Alice Thompson, MS, SPWS

Thompson & Associates Wetland Services. LLC
1514 Menomonee Ave.
South Milwaukee WI 53172
414-571-8383

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ADDENDUM TO REVIEW OF ENBRIDGE LINE 5 WISCONSIN SEGMENT RELOCATION PROJECT-B

FIELD REVIEWS July 10-13, 2023
Preliminary Report

Alice Thompson of Thompson and Associates Wetland Services, LLC was retained by the Mashkiiziibii Natural Resources Department (NRD), formerly the Bad River Natural Resources Department to review the wetland data provided by Enbridge in the relocation project, located in Ashland and Iron Counties, Wisconsin[1]. The proposed re-route skirts the Bad River Reservation on the west, south and east sides to join an existing pipeline route. The re-route is in a very water and wetland rich area of the state crossing major waterways and huge wetland complexes that all drain towards the Bad River Reservation to outfall into Lake Superior. The Bad River also flows through Copper Falls State Park and State Natural Area.

Previous reports (Report 1, 7.10.2020 , Response to WDNR EIS 3.13.2022, and Response to USACOE IP 3.13.2022) documented issues following a desktop review of the EIS, and IP permit data and a field review of wetlands in Iron and Ashland County public land on August 17-20, 2021. In 2021 we focused on significant forested wetlands in the Iron County corridor adjacent the Potato River, as well as wetlands in Iron County Forest Land in the vicinity of County Line Road. These wetlands had a state endangered plant, which was underreported by Enbridge consultants.

In the 2022 field review we focused on wetlands in the vicinity of **Tyler Forks River** (WBIC 2923100), a tributary to the Bad River that crosses through southeast corner of the Bad River Reservation. The entire river is considered a cold-water trout stream by the WDNR (Surface Water Data Viewer), an Outstanding Resource Water under the Tribe's Water Quality Standards on-Reservation, and has stretches classified

[1] There is additional work being proposed in Bayfield County (valve sites) and Douglas County (temporary pipe yard) as well related to the project, but these counties were not the focus of this review.

as an Exceptional Resource Water by the State of Wisconsin. This is contained in **ADDENDUM TO REVIEW OF ENBRIDGE LINE 5 WISCONSIN SEGMENT RELOCATION PROJECT** – **A** from April 20, 2023.

2023 Field Work

This is a preliminary report on the 2023 field work of the proposed Line 5 re-Route in Iron County Forest Land. In the **2023 field review** we revisited the large wetland complexes in the vicinity of Tyler Forks River furthering our understanding of this water and resource rich area and how the proposed pipeline could impact this area.

Figure 1. Moneses uniflora by Zakk Zander

Methods: We recorded vegetation, landscape position, hydrology and wildlife for wetlands encountered. Plant names will feature the scientific name and common name the first time they are noted, with further mention using the common name. Ojibwe names are in bold. We used a 6-foot-long section of rebar to measure the depth of wetland soils. Positions were noted with a Bad Elf GPS device and tracks were recorded with a Montana Garmin GPS device. The pipeline proposed route, company wetland polygons, WDNR mapped wetland polygons and points too small to delineate were uploaded on the Bad Elf. In addition, thick and thin blue stream lines were uploaded from Great Lakes Indian Fish and Wildlife Commission (GLIFWC). These lines were based on an ARC GIS model of LIDAR data modeled by GLIFWC and their contractors. The polygons and lines allowed us to understand our positions on the route and inform us as to additional areas to investigate. Bad Elf notes are added in parathesis as (BE…). Missed wetlands were noted if they had significant wetland vegetation, were in an appropriate landscape position and had evidence of hydrology. The designation of "Missed Wetland" is our best professional judgement in the field.

The map set in the WDNR Draft EIS Appendix H (52 pages) is dated 8/12/2020. The map set in the USACE permit application Appendix A, Attachment B map set (50 pages) is dated 12/30/2021. The USACE permit map set is referenced below as it is more recently created. This year we added using the Cornell Lab of Ornithology Merlin bird sounds ID app on our phones to document potential bird use in these wetlands.

Wetland names by Enbridge consultants begin with W for wetland, the county Ashland (as) or Iron (ir) and the final e refers to emergent, s is scrub shrub and f is forested. WWI wetlands may be noted as well if they were not noted by Enbridge.

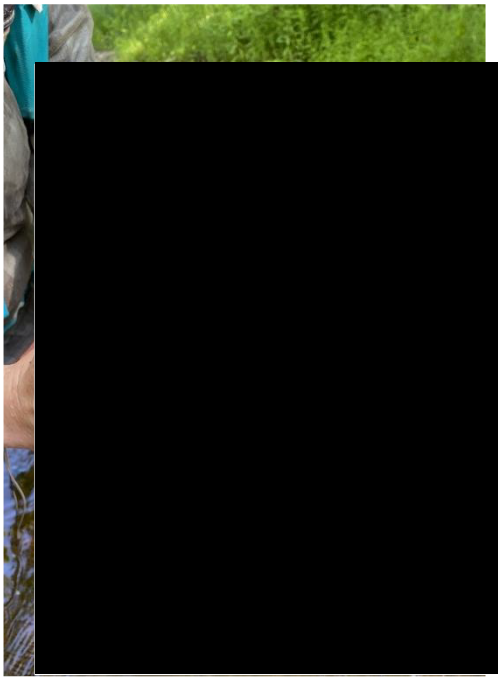

Figure 2. State threatened [redacted] Tyler Forks crossing. Photo by Zakk Zander

EXECUTIVE SUMMARY

This is a **preliminary report** to be able to make a meeting deadline. I intend to revisit the report in another month. For example, I intend to compare our findings below with the company's timed meanders and data sheets. I will also submit more GIS data for the 7/11/2023 field day. The findings of our 2023 field review uncovered several more missed wetlands within the survey corridor, and the consequences of this were reported in the 2022 field work report. Obviously missed wetlands result in undercounting the wetland impacts of this project.

We spent time in Iron County Forest Land in the **Tyler Forks** watershed. This river travels through the southeast corner of the Bad River reservation before flowing into the Bad River, which ultimately flows through the Reservation and to Lake Superior. Within the first 10 minutes of the second field day, wading across the clear Tyler Forks water, Jessica Strand spotted a [redacted]**)**, a state threatened species, potentially impacted by this proposed project (Figure 2). Two wetlands in particular this year, the wetland system south of Vogues Road, and north of Tyler Forks **wirc013f** and **wirc028f** west of Tyler Forks both contained very mature trees in the wetlands. **Wirc013f** was visited in both 2022 and 2023 as it is a stunning wetland with at least two orchid species, and a plethora of native trees, shrubs and forbs including mature northern white cedar, and mature black ash. The habitat had pools of standing water and a running rivulets of water that do not appear on the company maps. This wetland community on the north end best fits the description of a **Northern Wet-mesic Forest (AKA White cedar swamp)**. Because this wetland is proposed for open trenching, along with many other forested wetlands in this project, there is high risk of decades or more of damage to the structure, functions and wildlife that inhabit this wetland, both within the immediate construction corridor and outside of it. The wetland has old growth Northern white cedar and Eastern hemlock on the upland buffer–a fact not observed in the company reports.

Figure 3. Northern wet-mesic forest in wirc013f_x.

Figure 4. Black ash suitable for cultural uses with Dawn White in mature black ash swamp (wirc028f- south.

As noted in the 2022 report, the company's calculation of harm with the summary of direct, indirect and cumulative impacts to each of these wetlands underestimates the actual physical and biological damage that will follow this proposed pipeline construction and long-term maintenance. There are cumulative repercussions by the construction of this proposed pipeline that we can't quantify yet. The removal of

microtopography and alteration of hydrology will damage the wetlands irreparably in our lifetime. An improved forest road system and access may open the public lands to more logging or other unknown impacts, as well as the very probable spread of invasive species.

Wetland **wirc028f** has areas of immature Northern Hardwood Swamp, mostly dominated in the overstory by more immature trees. However, the understory in all areas of immature swamp was diverse and native. The southern portion of wirc028f, as described below, is **mature black ash swamp**. The trees were very large and mature, the soils were mucky and saturated, and the understory very diverse and well-developed including orchids.

The forested wetlands including **wirc028f**, **wirb046f** and others in the vicinity which we did not have time to field review are proposed for **blasting** during construction (WDNR Line 5 draft EIS_Dec. 2021_ Appendix G Wetland and Waterbody Impact Table). I made extensive comments during the WDNR EIS process previously on the blasting impacts to hydrologically sensitive wetlands.

"We know that thin soils, muck and organic soils, microtopography, seeps and post blasting hydrology are all factors that will limit the ability of the site to "restore" and will cause permanent impacts. There are obvious immediate negative impacts to amphibians, turtles including the rare wood turtle and other wildlife that cannot move out of the path of the blasting." Thompson, 3.13.2022

In the Conservation and Management section of the description of Northern Hardwood Swamp (WDNR, 2015) has the opening statement: "Maintaining site hydrology integrity is a key factor if the community is to remain viable. Black ash is sensitive to excessive changes in water levels… Sites that are fed by springs are susceptible to rutting, soil compaction, and channeling of water when disturbed by construction activities or heavy equipment." Blasting these forested wetlands will create permanent impacts to above and below ground hydrology, and topography including microtopography and will very likely extend outside of the construction corridor.

These wetlands are on public land in the ceded territory of the Ojibwe (Treaty of 1842, GLIFWC Map). There are multiple plants and animals present of cultural significance that are available by treaty rights to the tribe to harvest. Several black ash trees were found that could be used for cultural purposes by Dawn White (GLIFWC).

The uplands adjacent to the wetlands were commonly forested and had mature trees that are valuable buffers to the wetlands.

Finally, we have spent a significant amount of field time in the wetlands of Iron County Forest due to public access as well as the Ojibwe treaty rights in ceded territory. These issues located by us–including missed wetlands, confusing data, rare plants not identified (2022), the inadequate evaluation of pipeline impacts to intact wetlands and more, are very likely found throughout the project corridor. Our inability to field review private properties limits our understanding of those wetlands, but we have noted significant issues previously with our multiple desktop reviews of existing company data.

Field Review:

On July 10, 11 and 12, 2023 our field team revisited wetlands from the 2022 field review and explored new areas. The field team on July 10, 2023 was composed of: Alice Thompson of Thompson & Associates Wetland Services, LLC; Jessica Strand, Environmental Specialist and Zakk Zander, Wetland Specialist at the NRD; and Steve Garske, botanist for the Great Lakes Indian Fish and Wildlife Committee (GLIFWC). On July 11, 2023 we were joined by Dawn White (GLIFWC), and Chris Noll, UW Project Assistant for GLIFWC. On July 12, 2023 the team was Thompson, Strand, Zander, Garske and White.

July 10 and 12, 2023 we revisited the extensive wetland complex **wirc013f** located north of where Tyler Forks crosses the proposed pipeline, because we did not fully explore the wetland in 2022. Our goal on July 10 was to review this wetland walking from Vogues Road further south than in the 2022 field review, and on July 12 attempted to access the wetland on the south end walking north.

Figure 3. Old growth Northern white cedar and Eastern hemlock on wirc013f_x upland buffer. Zakk in foreground standing on centerline, Steve in background on centerline.

As reported in the 2022 field work, Wetland **wirc013f_x**, the wetland system south of Vogues Road, and north of Tyler Forks is a stunning wetland with at least two orchid species, and a plethora of native trees, shrubs and forbs including mature northern white cedar, and mature black ash. The habitat had pools of standing water and a running rivulets of water that do not appear on the company maps. Because this wetland is proposed for open trenching, along with many other forested wetlands in this project, there is high risk of decades or more of damage to the structure, functions and wildlife that inhabit this wetland, both within the immediate construction corridor and outside of it. The upland buffer on the north side of this wetland has mature, old growth northern white cedar and old growth Eastern hemlock.

In our 2023 review, we focused on the habitat structure, hydrology and rare plants. The wetland had a continuous canopy of conifer and hardwood trees. There were numerous stands of mature **giizhik** *Thuja occidentalis* or northern white cedar, intermixed with **gaagaagimizh** *Tsuga canadensis* (Eastern hemlock), **aagimaak** *Fraxinus nigra* (black ash), **zhiishiigimewanzh** *Acer rubrum* (red maple), **zhaashaagobiiag** *Acer spicatum* (mountain maple) and scattered **wadoop** *Alnus incana* (speckled alder).

In 2022 our herbaceous list was: sedges, *Carex bromoides* (Brome hummock sedge), *Rubus pubescens* (dwarf red raspberry), *Chrysosplenium americanum* (American golden saxifrage), *Onoclea sensibilis* (sensitive fern), *Boehmeria cylindrica* (false nettle), *Cicuta bulbifera* (bulblet-bearing water hemlock) and multiple orchids past bloom and thus difficult to identify.

In 2023 we found a multiple blooming *Platanthera lacera* (ragged fringed orchid) in the wetland wirc 019f to the north. However the orchids in wetland wirc013f were too early to identify to species level, but appeared to be *Platanthera* sp. Adding to the above list are: *Iris versicolor* (blue flag), *Trillium cernuum* (nodding trillium), *Caltha palustris* (marsh marigold), *Micranthes pensylvanica* (swamp saxifrage), *Callitriche sp*. (water starwort), *Gaultheria hispidula* (creeping snowberry-bog wintergreen), *Moneses uniflora* (one sided pyrola), *Pyrolla elliptica* (elliptic shinleaf), *Osmunda cinnamonea* (Cinnamon fern), *Impatiens capensis* (jewelweed), *Mitella nuda* (Naked Miterwort), *Ranunculus hispidus* (hispid buttercup), *Aralia nudicaulis* (wild sarasparilla), *Viburnum opulus* (high bush cranberry), *Acer spicatum* (mountain maple) seedlings, northen white cedar seedlings, hemlock seedlings. We counted over 20 *Plantanthera sp*. orchids in one area. There were abundant mosses and lichens including staghorn lichen.

Figure 4. Platanthera lacera in wirc019f.

The wetland had a high degree of microtopography, with downed logs, hummocks and pools. There was hydrologic diversity from saturated mucky soils, to standing water in pools, to flowing streams of water. There were a number of surface (standing) water depths recorded that varied from 3-12 inches (3, 4, 5, 6, 7, 8, 12). A small beaver dam backed up more water in an area. Groundwater signatures besides actively flowing water included plants: marsh marigold, swamp saxifrage, and groundwater-stained flocculant matter in the stream. We videoed multiple streamlets actively flowing to the west and south across the proposed pipeline workspace. This is in a period of moderate drought. At one area we calculated there was 70% standing or flowing water surrounding us.

Figure 5. Moneses uniflora - one sided pyrola in wirc0113f_x

With our rebar we measured a variety of soft soils or fines in the pools, varying from 9”, 20”, 24” and 49”. Our rebar often hit rock.

What Community Type?

The WDNR breaks Northern swamps into Northern Wet- Mesic Forest (AKA “White Cedar Swamp”) with northern white cedar as the dominant tree, and Northern Hardwood Swamp with black ash as the dominant tree which “sometimes occurs in almost pure stands” (WDNR).

This wetland wirc013f has a high degree of conifer canopy cover. In an examination of leaf on and leaf off aerial photography on “Google Earth” the swamp forest is dominated by conifers that remain green in fall or early spring aerials as compared to leaf off hardwood uplands to the north or south of the wetland. A forest dominated by black ash would not exhibit this green aerial signature in fall or early spring.

Figure 6. standing water and microtopography in wirc013f.

The microtopography, downed logs, springs, seeps and pools found in wirc013f_x is more characteristic of a Northern Wet- Mesic Forest (cedar swamp) than Northern Hardwood swamp.

There is evidence of past logging – very old rotting stumps (possibly from the Cutover era), within a well recovering mature swamp forest. There is overlap in the understory plant species between these two communities, but there are species present that are found in cedar swamps including *Moneses uniflora* (one sided pyrola) and the orchids. Possibly the most important element is that within the numerous mature cedars are many northern white cedar seedlings and saplings. They are found on upturned hummocks, and old logs.

Figure 7. Northern white cedar seeding on log and flowing water across the centerline in wirc013f.

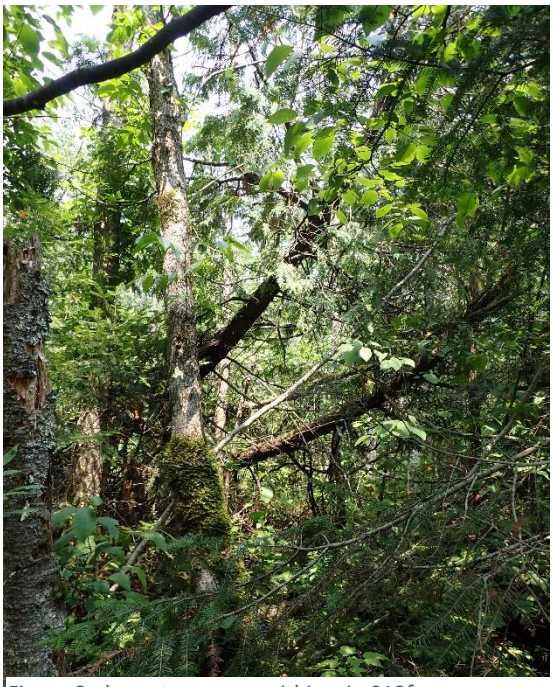

Figure 8. dense tree cover within wirc013f.

As quoted below- in the WDNR North Central Forest Ecological Landscape:

"Seepages, springs, and spring runs are characteristic features of many northern white-cedar swamps. For decades northern white-cedar reproduction has been adversely impacted by excessive browse pressure from white-tailed deer to the point that reproductive failure by northern white-cedar is now the norm across most of northern Wisconsin. Northern white-cedar's longevity allows this community type to persist at present, but the problem of northern white-cedar's reproductive failure needs resolution if the community type is to be maintained. Maintaining the viability of the northern white-cedar swamps is of paramount importance in the North Central Forest because the community is common and widespread there and constitutes a major repository of biodiversity for rare plants and some animals." WDNR, 2015 (N-53)

Figure 9. mature northern white cedar in wirc013f.

This reserve of mature northen white cedar and seedlings is at risk from immediate removal of mature trees, and their seedlings/saplings. The secondary impact is that once the site is leveled for the pipeline instalation, all microtopographic hummocks, logs and safe places for seeds to develop are erased, and with pipeline maintaince will continue to be void. This will include to all cleared workspace left level, which- even if not disturbed will not be conducive to seedlings. Finally the third impact is that the open corridor invites white tailed deer to enter the forest and browse along the open corridor and adjacent areas, favoring cedar.

This loss of northern white cedar and the black ash, mountain maple and red maple in this proposed project is a loss of plant diversity and rare species.

"*Northern Wet-mesic Forest (northern white-cedar swamp) is justly known for harboring rare plants and comes in a strong second, supporting at least 11 rare plant species. If these figures were adjusted and presented on a per-acre basis, the northern white-cedar swamps would outrank all of the other major vegetation types in terms of their ability to support rare plant species.*" WDNR, 2015 (N-53)

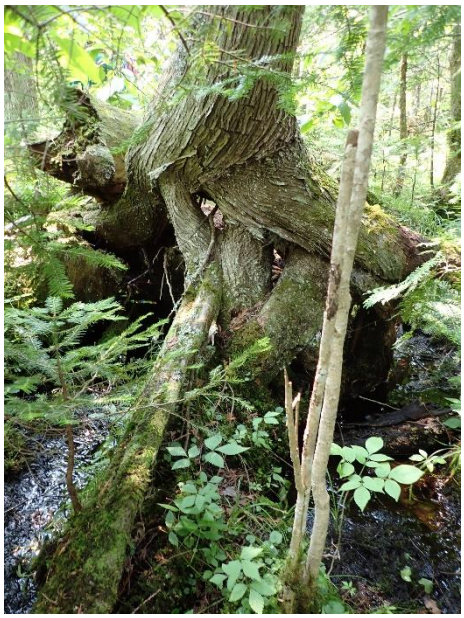

Figure 10. Complicated microtopography and wet mucky soils in wirc013f.

Birds recorded on the Merlin app (Cornell University Laboratory of Ornithology) included Hairy Woodpecker (also seen), Canada Warbler, Clay colored Thrush, Hermit Thrush, and Yellow-bellied Sapsucker.

The construction of this portion of the pipeline is proposed to be open cut. The destruction of the cedar swamp will be compounded by the decision to open cut it. To reiterate from the 2022 report: "It is painful to imagine how this wetland forest would fare after tree and log removal, vegetation removal, trenching with spoil banks, dewatering a trench that would continuously fill with water, transport of sediment laden trench water to other parts of the wetland, compression of muck and soft soils with timber mats and heavy equipment, equipment rutting, eventually replacing the trench and leveling out all microtopography and altering hydrology. The construction will cause irreparable harm to this wetland system, and cause the death of trees, seedlings, vegetation and amphibians among others. Habitat suitable for rare species including rare mammals will be lost, and the corridor will create route for invasive species" (Thompson, 2022 report).

Figure 13. Northern white cedar seedlings throughout wirc013f-north.

Wirc013f- South This wetland is so large that we could not field review it entirely from the northern access. We returned to the wetland from the south on July 12, 2023 and entered from the east primarily along a forest access road, staying within public land, in order to better understand the entire wetland community. This was a very confusing area as the wetland community was completely different from the Wirc013f community accessed from the north which we have investigated in both 2022 and two days previous this year. Someplace between the last area we observed and collected data on July 10, 2023 and the wetland boundary on the south end - the wetland community type changed from Northern wet -mesic forest to a much drier albeit forested community. The vegetation, hydrology and structure changed from the mucky, seepy log strewn water rich wetland to what looks more like a wetland/upland mosaic.

Figure 14. south end of wirc013f is much drier and the area was confusing considering it was lumped into the same plant community on most company documents as the northern portion of wirc013f.

The dominant trees overhead were *Acer saccharum* (Sugar maple), *Tsuga canadensis* (Eastern hemlock), and *Acer rubrum* (Red Maple). Shrubs including *Fraxinus americana* (white ash), sugar maple and *Prunus serotina* (black cherry). Except for the red maple, these trees are more upland tending than wetland.

The area had pockets of wetland flora in concave basins. The understory included *Carex arcta* (Northern cluster sedge), and *Carex pedunculata* (Long-stalk sedge), *Athyrium filix-femina* (Lady fern), *Dryopteris carthusiana* (Spinulose Wood fern), *Trientalis borealis* (star flower) , *Lonicera canadensis* (American fly honeysuckle), *Rubus pubescens* (dwarf red raspberry). We did not note any standing water. (BE veg plot 7/12 13,28)

North of the area where we completed the vegetative plot description were even more mature Eastern hemlocks, which were possibly old growth trees.

This area is very confusing and appears to be data poor. The lumping of this more wetland/upland complex in with the northern conifer dominated areas to the north is concerning as these areas have different functional values. The values are degraded when mixed. Construction impacts are also different. However, what is consistent between the north and south of this delineated wetland is that there are very old trees present- very possibly old growth forest- in this portion of the proposed pipeline route which are not considered as an impact in the company's assessments of functional loss.

Figure 11. wirc025f black ash swamp.

There is another forested wetland **wirc025f** that is adjacent wirc013f_x to the southeast. At the centerline of the proposed project, we identified the tree canopy as black ash, Eastern hemlock, red maple, sugar maple, *Betula alleghaniensis* (yellow birch) and black cherry. The shrub layer was saplings of black ash, sugar maple, green ash, and white spruce.

The forb component was *Carex bromoides* (Brome-like sedge), *Carex intumescens* (greater bladder sedge), *Carex projecta* (necklace sedge), *Glyceria striata* (fowl manna grass), *Athyrium filix-femina* (Lady fern), *Dryopteris carthusiana* (Spinulose Wood fern), *Osmunda claytoniana* (Interrupted fern), *Rubus pubescens* (dwarf red raspberry), *Ranunculus abortivus* (kidney-leaved buttercup), *Ranunculus recurvatus* (blisterwort), *Symphotricum lateriflorum* (calico aster) and *Scuttelaria lateriflora* (mad dog skullcap). The hydrology included concave basins, water stained leaves, geomorphic position, microtopography and buttressed trees.

This wetland community is Northern Hardwood Swamp dominated by black ash. The black ash were in mixed aged classes and we measured several mature trees with circumferences of 47 inches and 50 inches. A yellow birch had a circumference of 96 inches, and is directly within the permanent clear zone over the proposed pipeline.

These Black ash are culturally important to the Ojibwe; Dawn White found a straight tree that had a straight trunk suitable for cultural uses (Figure 12).

Figure 12. Black ash suitable for cultural purposes with Dawn White in wirc025f.

The impacts to this portion of the pipeline route include the removal of some very large mature trees including Eastern hemlock, Yellow birch and Black ash. This entire area- from the upland Eastern hemlocks and Northern white cedars on the north end of wirc013f_x, the mature Northern white cedar in the cedar swamp or wirc013f, and the wetland and upland mature trees on the south end of wirc013f_x as well as the black ash in wirc025f are mature and many could be considered old growth. Mesic "Old-growth forest is now extremely rare in Wisconsin, comprising at best only a few one-hundredths of 1% of forest cover (Frelich 1995)" WDNR, 2015. As discussed in the 2022 field work report, the Eastern hemlock or **gaagaagimizh** are shade tolerant, slow growing and long lived (up to 600-800 years). They provide important ecosystem services and **Gaagaagimizh** has cultural importance as a traditional medicine. In the uplands they slow water, buffer the wetland and harbor wildlife. They provide critical wildlife cover and forage in winter, and nest sites and food sources in summer for songbirds.

Figure 13. Old growth yellow birch with a circumference of 96 inches.

There appears to be no recognition of the permanent loss of these mature – old growth trees in this wetland and others in the company reported impacts. These will not grow back to this stature in our lifetime.

<u>Other areas field reviewed on Wednesday 7/12/2023 in brief:</u>

Walking in from Vogues Road

The access road **AR 084** has a **missed wetland** (BE Not Mapped Wetland Marsh Thistle). It has an abundance of wetland vegetation and is on the same topographic grade as a mapped wetland off the access road. (photo 185-6). This area appears to have under reported wetlands not shown in the wetland delineation and appears to connect to **wirc018**.

Wirc 018e was reviewed- it extends off the access corridor to the north and south with a braided stream and complicated topography. The wetland is forested outside the access clearing. There was standing water and American toad was observed.

Figure 14. Drift lines at 21 " above ground in wirc019f in the trail.

Wirc 019f was reviewed. The access road bisects a large, forested swamp and is currently unmown[2] and very wet with wetland vegetation. There were northern white cedar on both sides of the access road. Groundwater flock was visible on the west side of the road. There were drift lines to 21 inches high in the wetland on the access road. Vegetation included woolgrass, cattail and arrowhead. This area will be impacted by the use of the access road for the proposed project. The modifications in order to allow for heavy equipment will fill wetland, based on the current conditions. The impact to adjacent forested wetland areas will include sedimentation, and invasive species.

Figure 15. Swamp milkweed and monarch caterpillar in wirc046e.

For some unknown reason the wetland is narrowed on the west side of the polygon to not extend outside the narrow road- we did not see any evidence to suggest that this is appropriate.

Wirc046e was field reviewed. We found *Asclepias incarnata* (swamp milkweed) with five monarch caterpillars on them. Eggs were found as well on Milkweed leaves.

Wirc20e was field reviewed. A tree that could harbor bats was found.

Wirc021f was field reviewed.

Another **unmapped wetland** was found at the intersection of the access road and the proposed construction corridor (BE Small unmapped wetland).

Birds on Merlin app for 7/12/2023 included red eyed vireo, hermit thrush, and Eastern wood pewee. Two wood cock flew out of the forest near the south end of wirc013f. **Amphibians** seen included green frog, spring peeper, and Leopard frog.

On Tuesday July 11, 2023 the crew was Thompson, Strand, Zander, Garske, White and Noll. We left our cars at Vogues Road and Casey Sag Road and waded Tyler Forks.

Figure 16. Peeling bark suitable for bat use. Jessica Strand photo.

Tyler Forks- described in the 2022 report, was clear, and native crayfish were visible in the cobble. A [redacted] was swimming in the stream crossing of the proposed access (Figure 2).

[2] In comparison, the rest of the old logging road had been recently cleared up until this wetland.

Wird028f north- We first walked north from the proposed access and field reviewed **Wird028f** (BE veg plot) **north.** We cannot find any company data for this area. Overall the wetland on the north side of the access road appeared to be immature Northern hardwood swamp with more early successional *Populus tremuloides* (quacking aspen). **However trees were substantial in height and the understory was well developed, native and diverse**. Very few nonnative plants were observed and none were "invasive" (e.g. *Prunella vulgaris*).

Figure 17. wirc028f- north of 2 track access- immature hardwood swamp

The wetland canopy was *Populus tremuloides* (quaking aspen), *Abies balsamea* (balsam fir), *Fraxinus pennslyvanica* (green ash), *Fraxinus americana* (white ash) and *Fraxinus nigra* (black ash). The shrub layer included *Ilex verticillata* (common winterberry) and *Corylus americana* (American hazelnut).

Herbaceous layer included *Carex crinata*, *Carex projecta*, *Carex disperma*, *Carex intumensens, Carex gracillima*, *Agrostis perrennans* (upland bent grass), *Equisetum arvense* (horsetail) , *Maianthemum canadensis* (Canada mayflower), *Micranthes pensylvanica* (swamp saxifrage), *Athyrium filix-femina* (Lady fern), *Ranunculus abortivis* (kidney leaf buttercup), *Onoclea sensibilis* (sensitive fern), *Mitchella repens* (partridge berry)*, Prunella vulgaris* (heal-all), *Scuttelaria lateriflora* (mad dog skullcap), *Rubus pubescens* (dwarf red raspberry), and *Symphyotricum puniciem* (purple stem aster).

There were 8.5 inches of softer soils, and then hard pan.

Hydrology included microtopography, blackened leaves, shallow roots, and small concave basins.

A second area farther north was field reviewed within this wetland.

The wetland canopy was *Populus tremuloides* (quaking aspen), *Acer rubrum* (red maple), *Fraxinus pennslyvanica* (green ash), and *Fraxinus nigra* (black ash). The shrub layer included *Fraxinus pennslyvanica* (green ash), *Ilex verticillata* (common winterberry) and *Corylus americana* (American hazelnut). Herbaceous layer included *Carex brunnescens*, *Carex leptalia, Carex gynandra, Carex intumensens, Carex gracillima*, *Doellingeria umbellata* (parasol white-top), *Onoclea sensibilis* (sensitive fern), *Dryopteris carthusiana* (Spinulose woodfern)*, Rubus pubescens* (dwarf red raspberry), *Poa palustris* (fowl blue grass), and *Frageria virginiana* (strawberry).

Figure 18. wirc46f, well developed native understory.

Hydrology included microtopography, blackened leaves, shallow roots, and small concave basins. Soils were 4.5-7.5 inches deep, with hard pan below (BE veg plot 11.29AM).

Wirb046f is east of wird028f. It is located on the centerline of the proposed pipeline.

The wetland canopy was *Populus tremuloides* (quaking aspen), *Acer rubrum* (red maple), *Fraxinus pennslyvanica* (green ash), *Tilia americana* (basswood) and *Fraxinus americana* (white ash). The shrub layer included *Fraxinus pennslyvanica* (green ash), *Ilex verticillata* (common winterberry) and *Lonicera canadensis* (American fly-honeysuckle). Herbaceous layer included *Carex criniata*, *Carex projecta, Agrostis perrennans (upland bent grass), Athyrium filix-femina (Lady fern), Dryopteris intermedia,* (glandular wood fern), *Geum canadense* (white avens)*, Ranunculus acris* (tall buttercup)*, Pyrola elliptica* (shinleaf)*, Agrimonia striata* (roadside agrimony)*, Equisetum sylvanicum* (woodland horsetail), *Ribes triste* (swamp red current)*,*and *Rubus pubescens* (dwarf red raspberry).

Figure 19. wirc046f, immature hardwood swamp with diverse understory.

Hydrology included microtopography, hummocks, shallow roots, and concave basins. Soils were 4 inches deep, with rock.

Wird028f south- We then walked back to the 2 track access trail and walked south in **Wird028f- the same wetland we discussed above to the north. The first area was similar to the north- an immature forest with a well developed native groundcover.**

The wetland canopy was *Populus tremuloides* (quaking aspen), *Abies balsamea* (balsam fir), *Fraxinus pennslyvanica* (green ash),and *Acer rubra* (red maple). The shrub layer included *Ilex verticillata* (common winterberry), *Viburnum lentego* (nannyberry) and green ash saplings. Herbaceous layer included *Carex crinata*, *Carex gynandra*, *Equisetum slyvanicum* (woodland horsetail), *Equisetum arvense* (horsetail), *Maianthemum canadensis* (Canada mayflower), *Athyrium filix-femina* (Lady fern), *Dryopteris carthusiana* (spinulose woodfern), *Osmunda claytoniana* (interrupted fern), *Ranunculus recurvatus* (hooked buttercup), *Onoclea sensibilis* (sensitive fern), *Mitchella repens* (partridge berry)*,*

Figure 20. wirc028f- south of 2 track- immature hardwood swamp

Cornus canadensis (bunchberry)*, Clintonia borealis* (bluebead lily), *Lysimachia borealis* (star flower)*, Pyrola elliptica* (shinleaf), *Prunella vulgaris* (heal-all), *Scuttelaria lateriflora* (mad dog skullcap), *Frageria virginiana* (strawberry) and *Rubus pubescens* (dwarf red raspberry).

Hydrology included microtopography, geomorphic position, some buttressing, and concave basins. Soils were 3 inches deep, with rock below.

A *Fraxinus nigra*, black ash was found suitable for cultural purposes by Dawn White.

South of the previous description (in the same wetland) the vegetation became much more mature. The following is the description (on the centerline of the proposed pipeline) of the **mature Northern Hardwood Swamp, Black Ash Swamp.** The black ash had mixed age classes with some very large black ash. One tree had a circumference of 56 inches. The soils were muck with a number of groundwater indicator plant species including swamp saxifrage, marsh marigold and American golden saxifrage. There were several northern white cedar. The understory was native, and diverse including orchids. This is a very good example of an intact native black ash swamp.

Figure 21. wirc028f- south, mature Northern hardwood swamp, black ash swamp.

The wetland canopy was *Fraxinus nigra* (black ash), *Abies balsamea* (balsam fir), and *Ulmus americana* (American elm). The shrub layer included *Acer saccharum* (sugar maple), *Fraxinus nigra* (black ash), *Prunus virginiana* (chokecherry), and *Rubus ideaus* (common red raspberry). Herbaceous layer included *Carex interior*, *Caltha palustris* (marsh marigold), *Micranthes pennsylvania* (swamp saxifrage), *Glyceria striata* (fowl manna grass), *Galium asprellum* (rough bedstraw), *Equisetum slyvanicum* (woodland horsetail), *Equisetum arvense* (horsetail), *Athyrium filix-femina* (Lady fern), *Matteuccia struthiopteris* (ostrich fern), *Impatiens capensis* (jewelweed), *Geum canadense* (white avens), *Scuttelaria lateriflora* (mad dog skullcap), *Symphotrichum puniceum* (purple stemmed aster)*, Solidago gigantea* (early goldenrod)*, Ribes triste* (swamp red current), *Trillium cernuum* (nodding trillium), and *Lactuca biennis* (tall blue lettuce).

Other plants noted beyond this immediate area were: *Mitella nuda* (naked miterwort), *Onoclea sensibilis* (sensitive fern), *Packera aurea* (golden ragwort), *Hystric patula* (bottlebrush grass), *Micranthes pensylvania* (swamp saxifrage), *Calamagrostis canadensis* (Canada blue joint grass), *Chrysosplenium americanum* (American golden saxifrage), *Eutrochium maculatum* (joe pye weed), *Clematis virginiana* (Virgin's bower).

On our way north retracing this wetland we found orchids not yet in bloom. We identified them to the *Platanthera sp*. group. There were at least three orchids close together. We also found *Cirsium muticum* or marsh thistle. We also found five large northern white cedars west of the pipeline but within the workspace.

Hydrology included soils saturated to the surface, muck on the surface, buttressing/shallow roots, and concave basins. Water would well up as we stepped on the mucky soil. Soils were 4-22 inches deep, with rock below.

Birds located by sight or with the Merlin app by sound on this field day included: broad winged hawk, scarlet tanager and yellow bellied sapsucker.

Figure 22. Platanthera sp. orchid in wirc028f- south

Figure 23. wirc028f- Cirsium muticum- swamp thistle.

Figure 24. wirc028f- black ash and diverse native understory

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