80	Yes	FAC
2. *Betula papyrifera*	15	No	FACU
3. *Ostrya virginiana*	5	No	FACU
4.			
5.			
6.			
7.			
	100	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Corylus americana*	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Diervilla lonicera*	80	Yes	UPL
2. *Pteridium aquilinum*	15	No	FACU
3. *Thalictrum dioicum*	10	No	FACU
4. *Abies balsamea*	10	No	FAC
5. *Eurybia macrophylla*	10	No	UPL
6. *Bromus ciliatus*	10	No	FACW
7.			
8.			
9.			
10.			
11.			
12.			
	135	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	90	x 3 =	270
FACU species	60	x 4 =	240
UPL species	90	x 5 =	450
Column Totals:	250 (A)		980 (B)
Prevalence Index = B/A =			3.92

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W101P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/2	100					Sandy	
7-12	10YR 3/4	100					Sandy	
12-14	10YR 3/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W101P2

Investigator(s): Patrick Reardon Section, Township, Range: 34/35, 151, 33

Landform (hillside, terrace, etc.): Subtle Clay Lined Depression Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR K Lat: 47.849856 Long: -94.849616 Datum:

Soil Map Unit Name: Egglake-Spooner, till substratum complex, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	Wetland 101

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit. Wetland is located within a small shallow basin with rigid edges in places, appearing that it could have been potentially created during the last round of logging in the area by large equipment leaving indentations and ruts.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____ No X	Depth (inches): -	
Water Table Present?	Yes ____ No X	Depth (inches): -	
Saturation Present? (includes capillary fringe)	Yes ____ No X	Depth (inches): -	**Wetland Hydrology Present?** **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W101P2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix bebbiana*	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	5	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Cornus sericea*	20	Yes	FACW
2. *Fraxinus nigra*	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	30	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Scirpus cyperinus*	15	Yes	OBL
2. *Fragaria virginiana*	15	Yes	FACU
3. *Calamagrostis canadensis*	15	Yes	OBL
4. *Glyceria striata*	15	Yes	OBL
5. *Plantago major*	10	No	FACU
6. *Abies balsamea*	5	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
	75	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	45	x 1 =	45
FACW species	35	x 2 =	70
FAC species	5	x 3 =	15
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	110 (A)		230 (B)

Prevalence Index = B/A = 2.09

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W101P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/4	100					Sandy	
3-14	10YR 5/3	50	10YR 5/8	30	C	M	Loamy/Clayey	Prominent redox concentrations
	10YR 3/4	15						
	10YR 5/2	5						Sandy

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- X Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W102P1

Investigator(s): Patrick Reardon Section, Township, Range: 34/35, 151, 33

Landform (hillside, terrace, etc.): Top Of Hillslope Local relief (concave, convex, none): Convex Slope (%): 10

Subregion (LRR or MLRA): LRR K Lat: 47.851114 Long: -94.848762 Datum:

Soil Map Unit Name: Egglake-Spooner, till substratum complex, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -
Water Table Present?	Yes ____	No X	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W102P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus macrocarpa*			FACU
2. *Acer rubrum*			FAC
3. *Populus tremuloides*			FAC
4. *Ostrya virginiana*			FACU
5. *Betula papyrifera*			FACU
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Populus tremuloides*	30	Yes	FAC
2. *Cornus sericea*	20	Yes	FACW
3. *Fraxinus nigra*	10	No	FACW
4. *Corylus americana*	10	No	FACU
5. *Acer saccharum*	5	No	FACU
6.			
7.			
	75 =Total Cover		
Herb Stratum (Plot size: 6)			
1. *Pteridium aquilinum*	50	Yes	FACU
2. *Oryzopsis asperifolia*	20	Yes	UPL
3. *Anemone americana*	10	No	
4. *Fragaria virginiana*	10	No	FACU
5. *Eurybia macrophylla*	10	No	UPL
6. *Thalictrum dioicum*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	105 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	30	x 3 =	90
FACU species	80	x 4 =	320
UPL species	30	x 5 =	150
Column Totals:	170 (A)		620 (B)

Prevalence Index = B/A = 3.65

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W102P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/2	100					Sandy	
6-11	10YR 4/3	60					Sandy	
	10YR 2/2	40						
11-14	10YR 4/3	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W102P2

Investigator(s): Patrick Reardon Section, Township, Range: 34/35, 151, 33

Landform (hillside, terrace, etc.): Large, Deep Basin Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR K Lat: 47.851114 Long: -94.848762 Datum:

Soil Map Unit Name: Egglake-Spooner, till substratum complex, 0 to 2 percent slopes NWI classification: PEM1Cb

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	Wetland 102

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	X Water-Stained Leaves (B9)	___ Surface Soil Cracks (B6)
X High Water Table (A2)	___ Aquatic Fauna (B13)	___ Drainage Patterns (B10)
X Saturation (A3)	___ Marl Deposits (B15)	___ Moss Trim Lines (B16)
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	___ Dry-Season Water Table (C2)
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	X Saturation Visible on Aerial Imagery (C9)
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	___ Stunted or Stressed Plants (D1)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	X Geomorphic Position (D2)
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	___ Shallow Aquitard (D3)
X Inundation Visible on Aerial Imagery (B7)	X Other (Explain in Remarks)	___ Microtopographic Relief (D4)
___ Sparsely Vegetated Concave Surface (B8)		X FAC-Neutral Test (D5)

Secondary Indicators (minimum of two required)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -	
Water Table Present?	Yes X	No ____	Depth (inches): 12	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0	**Wetland Hydrology Present?** **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W102P2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 6)			
1. *Carex lacustris*	40	Yes	OBL
2. *Phalaris arundinacea*	40	Yes	FACW
3. *Typha angustifolia*	25	Yes	OBL
4. *Symphyotrichum lanceolatum*	10	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	115 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	50	x 2 =	100
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		165 (B)

Prevalence Index = B/A = 1.43

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W102P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-17	10YR 2/1	100					Mucky Loam/Clay	
17-20	10YR 4/1	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- X Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W103P1

Investigator(s): Patrick Reardon Section, Township, Range: 35, 151, 33

Landform (hillside, terrace, etc.): Backslope Of Ditch Local relief (concave, convex, none): Concave Slope (%): 33

Subregion (LRR or MLRA): LRR K Lat: 47.849233 Long: -94.848843 Datum:

Soil Map Unit Name: Egglake-Spooner, till substratum complex, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ____	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	**Yes** ____	**No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit. Sample location is within the road corridor. Soils have been disturbed by earth movement with construction of the road. Vegetation is mowed periodially throughout the growing season and appears to be comprised of introduced species from revegetation efforts after construction was completed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -
Water Table Present?	Yes ____	No X	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W103P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus resinosa*	5	Yes	FACU
2. *Populus tremuloides*	5	Yes	FAC
3. *Betula papyrifera*	5	Yes	FACU
4.			
5.			
6.			
7.			
	15	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Salix bebbiana*	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	5	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Bromus inermis*	80	Yes	UPL
2. *Melilotus officinalis*	15	No	FACU
3. *Phleum pratense*	5	No	FACU
4. *Agrostis perennans*	5	No	FACU
5. *Centaurea stoebe*	5	No	UPL
6. *Pastinaca sativa*	5	No	UPL
7.			
8.			
9.			
10.			
11.			
12.			
	115	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	5	x 3 =	15
FACU species	35	x 4 =	140
UPL species	90	x 5 =	450
Column Totals:	135 (A)		615 (B)

Prevalence Index = B/A = 4.56

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W103P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/2	100					Sandy	
7-14	10YR 6/3	55	10YR 4/6	30	CS	M	Sandy	
	10YR 2/2	5	10YR 5/8	10	CS	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Soils appear like they could potentially be mixed/disturbed from prior road construction.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W103P2

Investigator(s): Patrick Reardon Section, Township, Range: 35, 151, 33

Landform (hillside, terrace, etc.): Ditch Bottom Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR or MLRA): LRR K Lat: 47.849233 Long: -94.848843 Datum:

Soil Map Unit Name: Egglake-Spooner, till substratum complex, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	Wetland 103

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit. Wetland is located within a ditch bottom. Soils have been mixed and compacted during construction, vegetation has been introduced with revegetation activities that occured at the end of the construction project. Hydrology has been manipulated and funneled into this centralized location. The approach culvert downstream was installed at too high of an elevation, thus restricting flow and causing ponding and inudation within the ditch following seasonal melt and large precipitation events. It appears that wetland conditions would dissipate if proper flow would be restored.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	X Water-Stained Leaves (B9)	___ Aquatic Fauna (B13)
___ High Water Table (A2)	___ Marl Deposits (B15)	___ Hydrogen Sulfide Odor (C1)
___ Saturation (A3)	___ Oxidized Rhizospheres on Living Roots (C3)	___ Water Marks (B1)
___ Sediment Deposits (B2)	X Presence of Reduced Iron (C4)	___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	___ Iron Deposits (B5)
___ Thin Muck Surface (C7)	___ Other (Explain in Remarks)	___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)	___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)	___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)	___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)	X Geomorphic Position (D2)
___ Shallow Aquitard (D3)	___ Microtopographic Relief (D4)
X FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches):	-
Water Table Present?	Yes ____	No X	Depth (inches):	-
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches):	-

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The surrouding area has been graded so that overland flow will drain into the ditch bottom (low point). Outlet culvert is partially plugged and installed to high, creating ponding within the ditch before water can continue to flow into wetland 102.

VEGETATION – Use scientific names of plants. Sampling Point: W103P2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Salix bebbiana*	5	Yes	FACW
2. *Salix petiolaris*	5	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	10 =Total Cover		
Herb Stratum (Plot size: 6)			
1. *Carex lacustris*	60	Yes	OBL
2. *Plantago major*	5	No	FACU
3. *Taraxacum officinale*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	80 (A)		120 (B)

Prevalence Index = B/A = 1.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
The ditch had been recently mowed prior to the site visit, identification was difficult due to impacts associated with road maintenace

SOIL

Sampling Point: W103P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					Loamy/Clayey	
3-18	10YR 5/2	63	10YR 5/6	20	C	M	Loamy/Clayey	Prominent redox concentrations
			10YR 7/1	15	D	M		
			2.5YR 4/8	2	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Soils appear to be mixed/distrubed and compacted from road construction.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W104P1

Investigator(s): Patrick Reardon Section, Township, Range: 35, 151, 33

Landform (hillside, terrace, etc.): Upland slope above wetland Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR or MLRA): LRR K Lat: 47.850409 Long: -94.846985 Datum:

Soil Map Unit Name: Egglake-Spooner, till substratum complex, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -
Water Table Present?	Yes ____	No X	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W104P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus nigra*	20	Yes	FACW
2. *Populus balsamifera*	20	Yes	FACW
3. *Populus tremuloides*	15	Yes	FAC
4. *Quercus macrocarpa*	15	Yes	FACU
5.			
6.			
7.			
	70	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Corylus americana*	40	Yes	FACU
2. *Fraxinus nigra*	10	No	FACW
3. *Populus balsamifera*	10	No	FACW
4.			
5.			
6.			
7.			
	60	=Total Cover	
Herb Stratum (Plot size:)			
1. *Carex pensylvanica*	100	Yes	UPL
2. *Eurybia macrophylla*	10	No	UPL
3. *Abies balsamea*	5	No	FAC
4. *Athyrium filix-femina*	5	No	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	60	x 2 =	120
FAC species	20	x 3 =	60
FACU species	55	x 4 =	220
UPL species	115	x 5 =	575
Column Totals:	250 (A)		975 (B)
Prevalence Index = B/A =			3.90

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W104P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					Sandy	Traces Of Loam
6-14	10YR 4/3	60	10YR 5/8	5	C	M	Loamy/Clayey	
	10YR 3/2	30						
	10YR 4/6	5						Pockets of Sand Intermixed

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W104P2

Investigator(s): Patrick Reardon Section, Township, Range: 35, 151, 33

Landform (hillside, terrace, etc.): Wetland Basin Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR K Lat: 47.850409 Long: -94.846985 Datum:

Soil Map Unit Name: Egglake-Spooner, till substratum complex, 0 to 2 percent slopes NWI classification: PSS1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	Wetland 104

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- X Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____ No X	Depth (inches): -	
Water Table Present?	Yes ____ No X	Depth (inches): -	
Saturation Present? (includes capillary fringe)	Yes X No ____	Depth (inches): 0	**Wetland Hydrology Present?** **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Soils contain a muck component

VEGETATION – Use scientific names of plants. Sampling Point: W104P2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus nigra*	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	20	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Phalaris arundinacea*	90	Yes	FACW
2. *Carex lacustris*	15	No	OBL
3. *Typha angustifolia*	5	No	OBL
4. *Pastinaca sativa*	5	No	UPL
5. *Symphyotrichum lanceolatum*	5	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	115	x 2 =	230
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	140 (A)		275 (B)

Prevalence Index = B/A = 1.96

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W104P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					Mucky Loam/Clay	
5-14	10YR 2/1	80					Mucky Loam/Clay	
	10YR 4/2	20						Coarse Sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- X Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W105P1

Investigator(s): Patrick Reardon Section, Township, Range: 35, 151, 33

Landform (hillside, terrace, etc.): Ditch Inslope Local relief (concave, convex, none): Concave Slope (%): 25

Subregion (LRR or MLRA): LRR K Lat: 47.852173 Long: -94.842495 Datum:

Soil Map Unit Name: Ricelake-Blomford complex, mlra 88, 0 to 3 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	**Yes** ____	**No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit. Sample location taken in ditch inslope, soils are a mix of native and imported soils, vegetation is comprised of species associated with revegetation efforts that occurred after construction.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -	
Water Table Present?	Yes ____	No X	Depth (inches): -	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -	**Wetland Hydrology Present?** **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W105P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 6)			
1. *Trifolium repens*	60	Yes	FACU
2. *Bromus inermis*	40	Yes	UPL
3. *Melilotus officinalis*	20	No	FACU
4. *Pastinaca sativa*	10	No	UPL
5. *Plantago major*	5	No	FACU
6. *Taraxacum officinale*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	140 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	90	x 4 =	360
UPL species	50	x 5 =	250
Column Totals:	140 (A)		610 (B)
Prevalence Index = B/A =			4.36

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W105P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 3/2	100					Sandy	
1-14	10YR 4/6	70					Loamy/Clayey	
	10YR 2/1	30						Coarse Sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Soils appear to be fill placed during the construction of the road

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W105P2

Investigator(s): Patrick Reardon Section, Township, Range: 35, 151, 33

Landform (hillside, terrace, etc.): Large, Subtle Depression Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR K Lat: 47.852173 Long: -94.842495 Datum:

Soil Map Unit Name: Ricelake-Blomford complex, mlra 88, 0 to 3 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	Wetland 105

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____ No X	Depth (inches): -	
Water Table Present?	Yes ____ No X	Depth (inches): -	
Saturation Present? (includes capillary fringe)	Yes ____ No X	Depth (inches): -	**Wetland Hydrology Present?** **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W105P2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus nigra*	5	Yes	FACW
2. *Populus tremuloides*	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Populus tremuloides*	40	Yes	FAC
2. *Cornus sericea*	15	Yes	FACW
3. *Fraxinus ngira*	10	No	
4. *Alnus incana*	10	No	FACW
5. *Salix bebbiana*	5	No	FACW
6. *Populus balsamifera*	5	No	FACW
7.			
	85	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Carex lacustris*	40	Yes	OBL
2. *Calamagrostis canadensis*	35	Yes	OBL
3. *Pastinaca sativa*	5	No	UPL
4. *Cirsium arvense*	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	75	x 1 =	75
FACW species	40	x 2 =	80
FAC species	45	x 3 =	135
FACU species	5	x 4 =	20
UPL species	5	x 5 =	25
Column Totals:	170	(A)	335 (B)

Prevalence Index = B/A = 1.97

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W105P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 2/1	100					Loamy/Clayey	Coated in Organics
9-14	10YR 5/3	80	10YR 5/8	15	C	M	Loamy/Clayey	Prominent redox concentrations
			10YR 7/1	5	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Clay

Depth (inches): 9

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W106P1

Investigator(s): Patrick Reardon Section, Township, Range: 35, 151, 33

Landform (hillside, terrace, etc.): Subtle slope above wetland basin Local relief (concave, convex, none): Concave Slope (%): 15

Subregion (LRR or MLRA): LRR K Lat: 47.852509 Long: -94.847673 Datum:

Soil Map Unit Name: Wurtsmith-Meehan complex, 0 to 4 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -
Water Table Present?	Yes ____	No X	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W106P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tilia americana*	25	Yes	FACU
2. *Acer rubrum*	20	Yes	FAC
3. *Ostrya virginiana*	5	No	FACU
4.			
5.			
6.			
7.			
	50	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Corylus americana*	70	Yes	FACU
2. *Cornus rugosa*	15	No	UPL
3.			
4.			
5.			
6.			
7.			
	85	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Carex pensylvanica*	60	Yes	UPL
2. *Acer rubrum*	5	No	FAC
3. *Quercus macrocarpa*	5	No	FACU
4. *Abies balsamea*	5	No	FAC
5. *Anemone americana*	5	No	
6. *Maianthemum racemosum*	5	No	FACU
7. *Oryzopsis asperifolia*	5	No	UPL
8.			
9.			
10.			
11.			
12.			
	90	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	110	x 4 =	440
UPL species	80	x 5 =	400
Column Totals:	220 (A)		930 (B)
Prevalence Index = B/A =			4.23

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W106P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	100					Sandy	Traces of Loam
7-9	10YR 4/3	60					Sandy	
	10YR 2/1	40						
9-14	10YR 4/3	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-23-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W106P2

Investigator(s): Patrick Reardon Section, Township, Range: 35, 151, 33

Landform (hillside, terrace, etc.): Small Depression Basin Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR or MLRA): LRR K Lat: 47.852509 Long: -94.847673 Datum:

Soil Map Unit Name: Wurtsmith-Meehan complex, 0 to 4 percent slopes NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	Wetland 106

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches):	Remarks
Water Table Present?	Yes ____	No X	Depth (inches):	-
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Standing water within center of wetland basin, approximately 20 feet from sample pit

VEGETATION – Use scientific names of plants. Sampling Point: W106P2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	10	Yes	FAC
2. *Fraxinus nigra*	5	Yes	FACW
3. *Salix bebbiana*	5	Yes	FACW
4. *Populus tremuloides*	5	Yes	FAC
5.			
6.			
7.			
	25	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Spiraea alba*	15	Yes	FACW
2. *Fraxinus nigra*	10	Yes	FACW
3. *Populus tremuloides*	10	Yes	FAC
4. *Cornus sericea*	5	No	FACW
5.			
6.			
7.			
	40	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Carex lacustris*	80	Yes	OBL
2. *Calamagrostis canadensis*	25	Yes	OBL
3. *Scirpus cyperinus*	5	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	110	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	110	x 1 =	110
FACW species	40	x 2 =	80
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	175 (A)		265 (B)

Prevalence Index = B/A = 1.51

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W106P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					Mucky Sand	
6-14	10YR 5/3	75	10YR 5/8	5	C	M	Sandy	Prominent redox concentrations
	10YR 3/2	20						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-25-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W107P1

Investigator(s): Patrick Reardon Section, Township, Range: 35, 151, 33

Landform (hillside, terrace, etc.): Top Of Backslope Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR or MLRA): LRR K Lat: 47.851523 Long: -94.846707 Datum:

Soil Map Unit Name: Ricelake-Cutaway complex, mlra 88, 1 to 4 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	**Yes** ____	**No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -	
Water Table Present?	Yes ____	No X	Depth (inches): -	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -	**Wetland Hydrology Present?** **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W107P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus tremuloides*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Corylus americana*			FACU
2. *Populus tremuloides*			FAC
3. *Cornus rugosa*			UPL
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Bromus inermis*	15	Yes	UPL
2. *Cornus rugosa*	10	Yes	UPL
3. *Carex pensylvanica*	5	No	UPL
4. *Anemone americana*	5	No	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	30	x 5 =	150
Column Totals:	50	(A)	210 (B)

Prevalence Index = B/A = 4.20

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W107P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/2	100					Sandy	
8-14	10YR 4/4	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-25-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W107P2

Investigator(s): Patrick Reardon Section, Township, Range: 35, 151, 33

Landform (hillside, terrace, etc.): Ditch Bottom Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR K Lat: 47.851523 Long: -94.846707 Datum:

Soil Map Unit Name: Ricelake-Cutaway complex, mlra 88, 1 to 4 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	Wetland 107

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit. Wetland is located in the bottom of the ditch where soils have been imported or mixed, vegetation apppears to be comprised of introduced species mixed from the revegetatin process mixed with native species. Vegetation is mowed/disturbed regularly during the growing season. Hydrology is manipuled by artifically creating a low point on the landscape and funneling overland flow into this location. Ditch is poorly graded, so water tends to pond rather than flow to adjacent wetlands.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____ No X	Depth (inches): -	
Water Table Present?	Yes ____ No X	Depth (inches): -	
Saturation Present? (includes capillary fringe)	Yes ____ No X	Depth (inches): -	**Wetland Hydrology Present?** **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Proper grading and the installation of an approach culvert on the west end of the wetland would allow the ditch to flow into wetland 106

VEGETATION – Use scientific names of plants. Sampling Point: W107P2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 6)			
1. *Carex lacustris*	80	Yes	OBL
2. *Typha angustifolia*	40	Yes	OBL
3. *Bromus inermis*	30	No	UPL
4. *Cirsium arvense*	10	No	FACU
5. *Taraxacum officinale*	10	No	FACU
6. *Toxicodendron radicans*	5	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
	175 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	120	x 1 =	120
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	20	x 4 =	80
UPL species	30	x 5 =	150
Column Totals:	175 (A)		365 (B)

Prevalence Index = B/A = 2.09

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W107P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 2/2	93	10YR 3/6	5	C	M	Sandy	Prominent redox concentrations
			2.5Y 7/2	2	D	M		
13-16	10YR 6/2	70	10YR 5/8	30	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Sandy Clay

Depth (inches): 13

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Soils may have been imopacted (mix, fill, compacted during the construction of the roadway

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-25-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W108P1

Investigator(s): Patrick Reardon Section, Township, Range: 34, 151, 33

Landform (hillside, terrace, etc.): Creek Bank Hillslope Local relief (concave, convex, none): Concave Slope (%): 25

Subregion (LRR or MLRA): LRR K Lat: 47.856258 Long: -94.853087 Datum:

Soil Map Unit Name: Fluvaquents, frequently flooded-Hadludalfs complex 0 to 35 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -
Water Table Present?	Yes ____	No X	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W108P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Abies balsamea*	20	Yes	FAC
2. *Populus tremuloides*	10	Yes	FAC
3. *Betula papyrifera*	5	No	FACU
4. *Ulmus americana*	5	No	FACW
5.			
6.			
7.			
	40	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Corylus americana*	40	Yes	FACU
2. *Cornus rugosa*	10	Yes	UPL
3. *Betula papyrifera*	10	Yes	FACU
4. *Fraxinus nigra*	5	No	FACW
5. *Populus tremuloides*	5	No	FAC
6. *Abies balsamea*	5	No	FAC
7. *Rosa blanda*	5	No	FACU
	80	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Carex pensylvanica*	60	Yes	UPL
2. *Bromus inermis*	10	No	UPL
3. *Abies balsamea*	5	No	FAC
4. *Pyrola elliptica*	5	No	FACU
5. *Galium triflorum*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	45	x 3 =	135
FACU species	70	x 4 =	280
UPL species	80	x 5 =	400
Column Totals:	205 (A)		835 (B)

Prevalence Index = B/A = 4.07

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W108P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-11	10YR 2/2	100					Sandy	
11-16	10YR 3/3	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-25-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W108P2

Investigator(s): Patrick Reardon Section, Township, Range: 34, 151, 33

Landform (hillside, terrace, etc.): Creek Terrace/Fringe Wetland Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR or MLRA): LRR K Lat: 47.856258 Long: -94.853087 Datum:

Soil Map Unit Name: Fluvaquents, frequently flooded-Hadludalfs complex 0 to 35 percent slopes NWI classification: PEM1Cb

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	Wetland 108

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- X Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches):	0
Water Table Present?	Yes X	No ____	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Soils contain a mucky component

VEGETATION – Use scientific names of plants. Sampling Point: W108P2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Salix petiolaris*	60	Yes	FACW
2. *Alnus incana*	5	No	FACW
3.			
4.			
5.			
6.			
7.			
	65 =Total Cover		
Herb Stratum (Plot size: 6)			
1. *Carex lacustris*	60	Yes	OBL
2. *Salix petiolaris*	10	No	FACW
3. *Equisetum pratense*	10	No	FACW
4. *Phalaris arundinacea*	5	No	FACW
5. *Bromus ciliatus*	5	No	FACW
6. *Symphyotrichum lanceolatum*	5	No	FACW
7. *Petasites frigidus*	5	No	FACW
8.			
9.			
10.			
11.			
12.			
	100 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	105	x 2 =	210
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	165 (A)		270 (B)

Prevalence Index = B/A = 1.64

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W108P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	100					Mucky Sand	
7-16	10YR 4/1	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-25-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W109P1

Investigator(s): Patrick Reardon Section, Township, Range: 34, 151, 33

Landform (hillside, terrace, etc.): Hillslope Above Creek Local relief (concave, convex, none): Concave Slope (%): 40

Subregion (LRR or MLRA): LRR K Lat: 47.854252 Long: -94.854252 Datum:

Soil Map Unit Name: Graycalm-Grettum complex, 1 to 8 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	**Yes** ____	**No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -	
Water Table Present?	Yes ____	No X	Depth (inches): -	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -	**Wetland Hydrology Present?** **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: W109P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharum*	80	Yes	FACU
2. *Quercus macrocarpa*	5	No	FACU
3.			
4.			
5.			
6.			
7.			
	85	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Acer saccharum*	30	Yes	FACU
2. *Corylus americana*	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	40	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Carex pensylvanica*	15	Yes	UPL
2. *Equisetum pratense*	5	Yes	FACW
3. *Oryzopsis asperifolia*	5	Yes	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 16.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	125	x 4 =	500
UPL species	20	x 5 =	100
Column Totals:	150 (A)		610 (B)

Prevalence Index = B/A = 4.07

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W109P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1						Sandy	
3-16	10YR 4/3						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-25-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W109P2

Investigator(s): Patrick Reardon Section, Township, Range: 34, 151, 33

Landform (hillside, terrace, etc.): Creek Terrace/ Toe Of Slope Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR K Lat: 47.854252 Long: -94.854252 Datum:

Soil Map Unit Name: Fluvaquents, frequently flooded-Hadludalfs complex 0 to 35 percent slopes NWI classification: PEM1Cb

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	Wetl;and 109

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- X Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches):	Remarks
Water Table Present?	Yes X	No ____	Depth (inches):	3
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Standing Water wihin 5' of sample pit. Soils are comprised partially of muck.

VEGETATION – Use scientific names of plants. Sampling Point: W109P2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Cornus sericea*			FACW
2. *Salix petiolaris*			FACW
3. *Fraxinus nigra*			FACW
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 6)			
1. *Calamagrostis canadensis*	40	Yes	OBL
2. *Carex lacustris*	30	Yes	OBL
3. *Petasites frigidus*	10	No	FACW
4. *Equisetum praealtum*	10	No	FAC
5. *Rubus idaeus*	10	No	FAC
6. *Symphyotrichum lanceolatum*	5	No	FACW
7.			
8.			
9.			
10.			
11.			
12.			
	105 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	70	x 1 =	70
FACW species	15	x 2 =	30
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	105 (A)		160 (B)

Prevalence Index = B/A = 1.52

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W109P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					Mucky Sand	
6-14	2.5Y 4/1	98	10YR 3/6	2	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Fine Sandy Clay

Depth (inches): 6

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-25-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W110P1

Investigator(s): Patrick Reardon Section, Township, Range: 34, 151, 33

Landform (hillside, terrace, etc.): Upland Ridge Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR or MLRA): LRR K Lat: 47.852951 Long: -94.865488 Datum:

Soil Map Unit Name: Fluvaquents, frequently flooded-Egglake-Sax complex, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -
Water Table Present?	Yes ____	No X	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W110P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharum*	60	Yes	FACU
2. *Tilia americana*	20	Yes	FACU
3. *Ostrya virginiana*	10	No	FACU
4.			
5.			
6.			
7.			
	90	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Acer saccharum*			FACU
2. *Corylus americana*			FACU
3. *Ostrya virginiana*			FACU
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Eurybia macrophylla*	15	Yes	UPL
2. *Oryzopsis asperifolia*	10	Yes	UPL
3. *Carex pensylvanica*	5	No	UPL
4. *Anemone americana*	5	No	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	90	x 4 =	360
UPL species	30	x 5 =	150
Column Totals:	120 (A)		510 (B)

Prevalence Index = B/A = 4.25

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W110P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					Sandy	Traces of loam
4-17	10YR 5/3	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-25-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W110P2

Investigator(s): Patrick Reardon Section, Township, Range: 34, 151, 33

Landform (hillside, terrace, etc.): Edge of Large Wetland Basin Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR K Lat: 47.852951 Long: -94.865488 Datum:

Soil Map Unit Name: Fluvaquents, frequently flooded-Egglake-Sax complex, 0 to 2 percent slopes NWI classification: PSS1D/PEM1D

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	Wetland 110

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches):	Remarks
Water Table Present?	Yes X	No ____	Depth (inches):	5
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Standing water within 5' of sample pit at time of field obsevation

VEGETATION – Use scientific names of plants. Sampling Point: W110P2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix bebbiana*	70	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	70	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Alnus incana*	30	Yes	FACW
2. *Salix bebbiana*	30	Yes	FACW
3. *Cornus sericea*	15	Yes	FACW
4.			
5.			
6.			
7.			
	75	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Carex tuckermanii*	15	Yes	OBL
2. *Carex lacustris*	5	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	145	x 2 =	290
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	165 (A)		310 (B)

Prevalence Index = B/A = 1.88

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W110P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 2/1	100					Mucky Sand	
9-16	10YR 5/1	60					Loamy/Clayey	
	10YR 3/1	40						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-25-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W110P3

Investigator(s): Patrick Reardon Section, Township, Range: 34, 151, 33

Landform (hillside, terrace, etc.): Upland Ridge Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR or MLRA): LRR K Lat: 47.852951 Long: -94.865488 Datum:

Soil Map Unit Name: Ricelake-Cutaway complex, mlra 88, t to 4 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	**Yes** ____	**No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -	
Water Table Present?	Yes ____	No X	Depth (inches): -	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -	**Wetland Hydrology Present?** **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W110P3

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharum*	60	Yes	FACU
2. *Ostrya virginiana*	10	No	FACU
3. *Tilia americana*	10	No	FACU
4. *Betula papyrifera*	5	No	FACU
5. *Quercus macrocarpa*	5	No	FACU
6.			
7.			
	90	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Acer saccharum*	10	Yes	FACU
2. *Corylus americana*	5	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Carex pensylvanica*	15	Yes	UPL
2. *Oryzopsis asperifolia*	10	Yes	UPL
3. *Anemone americana*	5	No	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	105	x 4 =	420
UPL species	25	x 5 =	125
Column Totals:	130 (A)		545 (B)

Prevalence Index = B/A = 4.19

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W110P3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					Sandy	
3-12	10YR 5/4	70					Loamy/Clayey	
	10YR 5/6	30						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-25-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W110P4

Investigator(s): Patrick Reardon Section, Township, Range: 34, 151, 33

Landform (hillside, terrace, etc.): Toe of Inslope/Wetland Basin Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR K Lat: 47.852951 Long: -94.865488 Datum:

Soil Map Unit Name: Fluvaquents, frequently flooded-Egglake-Sax complex, 0 to 2 percent slopes NWI classification: PSS1D/PEM1D

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	Wetland 110

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- X Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches):	0
Water Table Present?	Yes X	No ____	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Peat present at sample location

VEGETATION – Use scientific names of plants. Sampling Point: W110P4

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix bebbiana*	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Spiraea alba*	30	Yes	FACW
2. *Cornus sericea*	30	Yes	FACW
3. *Fraxinus nigra*	15	Yes	FACW
4.			
5.			
6.			
7.			
	75	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Carex lacustris*	15	Yes	OBL
2. *Calamagrostis canadensis*	5	Yes	OBL
3. *Equisetum praealtum*	5	Yes	FAC
4. *Persicaria lapathifolia*	5	Yes	FACW
5. *Lathyrus ochroleucus*	5	Yes	UPL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 88.9% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	90	x 2 =	180
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	120 (A)		240 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W110P4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	100					Mucky Peat	Mucky Sand Intermixed
5-16	10YR 4/1	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- X 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-25-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W111P1

Investigator(s): Patrick Reardon Section, Township, Range: 34, 151, 33

Landform (hillside, terrace, etc.): Upland Ridge Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR or MLRA): LRR K Lat: 47.852999 Long: -94.869192 Datum:

Soil Map Unit Name: Ricelake-Cutaway complex, mlra 88, t to 4 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**		
Hydric Soil Present?	Yes ____	No X	**within a Wetland?**	**Yes** ____	**No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -	
Water Table Present?	Yes ____	No X	Depth (inches): -	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -	**Wetland Hydrology Present?** **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W111P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharum*	60	Yes	FACU
2. *Ostrya virginiana*	10	No	FACU
3. *Tilia americana*	10	No	FACU
4. *Betula papyrifera*	5	No	FACU
5. *Quercus macrocarpa*	5	No	FACU
6.			
7.			
	90	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Acer saccharum*	10	Yes	FACU
2. *Corylus americana*	5	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Carex pensylvanica*	15	Yes	UPL
2. *Oryzopsis asperifolia*	10	Yes	UPL
3. *Anemone americana*	5	No	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	105	x 4 =	420
UPL species	25	x 5 =	125
Column Totals:	130 (A)		545 (B)

Prevalence Index = B/A = 4.19

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W111P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					Sandy	
3-12	10YR 5/4	70					Loamy/Clayey	
	10YR 5/6	30						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-25-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W111P2

Investigator(s): Patrick Reardon Section, Township, Range: 34, 151, 34

Landform (hillside, terrace, etc.): Small Basin Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR K Lat: 47.852999 Long: -94.869192 Datum:

Soil Map Unit Name: Ricelake-Cutaway complex, mlra 88, t to 4 percent slopes NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No 0	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: Wetland 111

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- X Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): Remarks
Water Table Present?	Yes X	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Standing water approximately 10 to 15 feet from sample pit

VEGETATION – Use scientific names of plants. Sampling Point: W111P2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus nigra*	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	5	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Fraxinus nigra*	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	5	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Persicaria lapathifolia*	20	Yes	FACW
2. *Ranunculus pensylvanicus*	20	Yes	OBL
3. *Carex atherodes*	15	Yes	OBL
4. *Cardamine pensylvanica*	15	Yes	FACW
5. *Bidens frondosa*	15	Yes	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	35	x 1 =	35
FACW species	60	x 2 =	120
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	95 (A)		155 (B)

Prevalence Index = B/A = 1.63

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W111P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					Mucky Peat	
5-15	10YR 4/1	100					Sandy	Mixed with clay, highly compacted

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- X 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Thunder Lake Road- East Extension City/County: Redby/Beltrami Sampling Date: 10-26-23

Applicant/Owner: Red Lake Band Of Chippewa State: MN Sampling Point: W112P1

Investigator(s): Patrick Reardon Section, Township, Range: 34, 151, 33

Landform (hillside, terrace, etc.): Subtle Upland Ridge Local relief (concave, convex, none): Convex Slope (%): 0

Subregion (LRR or MLRA): LRR K Lat: 47.852022 Long: -94.851187 Datum:

Soil Map Unit Name: Egglake-Spooner, till substratum complex, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Climatic conditions have been drier than normal for the three months prior to the site visit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
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- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): -
Water Table Present?	Yes ____	No X	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): -

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: W112P1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus tremuloides*	40	Yes	FAC
2. *Ostrya virginiana*	20	Yes	FACU
3. *Tilia americana*	15	No	FACU
4. *Fraxinus nigra*	10	No	FACW
5.			
6.			
7.			
	85	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Fraxinus nigra*	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	
Herb Stratum (Plot size: 6)			
1. *Carex pensylvanica*	40	Yes	UPL
2. *Oryzopsis asperifolia*	10	No	UPL
3. *Eurybia macrophylla*	5	No	UPL
4. *Thalictrum dioicum*	5	No	FACU
5. *Bromus ciliatus*	5	No	FACW
6. *Osmorhiza claytonii*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	70	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	40	x 3 =	120
FACU species	45	x 4 =	180
UPL species	55	x 5 =	275
Column Totals:	165 (A)		625 (B)

Prevalence Index = B/A = 3.79

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

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Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W112P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-11	10YR 2/2	100					Sandy	
11-16	10YR 5/3	98	10YR 5/8	2	CS	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
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- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
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- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
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- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Wetland 100

Wetland 101

Wetland 102

Wetland 103

Wetland 104

Wetland 105

Wetland 106

Wetland 107

Wetland 108

Wetland 109

Wetland 110

Wetland 111

Wetland 112

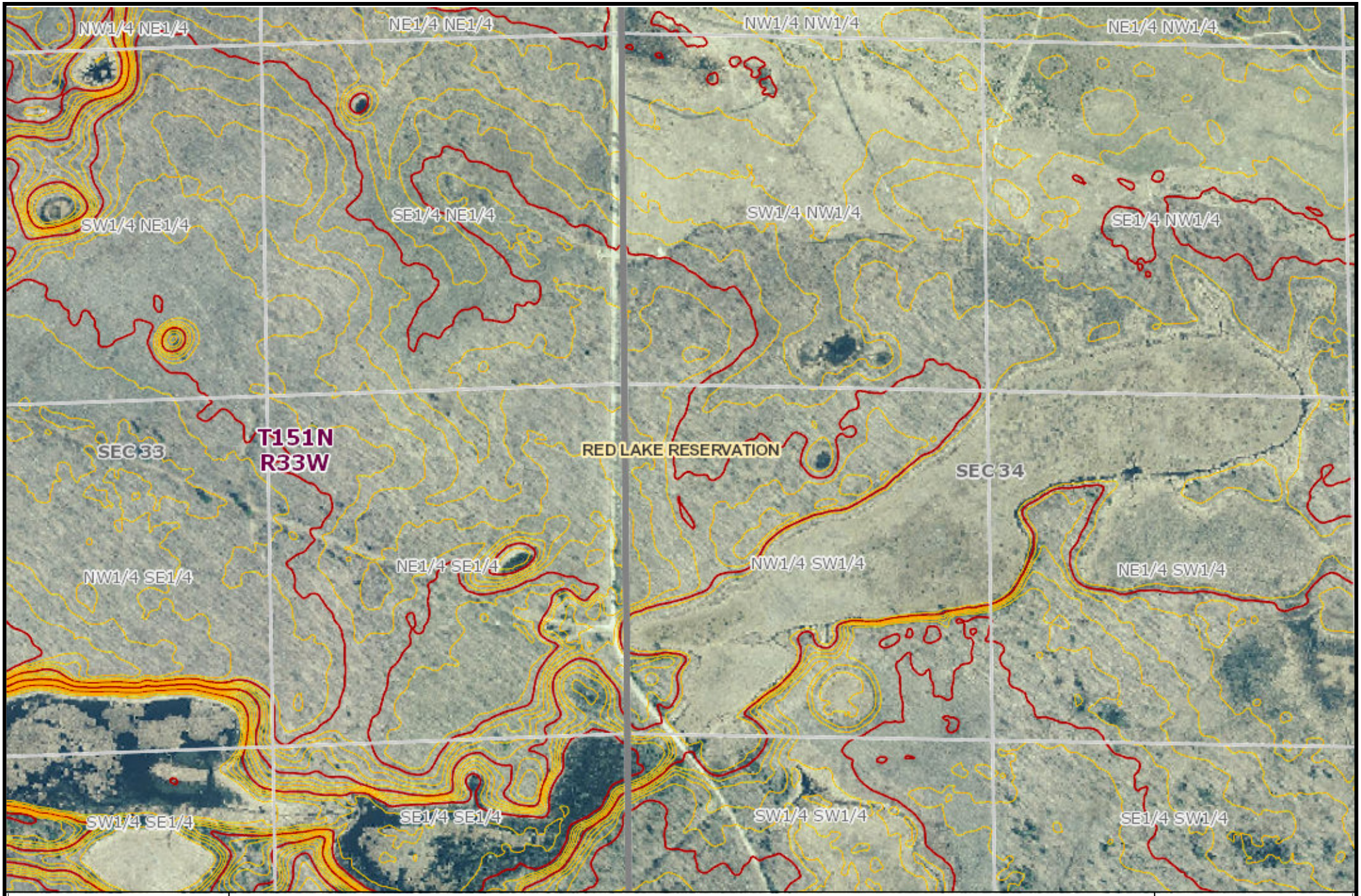
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:	
county: **Beltrami**	township number: **151N**
township name: **Green Lake**	range number:**33W**
nearest community: **Redby**	section number: **34**

Aerial photograph or site visit date:
Monday, October 23, 2023

Score using 1991-2020 normal period

(values are in inches)	first prior month: **September 2023**	second prior month: **August 2023**	third prior month: **July 2023**
estimated precipitation total for this location:	**1.64R**	**2.27R**	**2.39R**
there is a 30% chance this location will have less than: *	2.06	2.30	2.70
there is a 30% chance this location will have more than: *	2.98	3.49	4.42
type of month: dry normal wet	**dry**	**dry**	**dry**
monthly score	**3 * 1 = 3**	**2 * 1 = 2**	**1 * 1 = 1**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**6 (Dry)**		



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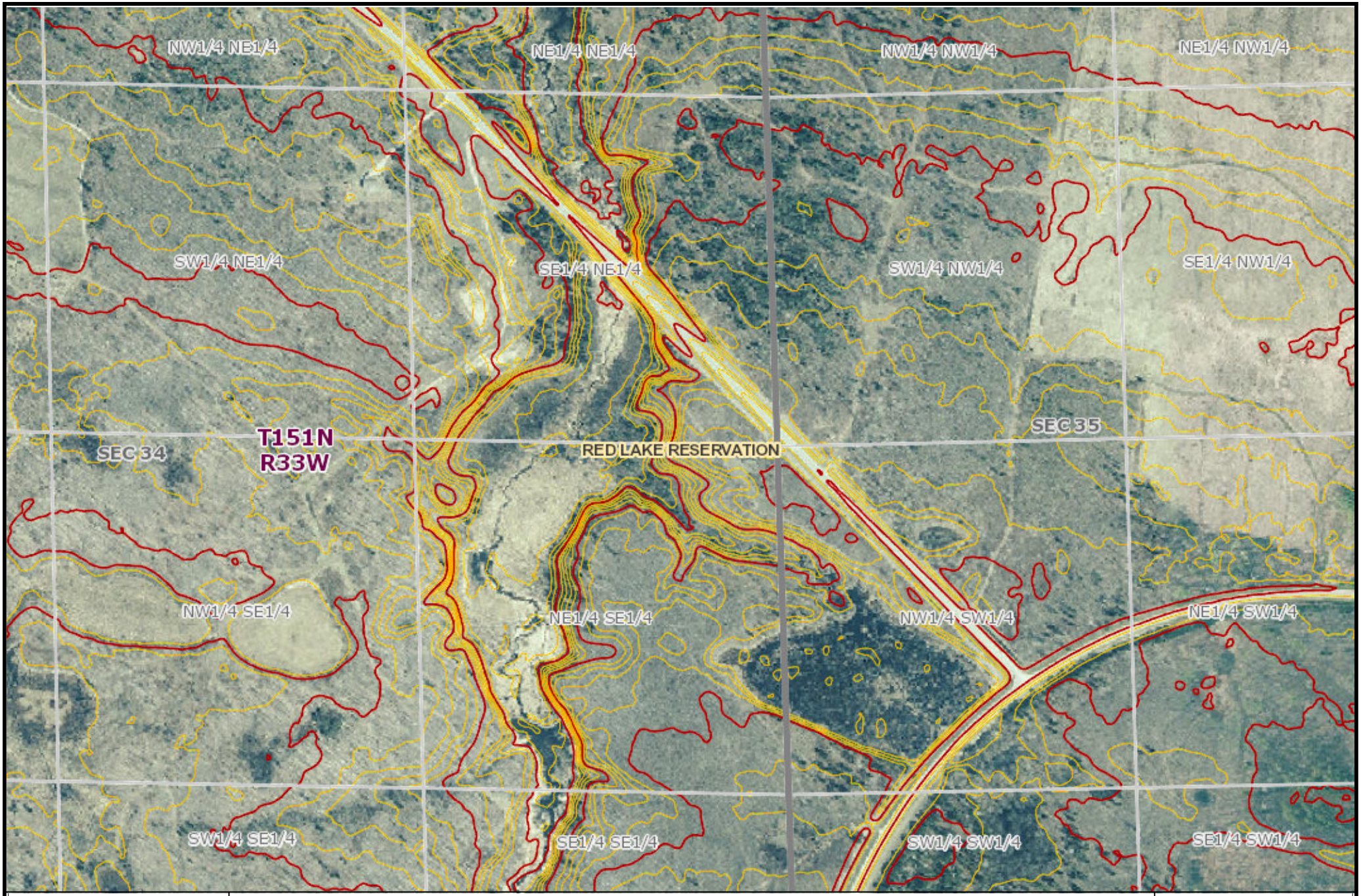
Date: 11/29/2023

This map is not a substitute for accurate field surveys or for locating actual property lines and any adjacent features.

Beltrami County
Minnesota

N



1:8,451

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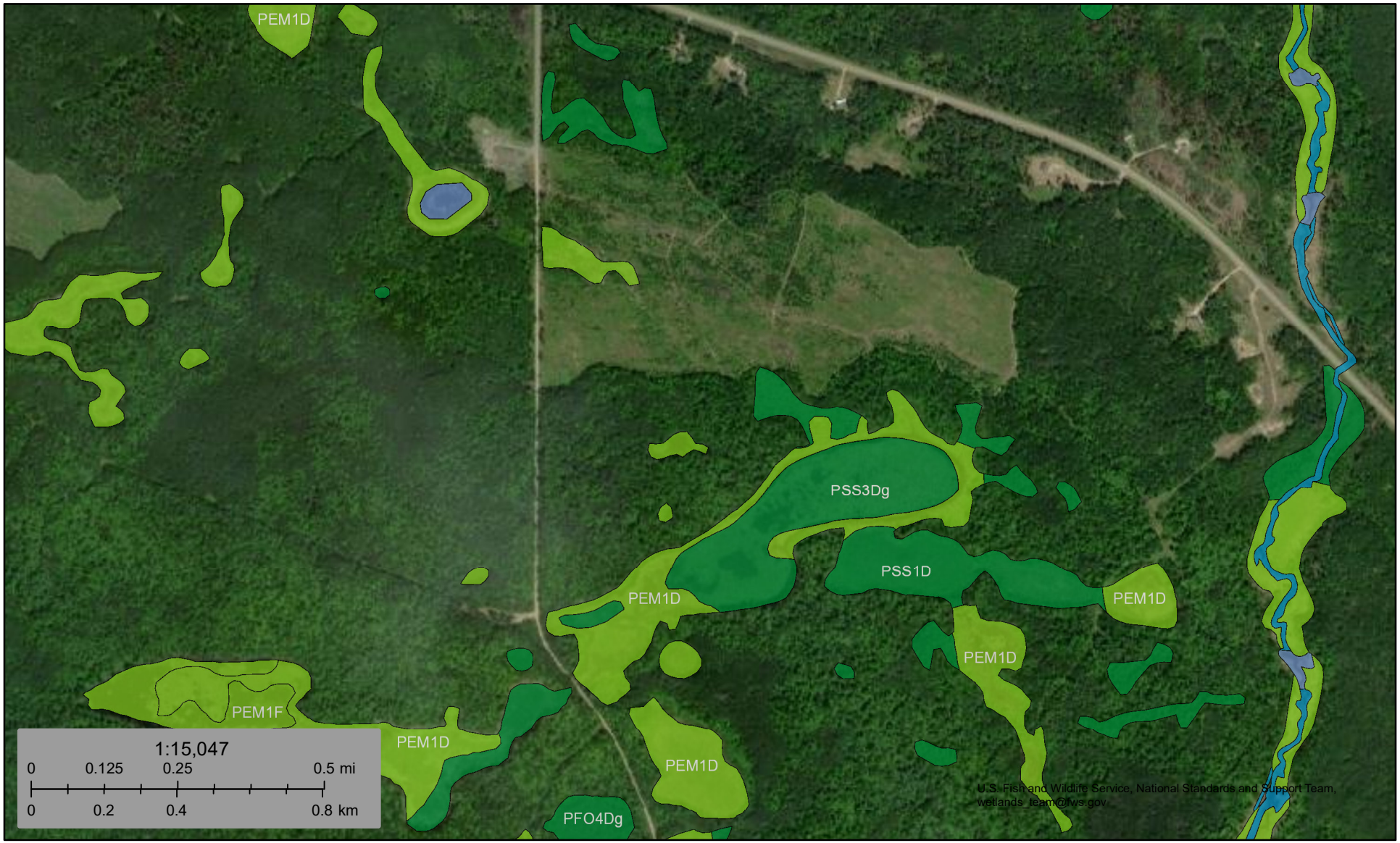
Beltrami County
Minnesota

N

U.S. Fish and Wildlife Service
National Wetlands Inventory

Wetlands



November 29, 2023

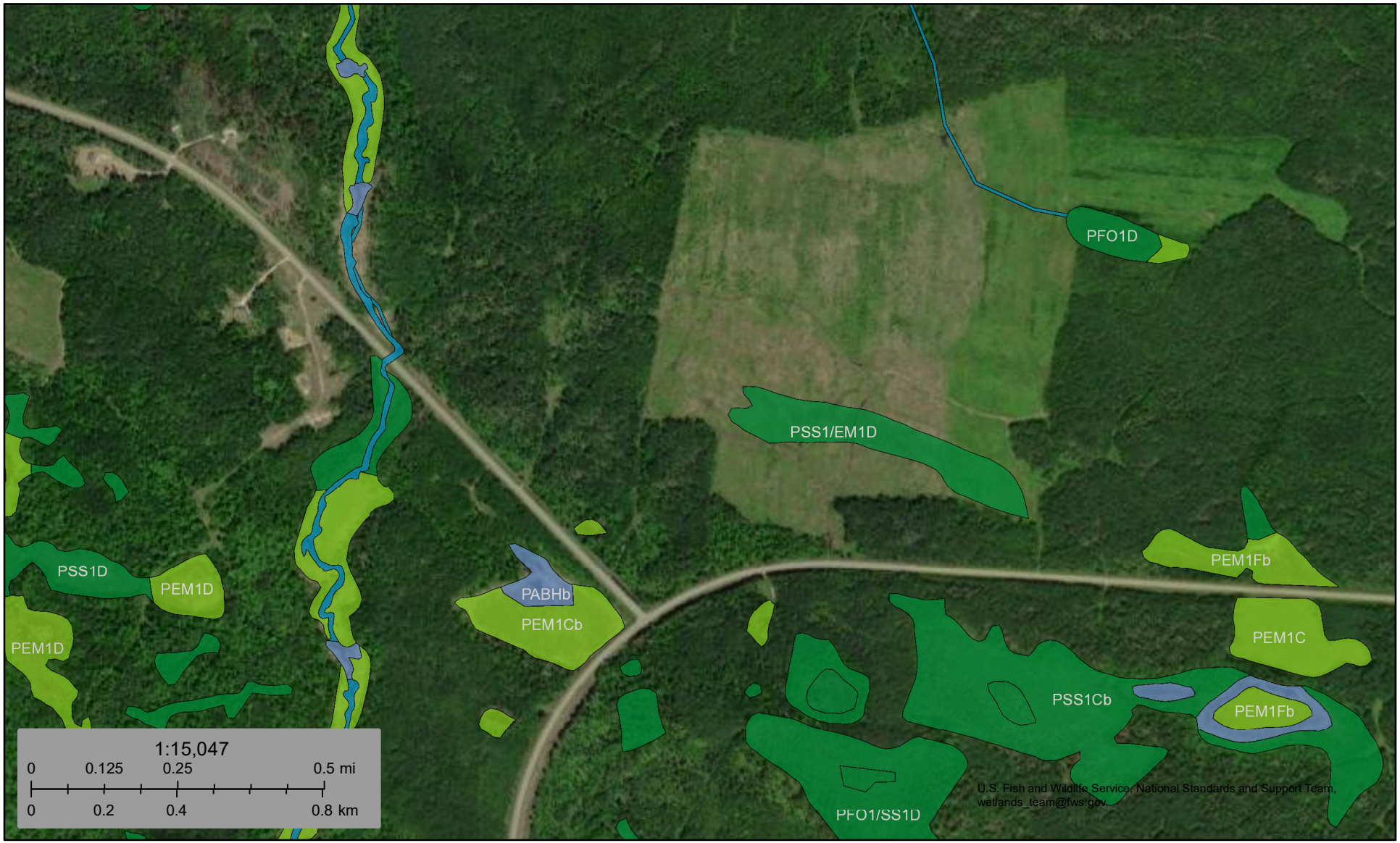
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

U.S. Fish and Wildlife Service
National Wetlands Inventory

Wetlands



November 29, 2023

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
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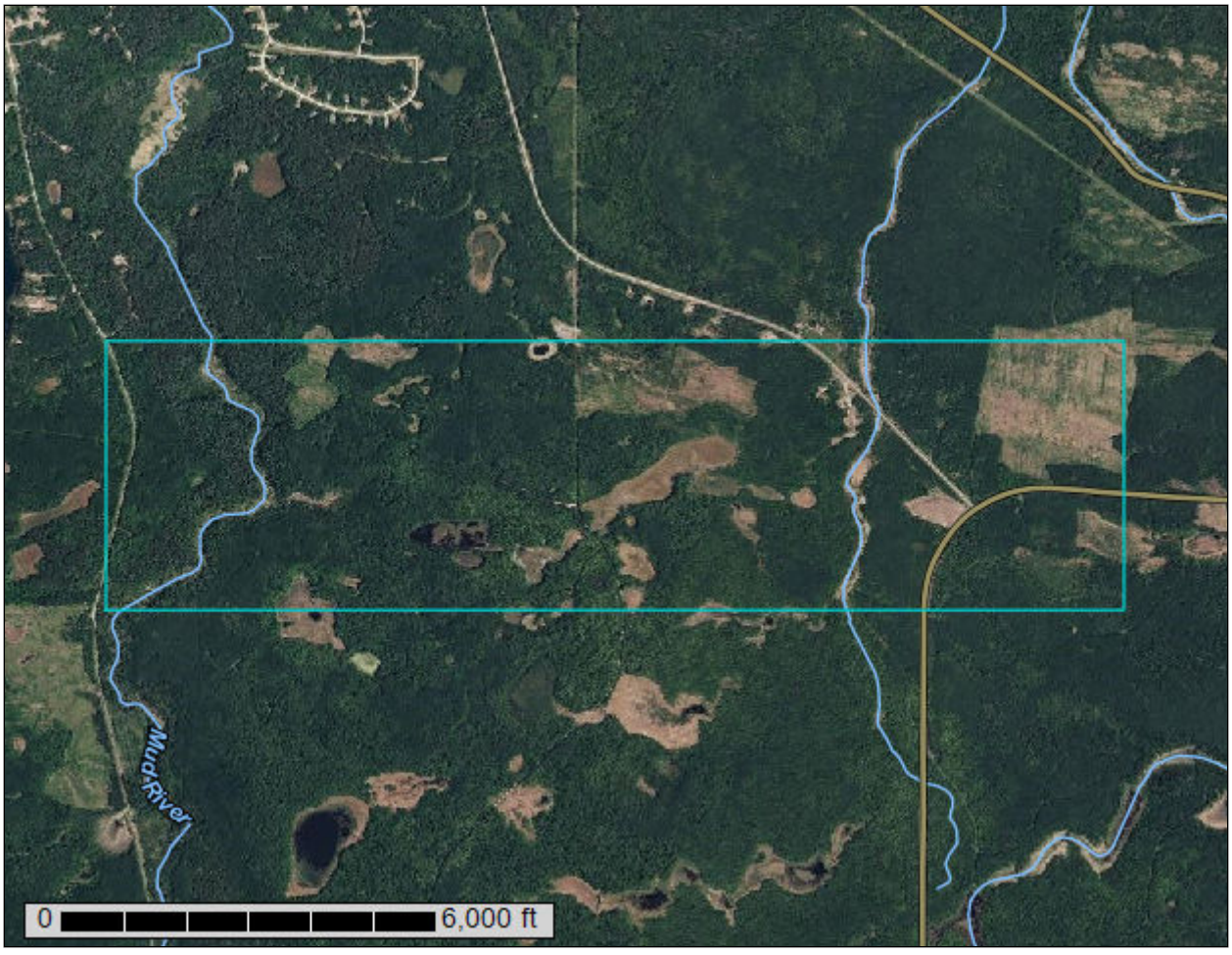
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Beltrami County, Minnesota



October 23, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

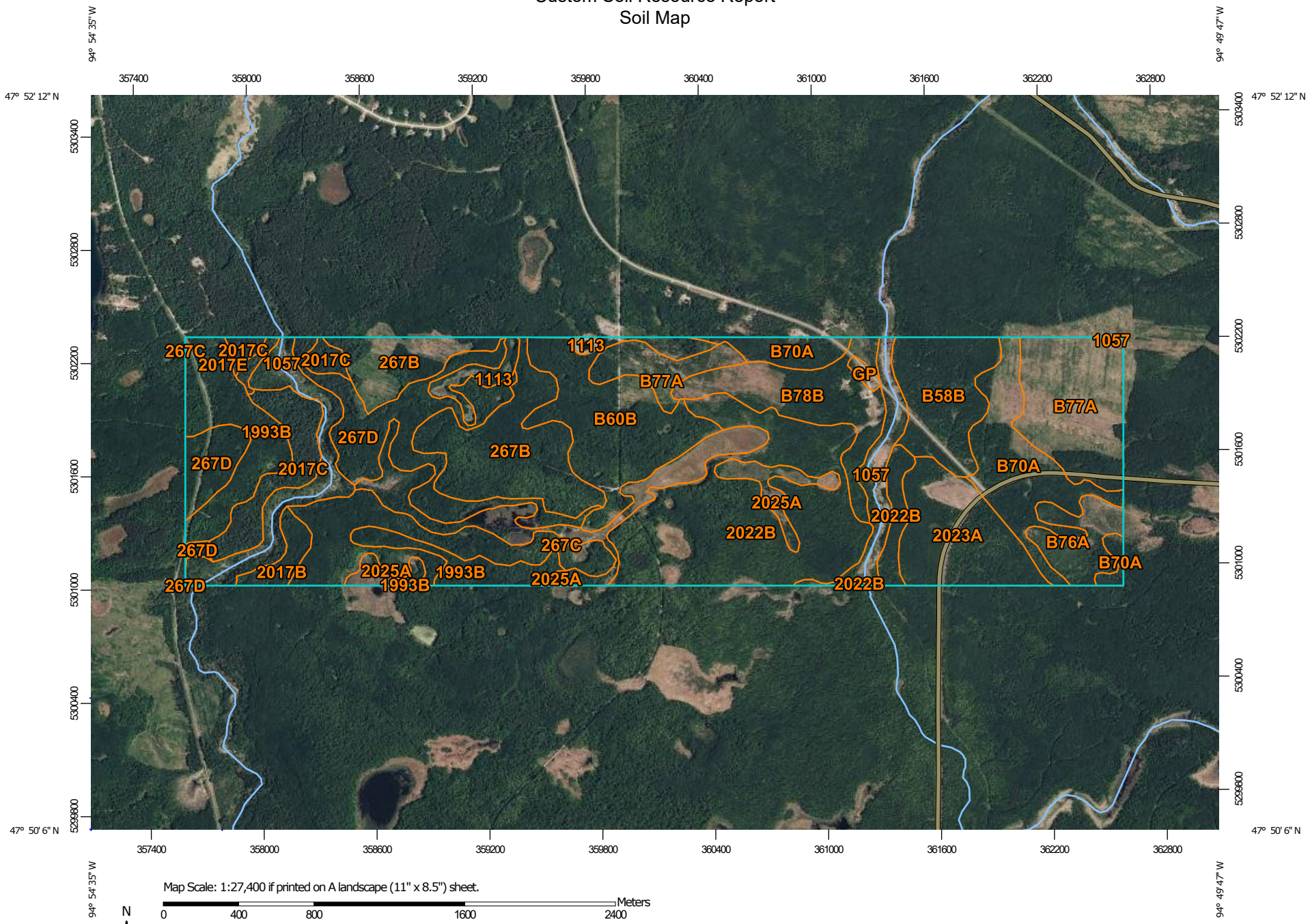
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Beltrami County, Minnesota
Survey Area Data: Version 19, Sep 9, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 1, 2021—Oct 1, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
267B	Snellman sandy loam, 1 to 8 percent slopes	146.3	9.0%
267C	Snellman sandy loam, 8 to 15 percent slopes	90.3	5.5%
267D	Snellman sandy loam, 15 to 30 percent slopes	128.3	7.9%
1057	Fluvaquents, frequently flooded-Hapludalfs complex, 0 to 35 percent slopes	99.6	6.1%
1113	Haslie, Seelyeville, and Cathro soils, frequently ponded, 0 to 1 percent slopes	17.4	1.1%
1993B	Snellman-Wykeham complex, 1 to 8 percent slopes	99.8	6.1%
2017B	Zimmerman-Andrusia complex, 1 to 8 percent slopes	15.7	1.0%
2017C	Zimmerman-Andrusia complex, 8 to 15 percent slopes	58.5	3.6%
2017E	Zimmerman-Andrusia complex, 15 to 30 percent slopes	4.7	0.3%
2022B	Wykeham-Baudette, till substratum complex, 1 to 4 percent slopes	225.4	13.8%
2023A	Egglake-Spooner, till substratum complex, 0 to 2 percent slopes	86.3	5.3%
2025A	Fluvaquents, frequently flooded-Egglake-Sax complex, 0 to 2 percent slopes	101.1	6.2%
B58B	Wurtsmith-Meehan complex, 0 to 4 percent slopes	74.2	4.6%
B60B	Ricelake-Cutaway complex, mlra 88, 1 to 4 percent slopes	119.3	7.3%
B70A	Ricelake-Blomford complex, mlra 88, 0 to 3 percent slopes	112.3	6.9%
B76A	Deford-Leafriver complex, 0 to 2 percent slopes	37.0	2.3%
B77A	Meehan-Deford complex, 0 to 3 percent slopes	127.9	7.9%
B78B	Graycalm-Grettum complex, 1 to 8 percent slopes	79.4	4.9%
GP	Pits, gravel-Udipsamments complex	3.7	0.2%
Totals for Area of Interest		**1,627.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas

shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Beltrami County, Minnesota

267B—Snellman sandy loam, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2v0lj
Elevation: 590 to 2,030 feet
Mean annual precipitation: 24 to 30 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 110 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Snellman and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Snellman

Setting

Landform: Moraines
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy till

Typical profile

A - 0 to 2 inches: sandy loam
E - 2 to 16 inches: loamy sand
Bt - 16 to 31 inches: sandy clay loam
C - 31 to 79 inches: sandy loam

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Forage suitability group: Sloping Upland, Acid (G057XN006MN)
Other vegetative classification: Sloping Upland, Acid (G057XN006MN)
Hydric soil rating: No

Minor Components

Wykeham

Percent of map unit: 10 percent
Landform: Moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F057XY021MN - Loamy Upland Moist Hardwood Forest
Other vegetative classification: Sloping Upland, Acid (G057XN006MN)
Hydric soil rating: No

Leaflake

Percent of map unit: 5 percent
Landform: Moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping Upland, Neutral (G057XN002MN)
Hydric soil rating: No

Egglake

Percent of map unit: 5 percent
Landform: Moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F057XY015MN - Wet Mixed Forest
Other vegetative classification: Level Swale, Neutral (G057XN001MN)
Hydric soil rating: Yes

Snellman, rolling

Percent of map unit: 3 percent
Landform: Moraines
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping; Fine Texture (G057XN023MN)
Hydric soil rating: No

Cathro, frequently ponded

Percent of map unit: 2 percent
Landform: Depressions on moraines
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R102AY037SD - Deep Marsh
Other vegetative classification: Not Suited (G057XN024MN)
Hydric soil rating: Yes

267C—Snellman sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2v0lk
Elevation: 590 to 2,030 feet
Mean annual precipitation: 24 to 30 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Snellman and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Snellman

Setting

Landform: Moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy till

Typical profile

A - 0 to 2 inches: sandy loam
E - 2 to 16 inches: loamy sand
Bt - 16 to 31 inches: sandy clay loam
C - 31 to 79 inches: sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Forage suitability group: Sloping; Fine Texture (G057XN023MN)

Other vegetative classification: Sloping; Fine Texture (G057XN023MN)
Hydric soil rating: No

Minor Components

Wykeham
Percent of map unit: 5 percent
Landform: Moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F057XY021MN - Loamy Upland Moist Hardwood Forest
Other vegetative classification: Sloping Upland, Acid (G057XN006MN)
Hydric soil rating: No

Leaflake
Percent of map unit: 3 percent
Landform: Moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping Upland, Neutral (G057XN002MN)
Hydric soil rating: No

Egglake
Percent of map unit: 3 percent
Landform: Moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F057XY015MN - Wet Mixed Forest
Other vegetative classification: Level Swale, Neutral (G057XN001MN)
Hydric soil rating: Yes

Cathro, frequently ponded
Percent of map unit: 2 percent
Landform: Depressions on moraines
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R102AY037SD - Deep Marsh
Other vegetative classification: Not Suited (G057XN024MN)
Hydric soil rating: Yes

Snellman
Percent of map unit: 2 percent
Landform: Moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Steep; Fine Texture (G057XN017MN)
Hydric soil rating: No

267D—Snellman sandy loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2v0ll
Elevation: 590 to 2,030 feet
Mean annual precipitation: 24 to 30 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Snellman and similar soils: 88 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Snellman

Setting

Landform: Moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy till

Typical profile

A - 0 to 2 inches: sandy loam
E - 2 to 16 inches: loamy sand
Bt - 16 to 31 inches: sandy clay loam
C - 31 to 79 inches: sandy loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F057XY018MN - Steep Sandy Upland Forest
Forage suitability group: Steep; Fine Texture (G057XN017MN)

Other vegetative classification: Steep; Fine Texture (G057XN017MN)
Hydric soil rating: No

Minor Components

Egglake

Percent of map unit: 3 percent
Landform: Moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F057XY015MN - Wet Mixed Forest
Other vegetative classification: Level Swale, Neutral (G057XN001MN)
Hydric soil rating: Yes

Cathro, frequently ponded

Percent of map unit: 3 percent
Landform: Depressions on moraines
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R102AY037SD - Deep Marsh
Other vegetative classification: Not Suited (G057XN024MN)
Hydric soil rating: Yes

Leaflake

Percent of map unit: 2 percent
Landform: Moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping Upland, Neutral (G057XN002MN)
Hydric soil rating: No

Wykeham

Percent of map unit: 2 percent
Landform: Moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F057XY021MN - Loamy Upland Moist Hardwood Forest
Other vegetative classification: Sloping Upland, Acid (G057XN006MN)
Hydric soil rating: No

Snellman, steep

Percent of map unit: 2 percent
Landform: Moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Not Suited (G057XN024MN)
Hydric soil rating: No

1057—Fluvaquents, frequently flooded-Hapludalfs complex, 0 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2ml29
Elevation: 660 to 1,970 feet
Mean annual precipitation: 25 to 31 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 80 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluvaquents, frequently flooded, loamy, and similar soils: 50 percent
Hapludalfs and similar soils: 45 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluvaquents, Frequently Flooded, Loamy

Setting

Landform: Flats on flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 6 inches: mucky silt loam
Cg - 6 to 80 inches: stratified silt loam to loamy coarse sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: RareNoneFrequentOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Ecological site: F088XY006MN - Floodplain Forest Wet
Forage suitability group: Not Suited (G088XN024MN)
Other vegetative classification: Not Suited (G088XN024MN)
Hydric soil rating: Yes

Description of Hapludalfs

Setting

Landform: Flood plains
Landform position (two-dimensional): Backslope, shoulder, summit
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Till

Typical profile

A - 0 to 4 inches: loam
E - 4 to 7 inches: silt loam
B/E - 7 to 11 inches: silty clay loam
Bt - 11 to 39 inches: silty clay
BC - 39 to 80 inches: clay loam

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C/D
Ecological site: F088XY014MN - Clayey Upland Wet-Mesic Hardwood Forest
Forage suitability group: Steep; Fine Texture (G088XN017MN)
Other vegetative classification: Steep; Fine Texture (G088XN017MN)
Hydric soil rating: No

Minor Components

Fluvaquents, frequently flooded

Percent of map unit: 5 percent
Landform: Flats on flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F088XY006MN - Floodplain Forest Wet
Other vegetative classification: Frequently Flooded (G088XN016MN)
Hydric soil rating: Yes

1113—Haslie, Seelyeville, and Cathro soils, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2w8f2
Elevation: 590 to 2,130 feet
Mean annual precipitation: 22 to 33 inches
Mean annual air temperature: 37 to 48 degrees F
Frost-free period: 110 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Haslie, frequently ponded, and similar soils: 31 percent
Seelyeville, frequently ponded, and similar soils: 29 percent
Cathro, frequently ponded, and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Haslie, Frequently Ponded

Setting

Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material over coprogenic material

Typical profile

Oa - 0 to 30 inches: muck
Lco - 30 to 79 inches: coprogenous silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 18.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: C/D
Ecological site: R057XY001MN - Marsh

Forage suitability group: Not Suited (G057XN024MN)
Other vegetative classification: Not Suited (G057XN024MN)
Hydric soil rating: Yes

Description of Seelyeville, Frequently Ponded

Setting
Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material

Typical profile
Oa1 - 0 to 10 inches: muck
Oa2 - 10 to 79 inches: muck

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 23.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Ecological site: R057XY001MN - Marsh
Forage suitability group: Not Suited (G057XN024MN)
Other vegetative classification: Not Suited (G057XN024MN)
Hydric soil rating: Yes

Description of Cathro, Frequently Ponded

Setting
Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material over till

Typical profile
Oa - 0 to 26 inches: muck
Cg - 26 to 79 inches: loam

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent

Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 15.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Ecological site: R057XY001MN - Marsh
Forage suitability group: Not Suited (G057XN024MN)
Other vegetative classification: Not Suited (G057XN024MN)
Hydric soil rating: Yes

Minor Components

Nidaros, frequently ponded

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R057XY005MN - Open Peatland
Other vegetative classification: Not Suited (G057XN024MN)
Hydric soil rating: Yes

Water

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Unranked

Endoaquolls, frequently ponded

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F057XY015MN - Wet Mixed Forest
Other vegetative classification: Ponded If Not Drained (G057XN013MN)
Hydric soil rating: Yes

1993B—Snellman-Wykeham complex, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t4sz
Elevation: 590 to 2,030 feet
Mean annual precipitation: 24 to 30 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 110 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Snellman and similar soils: 55 percent
Wykeham and similar soils: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Snellman

Setting

Landform: Moraines
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy till

Typical profile

A - 0 to 2 inches: sandy loam
E - 2 to 16 inches: loamy sand
Bt - 16 to 31 inches: sandy clay loam
C - 31 to 79 inches: sandy loam

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Forage suitability group: Sloping Upland, Acid (G057XN006MN)
Other vegetative classification: Sloping Upland, Acid (G057XN006MN)
Hydric soil rating: No

Description of Wykeham

Setting

Landform: Moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Coarse-loamy till

Typical profile

A - 0 to 7 inches: fine sandy loam

E - 7 to 11 inches: fine sandy loam
BE - 11 to 19 inches: fine sandy loam
Bt - 19 to 28 inches: sandy clay loam
C - 28 to 79 inches: sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 22 to 49 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2c
Hydrologic Soil Group: C
Ecological site: F057XY021MN - Loamy Upland Moist Hardwood Forest
Forage suitability group: Sloping Upland, Acid (G057XN006MN)
Other vegetative classification: Sloping Upland, Acid (G057XN006MN)
Hydric soil rating: No

Minor Components

Leaflake

Percent of map unit: 2 percent
Landform: Moraines
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping Upland, Neutral (G057XN002MN)
Hydric soil rating: No

Bemidji

Percent of map unit: 2 percent
Landform: Moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping Upland, Acid (G057XN006MN)
Hydric soil rating: No

Egglake

Percent of map unit: 1 percent
Landform: Moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear

Across-slope shape: Concave
Ecological site: F057XY015MN - Wet Mixed Forest
Other vegetative classification: Level Swale, Neutral (G057XN001MN)
Hydric soil rating: Yes

2017B—Zimmerman-Andrusia complex, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2qkj4
Elevation: 1,000 to 1,600 feet
Mean annual precipitation: 22 to 27 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 90 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Zimmerman and similar soils: 45 percent
Andrusia and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zimmerman

Setting

Landform: Hillslopes on moraines
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Outwash

Typical profile

A - 0 to 3 inches: loamy fine sand
E - 3 to 16 inches: fine sand
Bw - 16 to 35 inches: fine sand
E and Bt - 35 to 60 inches: fine sand

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 19.99 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: A
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Forage suitability group: Sandy (G057XN022MN)
Other vegetative classification: Sandy (G057XN022MN)
Hydric soil rating: No

Description of Andrusia

Setting

Landform: Hillslopes on moraines
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Outwash

Typical profile

A - 0 to 3 inches: loamy sand
E - 3 to 29 inches: sand
Bt - 29 to 39 inches: gravelly sandy loam
C - 39 to 60 inches: sand

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Forage suitability group: Sloping Upland, Low AWC, Neutral (G057XN004MN)
Other vegetative classification: Sloping Upland, Low AWC, Neutral (G057XN004MN)
Hydric soil rating: No

Minor Components

Grettum

Percent of map unit: 10 percent
Landform: Hillslopes on moraines
Landform position (two-dimensional): Footslope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F057XY018MN - Steep Sandy Upland Forest
Other vegetative classification: Sloping Upland, Low AWC, Acid (G057XN008MN)
Hydric soil rating: No

Leaflake

Percent of map unit: 5 percent

Landform: Hillslopes on moraines
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping Upland, Neutral (G057XN002MN)
Hydric soil rating: No

Andrusia, hilly

Percent of map unit: 3 percent
Landform: Hillslopes on moraines
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Steep; Coarse Texture; Low AWC (G057XN018MN)
Hydric soil rating: No

Leafriver

Percent of map unit: 2 percent
Landform: Depressions on moraines
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F057XY003MN - Peatland
Other vegetative classification: Organic (G057XN014MN)
Hydric soil rating: Yes

2017C—Zimmerman-Andrusia complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2qkjp
Elevation: 1,000 to 1,600 feet
Mean annual precipitation: 22 to 27 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 90 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Zimmerman, rolling, and similar soils: 45 percent
Andrusia, rolling, and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zimmerman, Rolling

Setting

Landform: Hillslopes on moraines

Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Outwash

Typical profile

A - 0 to 3 inches: loamy fine sand
E - 3 to 16 inches: fine sand
Bw - 16 to 35 inches: fine sand
E and Bt - 35 to 60 inches: fine sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 19.99 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): 6s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Forage suitability group: Sandy (G057XN022MN)
Other vegetative classification: Sandy (G057XN022MN)
Hydric soil rating: No

Description of Andrusia, Rolling

Setting

Landform: Hillslopes on moraines
Landform position (two-dimensional): Backslope, shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Outwash

Typical profile

A - 0 to 3 inches: loamy sand
E - 3 to 29 inches: sand
Bt - 29 to 39 inches: gravelly sandy loam
C - 39 to 60 inches: sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Forage suitability group: Sloping Upland, Low AWC, Neutral (G057XN004MN)
Other vegetative classification: Sloping Upland, Low AWC, Neutral (G057XN004MN)
Hydric soil rating: No

Minor Components

Andrusia, hilly

Percent of map unit: 10 percent
Landform: Hillslopes on moraines
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Steep; Coarse Texture; Low AWC (G057XN018MN)
Hydric soil rating: No

Leaflake

Percent of map unit: 5 percent
Landform: Hillslopes on moraines
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping Upland, Neutral (G057XN002MN)
Hydric soil rating: No

Grettum

Percent of map unit: 3 percent
Landform: Hillslopes on moraines
Landform position (two-dimensional): Footslope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F057XY018MN - Steep Sandy Upland Forest
Other vegetative classification: Sloping Upland, Low AWC, Acid (G057XN008MN)
Hydric soil rating: No

Leafriver

Percent of map unit: 2 percent
Landform: Depressions on moraines
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F057XY003MN - Peatland
Other vegetative classification: Organic (G057XN014MN)
Hydric soil rating: Yes

2017E—Zimmerman-Andrusia complex, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2qkjq
Elevation: 1,000 to 1,600 feet
Mean annual precipitation: 22 to 27 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 90 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Zimmerman, hilly, and similar soils: 45 percent
Andrusia, hilly, and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zimmerman, Hilly

Setting

Landform: Hillslopes on moraines
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Outwash

Typical profile

A - 0 to 3 inches: loamy fine sand
E - 3 to 16 inches: fine sand
Bw - 16 to 35 inches: fine sand
E and Bt - 35 to 60 inches: fine sand

Properties and qualities

Slope: 12 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 19.99 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: F057XY018MN - Steep Sandy Upland Forest
Forage suitability group: Steep; Coarse Texture; Low AWC (G057XN018MN)

Other vegetative classification: Steep; Coarse Texture; Low AWC (G057XN018MN)
Hydric soil rating: No

Description of Andrusia, Hilly

Setting

Landform: Hillslopes on moraines
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Outwash

Typical profile

A - 0 to 3 inches: loamy sand
E - 3 to 29 inches: sand
Bt - 29 to 39 inches: gravelly sandy loam
C - 39 to 60 inches: sand

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: F057XY018MN - Steep Sandy Upland Forest
Forage suitability group: Steep; Coarse Texture; Low AWC (G057XN018MN)
Other vegetative classification: Steep; Coarse Texture; Low AWC (G057XN018MN)
Hydric soil rating: No

Minor Components

Zimmerman

Percent of map unit: 12 percent
Landform: Hillslopes on moraines
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sandy (G057XN022MN)
Hydric soil rating: No

Leaflake

Percent of map unit: 5 percent
Landform: Hillslopes on moraines
Landform position (two-dimensional): Shoulder, summit

Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping Upland, Neutral (G057XN002MN)
Hydric soil rating: No

Redby

Percent of map unit: 2 percent
Landform: Hillslopes on moraines
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R057XY012MN - Sandy Prairie
Other vegetative classification: Level Swale, Low AWC, Acid (G057XN007MN)
Hydric soil rating: No

Leafriver

Percent of map unit: 1 percent
Landform: Depressions on moraines
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F057XY003MN - Peatland
Other vegetative classification: Organic (G057XN014MN)
Hydric soil rating: Yes

2022B—Wykeham-Baudette, till substratum complex, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2qkjc
Elevation: 1,000 to 1,600 feet
Mean annual precipitation: 22 to 27 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 90 to 130 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Wykeham and similar soils: 40 percent
Baudette, till substratum, and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wykeham

Setting

Landform: Rises on moraines
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Till

Typical profile

A - 0 to 7 inches: fine sandy loam
E - 7 to 11 inches: fine sandy loam
BE - 11 to 19 inches: fine sandy loam
Bt - 19 to 28 inches: sandy clay loam
C - 28 to 71 inches: fine sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 22 to 49 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C
Ecological site: F057XY021MN - Loamy Upland Moist Hardwood Forest
Forage suitability group: Sloping Upland, Acid (G057XN006MN)
Other vegetative classification: Sloping Upland, Acid (G057XN006MN)
Hydric soil rating: No

Description of Baudette, Till Substratum

Setting

Landform: Hillslopes on moraines
Landform position (two-dimensional): Footslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Silty glaciolacustrine deposits over till

Typical profile

A - 0 to 4 inches: silt loam
E - 4 to 8 inches: very fine sandy loam
Bt - 8 to 35 inches: silty clay loam
C - 35 to 50 inches: silt loam
2C - 50 to 60 inches: fine sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 26 to 45 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C
Ecological site: F057XY020MN - Fine Upland Moist Hardwood Forest
Forage suitability group: Sloping Upland, Neutral (G057XN002MN)
Other vegetative classification: Sloping Upland, Neutral (G057XN002MN)
Hydric soil rating: No

Minor Components

Littleswan, till substratum

Percent of map unit: 10 percent
Landform: Hillslopes on moraines
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F057XY017MN - Steep Loamy Upland Forest
Other vegetative classification: Level Swale, Neutral (G057XN001MN)
Hydric soil rating: No

Egglake

Percent of map unit: 7 percent
Landform: Swales on moraines
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F057XY015MN - Wet Mixed Forest
Other vegetative classification: Level Swale, Neutral (G057XN001MN)
Hydric soil rating: Yes

Spooner, till substratum

Percent of map unit: 5 percent
Landform: Swales on moraines
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F057XY015MN - Wet Mixed Forest
Other vegetative classification: Level Swale, Acid (G057XN005MN)
Hydric soil rating: Yes

Snellman

Percent of map unit: 3 percent
Landform: Hillslopes on moraines
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping Upland, Acid (G057XN006MN)
Hydric soil rating: No

2023A—Egglake-Spooner, till substratum complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2qkjd
Elevation: 1,000 to 1,600 feet
Mean annual precipitation: 22 to 27 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 90 to 130 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Egglake and similar soils: 40 percent
Spooner, till substratum, and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Egglake

Setting

Landform: Swales on moraines
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Till

Typical profile

A - 0 to 4 inches: loam
E - 4 to 9 inches: fine sandy loam
Btg - 9 to 25 inches: sandy clay loam
Cg - 25 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 to 30 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F057XY015MN - Wet Mixed Forest
Forage suitability group: Level Swale, Neutral (G057XN001MN)
Other vegetative classification: Level Swale, Neutral (G057XN001MN)

Hydric soil rating: Yes

Description of Spooner, Till Substratum

Setting

Landform: Swales on moraines
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Silty glaciolacustrine deposits over till

Typical profile

A - 0 to 4 inches: silt loam
E - 4 to 7 inches: very fine sandy loam
Btg - 7 to 25 inches: silty clay loam
Cg - 25 to 50 inches: silt loam
C - 50 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 to 30 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 11.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F057XY015MN - Wet Mixed Forest
Forage suitability group: Level Swale, Acid (G057XN005MN)
Other vegetative classification: Level Swale, Acid (G057XN005MN)
Hydric soil rating: Yes

Minor Components

Littleswan, till substratum

Percent of map unit: 12 percent
Landform: Hillslopes on moraines
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F057XY017MN - Steep Loamy Upland Forest
Other vegetative classification: Level Swale, Neutral (G057XN001MN)
Hydric soil rating: No

Wykeham

Percent of map unit: 9 percent
Landform: Rises on moraines
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F057XY021MN - Loamy Upland Moist Hardwood Forest
Other vegetative classification: Sloping Upland, Acid (G057XN006MN)

Hydric soil rating: No

Sax, depressional

Percent of map unit: 4 percent
Landform: Depressions on moraines
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F057XY003MN - Peatland
Other vegetative classification: Not Suited (G057XN024MN)
Hydric soil rating: Yes

2025A—Fluvaquents, frequently flooded-Egglake-Sax complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2qkjw
Elevation: 1,000 to 1,600 feet
Mean annual precipitation: 22 to 27 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 90 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluvaquents, frequently flooded, and similar soils: 40 percent
Egglake and similar soils: 25 percent
Sax, depressional, and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluvaquents, Frequently Flooded

Setting

Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

A - 0 to 16 inches: fine sandy loam
Cg - 16 to 80 inches: stratified loamy sand to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: FrequentNoneRare
Frequency of ponding: Frequent

Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A/D
Ecological site: F057XY016MN - Flood Plain Forest
Forage suitability group: Frequently Flooded (G057XN016MN)
Other vegetative classification: Frequently Flooded (G057XN016MN)
Hydric soil rating: Yes

Description of Egglake

Setting

Landform: Swales on moraines
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Till

Typical profile

A - 0 to 4 inches: loam
E - 4 to 9 inches: fine sandy loam
Btg - 9 to 25 inches: sandy clay loam
Cg - 25 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 to 30 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F057XY015MN - Wet Mixed Forest
Forage suitability group: Level Swale, Neutral (G057XN001MN)
Other vegetative classification: Level Swale, Neutral (G057XN001MN)
Hydric soil rating: Yes

Description of Sax, Depressional

Setting

Landform: Depressions on moraines
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over silty glaciolacustrine deposits

Typical profile

Oa - 0 to 13 inches: muck
A - 13 to 15 inches: silt loam

Bg - 15 to 36 inches: silt loam
Cg - 36 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 to 10 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Very high (about 14.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Ecological site: F057XY003MN - Peatland
Forage suitability group: Not Suited (G057XN024MN)
Other vegetative classification: Not Suited (G057XN024MN)
Hydric soil rating: Yes

Minor Components

Littleswan, till substratum

Percent of map unit: 10 percent
Landform: Hillslopes on moraines
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F057XY017MN - Steep Loamy Upland Forest
Other vegetative classification: Level Swale, Neutral (G057XN001MN)
Hydric soil rating: No

Water

Percent of map unit: 5 percent

B58B—Wurtsmith-Meehan complex, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2pg47
Elevation: 980 to 1,610 feet
Mean annual precipitation: 25 to 27 inches
Mean annual air temperature: 36 to 39 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Wurtsmith and similar soils: 45 percent
Meehan and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wurtsmith

Setting

Landform: Rises on outwash plains
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy outwash

Typical profile

A - 0 to 3 inches: loamy sand
Bw - 3 to 18 inches: sand
BC - 18 to 33 inches: sand
C - 33 to 80 inches: sand

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (2.00 to 20.00 in/hr)
Depth to water table: About 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F088XY013MN - Dry Sandy Upland Coniferous Forest
Forage suitability group: Sloping Upland, Low AWC, Acid (G088XN008MN)
Other vegetative classification: Sloping Upland, Low AWC, Acid (G088XN008MN)
Hydric soil rating: No

Description of Meehan

Setting

Landform: Rises on outwash plains
Parent material: Sandy outwash

Typical profile

A - 0 to 3 inches: loamy sand
Bw1 - 3 to 12 inches: loamy sand
Bw2 - 12 to 47 inches: sand
C - 47 to 80 inches: coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (2.00 to 20.00 in/hr)
Depth to water table: About 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A/D
Ecological site: F088XY011MN - Moist Sandy Mixed Forest
Forage suitability group: Level Swale, Low AWC, Acid (G088XN007MN)
Other vegetative classification: Level Swale, Low AWC, Acid (G088XN007MN)
Hydric soil rating: No

Minor Components

Friendship

Percent of map unit: 10 percent
Landform: Rises on outwash plains
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F088XY013MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping Upland, Low AWC, Acid (G088XN008MN)
Hydric soil rating: No

Roscommon

Percent of map unit: 5 percent
Landform: Swales on outwash plains
Ecological site: F088XY008MN - Wet Mixed Forest
Other vegetative classification: Level Swale, Low AWC, Acid (G088XN007MN)
Hydric soil rating: Yes

B60B—Ricelake-Cutaway complex, mlra 88, 1 to 4 percent slopes

Map Unit Setting

National map unit symbol: sfwx
Elevation: 980 to 1,610 feet
Mean annual precipitation: 25 to 27 inches
Mean annual air temperature: 36 to 39 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ricelake and similar soils: 60 percent
Cutaway and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ricelake

Setting

Landform: Moraines on flats
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy outwash over till

Typical profile

A - 0 to 2 inches: loamy sand
E - 2 to 23 inches: loamy sand
Bt - 23 to 30 inches: sandy loam
Bw - 30 to 35 inches: sand
2C - 35 to 80 inches: clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F088XY015MN - Loamy Upland Wet-Mesic Mixed Forest
Forage suitability group: Level Swale, Low AWC, Acid (G088XN007MN)
Other vegetative classification: Level Swale, Low AWC, Acid (G088XN007MN)
Hydric soil rating: No

Description of Cutaway

Setting

Landform: Rises on moraines
Down-slope shape: Convex
Across-slope shape: Linear

Typical profile

A - 0 to 3 inches: loamy sand
E - 3 to 14 inches: loamy sand
E/B - 14 to 31 inches: loamy sand
2Bt - 31 to 39 inches: clay loam
2Bk - 39 to 50 inches: clay loam
2C - 50 to 80 inches: clay loam

Properties and qualities

Slope: 2 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)

Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C/D
Ecological site: F088XY015MN - Loamy Upland Wet-Mesic Mixed Forest
Forage suitability group: Sloping Upland, Low AWC, Acid (G088XN008MN)
Other vegetative classification: Sloping Upland, Low AWC, Acid (G088XN008MN)
Hydric soil rating: No

Minor Components

Blomford

Percent of map unit: 10 percent
Landform: Drainageways on moraines
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F088XY008MN - Wet Mixed Forest
Other vegetative classification: Level Swale, Acid (G088XN005MN)
Hydric soil rating: Yes

B70A—Ricelake-Blomford complex, mlra 88, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: sfx5
Elevation: 980 to 1,610 feet
Mean annual precipitation: 25 to 27 inches
Mean annual air temperature: 36 to 39 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ricelake and similar soils: 60 percent
Blomford and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ricelake

Setting

Landform: Flats on moraines
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy outwash over till

Typical profile

A - 0 to 2 inches: loamy sand
E - 2 to 23 inches: loamy sand
Bt - 23 to 30 inches: sandy loam
Bw - 30 to 35 inches: sand
2C - 35 to 80 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F088XY015MN - Loamy Upland Wet-Mesic Mixed Forest
Forage suitability group: Level Swale, Low AWC, Acid (G088XN007MN)
Other vegetative classification: Level Swale, Low AWC, Acid (G088XN007MN)
Hydric soil rating: No

Description of Blomford

Setting

Landform: Drainageways on moraines

Typical profile

A - 0 to 5 inches: loamy fine sand
Eg - 5 to 23 inches: loamy fine sand
2Btg - 23 to 55 inches: clay loam
2BCg - 55 to 65 inches: silty clay loam
2Cg - 65 to 80 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F088XY008MN - Wet Mixed Forest

Forage suitability group: Level Swale, Acid (G088XN005MN)
Other vegetative classification: Level Swale, Acid (G088XN005MN)
Hydric soil rating: Yes

Minor Components

Cutaway
Percent of map unit: 10 percent
Landform: Rises on moraines
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F088XY015MN - Loamy Upland Wet-Mesic Mixed Forest
Other vegetative classification: Sloping Upland, Low AWC, Acid (G088XN008MN)
Hydric soil rating: No

B76A—Deford-Leafriver complex, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: sfxv
Elevation: 980 to 1,610 feet
Mean annual precipitation: 25 to 27 inches
Mean annual air temperature: 36 to 39 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition
Deford and similar soils: 55 percent
Leafriver and similar soils: 25 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deford

Setting
Landform: Flats on beach ridges
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits

Typical profile
A - 0 to 4 inches: fine sand
C - 4 to 32 inches: fine sand
Cg - 32 to 80 inches: fine sand

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (2.00 to 20.00 in/hr)

Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F088XY008MN - Wet Mixed Forest
Forage suitability group: Level Swale, Low AWC, Acid (G088XN007MN)
Other vegetative classification: Level Swale, Low AWC, Acid (G088XN007MN)
Hydric soil rating: Yes

Description of Leafriver

Setting

Landform: Depressions on beach ridges
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy glaciofluvial deposits

Typical profile

Oa - 0 to 9 inches: muck
A - 9 to 14 inches: sandy loam
Cg - 14 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A/D
Ecological site: F088XY007MN - Wet Depressional Forest
Forage suitability group: Ponded If Not Drained (G088XN013MN)
Other vegetative classification: Ponded If Not Drained (G088XN013MN)
Hydric soil rating: Yes

Minor Components

Deford, depressional

Percent of map unit: 10 percent
Landform: Depressions on beach ridges
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F088XY007MN - Wet Depressional Forest
Other vegetative classification: Ponded If Not Drained (G088XN013MN)

Hydric soil rating: Yes

Meehan

Percent of map unit: 5 percent
Landform: Outwash plains, beach ridges
Ecological site: F088XY011MN - Moist Sandy Mixed Forest
Other vegetative classification: Level Swale, Low AWC, Acid (G088XN007MN)
Hydric soil rating: No

Markey

Percent of map unit: 5 percent
Landform: Depressions on beach ridges
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F088XY003MN - Open Peatland
Other vegetative classification: Not Suited (G088XN024MN)
Hydric soil rating: Yes

B77A—Meehan-Deford complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: sfxw
Elevation: 980 to 1,610 feet
Mean annual precipitation: 25 to 27 inches
Mean annual air temperature: 36 to 39 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Meehan and similar soils: 60 percent
Deford and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Meehan

Setting

Landform: Beach ridges, outwash plains
Parent material: Sandy glaciofluvial deposits

Typical profile

A - 0 to 3 inches: loamy sand
Bw1 - 3 to 12 inches: loamy sand
Bw2 - 12 to 47 inches: sand
C - 47 to 80 inches: coarse sand

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (2.00 to 20.00 in/hr)
Depth to water table: About 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A/D
Ecological site: F088XY011MN - Moist Sandy Mixed Forest
Forage suitability group: Level Swale, Low AWC, Acid (G088XN007MN)
Other vegetative classification: Level Swale, Low AWC, Acid (G088XN007MN)
Hydric soil rating: No

Description of Deford

Setting

Landform: Swales on beach ridges, flats on beach ridges
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits

Typical profile

A - 0 to 4 inches: fine sand
C - 4 to 32 inches: fine sand
Cg - 32 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (2.00 to 20.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F088XY008MN - Wet Mixed Forest
Forage suitability group: Level Swale, Low AWC, Acid (G088XN007MN)
Other vegetative classification: Level Swale, Low AWC, Acid (G088XN007MN)
Hydric soil rating: Yes

Minor Components

Wurtsmith

Percent of map unit: 7 percent
Landform: Knolls on beach ridges
Down-slope shape: Convex
Across-slope shape: Convex

Ecological site: F088XY013MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping Upland, Low AWC, Acid (G088XN008MN)
Hydric soil rating: No

Deford, depressional

Percent of map unit: 3 percent
Landform: Depressions on beach ridges
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F088XY007MN - Wet Depressional Forest
Other vegetative classification: Ponded If Not Drained (G088XN013MN)
Hydric soil rating: Yes

B78B—Graycalm-Grettum complex, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: sfxx
Elevation: 980 to 1,610 feet
Mean annual precipitation: 25 to 27 inches
Mean annual air temperature: 36 to 39 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Graycalm and similar soils: 60 percent
Grettum and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Graycalm

Setting

Landform: Beach ridges
Landform position (two-dimensional): Shoulder, summit
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits

Typical profile

A - 0 to 3 inches: sand
Bw - 3 to 22 inches: sand
E - 22 to 35 inches: sand
E and Bt - 35 to 60 inches: sand
C - 60 to 80 inches: sand

Properties and qualities

Slope: 4 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (2.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F088XY012MN - Very Dry Sandy Upland Coniferous Forest
Forage suitability group: Sandy (G088XN022MN)
Other vegetative classification: Sandy (G088XN022MN)
Hydric soil rating: No

Description of Grettum

Setting

Landform: Beach ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits

Typical profile

A - 0 to 3 inches: loamy sand
Bw - 3 to 31 inches: sand
E and Bt - 31 to 74 inches: sand
C - 74 to 80 inches: sand

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: F088XY013MN - Dry Sandy Upland Coniferous Forest
Forage suitability group: Sloping Upland, Low AWC, Acid (G088XN008MN)
Other vegetative classification: Sloping Upland, Low AWC, Acid (G088XN008MN)
Hydric soil rating: No

Minor Components

Wurtsmith

Percent of map unit: 5 percent
Landform: Beach ridges
Landform position (two-dimensional): Summit, shoulder, backslope

Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F088XY013MN - Dry Sandy Upland Coniferous Forest
Other vegetative classification: Sloping Upland, Low AWC, Acid (G088XN008MN)
Hydric soil rating: No

Meehan

Percent of map unit: 3 percent
Landform: Beach ridges, outwash plains
Ecological site: F088XY011MN - Moist Sandy Mixed Forest
Other vegetative classification: Level Swale, Low AWC, Acid (G088XN007MN)
Hydric soil rating: No

Deford

Percent of map unit: 2 percent
Landform: Drainageways on beach ridges
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F088XY008MN - Wet Mixed Forest
Other vegetative classification: Level Swale, Low AWC, Acid (G088XN007MN)
Hydric soil rating: Yes

GP—Pits, gravel-Udipsamments complex

Map Unit Setting

National map unit symbol: 2p2d3
Elevation: 660 to 1,640 feet
Mean annual precipitation: 27 to 33 inches
Mean annual air temperature: 39 to 46 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, gravel: 80 percent
Udipsamments and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Gravel

Setting

Landform: Stream terraces, outwash plains, moraines
Parent material: Outwash

Description of Udipsamments

Setting

Landform: Stream terraces, outwash plains, moraines
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Outwash

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: F057XY023MN - Dry Sandy Upland Coniferous Forest

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