July 2013 version

ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at: Environmental Quality Board http://www.eqb.state.mn.us/content/eaw-process**.** The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item, or can be addresses collectively under EAW Item 19.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. **Project title:** Wright Bog Horticultural Peat Project

2. **Proposer:**
   Premier Horticulture, Inc.
   Contact person: Frédéric Caron
   Title: Chief Operating Officer
   Address: 1, avenue Premier
   City, State, ZIP: Riviere-du-Loup, Quebec G5R 6C1
   Phone: (418) 867-8883 ext. 6828
   Fax:
   Email: carf@premiertech.com

3. **RGU:**
   Minnesota Department of Natural Resources
   Contact person: Bill Johnson
   Title: Planning Director
   Address: 500 Lafayette Road, Box 25
   Division of Ecological & Water Resources
   City, State, ZIP: St. Paul, MN 55155
   Phone: (651) 259-5126
   Fax: (651) 296-1811
   Email: bill.johnson@state.mn.us

4. **Reason for EAW Preparation:** (check one)

Required:	Discretionary:
☐EIS Scoping	☐ Citizen petition
☑ Mandatory EAW	☐ RGU discretion
	☐ Proposer initiated

   If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):
   4410.4300 subpart 12A, Nonmetallic Mineral Mining.

5. **Project Location:**
   County: Carlton
   City/Township: Beseman Township
   PLS Location (¼, ¼, Section, Township, Range):

SE ¼ SE ¼	Section 20	T49N	R21W
W ½ SE ¼	Section 21	T49N	R21W
SW ¼	Section 21	T49N	R21W
NW ¼	Section 21	T49N	R21W

NW ¼ SW ¼	Section 27	T49N	R21W
NW ¼	Section 28	T49N	R21W
NW ¼ NE ¼	Section 28	T49N	R21W
S ½ NE ¼	Section 28	T49N	R21W
NE ¼ NE ¼	Section 28	T49N	R21W

Watershed (81 major watershed scale): 9 (Mississippi River – Grand Rapids)
GPS Coordinates: 47.7015, -92.9960 (Intersection of County State Aid Highway (CSAH) 23 and access road)
Tax Parcel Number: Premier Horticulture (42-010-3310, 42-010-3320, 42-010-4380, 42-010-4390, 42-010-4400, 42-010-4500); Carlton County Memorial Forest (42-010-3300, 42-010-3330, 42-010-4360, 42-010-4370, 42-010-4240, 42-010-3280, 42-010-3050, 42-010-4410); James Warhol (42-010-2720); David Stenson (42-010-2690); Tax Forfeit-State Administered (42-010-2500, 42-010-2470)

At a minimum attach each of the following to the EAW:

- **County map showing the general location of the project;**
- **U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); and**
- **Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan.**

Figure/Attachment	Description
Figure 1	County Map
Figure 2	USGS Topographic Map
Figure 2a	Local Topography
Figure 3	Project Features & Wetland Resources
Figure 4	Wetland Communities
Figure 4a	Permanent & Temporary Impacts on Wetland Plant Communities
Figure 4b	Culvert Crossing Details
Figure 4c	Drainage Outlet - Cross Section View
Figure 5	MBS Sites of Biodiversity Significance & Designated Old Growth Forest
Figure 5a	MBS Sites of Biodiversity Significance at Wright Bog & Black Lake Bog
Attachment 1	Black Lake Bog Water Monitoring Data
Attachment 2	Black Lake Bog Mercury Monitoring Data
Attachment 3	Natural Heritage Program Correspondence
Attachment 4	Rare Plant Survey
Attachment 5	SHPO Correspondence
Attachment 5a	Unanticipated Discoveries Plan
Attachment 6	Basis and Calculation for Estimating GHG Emissions from *In Situ* Peat Decomposition
Attachment 7	Wright Bog & Black Lake Bog Operation Timelines

6. Project Description:

a. **Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50 words).**

Premier Horticulture, Inc. proposes to develop approximately 316 acres of the Wright Bog in Carlton County for horticultural peat extraction. The proposed site would be cleared and ditched, with drained water discharged into Little Tamarack River. *Sphagnum* moss peat would be collected using the milled peat vacuum harvesting method. Mined areas would be restored back to *Sphagnum*-type moss originating from an adjacent Donor Site.

b. **Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.**

Summary

Premier Horticulture, Inc. proposes to develop the Wright Bog by constructing a new horticultural peat harvesting facility located approximately 3 miles west of their existing Black Lake Bog (Peatrex) horticultural peat harvesting operation. The project would provide *Sphagnum* moss peat for their existing processing plant located west of Cromwell in Carlton County, Minnesota; see Figure 1 – County Map. The proposed development areas would be cleared and ditched, with drainage water conveyed through the ditch system, sedimentation basins, and the north drainage ditch eventually discharging into the Little Tamarack River. The company plans to develop a total of 316.4 acres that includes 255.2 acres of peat harvesting areas, 5.7 acres for a drainage ditch north of the site, 5.1 acres for sedimentation basins, 2.7 acres for access roads within the harvesting area, 2.4 acres for an access road to the harvesting area, 15.6 acres for peat stockpiles within the harvest area, 2.0 acres for an equipment yard, and 28.0 acres for a restoration donor site.

Sphagnum moss peat would be harvested by the vacuum method and transported via covered trucks for processing at the existing plant facilities; this is the same procedure for the Black Lake Bog operation. Phase 1 harvesting (212.5 acres) would be fully initiated within 10 years and continue for another 14 years. As the shallower Phase 1 harvest fields are beginning to be retired around year 10, Phase 2 harvesting (42.7 acres) would begin to sustain the processing plant's peat supply for an estimated 14 years. The 28-acre restoration Donor Site would not be ditched, drained, or filled. It is estimated that the Wright Bog would support a horticultural peat harvesting operation for approximately 25 years. At the conclusion of peat harvesting, the majority of the site would be restored to a *Sphagnum* moss-dominated, bog-type wetland according to the "Canadian Approach" advocated by the Canadian Sphagnum Peat Moss Association. Financial assurance is required under both state and federal regulations.

Harvesting Method

The proposed project involves harvest of *Sphagnum* moss peat for horticultural purposes. These operations typically occur in three stages: bog preparation; field preparation and harvesting; and product packaging and shipping. See Figure 3 – Project Features & Wetland Resources for a depiction of the project elements at the proposed peat mining site.

<u>Bog Preparation</u>

The first step in preparing the bog for horticultural peat harvesting involves removing the tree cover and digging the main ditches to drain the surface of the bog. This work would occur during the

winter months under frozen ground conditions to allow machinery to dig the first main drainage ditches and clear vegetation from the ditch maintenance zones. The harvest fields would be cleared of vegetation at the same time also under frozen ground conditions. Supplementary land clearing may occur in the subsequent fall months once the bog surface is sufficiently drained. Some timber may be of merchantable size (and marketed), while smaller trees would be used as an underlayment for production field roads. This activity would apply to 255.2 acres of the site. An excavator would be used to remove trees and dig the main drainage ditches. The following infrastructure would be constructed to enable operations within the bog: settling basins; drainage ditches; culverts; and roads.

Settling Basins. Horticultural peat operations include settling basins to remove suspended solids from discharge waters to protect water quality. Drainage water from the harvest areas would be routed through the ditch system and sedimentation basins for treatment. Basin size would be calculated according to the New Brunswick guidelines for peat mining to ensure adequate water residence time and settling efficiency. Two parallel basins would be constructed to allow cleaning of one while the other continues to treat discharge water. Water control structures would be installed on the inlets and outlets of the basins to: 1) control water flow to achieve adequate residence time; 2) provide for required discharge water flow monitoring; and 3) allow individual basins to be isolated from water flow for periodic cleaning. An excavator would be used to construct the settling basins. This activity would apply to 5.1 acres of the site.

Drainage Ditches. The bog must be sufficiently drained to allow for vehicle travel and to dry the surface layers of peat for harvest. A number of ditches of varying sizes would be required to drain the site including: 1) v-shaped field ditches (3 feet deep x 3 feet wide) to remove surface water and facilitate peat drying; 2) perimeter ditches (6 feet deep x 6 feet wide) that surround the bog and receive water from the field ditches; and 3) a drainage outlet ditch (8 feet deep x 18 feet wide) to convey water from the site. Ditch spacing and field length are sized to accommodate harvesting equipment. Field ditches would be approximately 100 feet apart and constructed using a tractor-mounted double-wheel rotary ditcher. The entire operation would include 114,441 linear feet of field ditches and 15,268 linear feet of perimeter ditches. The drainage outlet to the north of the operation would be 7,094 feet in length and 35 feet wide (18 feet for the ditch and 17 feet for the spoil bank). It would permanently affect a total of 5.7 acres (5.1 acres of wetland and 0.6 acres of upland). See Figure 4c – Drainage Outlet – Cross Section View for a typical drainage ditch cross-section.

Culverts. Two culvert crossings would be installed in the drainage outlet north of the operation in Section 17, T49N, R21W. These culvert crossings were required by non-project, private landowners as part of an easement agreement allowing construction of the drainage outlet across private land. The culvert crossings would maintain access to the private property. See Figure 4b – Culvert Cross Section for a depiction of these project features.

Roads. A gravel access road would be constructed west of CSAH 23 to a storage yard situated on upland adjacent to the bog. From there roads would extend into the peat harvesting area to allow truck access to all production fields. These are corduroy-type gravel roads consisting of a base of trees cut from the site that would be covered with a layer of clay and surfaced with Class 5 gravel. Roads would be constructed using: tractors; trailers; excavator; dozer; loader; and trucks. The bog access road from CSAH 23 would be 4,700 feet in length with a 20-foot right-of-

way, permanently affecting 2.1 acres. The harvesting area access roads would total 4,425 feet for Phase 1 and 1,620 feet for Phase 2; with the addition of a 20-foot right-of-way these roads would permanently affect a total of 2.7 acres. Total permanent wetland impacts for the access and harvest area roads would be 3.5 acres and these impacts would be mitigated through the purchase of wetland credits. In addition, areas for stockpiling harvested peat would be located on both sides of the Phase 1 road covering an additional 15.6 acres. The peat stockpile areas would be considered as temporary wetland impacts to be restored when harvest ends.

Field Preparation and Harvesting

Several steps are needed to mechanically prepare the drained bog surface for horticultural peat harvesting. The work is done by tractors using specialized pull-behind implements for each different step. The steps include:

- *Chopping* chips stumps and other woody material not removed during clearing; the chopped material is later removed from the fields during raking.
- *Profiling* crowns the bog surface between the field ditches, promoting surface water runoff and aiding in uniform drying of the peat surface.
- *Raking* removes debris resulting from the chopping process; it also removes other woody material that may be present throughout the peat profile.
- *Milling* shreds the top layer of peat to promote evaporative drying.
- *Harrowing* overturns the milled peat periodically until it is sufficiently dry for harvest.

Larger wood debris is periodically removed from the harvest fields using a “stick picker.” This material is used as an underlayment for production field roads, or stockpiled and burned onsite during the winter months.

Once the harrowed peat surface is sufficiently dry, the *Sphagnum* moss peat would be collected using vacuum harvesters. These specialized machines are either self-propelled or pulled behind a tractor. They pneumatically lift or “vacuum” the air-dried peat from the harrowed field surface into collecting tanks. The harvested peat is dumped from the collecting tanks into stockpiles at the end of each field and is ready for transport to the processing plant. Approximately 1-3 inches of peat are removed each year with this harvesting system.

Product Processing and Shipping

The peat would be processed at the Proposer’s existing plant located west of Cromwell, Minnesota. The peat would be transported from the bog in covered, 160-yard capacity trucks for approximately seven miles to the processing plant. The Proposer estimates that typically 6-12 truckloads of peat would be shipped daily from the bog to the processing plant during the April-October harvest season. The peat would be screened to remove wood and other debris, and may be passed through a hammermill or grinder to ensure uniform particle size. The peat would then be compressed into "bales" of various sizes and sealed in plastic bags. The bagged peat would then be loaded onto pallets for shipping via truck, with the peak shipping season for finished project occurring in the spring.

Processing-related waste, which is primarily small woody debris, is separated from the peat at the plant and temporarily piled. Commercial use of the material includes bagging and sale as mulch for landscape gardening. Another use includes trucking the material back to the harvest areas and

depositing it to level out and maintain roadside areas or block-and-fill ditches in areas being restored.

Anticipated Production, Project Life, and Site Phasing
At peak production the Proposer anticipates that approximately 150,000 cubic yards of *Sphagnum* moss peat would be collected annually from the 255-acre harvesting area. Given sampled peat depths, it is estimated at this rate of harvest that the Wright Bog would support a horticultural peat operation for approximately 25 years. All acreage contained within the Phase 1 limits would be subject to harvest within the first 10 years, although the peat resource is not expected to be fully depleted within this phase. As harvest terminates in shallower Phase 1 peat fields, Phase 2 would then be developed to maintain the peat feed supply. Phase 2 would not be initiated until after Phase 1 is completely developed. See Attachment 7 - Wright Bog & Black Lake Bog Operation Timelines for a depiction of proposed Phase 1 and 2 sequencing.

Wright Bog Restoration
Restoration of the Wright Bog would be phased and begin when the peat resource is depleted and mining stops. *Sphagnum* moss would be collected as needed from the designated Donor Site for site restoration. This area is owned by the Proposer and was selected because it has few, very small trees and a continuous *Sphagnum* moss cover. Because of the sparse cover, site preparation for the Donor Site is not as extensive as necessary for the mined areas. The trees would be removed just prior to use; otherwise the Donor Site would be left untouched until that time. Only the top 3-4 inches of live, growing *Sphagnum* moss would be removed, which means the bare peat surface is never exposed. The material removed is the most viable for transplant and leaves a layer of moss behind to regenerate. Donor areas are expected to regenerate in 4-6 years, potentially allowing the same donor sites to be used more than once over the life of the project.

The donor material moss would be spread at depleted mining areas at a ratio of 1:10 to 1:15 (donor area:area restored). Fully-restored ground cover to a layer of Sphagnum mosses and associated peatland plants is predicted to be complete in approximately 5-7 years at the mined areas.

Site Reclamation
Site cleanup would commence upon deactivation. Debris and mobile equipment would be removed within one year from the time mining areas are deactivated. Unless provisions have been made for continued subsequent use, within three years all parking areas and storage pads, equipment, facilities, and structures would be removed and the sites revegetated. Access and field roads would not be removed but they would be revegetated and wetland losses mitigated (as stated above).

The roads would be decommissioned and revegetated after all mining site restorations are deemed complete. When it occurs road reclamation would consist of ripping at the depth range necessary to mix the surface with the corduroy roadbed, reduce compaction, and create an organic/clay/gravel seedbed that would be planted with native trees.

Vegetative debris from clearing operations, and spoil banks and berms created by field ditch construction, would be leveled to re-establish surface elevations no greater than pre-mining conditions. These areas would be revegetated to the standards cited above. Reclamation of ditches, settling basins, and drainage outlets would be consistent with the overall reclamation plan

and plugged or filled with vegetative debris, spoil banks, and berms as necessary to stabilize the hydrology of the site.

Financial Assurance
Both the DNR's Permit to Mine Peat and the Federal Section 404 Clean Water Act Permit require financial assurance of all peat mine operators. Financial assurance is a condition of the Permit to Mine. It ensures a source of funds that could be used by DNR in the event that Premier Horticulture fails to complete closure and reclamation activities. The amount and form of financial assurance would be determined in permitting.

c. **Project magnitude:**

Description	Quantity
Total Project Acreage	316.4
Linear project length (Trails)	0
Number and type of residential units	0
Commercial building area (in square feet)	N/A
Industrial building area (in square feet)	Office, 500 sq. ft.
Institutional building area (in square feet)	Garage, 3,200 sq. ft.
Other uses – specify (in square feet)	None
Structure height(s)	25 ft.

d. **Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.**

The purpose of the project is to extract *Sphagnum* moss peat from the Wright Bog for processing, packaging, and sale to commercial and retail horticultural markets. The project would maintain employment for 4 full-time employees and 13 part-time seasonal employees.

d. **Are future stages of this development including development on any other property planned or likely to happen?** ☑ Yes ☐ No
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

There is potential for additional bog development in Carlton County to provide a continuing supply of peat to the Cromwell plant in the next 10-15 years. In addition to peat surveys conducted by the DNR (available at https://catalog.data.gov/dataset/peat-inventory-data-minnesota), Premier Horticulture has conducted their own surveys of several bogs in Carlton County that show potential for commercial development. Environmental review commensurate with project size and/or potential environmental effects would be conducted if and when this additional development is proposed.

e. **Is this project a subsequent stage of an earlier project?** ☑ Yes ☐ No
If yes, briefly describe the past development, timeline and any past environmental review.

This project was preceded by the Black Lake Bog (Peatrex) development for which an EAW was conducted in 1985. That project included the harvesting fields (230 acres) and peat processing and

packaging facility (15 acres). Permitting for a 159-acre expansion to the harvest area of the Black Lake Bog operation was completed in 2005. The expansion consisted of additional peat harvesting fields adjacent to the existing operation and a donor site. The project did not require mandatory State Environmental Review

7. Cover types: Estimate the acreage of the site with each of the following cover types before and after development:

	Before	During	After		Before	During	After
Wetlands	312.5	28.0	303.9	Other (describe)			
Deep water/streams				Peat harvesting area	0.0	255.2	0.0
Wooded/forest	3.9	0.0	0.0	Peat stockpile area	0.0	15.6	0.0
Brush/Grassland	0.0	0.0	0.0	Access road	0.0	2.1	2.1
Cropland	0.0	0.0	0.0	Harvest area roads	0.0	2.7	2.7
Lawn/landscaping	0.0	0.0	0.0	Sedimentation basins	0.0	5.2	0.0
Impervious surface	0.0	0.0	0.0	Equipment yard	0.0	2.0	2.0
Stormwater Pond	0.0	0.0	0.0	Drainage outlet	0.0	5.7	5.7
				Donor Site	0.0	28.0	0.0
				TOTAL	**316.4**	**316.4**	**316.4**

8. Permits and approvals required: List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. ***All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.***

Unit of government	Type of application	Status
US Army Corps of Engineers	Section 404 Permit	Application submitted
DNR	Permit to Mine	To be applied for
	State Peat Lease	To be applied for
	Water Appropriation Permit	To be applied for
MN Pollution Control Agency	Section 401 Certification	To be applied for
	NPDES/SDS Multi-Sector General Industrial Stormwater Permit	To be applied for
	NPDES/SDS Individual Wastewater Permit	To be applied for
	Construction Stormwater Permit	To be applied for
	Above-Ground Tank Notification	Submitted after installation
	Hazardous Waste Generator License	To be completed online

Unit of government	Type of application	Status
Carlton County	Building Permit	To be applied for
	Wetland Conservation Act	To be applied for

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

9. Land use:

a. Describe:

i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.

Forest, wetlands, and farmland surround the project site. The primary agricultural crop is forage hay coupled with some livestock production. Rural private residences associated with the farms are scattered throughout the area. Logging and dispersed recreation (e.g., hunting; snowmobiling) occur in the area.

Premier Horticulture's Black Lake Bog operation is located approximately three miles east of the proposed Wright Bog site.

A Grant-in-Aid snowmobile trail currently runs through the Wright Bog. Carlton County is the local governmental sponsor and the Cromwell Sno-Gophers Snowmobile Club are the designated trail user organization. There are 121 miles of trail in the system, with a segment that crosses Section 21, T49N, R21W in the project vicinity.

ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

The "Carlton County Community Based Comprehensive Plan" published in April 2001 is the most recent comprehensive plan available. The plan classifies the project site as a wetland with no future development plans identified.

iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The peat harvesting area is currently zoned A-1 Agriculture/Forest Management. The access road would cross an area zoned A-2 Agriculture/Rural Residential along the CSAH 23 corridor. These zoning designations are compatible with the project.

b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

The proposed project is compatible with adjacent and nearby land uses such as logging and agriculture. The project is also compatible with existing peat extraction activities in the vicinity.

Phase 1 peat mining and installation of the sedimentation basins would require a reroute of the snowmobile trail to avoid project operations.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

Planning is underway between the Proposer, DNR, and Carlton County to develop a reroute of the snowmobile trail around the project. This would require site preparation along the new corridor, principally in the form of vegetation removal and clearing. As long as project-related winter activities are separated from recreational snowmobiling by the reroute, the project and the trail should be compatible.

10. Geology, soils and topography/land forms:

a. **Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.**

The geology underlying the project site consists of glacial loamy till overlaid with organic peat. There are no susceptible geologic features that would limit the project or that would be affected by the project. No mitigation measures are needed to specifically address the geologic features present.

b. **Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.**

According to the Carlton County Soil Survey, the bog site is dominated by peat of the Waskish soil series (Typic Sphagnofibrist) with some Lobo (Hemic Sphagnofibrist) and Greenwood (Typic Borohemist) soil series on the outer edges. The soil series occurring at the equipment yard site is a Duluth very fine sandy loam, 0-2 percent slopes. This soil is moderately well drained with slow permeability.

<u>Topography</u>

Topography at the project site is essentially flat to gently sloping with very little erosion potential or impermeability concerns; see Figure 2 – USGS Topographic Map and Figure 2a – Local Topography. The discharge drainage ditch gradually slopes to the north providing the gradient needed to drain the site enough to allow peat harvesting. Any erosion that does occur on the peat harvesting fields would be routed through the drainage ditch system and sedimentation basins for treatment. The

sedimentation basins would be built before the collection ditch is excavated from the mining area. This would ensure treatment of all water leaving the site, even in the initial stages of drainage.

Soil Excavation and Grading

Soil movement is associated with both mining and development of support facilities.

Mining. The peat harvesting fields total 255.2 acres with peat removal to a depth of approximately five feet. This results in an estimated 2,000,000 cubic yards of *Sphagnum* moss peat extraction over the life of the project.

Support Facilities. The equipment yard site would be minimally graded to level it out for parking and office and garage building construction. Roads would consist of a base of trees cut from the site, covered with a layer of clay and surfaced with Class 5 gravel, both of which would be sourced offsite. For both actions an estimated 14,000 cubic yards of clay and gravel would be used on the site, which is based on an average 1.25-foot clay-gravel layer spread on approximately seven acres of roadway and storage yard.

Soil Limitations – Contamination Potential

Peat's high absorptive capacity makes it unlikely that any groundwater contamination would occur, especially once the site is drained and the water table is lowered. There is some potential for groundwater contamination with the soil series occurring at the storage yard site. At this location the soil is a Duluth very fine sandy loam exhibiting 0-2 percent slopes that is moderately well drained with slow permeability. To prevent groundwater contamination, any fuel, lubricants, or other chemicals used in the operation or maintenance of equipment would be stored above-ground in impermeable containment structures. Any diesel tanks used would be equipped with a spill containment kit; workers would be trained to deal with minor spills. The Minnesota Pollution Control Agency's (MPCA's) Emergency Management Unit is to be called in case of any major spills; see Item 12 for more detail on the potential for project-related contamination.

NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 11 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 10.

11. Water resources:

a. **Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.**

i. **Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.**

There are no DNR public watercourses or basins, DNR-listed calcareous fens, county or jurisdictional ditches, or designated trout streams/lakes located within or adjacent to the project boundary. The

majority of the project site is located on a raised bog peatland. The site drains north through a series of beaver ponds connected by a small stream. Discharge would flow from both the proposed Wright Bog operation, and the existing Black Lake Bog operation, into the Little Tamarack River, then the Tamarack River and eventually to Big Sandy Lake. Big Sandy Lake was listed on the 2008 MPCA 303d Impaired Waters List due to excessive nutrients, specifically phosphorus. A Total Maximum Daily Load (TMDL) for Big Sandy Lake was completed in 2011. The project would be subject to a wasteload allocation for total phosphorus as identified in the TMDL. Regarding other surface water resources, review of the current MPCA 303d Impaired Waters List revealed no features with special designations or water quality impairments within one mile of the project.

ii. **Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.**

The approximate average depth to the water table is 0.5 feet. The project is not within an MDH wellhead protection area. There are no wells onsite because the site is primarily an uninhabited peatland. The closest well would be at a private residence located approximately 0.5 miles to the northeast of the site.

b. **Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.**

i. **Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.**

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

The project would not discharge wastewater to a publicly owned treatment facility.

2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.

A portable restroom would be set up at the storage yard site to collect sanitary waste generated by approximately 5-10 employees. The unit would be serviced regularly by a licensed company that would remove sanitary waste from the site for treatment at a municipal facility.

3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.

Water naturally resides in the peat pore spaces thus requiring site dewatering to achieve project objectives (i.e., obtaining a dried peat surface for vacuum extraction). Because uncontrolled water discharges can have adverse effects on receiving waters, project-related dewatering would: be subject to MPCA permitting conditions; be done in stages; and direct drainage from the site through the ditch and settling basin system prior to release to downstream waters. Estimates of water quantity and quality coming off the Wright Bog can be derived from monitoring data collected from peat extraction operations at the nearby Black Lake Bog.

Regulatory Controls

Wastewater discharge from the proposed project is subject to MPCA permitting authorities. Specifically:

NPDES Permit. Any drainage water discharge from a peat mining operation is classified as industrial process wastewater by the MPCA and subject to regulation under the National Pollutant Discharge Elimination System (NPDES) permit. The specific permits required include the NPDES/SDS Multi-Sector General Industrial Stormwater Permit, and the NPDES/SDS Individual Wastewater Permit.

Big Sandy Lake TMDL. Discharge would flow from both the proposed Wright Bog operation and the existing Black Lake Bog operation into the Little Tamarack River, which then flows to the Tamarack River and eventually to Big Sandy Lake. The TMDL for Nutrients/Eutrophication has been completed for Big Sandy Lake, which has an impairment for aquatic recreation. According to the Statewide TMDL for mercury, Big Sandy Lake also has an impairment for aquatic consumption. Discharging into an impaired water such as Big Sandy Lake would require strict adherence to NPDES permit discharge limits to insure no further contamination of downstream waters.

Discharge Volumes

Estimates of annual water discharge volumes for future operations at the Wright Bog can be derived using analog data from Premier Horticulture's Black Bog Lake operation.

Available Discharge Volume Data from Black Lake Bog. Water quantity data is available for the Black Lake Bog site covering the 10-year period from 2005-2014. The data was collected as a monitoring condition of Premier Horticulture's NPDES water quality permits for the Black Lake Bog operation.

Water discharge is measured once a month at the Black Lake Bog operation during the frost-free season only when the discharge point is ice free. Total monthly discharge volume is extrapolated from this single measurement. Water discharge varies throughout the season and generally the greatest volume of water leaving the site occurs during the spring thaw. In some of the drier summer months no water leaves the site. No discharge occurs during the winter months when the drainage ditches are frozen. EAW Attachment 1, "Table 1: Water Quality, Precipitation and Flow Data for the Premier Horticulture Black Lake Site 2005-2014," details water monitoring data for the entire site and includes discharge volume and precipitation data, along with the calculated mean, maximum, and minimum annual water discharged per acre.

The original discharge volumes calculated for October 2010 (296,218,217 gallons) and November 2008 (86,491,560 gallons) were exceptionally high due to flow being measured after unusually extreme, short-lived rain events. Because these volumes were not representative of the entire month, the numbers were substituted with the average October and November flows calculated from the other years. The more representative substituted flows were 7,193,682 gallons for October 2010, and 1,997,088 gallons for November 2008.

Annual water discharged from the site ranged from a minimum of 385,946 gallons to a maximum of 122,347,236 gallons, with an average annual discharge of 40,402,385 gallons. Premier Horticulture's Black Lake Bog DNR Water Appropriation Permit authorizes the use (discharge) of 150 million gallons of water per year. Based on the total drainage area for the years listed in EAW Attachment 1, per acre drainage volume ranged from a minimum of 1,812 gallons/acre/year to a maximum of 453,138 gallons/acre/year, with an average annual discharge of 143,191 gallons/acre/year.

Estimated Annual Wright Bog Discharge Volume. Because the Wright Bog is: 1) a similar raised bog landform, 2) composed of the same *Sphagnum* moss peat, and 3) would be ditched and drained in an identical manner, it is reasonable to rely on the Black Lake Bog data to roughly estimate the flow from the proposed Wright Bog operation. Using the analog data from the Black Lake Bog monitoring, calculations for Phase 1 (212.5 acres) of the proposed Wright Bog operation result in an estimated minimum discharge of 385,050 gallons per year to a maximum of 96,291,825 gallons per year, with a mean discharge of 30,248,088 gallons per year. The addition of Phase 2 (42.7 acres) for a total drainage area of 255.2 acres would result in an estimated minimum discharge of 462,422 gallons per year to a maximum of 115,640,082 gallons per year, with a mean discharge of 36,542,343 gallons per year.

Water Quality

Estimates of monthly water discharge quality for future operations at the Wright Bog can be derived using analog data from Premier Horticulture's Black Bog Lake operation.

Pollutants of Interest with Peat Operations. The conventional pollutants of interest from peat mining operations typically include: suspended solids; pH (acidic); and phosphorus. Water from raised bogs such as the Wright Bog exhibit the chemical characteristics of *Sphagnum* moss peat; the water is generally acidic (pH < 4.2), low in nutrients (especially calcium (< 2 mg/L)), and has a tea colored "bog stain" (from tannins). Discharges outside the water quality standards for any of these pollutants can be detrimental to fish and other aquatic organisms.

Mercury is another pollutant of interest because it accumulates in peatlands as a result of atmospheric deposition. Elemental mercury can be converted to methylmercury by aquatic bacteria in highly organic portions of aquatic systems such as lake sediments and wetlands. Toxicity of methylmercury concentrations increases in each step in the aquatic food chain, with large game fish such as walleye and northern pike having the highest concentrations in Minnesota. When these concentrations become too high, fish consumption advisories are posted to protect human health. "Impaired waters" are classified as water bodies where the fish consumption advisory is more restrictive than one meal per week.

Sulfate can also be pollutant of interest if it occurs in concentrations high enough to be detrimental to wild rice. The effect of sulfate on the growth of wild rice depends on the amount of iron and organic carbon in the sediment. The MPCA is currently developing sulfate standards that are specific to individual wild rice waters based on these parameters. Wild rice waters listed on the MPCA's draft list possibly affected by potential discharges from the Wright Bog include the Tamarack River and Big Sandy Lake.

Available Water Quality Data from Black Lake Bog. Premier Horticulture's current NPDES permit for the Black Lake Bog operation has been in effect since July 2004 and includes limits for pH (8.5 calendar month maximum), phosphorus (1.0 mg/L calendar month average), and total suspended solids (30 mg/L calendar month average, 45 mg/L calendar month maximum). Flow, minimum pH, mercury, specific conductance, and turbidity parameters are "monitor only" conditions. Black Lake Bog discharge water quality data from 2005 through 2014 for the sedimentation basin outfall monitoring station (SD-001) are presented in Attachment 1 – Black Lake Bog Water Monitoring Data.

Monitoring indicates general compliance with Black Lake Bog NPDES permit limits since they were established in July 2004. Exceedances do occur occasionally and are shown in the attachment. There were only four exceedances of permit limits for total suspended solids and one for phosphorus during the 10-year monitoring period; there was one exceedance of the water quality standard for mercury over the same period.

There were 16 mercury levels reported from the Black Lake Bog for the period 2007-2014. To allow direct comparison with the State of Minnesota's non-Lake Superior Basin water-column mercury standard of 6.9 ng/L, mercury concentrations are reported in ng/L than ug/L for the Black Lake Bog operation. See Attachment 2 – Black Lake Bog Mercury Monitoring Data for the monitoring reports from 2007 to 2014. Black Lake Bog discharges over the reporting period resulted in only one exceedance of the mercury standard when an 8.94 ng/L concentration was recorded in June 2012.

To address potential sulfate loading to downstream water, the Proposer conducted an analysis of Black Lake Bog discharge water for sulfate in September 2015. The results show sulfate as "not detected" at a 2.0 mg/L reporting limit.

Estimated Monthly Wright Bog Water Quality. Because the Wright Bog is: 1) a similar raised bog landform, 2) composed of the same *Sphagnum* moss peat, and 3) would be ditched and drained in an identical manner, it is reasonable to expect the discharge water quality from the proposed project to be similar to water quality from Black Lake Bog as reported in Attachments 1 and 2. It is expected that discharge from the proposed Wright Bog would meet limits likely imposed for the parameters monitored at the Black Lake Bog. Additional consideration for pollutants of interest includes:

- Mercury. Estimated mean monthly mercury loading from the entire 255.2-acre Wright Bog mining site, if based on the mean monthly mercury loading of 0.000332766 g/acre/month from the Black Lake Bog, would be approximately 0.0849 grams/month. Assuming a seven-month flow period from April through October, then the mean annual mercury loading from the Wright Bog would be about 0.5940 grams/year. Maximum mercury loading for the

Wright Bog can be calculated in the same manner resulting in a maximum monthly loading of 0.3798 grams/month, and a maximum annual loading of 2.6586 grams/year. The MPCA would evaluate mercury monitoring data for the existing discharge. A reasonable potential analysis would be conducted as part of the permitting process. The facility may be subject to a mercury limit for the proposed discharge.

- Sulfate. Although sulfate was not detected at a 2.0 mg/L reporting limit for water leaving the Black Lake Bog, to be protective of wild rice any future Wright Bog operation may be subject to sulfate monitoring or a potential sulfate limit once the wild rice rulemaking is finalized and takes effect.
- pH. The MPCA has identified that the project would be subject to a pH effluent limit for its discharge.
- Phosphorus. Big Sandy Lake was listed on the 2008 MPCA 303d Impaired Waters List due to excessive nutrients, specifically phosphorus. A TMDL for Big Sandy Lake was completed in 2011. The project would be subject to a wasteload allocation for total phosphorus as identified in the TMDL.
- Suspended Solids. Potential discharges of suspended solids are addressed by locating sedimentation basins at the northern outlet of the bog that would treat all water leaving the site as wastewater and stormwater. The sedimentation basins would be built before the collection ditch is excavated in the mining area. This would ensure treatment of all water leaving the site, even in the initial stages of drainage. To ensure adequate water residence time and settling efficiency, sedimentation basins would be designed and constructed according to Appendix A in the 1998 New Brunswick guidelines for peat mining; this is available upon request. Drainage ditches also serve as *de facto* sedimentation basins and therefore contribute to the overall settling efficiency of the system.

ii. **Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.**

Stormwater runoff at the site would have essentially the same quantity and quality characteristics as the wastewater described in the previous section. Stormwater runoff flow routes and receiving water bodies would also be the same as wastewater. Because stormwater would also be treated using the same sedimentation basin system that would treat all water leaving the site, potential environmental effects are expected to be similar to wastewater.

Stormwater management is subject to an MPCA NPDES/SDS Multi-Sector General Industrial Stormwater Permit. A Stormwater Pollution Prevention Plan (SWPPP) would be developed for erosion prevention and sediment control during the construction and post-construction phases of the project. Existing slopes on the site are in the 0-2 percent range, with very little erosion potential. An exception to this would occur along the margins of the access roads and where slopes may range from 25 to 33 percent. These areas would have a layer of organic soil applied to promote plant growth and be stabilized with either straw mulch or fiber blankets. Additional stormwater

best management practices (BMPs) specific to activities at the equipment yard and access roads include:

- Installation of silt fences in any areas showing the potential for sediment discharge.
- Routine inspection of the construction site by the onsite project manager and/or contractor with maintenance performed if needed.
- Revegetating all disturbed areas surrounding the access roads and equipment yard with a perennial plant cover exhibiting a density of at least 70 percent to preclude erosion and ensure long-term site stabilization.
- Removal of all silt fences and any other temporary synthetic erosion and sediment controls once construction is complete and slopes are permanently stabilized.

MPCA would likely require "benchmark monitoring" for industrial stormwater generated from any non-mining areas at the proposed site.

iii. **Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.**

Draining the peat harvest site is a necessary part of the project to allow equipment access and to facilitate peat drying. This dewatering would require a DNR Water Appropriation Permit. The proposed Wright Bog operation would drain approximately 255.2 acres at full capacity. Based on the Black Lake Bog monitoring data, mean flow from the Wright Bog is predicted to be approximately 36,542,343 gallons/year. Maximum flow from the Wright Bog would be estimated at approximately 115,640,082 gallons/year. No discharge occurs during the winter months when the drainage ditches are frozen.

The estimated maximum project-related discharge from the Wright Bog is unlikely to result in a noticeable change in streamflow or downstream impacts to receiving waters. The Water Appropriation Permit would likely require frequent discharge monitoring during operations as a permit condition. Stage monitoring of downstream receiving waters may also be considered to confirm no adverse effects to receiving waters. Use of a data logger to record continuous data, which would allow for an accurate record of water use for the site, is likely to be recommended or required.

iv. **Surface Waters**

a) Wetlands – Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate

environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed, and identify those probable locations.

A wetland delineation was conducted in September 2015 to guide construction for the access road and equipment yard to minimize wetland impacts. This report is available upon request.

Physical Effects or Alterations to Wetland Features

The project involves development of a total of 312.5 acres of wetlands that include 255.2 acres of peat harvesting areas, 5.1 acres for a drainage outlet north of the site, 5.1 acres for sedimentation basins, 2.7 acres for access roads within the harvesting area, 0.8 acres for an access road to the harvesting area, 15.6 acres for peat stockpiles within the harvest area, and 28.0 acres for a restoration Donor Site.

Figure 3 – Project Features & Wetland Resources shows wetlands as they occur on the project site relative to project elements. Wetlands present in the proposed development areas would be cleared of all vegetation and ditched, with drainage water conveyed through the ditch system, sedimentation basins, and the north drainage ditch eventually discharging to the Little Tamarack River. Ditches would be periodically cleaned with the dredged peat material being spread onto the harvest fields to be dried, collected, and processed as marketable product.

Project-related activities would impact nine types of wetland plant communities as classified under the "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin, et al., 1979); see Figure 4: Wetland Communities. All of these wetlands are classified as *palustrine*, which is defined as non-tidal wetlands dominated by trees, shrubs, persistent emergent, and emergent mosses or lichens. The affected wetland communities include:

PFO4/PSS3Bq (275.0 ac). This is a mix of two wetland communities associated with peatlands. The PFO4 plant community is a coniferous wetland dominated by black spruce growing on a continuous *Sphagnum* moss mat with acid, peat soils. In Minnesota the PSS3Bq plant community is open bog characterized as scrub-shrub often with young trees less than six meters tall; labrador tea, bog laurel, semi-leaved leatherleaf, and bog rosemary are representative plants that occur at the site.

PSS3/PEM1Bq (4.9 ac). This is a mix of two wetland communities associated with peatlands. The PSS3 plant community is open peatland characterized as scrub-shrub dominated by broad-leaved evergreen shrub species growing on a *Sphagnum* moss mat layer. The PEM1Bq is a peatland plant community exhibiting emergent, erect, rooted, herbaceous hydrophytes (e.g., cattails; bulrushes) at least for part of the growing season. Although typically saturated, unsaturated conditions may occur late in the season most years.

PEM1F (1.3 ac). This is a wetland community that is semi-permanently flooded, thus exhibiting saturated soils and/or standing water up to six inches deep. Herbaceous emergent vegetation such as cattails, bulrushes, arrowheads, and lake sedges are typical.

PEM1Fb (1.7 ac). This is a wetland community that is semi-permanently flooded often due to beaver activity. It exhibits saturated soils and/or standing water up to six inches deep. With

beaver present, conditions are favorable for herbaceous emergent vegetation such as cattails, bulrushes, arrowheads, and lake sedges.

PFO1/PSS1B (0.7 ac). This is a mix of two wetland communities. The PFO1 plant community includes broad-leaved deciduous trees such as red maple or ash; overstory, understory, and herbaceous vegetative layers are usually present that occur on highly decomposed organic soils. The PSS1B plant community is scrub-shrub with broad-leave deciduous plants present. This shrub wetland often includes true shrubs, young trees, and small or stunted specimens of the same due to environmental conditions. Alders, willow, and bog birch occur at the site.

PFO4Bq (0.3 ac). This is a wetland community characterized by woody vegetation that is six meters tall or taller in peatland. Trees are typically needle-leaved evergreens such as young or stunted black spruce. These sites are typically saturated most of the growing season but can exhibit drier conditions late.

PSS1/PEM1B (0.2 ac). This is a mix of two wetland communities. The PSS1 plant community is scrub-shrub very likely dominated by alder. The PEM1B plant community is seasonally saturated and typically dominated by perennial, emergent grass-like plants such as sedges.

PSS1B (0.2 ac). The PSS1B type is a scrub-shrub plant community with broad-leave deciduous plants present. This shrub wetland often includes true shrubs, young trees, and small or stunted specimens of the same due to environmental conditions. Alders, willow, and bog birch occur at the site.

PUBF (0.2 ac). The PUBF plant community is characterized as a shallow open water community exhibiting an unconsolidated bottom. Bulrush and similar plants are often present.

See Table 1 for a summary of impacted acreage of wetland plant communities by wetland type.

Table 1 Wright Bog Horticultural Peat Project Wetland Impacts

Activity	PFO4/ PSS3Bq	PSS3/ PEM1Bq	PEM1Fb	PEM1F	PFO1/ PSS1B	PFO4Bq	PSS1/ PEM1B	PSS1B	PUBF	Total	Permanent Wetland Impacts	Temporary Wetland Impacts
Access Road	0.2	0.4					0.2			0.8	0.8	
Harvest Area Roads	2.7									2.7	2.7	
Peat Stockpile Area	15.6									15.6		15.6
Equipment Yard												
Phase 1	212.5									212.5		212.5
Phase 2	42.4	0.3								42.7		42.7
Sedimentation Basins	1.3	3.8								5.1		5.1
Drainage Outlet	0.3	0.4	1.7	1.3	0.7	0.3	0	0.2	0.2	5.1	5.1	
Totals	**275.0**	**4.9**	**1.7**	**1.3**	**0.7**	**0.3**	**0.2**	**0.2**	**0.2**	**312.5**	**8.6**	**275.9**

Notes:

- Wetland plant communities typed under Classification of Wetlands and Deepwater Habitats of the United States (Coward, et al., 1979).
- Perimeter and interior ditch impacts are included in the Phase 1 and 2 peat extraction area totals.
- The 28-acre restoration Donor Site would not be ditched, drained, or filled so it was not listed as a wetland impact.

Regulatory Controls

Peat mining operations in Minnesota are subject to ongoing regulatory control administered through state, federal, and local authorities, each of whose goal includes ensuring a no-net-loss of wetlands.

Permit to Mine. The project requires a DNR Permit to Mine, the focus of which is site reclamation of mined peatlands. Though the Permit to Mine applies to all areas of the project, the significance of this permit regarding wetlands is that the state's wetland conservation rules (Minnesota Rules Chapter 8420) do not apply to peat mining operations subject to the Permit to Mine. However, this relates only to those portions of an operation that would be temporarily removed from wetland status and would be returned to wetland on reclamation. This project would have 275.9 such acres of loss in functional value of wetlands during mining. Reclamation is to be progressive with vegetation re-established during the first normal planting season after activity ceases at a site. Progress on revegetation is to be assessed in the fourth and fifth year with the requirement of 75% cover of live, self-sustaining wetland or typical peatland species. Water levels in open water areas must be stable within five years following the cessation of mining.

Wetlands Conservation Act Permit. The provisions of the Minnesota Wetlands Conservation Act (WCA) and associated rules (Minnesota Rules Chapter 8420) apply to project-related wetland impacts where the permanent conversion of wetland to non-wetland is proposed. Authority for administering WCA resides with local units of government. This applies to 7.1 acres of project activities, with Carlton County as the local governmental unit (LGU) responsible for project compliance. Under the current WCA replacement standards, a wetland replacement ratio of 1.5:1 is required in the portion of the state where the proposed mine is located, which can be further reduced to a 1:1 replacement ratio if the replacement wetland is "project-specific replacement with the same watershed or county as the impacted wetland, a majority of which is in-kind."

Section 404 Permit. The project is also subject to permitting under Section 404 of the Clean Water Act through the US Army Corps of Engineers (USACE). The mitigation rule specifies a preference for mitigation banking over project-specific compensation since the use of mitigation banks can reduce the risk of failure or temporal loss when replacing wetland/aquatic functions. The 2009 St. Paul District Wetland Mitigation Policy states that the basic compensation ratio of 1.5:1 for the greater than 80 percent areas can be reduced to 1:1 by providing on-site (within the same bank service area) and in-kind (same wetland plant community) from a Corps-approved wetland mitigation bank. In-advance compensation is preferred over mitigation that is conducted concurrent or after authorized impacts, and "temporal losses of wetland/aquatic resource functions" would require additional temporal mitigation. The Proposer notes for

previously permitted peat development projects, the USACE has required temporal mitigation equal to 10 percent of the wetland area impacted or whatever amount is determined through the 404 permitting process. The project also requires a Clean Water Act Section 401 Water Quality Certification that the discharge complies with the applicable water quality standards; this is the responsibility of the MPCA.

Wetland Mitigation: Avoidance and Minimization

There are no alternatives to the project that would not impact wetlands because peat only occurs in wetlands. Project features designed to minimize wetland impacts include:

- Placement of the access road in upland areas to the greatest degree possible.
- Locating the entire storage yard in an upland site.
- Utilizing the wetland delineation conducted in September 2015 to inform final placement of the access road and equipment yard and guide construction; this delineation is available upon request.

The Wright Bog project would result in permanent, temporary, and temporal wetland impacts subject to mitigation; see Figure 4a: Permanent & Temporary Impacts on Wetland Plant Communities. Mitigation proposed by Premier Horticulture includes:

Permanent Impacts. Permanent wetland changes would result from the access road, harvest area roads, and drainage outlet that are proposed to remain on-site after peat harvesting ceases. These impacts would be compensated through the purchase of credits from an approved wetland bank in Wetland Bank Service Area 5. This is within the same area where the project is located.

Temporary Impacts. Temporary wetland changes resulting from peat mining would be addressed after harvesting ceases on any given area. This would apply to the majority of the affected Wright Bog site, and restoration would be based on the state-of-the-art "Canadian Approach," which would establish *Sphagnum* mosses and associated peatland species to provide 1:1 on-site, in-kind bog restoration. This restoration would be phased, with areas restored as they are taken out of production. A detailed "Description of Replacement Wetland Construction" is available upon request.

Temporal Impacts. Losses of anticipated ecological functions that occur between the initiation of mitigation, and when these same functions (eventually) mature on compensatory mitigation sites, would be mitigated through the purchase of wetland credits at an amount equal to ten percent of the total temporary wetland impacts, or whatever amount is determined through the Section 404 permitting process.

All project activities at the Donor Site, including restoration, are subject to the DNR Permit to Mine. No mitigation is required because no permanent conversion from wetland to non-wetland is proposed; wetlands would not be ditched, drained, or filled for this aspect of the project.

Wetlands Restoration Methodology

To meet the restoration criteria, the project proposes to restore the Wright Bog site based upon the state-of the art "Canadian Approach" detailed in the publication "Peatland Restoration Guide," by

Quinty and Rochefort (2003). The technique would establish *Sphagnum* mosses and associated peatland species, thus providing 1:1 in-kind, onsite bog restoration. The proposed restoration is described in more detail in the "Description of Replacement Wetland Construction;" this document is available upon request.

Restoration would be phased and begin as mined areas are depleted of horticultural peat and mining ceases. *Sphagnum* moss would be collected as needed from the designated Donor Site for site restoration; this area is owned by the Proposer. Only the top four inches of *Sphagnum* moss would be collected because this is the most viable material for transplant. The donor material would be spread at a ratio of 1:10 to 1:15 (donor area:area restored). These donor areas would subsequently regenerate in 4-6 years, potentially allowing the same donor sites to be used more than once for restoration purposes over the life of the project. For the mined areas, fully-restored ground cover to a layer of Sphagnum mosses and associated peatland plants is predicted to be complete in approximately 5-7 years.

Drawdown of Local Water Table

Wetland plant communities in areas immediately adjacent to the proposed mining operation have the potential to be affected by local drawdown of the water table resulting from installation of ditches to drain water from the peat resources to be mined. Reduction in hydrology can cause a loss of wetland area while in other instances the wetland community could change but still remain a wetland. Such an effect has not been quantified but is anticipated to occur.

The Proposer has been collecting monthly monitoring well data at the neighboring Black Lake Bog during the frost-free period from October 2008 through October 2013. Piezometers were placed there at 75 feet and 150 feet away from, and perpendicular to, the perimeter drainage ditch at three locations. The monitoring indicates the water table was almost always higher at the 150-foot well compared to the 75-foot well, but the difference was mostly slight averaging 2.8 inches, 4.3 inches, and 6.5 inches respectively at the three sites. In terms of water level suppression, the annual high water level for the 75-foot wells was within 12 inches of the surface for at least three of the six years monitored.

The ditch dimensions proposed for the Wright Bog would be approximately the same as those present at the Black Lake Bog operation. Because both sites are raised bog landforms made up of predominantly the same type of *Sphagnum* moss peat, ditching is expected to cause a similar effect on water levels at the Wright Bog and adjacent areas. This effect would be present while ditches are actively draining the site, which could occur for up to 25 years over the course of the project. Once the ditches are reclaimed, the local water table would likely re-establish at a level similar to pre-project conditions.

b) **Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize**

turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

Discharge from the site would pass through the sedimentation basins to the drainage outlet north of the operation. This drainage outlet would pass through a series of intermittent beaver ponds connected by a small stream. The outlet would be approximately 7,000 feet in length with a 35 foot right-of-way (18 feet for the ditch and 17 feet for the spoil bank) affecting a total of 5.7 acres (O.6 acres of upland and 5.1 acres of permanent wetland impacts). The outlet would be ditched and dredged to ensure adequate flow and may divert the existing stream flow and drain beaver ponds. To minimize wetland impacts, and to allow access and provide solid footing for dredging equipment, the outlet would follow the upland edge whenever possible. To control flow and prevent turbidity and sediment discharge during construction, the beaver ponds and dams present in the outlet path would be used as temporary sediment traps. Once construction is complete, all beaver dams would be breached except for the northernmost dam furthest downstream. This dam would be left to provide additional permanent sediment control. Other BMPs such as silt fences and vegetated slopes would be employed as needed to reduce turbidity and sediment discharge.

Watercraft do not currently use the drainage outlet. Future use is not anticipated.

12. Contamination/Hazardous Materials/Wastes:

a. **Pre-project site conditions – Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.**

The project site does not contain any potential environmental hazards due to past land uses.

b. **Project related generation/storage of solid wastes – Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.**

The project would generate solid waste materials typical to such operations, including: 1) filters from servicing, repair and maintenance of equipment; and 2) packaging materials such as plastic, wood, and cardboard. These would be collected, stored, and turned over to a licensed operator for disposal in compliance with existing regulations. Other solid wastes would not be generated.

c. **Project related use/storage of hazardous materials – Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spill or release of**

hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

An above-ground diesel fuel tank would be located at the storage yard, set up, and operated in accordance with existing regulations for the type and model selected. A 2,600 gallon Westeel brand double-wall above-ground diesel fuel tank, and a 300 gallon Westeel brand double-wall above-ground tank for used oil, would be located at the storage yard. According to the MPCA, sites that contain tanks over 1,100 gallons but less than 1 million gallons should comply with Minnesota Rules Chapter 7151 (https://www.revisor.mn.gov/rules/?id=7151) in lieu of a permit. All tanks would be set up and operated in accordance with existing regulations. Gasoline would also be stored at the storage yard, likely accomplished using three 2–5 gallon portable plastic cans (for a maximum of 15 gallons total).

The US Environmental Protection Agency requires non-transportation-related facilities with a total above-ground oil storage capacity of greater than 1,320 gallons, and that "could reasonably be expected to discharge oil in quantities that may be harmful into navigable waters or adjoining shorelines," to meet Spill Prevention, Control, and Countermeasure (SPCC) requirements (https://www.epa.gov/oil-spills-prevention-and-preparedness-regulations). The project may have to comply with these requirements.

Other requirements may include:

- hazardous waste regulations;
- state and local fire code; and
- other miscellaneous state and local regulations.

Other petroleum products, such as hydraulic oil, motor oil, and lubricants would be stored at the storage yard in a contained area. No below-ground storage tanks would be used.

d. **Project related generation/storage of hazardous wastes – Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.**

Used oil and related waste materials, such as fluids from servicing, repair, and maintenance of equipment, would be present on site. Potential environmental effects include soil and groundwater contamination from spills or leaks. To prevent any spills or leaks, used oil and related waste materials would be stored in an enclosed area with a concrete or other impermeable floor until they are utilized according to MPCA guidelines (https://www.pca.state.mn.us/sites/default/files/w-hw4-30.pdf), or turned over to a licensed operator.

13. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

General Landscape Characteristics

The proposed project site is located within a subsection of the Ecological Classification System (ECS) called the St. Louis Moraines. The DNR summarizes this landscape feature as follows:

> *St. Louis Moraines Subsection*. End moraines are the dominant landform with large parts characterized by rolling steep slopes; pitted outwash moraines occur at the northeast edge while ground moraine is present at the southern end. Soil types include Hemists (moderately decomposed organic soils) and annual precipitation averages 27 inches. Although the majority of the pre-settlement vegetation in subsection is upland forest types, conifer swamp and bogs were scattered throughout the subsection. Fire and windthrow were the most common natural disturbances, with fire being especially important in maintaining relatively pure red and white pine stands. The St. Louis Moraines subsection is currently heavily forested; timber harvesting is extensive with quaking aspen as the primary species taken. Recreation is another primary land use. For more information see: http://www.dnr.state.mn.us/ecs/212Nb/index.html.

Site Characteristics and Vegetation

The Wright Bog is a "raised bog" landform that exhibits a domed bog surface that isolates it from mineral-rich groundwater and runoff from adjacent uplands. The bog occurs in a general landscape mosaic of patches of upland forest and areas of brushland and grassland. Vegetation is a mixture of open and forested areas with a dense cover of *Sphagnum* moss throughout. Ericaceous shrubs such as leatherleaf (*Chamaedaphne calyculata*) and Labrador tea (*Ledum groenlandicum*) are common along with stunted black spruce trees (*Picea mariana*). Tussock cottongrass (*Eriophorum spissum*) is also frequently found. In areas where the bog borders upland forest the vegetation cover is dominated by willows (*Salix spp.*), alders (*Alnus spp.*), and bog birch (*Betula pumila*) along with wiregrass sedge (*Carex lasiocarpa*) and lake sedge (*Carex lacustris*). See Figure 4 – Wetland Communities for the wetland vegetation community types present at the site.

Fisheries Resources

The project site itself does not include fisheries resources. The Little Tamarack River is located approximately one mile north of the project site and contains the primary fisheries resources potentially affected by the project.

Wildlife Resources

DNR has conducted extensive studies of peatland animal ecology. The project site provides habitat for a variety of mammals, bird, amphibians, and reptiles. Very few large mammals are specifically associated with peatlands. However some large species such as American black bear, moose, and white-tailed deer forage and move throughout peatland habitats when conditions are favorable (e.g., presence of fruiting ericaceous plants; frozen ground conditions), especially when the peatlands are adjacent to habitats with suitable cover. Mammals specifically suited to bogs include bog lemmings and some species of shrews and voles. Bird species that use lowland conifer habitats (similar to the site) include Connecticut warbler, yellow-bellied flycatcher, boreal chickadee, palm warbler, ruby-crowned kinglet, and olive-sided flycatcher. Amphibians typical to bogs include spring peepers, gray treefrog, four-toed salamander, wood frog, northern leopard frog, and green frog.

The DNR's Minnesota's Wildlife Action Plan 2015 – 2025: Working with Partners for Wildlife Conservation (http://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/mnwap/wildlife-action-

plan-2015-2025.pdf) states that there are 74 Species in Greatest Conservation Need (SGCN) present in the St. Louis Moraines.

b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-____) and/or correspondence number (ERDB 20060830-0002) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

There are no known threatened or endangered wildlife species on the site.

NHIS Correspondence

The Minnesota Natural Heritage Information System (NHIS) database was reviewed for rare plants and animals within a one-mile radius of the site first in 2006, and then again in 2015; see Attachment 3: 2015 Natural Heritage Program Correspondence. Based on this review, there are no known occurrences of rare species in the search area. The Natural Heritage Review also identified the following issues:

Sites of Biodiversity Significance. The Wright Bog project site lies within a DNR Minnesota Biological Survey (MBS) designated Site of Moderate Biodiversity Significance. The site covers 5,123 acres; see Figure 5 – MBS Sites of Biodiversity Significance & Designated Old Growth. Sites ranked as Moderate contain occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery. The Moderate ranking was based on photo interpretation during the MBS assessment of Carlton County. This particular site contains a large undisturbed peatland with good quality examples of the following native plant communities: Northern Spruce Bog; Northern Open Bog; Northern Poor Fen; Northern Poor Conifer Swamp; Northern Rich Fen; Northern Wet Meadow; and Northern Shrub Swamp. DNR recommended that disturbance within the site be minimized to the extent feasible, and that measures be taken to avoid/minimize disturbance to the surrounding native plant communities.

The Wright Bog site is at least one mile from any other adjacent Sites of Biodiversity Significance. A Site of High Biodiversity Significance occurs to the north and east of the Wright Bog. This site is upgradient of the Wright Bog complex and is separated from it by roads and areas without a biodiversity significance classification. See Figure 5a – MBS Sites of Biodiversity Significance at Wright Bog and Black Lake Bog, which shows the neighboring sites of biodiversity significance to the Wright Bog.

Rare Natural Communities. One or more of the wetland plant communities noted above could constitute a "rare natural community" under WCA. Approval must be denied for wetland replacement plans for project activities determined to permanently adversely affect such a natural community. This would be addressed during the WCA process.

Old Growth Forest. Designated Old Growth Forest is located within the Site of Moderate Biodiversity Significance that is in relatively close proximity to the proposed discharge ditch.

DNR recommends for the project be designed to avoid impacts to this old growth forest. See Figure 5 – MBS Sites of Biodiversity Significance & Designated Old Growth.

State-listed Mussels. Although mussels are not expected to occur at the project site, state-listed mussels of special concern are known to occur in the Tamarack River, which is downstream of the proposed discharges identified in Items 11b.i.3 and 11b.ii. Mussels may be negatively affected by changes in water flow or deterioration in water quality, including sedimentation or siltation.

Northern Long-eared Bat. The northern long-eared bat (*Myotis septentrionalis*) can be found throughout Minnesota and is a state-listed species of special concern. During the winter this species hibernates in caves and mines, while during the active season (approximately April-October) it roosts under bark, in cavities, or in crevices of both live and dead trees. Research has identified 22 tree species in Minnesota as roosting sites, with the most common tree species being trembling aspen, red maple, and red oak. One roost has also been recorded in tamarack, which is a tree species found at the bog site. This same research is unclear on the degree that bog habitats are used by this species. Regardless, where they are known to occur these bats would use a wide range of trees in terms of size, where the smallest diameter roost recorded being about 4-inch diameter breast height or dbh. Activities typical to a peat mining operation that may affect this species include, but are not limited to, any disturbance to hibernacula and destruction/degradation of habitat, including tree removal.

The NHIS database is continually updated and is the most complete source of data on Minnesota's rare or otherwise significant species, natural communities, and other natural features. However, this database is not comprehensive and there may be significant natural features within the one-mile review area that are not represented in the database. Rare of otherwise significant species with potential habitat at the site, but not represented in the NHIS database, include:

Sharp-tailed Grouse. The sharp-tailed grouse (*Typanuchus phasianellus*) requires open landscapes as habitat to survive and reproduce. These landscapes typically include meadows, open bogs, and brushlands where the quality of the habitat mosaic increases with size. The species does not usually migrate long distances, but may move several miles to reach optimal habitat conditions for breeding, nesting, brood rearing, foraging, and finding cover throughout the seasons. The species is classified and listed as a SGCN in Minnesota and is identified in the state's 2015 Wildlife Action Plan, which is approved by the USFWS and updated every 10 years.

The proposed project is within 1.5 miles of two historic sharp-tailed grouse leks or dancing grounds. Leks are important sites where male birds congregate during the breeding season to perform their courtship dance to attract females for breeding. Sharp-tailed grouse would continue to use the same dancing grounds as habitat conditions remain suitable. The Wright Bog is located centrally between the two historic leks, where the annual DNR Sharp-tailed Grouse Lek Survey recorded dancing in the bog area between the lek sites in April, 2017. Given the difficulty in surveying this type of habitat due to generally limited access and visibility, this observation is an important indicator of the value of the Wright Bog for the species.

At a regional scale, notable sharp-tailed grouse population declines have been observed over the last few decades in east-central Minnesota. The two leks in the project vicinity have

experienced a steady decline in participating birds over the past 15 years. When considering sharp-tailed grouse populations across a broader scale, the Wright Bog serves as a critical habitat connection between known populations in eastern Aitkin County and other populations in the Cromwell area of western Carlton County.

Rare Plant Survey

A rare plant survey of the site was conducted by a qualified botanist at eight sample sites on August 1, 2005; see Attachment 4 – Rare Plant Survey. No rare plants were documented. Because no changes have occurred at the site since 2005, the Proposer has not conducted a survey to update the original assessment. DNR notes the findings of a plant survey would be more robust if conducted 2-3 times during the growing season; this is because different plant species are identifiable at different times of the year. Any future surveys should be coordinated with DNR's Natural Heritage Program. There are no known threatened or endangered plant species on the site, or within eight miles of the site.

No comprehensive vegetation survey has been conducted for the site. DNR however has completed an extensive assessment of peatland resources throughout the state. Eighteen peatland areas were determined to be ecologically significant, providing unique habitats for a number of listed species. These peatlands are designated for protection under the Peatland Protection Act (Minnesota Statutes, sections 84.035 and 84.036). The Wright Bog was not recommended for protection under this Act.

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

Fisheries Resources

Potential peat mining-related effects to fish resources could result from decreased pH or uncontrolled flushes of peat sediments into streams.

Acidity or pH. Water leaving the site from drained, aerated peat could result in reduced acidity or pH levels in receiving waters. Water acidity or pH reductions can kill fish and aquatic life as well as limit egg production and hatching, especially during spring snowmelt when drainage from peat fields often peaks. The proposer reports discharges leaving the Wright Bog can be generally considered acidic (pH < 4.2).

Sediments. Peat sediments can take the form of turbidity and suspended solids resulting from erosion of the excavation areas and ditches; sediment flushes could bury natural substrate. Turbidity-generated cloudy water can eliminate some kinds of fish and other aquatic life, in part by damaging their feeding methods. Solids can fill in streams, lakes, and wetlands, and destroy the environments on which many fish depend; they can also deplete dissolved oxygen as they decompose.

Wildlife Resources

The project would alter existing peatland habitats during site preparation, mining, and site restoration for the Phase 1 and 2 mining sites and the restoration Donor Site. All vegetation would be removed

from the mining sites leaving a bare peat substrate. Any cover value to wildlife from existing surface vegetation, for example shrubs and stunted trees, would be lost during site preparation. Loss of cover reduces structural diversity as well as forage diversity. This condition would persist over the course of mining operations until site reclamation re-establishes a layer of *Sphagnum* mosses and associated peatland plants in approximately 5-7 years post-mining. Although vegetation on the Donor Site would not be removed down to the bare peat substrate, similar loss of structural and forage diversity can be expected on this acreage. However *Sphagnum* moss and shrubs would re-establish on the remaining moss substrate in 4-6 years without any active restoration efforts. The Donor Site is expected to persist as an undrained, open, *Sphagnum* moss*/shrub*-dominated peatland area over the course of the project.

Wildlife present at Wright Bog use these wetlands to varying degrees depending on the individual habitat requirements of each species. These habitats may be primary, meaning wildlife depend on them for survival, or seasonal where wildlife use them when food, water, and cover are abundant. Site preparation and elimination of surface vegetation would result in the immediate loss of this habitat type, thus changing the habitat composition of the local bog landscape over the course of the project. This could create potential short-term and long-term consequence. Proposed clearing and draining the project site would reduce nesting and foraging habitat available for reptiles, amphibians, and birds that use the bog. These changes may also affect species of migratory songbirds and raptors that depend on stable bog habitats as stopping grounds during annual migration. Once all project activity ceases, for the restored bog areas it can be expected that neighboring vegetation would serve as a seed source for re-establishment of shrubs and forested cover onto the *Sphagnum* moss surface, thus once again providing some degree of plant species diversity more suitable as habitat for wildlife. This would take decades to advance.

Road construction would alter a total of 5.1 acres of both bog and upland habitats along a 25-foot wide right-of-way along the road corridor. Roads are a permanent project feature and total approximately two miles of impervious surface during and after the project. These roads would create edge conditions that may benefit some wildlife to the detriment of others. Roads particularly benefit meso-predators such as fox and skunk by providing increased opportunities to access the bog's interior areas, which may increase nest and small mammal predation.

Increased human activities and noise associated with mining equipment and operations creates disturbance that would affect wildlife in the area. Wildlife that may be using the site would likely be displaced to adjacent or nearby habitats. These habitats may not be as suitable for all species affected, or may increase competition for feeding, resting, and breeding habitat in adjacent refuge areas.

<u>Sharp-tailed Grouse</u>

Similar to other wildlife, sharp-tailed grouse occupying the Wright Bog would likely be sensitive to project-related site disturbance and habitat conversion. Initial site clearing would eliminate brush and grassland cover, with conditions remaining this way for up to 25 years while peat harvesting operations are underway. These changes are unsuitable for sharp-tailed grouse nesting, brood rearing, and foraging habitat. Extirpation is unlikely but this project may cause reductions in local populations, especially in terms of habitat connectivity between other areas of suitable sharp-tailed grouse habitat and populations. Project-related habitat changes are expected to influence east-west movement of sharp-tailed grouse between the historic leks. At a larger scale, there could be a reduction in the movement of birds between populations in western Aitkin County and the Cromwell area (to the east) due to lessened habitat connectivity from mining in the bog.

Northern Long-eared Bat

There are no records of known hibernacula for the northern long-eared bat at the project site.

The primary potential effects to this species are mortality to young bats (yet unable to fly) during site preparation and the general loss of roost trees as a function of site preparation. Young northern long-eared bats, if present in tamarack and black spruce that is harvested in the months of June or July, are unlikely to survive tree felling and processing. Tree harvest outside these months, which is a project feature, is not likely to result in young-bat mortality. To the degree that existing stands of tamarack and/or black spruce provide the types of cavities, crevices, and loose bark that is attractive to northern long-eared bats, then this roosting habitat would be eliminated progressively over the course of the project. Eventually, no roosting sites would be available in the bog if and until required site reclamation and associated revegetation transitions to early-successional species, especially tree species; this will not be complete for some decades into the future. If the species' roosting site preference for bog-type trees is low, then this site may not provide much suitable habitat (even before the project) and would tend to make site-level impacts improbable. No population-level effects are anticipated.

Old Growth Forest

For the designated old growth stand, the project drainage outlet would be located near this site feature. Because the drainage outlet would follow an established small stream channel, and the land and elevational differences seem high enough above the watercourse, it is not expected to substantially change the hydrology of the adjacent uplands or negatively affect the old growth forest. If the hydrology of the drainage outlet does raise the local water table, then there could be some limited mortality to the surrounding lowland species, such as black spruce, tamarack, and cedar where present.

State-listed Mussels

No impacts are anticipated to state-listed mussels from project-related discharges. Conditions under the NPDES permit would be protective to water quality for these species.

Plant Communities

All vegetation would be removed from the Phase 1 and 2 harvest zones leaving a bare peat substrate. This would eliminate any acreage of Northern Spruce Bog, Northern Open Bog, Northern Poor Fen, Northern Poor Conifer Swamp, Northern Rich Fen, Northern Wet Meadow, and Northern Shrub Swamp that is present. This would also be the case for vegetation at ancillary project features such as access roads and sedimentation basins. This condition would persist over the course of peat operations into harvest site restoration as well as persist into reclamation planned for ancillary facilities such as roads and storage areas. Although disturbance at the Donor Site is far less intensive over the project, only a layer of *Sphagnum* moss would be present with little or no other vegetation.

Wetland and other plant communities outside the project boundary could be affected by localized water table drawdown. Ditches would lower the water table directly adjacent to them, where the lateral effect of localized drawdown would be greater with increased ditch depth. As described in Item 11a, the perimeter ditches have the potential to reduce the water table adjacent and outside the project site an estimated one foot at 75 feet outside the project boundary. Plant species more tolerant of high water tables could be affected during the drawdown, in particular being outcompeted by plant species

more tolerant of drier conditions. Effects on plant growth on existing ditched peatland sites appears to be minimal with increased tree and ericaceous shrub growth, and reduced *Sphagnum* cover in close proximity to the ditch. Effects on hydrology beyond the site are expected to be limited in extent whose duration is likely restricted to the 25 years of active mining. If the water table returns to pre-project levels in these areas, then there would be new opportunities for more water-tolerant plant species to re-establish along the perimeter of the site.

Invasive Species

Road construction and upland vegetation removal results in disturbed soils that provides conditions where invasive plant species, such as reed canary grass and narrow-leaved/hybrid cattail, may be introduced to the site by animals, birds and the wind, operator clothing, or on equipment or trucks entering the site from offsite infested areas. For the peat areas, it is projected that the acidic, nutrient poor nature of the peat substrate at the project site should prevent any substantial infestations. Because the site has no invasive plant species at present, unless introduced otherwise equipment leaving the site would not be transporting invasive species. Gravel and clay used for road construction could be a source of invasive seedstock; if invasive plants become established, then there is potential for spread to adjacent non-bog areas such as uplands or along roadsides.

Sites of Biodiversity Significance

Because the existing vegetation and natural communities constitute the basis of the Site of Biodiversity Significance classification, the ecological functions and values of these natural communities would be lost on the acreages subjected to project development. Similarly, any synergistic ecological benefits from this site in conjunction with adjacent Sites of Biodiversity Significance would disappear during the active harvest period. For the Site of High Biodiversity Significance located immediately north of the project, it would not be drained or otherwise disturbed by the Wright Bog project. The surrounding areas of “high” and “moderate” biodiversity significance are not expected to be affected by the development because changes to vegetation would remain onsite.

Drainage water leaving the site to the Little Tamarack River is not projected to affect the Site of High Biodiversity Significance because the project’s potential discharge is downstream of this area. Construction and maintenance of the drainage ditches during operations could have some effect on the Site of Moderate Biodiversity Significance surrounding the project site.

d. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

Fisheries Resources

To address acidity or pH the MPCA has identified that the project would be subject to a pH effluent limit for its discharge. Drainage water would flow via the drainage outlet and an un-named creek through a mineral upland, which would moderate pH and then on to the Little Tamarack River. Monitoring would be required and if necessary additional measures would be applied to prevent pH from dropping below the assigned regulatory standard. For sediment, the proposed project is designed to prevent sediment flushes by routing all drainage water through maintained settling basins with controlled outlets. Given these measures, the proposed project is not expected to affect fisheries resources in the Little Tamarack River.

Wildlife Resources

In both the mined and unmined parts of the former bog areas, wildlife habitat values favoring early successional species would be restored after the project is complete and site restoration has occurred. The restoration process would re-establish the *Sphagnum* moss dominated peatland plant community within 5-10 years of project completion. As peat harvesting ceases sequentially on areas of the site, staged restoration would be conducted to minimize the extent of unvegetated areas and increase potential wildlife habitat. Restoration sequencing is tied to depth of peat resource, with shallower areas along the periphery of the bog being exhausted first and thus being first to be restored, with all peat harvesting areas undergoing restoration after mining is complete in 25 years. Once the site is completely restored, post-restoration habitat values would re-emerge as a new assemblage of trees, shrubs, persistent emergent, and emergent mosses or lichens re-establish over time. Trees such as black spruce and tamarack would take additional time to establish and mature to pre-mining size and abundance. What would exactly happen is speculative but it is reasonable to expect a surface cover similar to adjacent areas at the time. This process is expected to take decades to unfold.

Other project features, such as open water in ditches and sedimentation basins, provide altered habitat that may exhibit some wildlife benefit for generalist species such as muskrat and mallards. The habitat quality of these areas would not be comparable to the species and structural diversity present in the original bog prior to peat operations.

Sharp-tailed Grouse

Sharp-tailed grouse persist in open landscape complexes containing open grasslands, brushlands, and bogs. Limiting the duration of actual peat mining, with progressive site restoration, is the principal means of mitigating adverse consequences to sharp-tailed grouse in the project area. When peat mining is complete, restoration has occurred, and the restored sites begin to exhibit early successional bog conditions, habitat that is suitable for sharp-tailed grouse lek activity may be present as long as the species' other habitat requirements are met in adjacent areas. In this case the bog, brushland, and hayland habitats necessary for sustaining sharp-tailed grouse populations are all found relatively close and/or adjacent to the project site. Because shallower peat resources along the periphery of the bog would be mined out first, these areas would be the first restored to a more natural vegetative condition (and serve as potential future habitat). Restoration activities would progress to the interior of the bog over the 25 years of project activity, allowing for eventual vegetative succession across the entire site. Human disturbance would also cease at the completion of mining that could also benefit the species. Finally, although site conditions vary within the Wright Bog, work is limited to the north-central part of the bog. This provides some opportunity for east-west habitat connectivity across the southern part of the bog between the Aitkin and Cromwell sharp-tailed grouse populations.

Northern Long-eared Bat

Conducting harvest outside the June-July period when young, pre-flight bats would be using trees as nursery roosts (if present) is the principal means to avoid direct mortality to bats. Conducting harvest outside this period is already a project feature because the vast majority of tree harvest would likely be conducted during the fall and winter months when the bog surface would be frozen to support equipment. In terms of minimizing loss of potential roost tree habitat at the site, limiting tree removal to only the amount necessary to achieve project objectives is an available measure.

Because site preparation would occur over several seasons, some habitat potential would be preserved until all the peat mining areas have been completely cleared.

Plant Communities

Restoration of peat harvesting areas would be phased, with restoration beginning on areas of the bog as they are depleted of horticultural peat and mining ceases. It is projected to take approximately 5-7 years for a cover layer of *Sphagnum* mosses and associated peatland plants to completely cover harvested areas. It is likely a new assemblage of trees, shrubs, persistent emergent, and emergent mosses or lichens would re-establish over time. Trees such as black spruce and tamarack would take additional time to establish and mature to pre-mining size and abundance; this process could take decades to unfold.

Potential water table drawdown effects to vegetation along the perimeter ditches can be addressed by digging ditches no deeper than necessary to dry the surface peat layers for harvest. Keeping drawdown to the minimum necessary to achieve project objectives limits the opportunity for establishment of species requiring dry conditions, which in turn could improve the chances of successful re-establishment of wetland plant communities in these areas post-project.

Road effects on site hydrology and vegetation would be minimized by constructing corduroy roads that float on the peat and allow water to pass through and equilibrate on both sides. Roads are constructed using the largest non-commercial timber harvested from the site as a base and then adding a layer of clay and then Class 5 gravel. The road is maintained periodically by adding sticks, roots, and gravel to lower areas. This way of constructing bog roads calls for frequent maintenance, but it prevents a "dam effect" the road could have on wetlands. Road reclamation would consist of ripping at the depth range necessary to mix the surface with the corduroy roadbed, reduce compaction, and create an organic/clay/gravel seedbed that would be planted with native trees. Ripping the road surface loosens soil and increases infiltration capacity, thus improving the germination, growth, and re-establishment of trees and shrubs. Native bog plants are eventually expected to also colonize the substrate composed of corduroy, clay, and organic matter that would accumulate throughout the years.

Invasive Species

The Proposer anticipates the low pH and minimal nutrient content of the *Sphagnum* moss peat harvested at the site to provide a poor substrate for invasive plant species colonization. When peat harvesting ceases there would remain a layer of low pH, nutrient poor peat that would benefit site restoration to a *Sphagnum*-moss dominated ecosystem uniquely adapted to these conditions. There may be some limited opportunity for invasive plant species to colonize roadsides or other areas where more nutrient rich soil was imported. One means to avoid this situation is to import only clean fill and ensure vehicles traveling into the site arrive clean. The Proposer commits to use only clean fill consisting of trees from the site, and clay and gravel from established pits would be used in road construction with the project. Invasive plants would be manually or mechanically removed should this occur. If necessary, these areas may also be treated with herbicides approved for wetland use to eradicate and prevent the spread of any invasive plants. Also, to ensure the restoration of *Sphagnum* moss and other bog species Department of the Army 404 Permits issued to horticultural peat companies harvesting *Sphagnum* moss peat require a minimum of 15 cm of acidic, nutrient-poor peat over 35 cm of sedge peat. This requirement also prevents invasive species infestations.

Sites of Biodiversity Significance

Once peat harvesting is complete the majority of the Wright Bog site would be restored in-kind to a *Sphagnum* moss dominated, bog-type wetland (Cowardin, et al., 1979 classification type: PFO/PSS). This new bog is expected to eventually establish the ecosystem values of an early-successional bog and associated habitat. This process would take decades after the 25 years of project activity. As this process unfolds, whether the site would feature the original characteristics warranting classification as a Site of Biodiversity Significance is uncertain. Still, if the other Sites of Biodiversity Significance in the project vicinity are retained on the landscape, then the restored site and its associated ecological values would eventually contribute similar functions within the greater mosaic of more climax state-successional natural communities and related habitats.

For the Site of Moderate Biodiversity Significance, potential adverse effects to areas adjacent to the project from water draining the site would be would be minimized by digging drainage ditches only as deep as necessary to dry peat surface layers and support harvesting equipment. Upon cessation of mining, site reclamation includes stabilizing the site hydrology that should further limit any localized dewatering impacts into the future.

14. Historic properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

As requested by the SHPO an archaeological survey of the project site was conducted by a licensed archaeologist in 2006; this report is available upon request. SHPO re-reviewed the project in 2017. Based on the results of the 2006 survey and the project location, SHPO's second review [SHPO Number 2017-2174; June 27, 2017] noted the proposed project is located in an area that has the potential to contain archaeological sites. Because there are no current methods for archaeological surveying in wetlands, SHPO recommended preparation of an Unanticipated Discoveries Plan or UDP. Such a plan would provide a protocol for mining operators should human remains or artifacts be discovered during operations. The Proposer prepared a UDP that has been provided to SHPO for its project record; SHPO reported the UDP is appropriate for this type of project. See Attachment 5 - SHPO Correspondence and Attachment 5a – Unanticipated Discoveries Plan.

15. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

There are no designated scenic views or vistas on or near the project site. The project site would be separated from adjacent roads by dense forest cover that would act as a visual buffer. No visual effects are anticipated.

16. Air:

a. **Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.**

There are no stationary source air emissions expected.

Greenhouse Gas Emissions

Although the project does not include any emissions from stationary sources, it would generate greenhouse gas emissions (GHGs) in the form of carbon dioxide, methane, and/or nitrous oxide. These gases would be emitted by: 1) production machinery and processing plant operations; and 2) *in situ* decomposition of organic peat material. Estimates were derived for both sources of project-related GHGs.

Production and Processing

The Canadian peat industry relies on an internal "beta" version of a carbon emissions calculator that was developed by the International Reference Centre for the Life Cycle of Products, Processes and Services (CIRAIG) Research Group based in Montreal (CIRAIG, 2013). Characterized as a "cradle to gate" type of approach, the calculator estimates carbon emitted from harvest through processing only; it does not account for emissions once processing is complete. Values in the calculator are reported in metric tons (t) where 1 t = 1.102 US or "short" tons (T). Estimates for the EAW are reported in both metric and US short tons.

According to this calculator when applied to the proposed project, the average for the Canadian industry in 2014 was 19.2 kg CO_2 per cubic meter of peat harvested. Calculated on a basis of 3,000,000 cubic feet (85,000 cubic meters) of peat harvested per year, it is estimated that the project would emit an average of approximately 1,632 t of carbon (CO_2 Eq) per year from fuel and energy used for peat harvest, processing, and transportation. This is equivalent to 1,799 T of CO_2 Eq per year. This estimate was calculated for the entire harvest site, but would be proportionally less at first due to the bog being developed in phases.

In Situ Decomposition

Project-related ditching and draining of peat lands for peat mining, and the removal and stockpiling of peat materials, results in GHG emissions from *in situ* decomposition. These emissions can be calculated using appropriate emission factors for mining activities due to biomass clearing, site drainage (including ditches), and peat stockpiling. Values are reported in both metric and US short tons.

An estimate for project-related GHG emissions due to *in situ* peat decomposition was derived from literature-based emission factors as applied to the project; see Attachment 6: Basis and Calculation for Estimating GHG Emissions from *In Situ* Peat Decomposition. Table 2 below lists the emission factors relevant to the project whose sum represents the one-time or annual amount of carbon generated from *in situ* peat decomposition. Calculations for the project are based on a 255 acre

(103.2 hectare) peat harvesting area, a 12.8 acre (5.2 hectares) drainage ditch area, and peat stockpiles with a total surface area of 12.2 acres (4.9 hectares). Emission values were adjusted assuming 1 t C equals 3.67 t CO_2 equivalent. It should be noted that the estimate for land biomass clearing is one time only; this is because site clearing only occurs once at the start of the project. Estimates for the remaining three activities are annual and occur over the course of the project. See Table 2 for estimated emissions from land biomass clearing, drained areas, drainage ditches, and peat stockpiling.

Table 2 Estimated Emissions from *In Situ* Peat Decomposition

Emission Factor	**Hectares**	**Emission Value**	**Estimated Emissions (One Time Only)**	
			t CO_2 Eq	**T CO_2 Eq**
Land biomass cleared	103.2	2.8 t C ha^{-1} (10.3 t CO_2 ha^{-1} yr^{-1})	**1,063**	**1,172**
Emission Factor	**Hectares**	**Emission Value**	**Estimated Emissions (Annual)**	
			t CO_2 Eq	**T CO_2 Eq**
Drained areas	103.2	11.4 t CO_2 ha^{-1} yr^{-1}	1,176	1,296
		0.008 t CH_4 ha^{-1} yr^{-1} x 25 (CO_2 Eq)	20	22
		0.001 t N_2O ha^{-1} yr^{-1} x 298 (CO_2 Eq)	31	34
Drainage Ditches	5.2	0.15 t CH_4 ha^{-1} yr^{-1} x 25 (CO_2 Eq)	20	22
Peat stockpiles (Surface Area)	4.9	50 t C ha^{-1} (183.5 t CO_2 ha^{-1} yr^{-1})	899	991
Estimated Total CO_2 Eq per year			**2,146**	**2,366**

Total annual emissions from production and processing, and *in situ* decomposition, are 3,778 t CO_2 Eq per (cradle to gate) during the project; this is equivalent to 4,165 T of CO_2 Eq per year. These numbers are comparable to emissions estimated from similar-type European peat operations and production (Klasmann-Deilmann, 2015). If these one-time and annual emissions are limited to the 25-year duration of the project and summed, then this results in a lifetime emission of 95,512 t CO_2 Eq; this translates to 105,284 T CO_2 Eq over the life of the project.

b. **Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.**

Vehicle emissions due to the project would include those from 3-4 diesel agricultural tractors used to maintain fields and harvest the peat, and 1-2 semi-trucks to haul peat from the fields to the plant. Vehicles would only be run when necessary and are not expected to be a substantial source of emissions. Vehicle emissions are expected to be similar to that currently produced by logging and agricultural operations in the area.

c. **Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 16a). Discuss the effect of dust and odors in the vicinity of the project**

including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

Dust

The project would potentially generate peat dust during site preparation, during harvesting under dry and windy conditions, and during peat transport via truck to the processing plant. To address potential dust effects, harvesting would be limited during adverse weather conditions (i.e., high winds) and covering trucks when transporting peat. The project site would also be separated from adjacent roads by a densely forested buffer, which would limit dust transport to local receptors. Should local receptors experience any dust problems, vacuum harvesters would be fitted with additional equipment to reduce dust. The additional truck traffic at the processing plant site also has the potential to generate dust. There is currently no dust problem at the plant site due to truck traffic and none is expected. Should dust become a problem, liquid dust suppression products would be applied.

Odors

The project would not generate odors.

17. Noise:

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Noise would be generated during operation of some harvesting and processing equipment, and from truck traffic. Noise levels are not expected to be greater than already present in the project vicinity due to logging and agricultural activities. Potential receptors are located approximately ½ mile from the production fields. Noise from truck traffic at the plant site may be more frequent with the additional hauling trips, but the noise levels would remain the same.

18. Transportation:

a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

There are no existing parking places on the site. There are five new parking spaces proposed. The estimated total average daily traffic generated would be 10-20 vehicles per day, and would be spread out over the work day.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. *If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access

Management Manual, Chapter 5 *(available at: Department of Transportation http://www.dot.state.mn.us/accessmanagement/resources.html)* or a similar local guidance.

The minimal amount of increased traffic on the rural roads in the area due to the project is not expected to affect the regional transportation system.

c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

Project transportation effects are expected to be minimal and not require any special measures to minimize or mitigate them.

19. Cumulative potential effects: (Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

The geographic scale of the project includes the immediate Wright Bog harvesting area, access and field roads, equipment storage area, drainage outlet, sedimentation basins, and restoration Donor Site that constitute the proposed project. It also includes the operations at the Black Lake Bog peat harvesting site as well as the Peatrex plant site, office, and shipping yard. These are respectively located approximately three and seven miles east of the proposed Wright Bog project.

The timeframes related to project and environmental effects are expected to vary over the life of the project; see Attachment 7 – Wright Bog & Black Lake Bog Operation Timelines. The Black Lake Bog site was previously permitted and has been in operation since 1986. The Black Lake Bog harvest site would be gradually phased out and restored over the next 4-7 years. The Wright Bog harvest site would continue to operate for the next 25-30 years including site restoration. The Peatrex plant site, office, and shipping yard would also continue to operate concurrent with the proposed Wright Bog project.

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

No other projects are known at this time to be proposed in the vicinity of the Wright Bog and Black Lake Bog projects. In the future, Premier Horticulture would seek out additional peat resources in the area to allow them to continue producing peat using the existing plant infrastructure when the Wright Bog resource is exhausted. No future sites have been identified.

c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

There would be a cumulative reduction in wildlife habitat in the short term due to the removal of surface vegetation at the Wright Bog operation as Black Lake Bog operations continue; this includes

habitat used by sharp-tailed grouse. The staged restoration of the Black Lake Bog (in closure) would reduce this impact over the course of peat extraction activities proposed at the Wright Bog.

Cumulative traffic from both projects would be dispersed over a wider area through the use of different roads from each harvest site to access the processing plant. However, there should be no net increase in overall truck traffic due to the fixed production capacity of the packaging plant.

Both the Wright Bog and Black Lake Bog operations would discharge drainage water into the same receiving waters (i.e., Little Tamarack River). This cumulative effect would only occur for the initial 4-7 years of projected Wright Bog operations until the Black Lake Bog operation is closed and the site restored. Historic water quality data from the Black Lake Bog suggests that discharge would remain within regulatory limits. Regarding cumulative water quantity from discharges, the Black Lake Bog discharge's maximum discharge rate is a small percentage of the estimated flow of the receiving water. Adding Wright Bog discharges, if similar to Black Lake Bog discharges, is unlikely to result in a noticeable change in streamflow or downstream impacts. Any cumulative effects would decline and eventually cease once operations at the Black Lake Bog are terminated and that site fully reclaimed.

20. Other potential environmental effects: If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

There are no other known or potential environmental effects that were not discussed in EAW items 1 to 19.

RGU CERTIFICATION. *(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature _____ Date _____December 1, 2017_____

Title _____Planning Director State_____