APPENDIX B

BOTANICAL SURVEYS

Spring and Fall 2023

Spring & Fall Botanical Surveys for a Proposed Quarry Expansion in Hartville, Hants County, Nova Scotia

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Spring & Fall Botanical Surveys for a Proposed Quarry Expansion in Hartville,

Hants County, Nova Scotia

Introduction

Spring and fall vascular plant surveys were conducted at the site of a proposed quarry expansion in Hartville, Hants County, Nova Scotia, on June 21st and September 8th, 2023, by botanist Ruth E. Newell, B.Sc. (Hons.), M.Sc. Observations from these surveys are presented in this report.

The area surveyed is indicated by the yellow boundary lines shown in Figure 1.

Primary habitats present within the survey area include several, relatively recent cutovers of different ages at the southern end of the property (Fig. 2), mixed woodland (Figs. 3 & 4), primarily coniferous woodland (Fig. 7) and several wetlands including a high shrub bog and a swamp (Figs. 5 & 6).

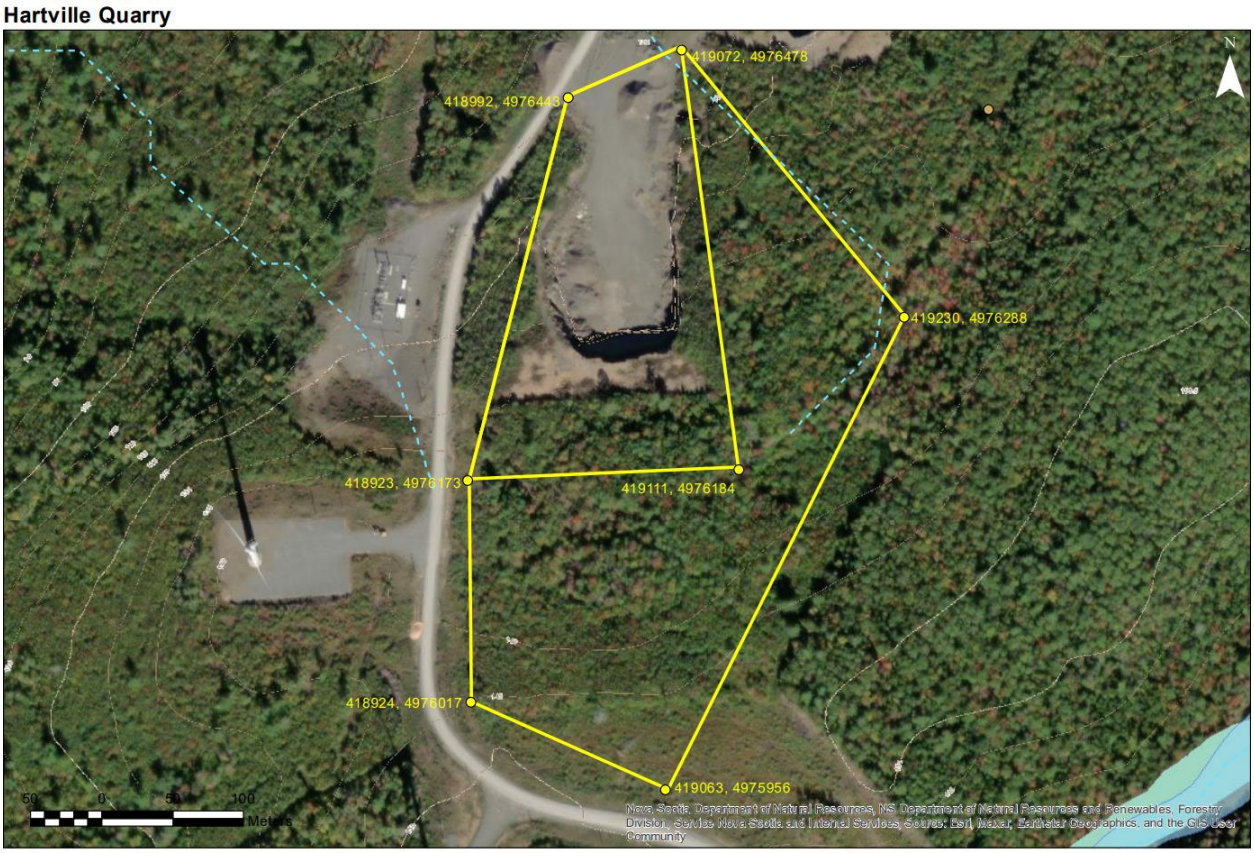

Figure 1. The survey area for the proposed Hartville quarry expansion.

All vascular plants observed during these surveys as well as the habitat(s) in which they occur, and both their provincial general status rank and the Atlantic Canada Conservation Data Centre (ACCDC)

subnational status rank are provided in APPENDIX 1 at the end of this document. Information on these status ranks including status rank definitions can be found on the Wild Species 2020, The General Status of Species in Canada website (https://www.wildspecies.ca/) and the Atlantic Canada Conservation Data Centre (ACCDC) website (http://www.accdc.com).

Results

Habitat Descriptions

1) **Two, relatively recent cutovers located at the south end of the property (20T 0418999 4976047) (Fig. 2).**

Figure 2. One of two adjacent, relatively recent, cutover areas at the south end of the property.

Two cutovers occur at the south end of the property. The southernmost cutover (adjacent to the road) (Fig. 2) is younger than the adjacent cutover to the north.

Tree species observed during the spring survey in these two cutover areas include American Beech (*Fagus grandifolia*), Moose Maple (*Acer pensylvanicum*), Sugar maple (*Acer saccharum*), Trembling Aspen (*Populus tremuloides*), Large-toothed Aspen (*Populus grandidentata*), Northern Red Oak (*Quercus rubra*), Paper Birch (*Betula papyrifera*) and Wire Birch (*B. populifoia*). Shrub and herbaceous species present include Beaked Hazelnut (*Corylus cornuta*), Sweet Fern (*Comptonia peregrina*), Bush Honeysuckle (*Diervilla lonicera*), Speckled Alder (*Alnus incana* ssp. *rugosa*), Wild Sarsaparilla (*Aralia*

nudicaulis), Tall White Aster (*Doellingeria umbellata*), Yellow Bluebead Lily (*Clintonia borealis*), Bracken Fern (*Pteridium aquilinum*), etc. A more detailed species list is provided in TABLE 1.

Occasional wet ditches were also present within these cutover areas.

Additional vascular plant species observed in these areas during the fall survey include Balsam Fir (*Abies balsamea*), White Spruce (*Picea galuca*), Hay-scented Fern (*Dennstaedtia punctilobula*), Canada Goldenrod (*Solidago canadensis*), Rough Goldenrod (*Solidago rugosa*), Bebb's Willow (*Salix bebbiana*), Woolly Bulrush (*Scirpus cyperinus*) and Calico Aster (*Symphyotrichum lateriflorum*).

Species of conservation concern:

There were no vascular plant species of conservation concern observed in this habitat during these surveys **with the exceptions of American Beech (*Fagus grandifolia*) which is now considered to be an S3S4 species, i.e., a species considered to be vulnerable to apparently secure (ACCDC) and a vulnerable/YELLOW species (General Status Rank).**

2) Mixed Woodland (20T 0418960 4976157, 20T 0418974 4976136, 20T 0419120 4976372) (Figs. 3 & 4).

Figure 3. Mixed woodland occurring southwest of the existing quarry pit.

Mixed woodland (Figs. 3 & 4) occurs immediately west, south, and east of the open quarry pit. Tree species present within this habitat, include Balsam Fir (*Abies balsamea*), Red Spruce (*Picea rubens*), White Spruce (*Picea glauca*), White Pine (*Pinus strobus*), Eastern Hemlock (*Tsuga canadensis*), Pin Cherry (*Prunus pensylvanica*), Northern Red Oak (*Quercus rubra*), Wire Birch (*Betula populifolia*), White Birch (*B. papyrifera*), Trembling Aspen (*Populus tremuloides*), Large-toothed Aspen (*P. grandidentata*) and Red Maple (*Acer rubrum*). Shrub and herbaceous species present include Hobblebush (*Viburnum lantanoides*), Sheep Laurel (*Kalmia angustifolia*), Late Lowbush Blueberry (*Vaccinium angustifolium*), Velvet-leaved Blueberry (*V. myrtilloides*), a blackberry (*Rubus* sp.), Bunchberry (*Cornus canadensis*). Northern Starflower (*Lysimachia borealis*), Wild Lily-of-the-Valley (*Maianthemum canadense*), Bracken Fern (*Pteridium aquilinum*), Pink Lady's-slipper (*Cypripedium acaule*), Whorled Wood Aster (*Oclemena acuminata*) and Painted Trillium (*Trillium undulatum*).

Additional vascular plant species observed in these areas during the fall survey, include Sweet Fern (*Comptonia peregrina*), Beaked Hazelnut (*Corylus cornuta*), Goldthread (*Coptis trifolia*), Northern Bush Honeysuckle (*Diervilla lonicera*), Mountain Holly (*Ilex mucronata*), Cucumber Root (*Medeola virginiana*), etc.)

Figure 4. Mixed woodland occurring east of the open quarry pit.

Species of conservation concern:

There were no vascular plant species of conservation concern observed in this habitat during this survey **with one exception. American Beech (*Fagus grandifolia*) is now considered to be an S3S4 species, i.e.,**

a species considered to be vulnerable to apparently secure (ACCDC) and a vulnerable/YELLOW species (General Status Rank).

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3) Swamp (20T 0419128 4976185) (Figs. 5 & 6)

A narrow, elongate swamp occurs south of the open quarry pit within mixed woodland. It runs roughly parallel to the south end of the quarry pit. A small, intermittent stream and scattered, small boggy pools are present within the swamp area. The substrate of this habitat is primarily composed of sphagnum moss. Ferns are particularly abundant, especially Cinnamon Fern (*Osmundastrum cinnamomeum*) and Sensitive Fern (*Onoclea sensibilis*). Other ferns occurring in the swamp, include Interrupted Fern (*Claytosmunda claytoniana*), Lady Fern (*Athyrium filix-femina*), Beech Fern (*Phegopteris connectilis*), Crested Wood Fern (*Dryopteris cristata*). Common Oak Fern (*Gymnocarpium dryopteris*) and New York Fern (*Parathelypteris noveboracensis*). Tree and shrub species present within the swamp habitat include White Ash (*Fraxinus americana*), Red Maple (*Acer rubrum*), Black Spruce (*Picea mariana*), Yellow Birch (*Betula alleghaniensis*), Balsam Fir (*Abies balsamea*), Common Winterberry, (*Ilex verticillata*), Speckled Alder (*Alnus incana* ssp. *rugosa*) and Beaked Hazelnut (*Corylus cornuta*). Additional herbaceous species present include Whorled Wood Aster (*Oclemena acuminata*), Wild Sarsaparilla (*Aralia nudicaulis*), Northern Starflower (*Lysimachia borealis*), Bladder Sedge (*Carex intumescens*), Three-seeded Sedge (*Carex trisperma),* Brownish Sedge (*C. brunnescens*), Fowl Manna Grass (*Glyceria striata*), American Golden Saxifrage (*Chrysoplenium americanum*), etc.

Occasional, somewhat isolated, small swampy areas were also observed separate from the large area described above.

Additional vascular plant species observed in this area during the Autumn survey include Northern Water Horehound (*Lycopus uniflorus*) and Calico Aster (*Symphyotrichum lateriflorum*).

Species of conservation concern:

There were no vascular plant species of conservation concern observed in this habitat during these surveys.

Figure 5. Swamp occurring south of the quarry pit in mixed woodland. Sensitive Fern (*Onoclea sensibilis*) is very common within this wetland and is present in the photo.

Figure 6. Another photo of the swamp shown in Fig. 5. The common fern species in this photo is Cinnamon Fern (*Osmundastrum cinnamomeum*).

Occasional, somewhat isolated, small swampy areas were also observed separate from the large area described above.

Species of conservation concern:

There were no vascular plant species of conservation concern observed in this habitat during these surveys.

4) High Shrub Bog (20T 0419221 4976287) (Fig. 7)

A high shrub sphagnum bog (20T 0419221 4976287) occurs southeast of waypoint 419111 4976184 (Fig. 1). Part of this wetland is outside of the survey area.

Vascular plant species present within this wetland include Red Maple (*Acer rubrum*), Balsam Fir (*Abies balsamea*), Black Spruce (*Picea mariana*), Speckled Alder (*Alnus incana* ssp. *rugosa*), Common Winterberry (*Ilex verticillata*), Velvet-leaved Blueberry (*Vaccinium myrtilloides*), Woodland Horsetail (*Equisetum sylvaticum*), Cinnamon Fern (*Osmundastrum cinnamomeum*), Bunchberry (*Cornus canadensis*), Wild Lily-of-the-valley (*Maianthemum canadense*), Three-seeded Sedge (*Carex trisperma*) and Goldthread (*Coptis trifolia*).

Additional species observed during the Fall survey include Yellow Birch, (*Betula alleghaniensis*), White Birch (*Betula papyrifera*), Hobblebush (*Viburnum lantanoides*), New York Fern (*Parathelypteris noveboracensis*), Sensitive Fern (*Onoclea sensibilis*), Bristly Dewberry (*Rubus hispidus*), etc.

Species of conservation concern:

There were no vascular plant species of conservation concern observed in this habitat during these surveys.

Figure 7. Outer edge of a high shrub bog located southeast of the existing quarry.

5) Coniferous Woodland (20T 0419129 4976240) (Fig. 8)

There are scattered small stands of primarily coniferous trees present south and east of the open quarry area (Fig. 8). Herbaceous vegetation on the forest floor is generally scant in these areas. Herbaceous species present include Wild Lily-of-the-valley (*Maianthemum canadense*), Wild Sarsaparilla (*Aralia nudicaulis*) and Pink Lady's-slipper (*Cypripedium acaule*). Trees present, include White Pine (*Pinus strobus*), Red Spruce (*Picea rubens*) and Balsam Fir (*Abies balsamea*).

Figure 8. Coniferous woodland occurring south and east of the open quarry pit.

Species of conservation concern:

There were no vascular plant species of conservation concern observed in this habitat during this survey.

Discussion

No species listed under either federal species-at-risk legislation or provincial species-at-risk- legislation were observed on the quarry property during these surveys.

Almost all vascular plant species observed and recorded during these surveys fall into the Nova Scotia general status rank categories of **GREEN, LIGHT GREEN** or **EXOTIC** with GREEN indicating a plant with a secure conservation status within the province, LIGHT GREEN indicating a species that is at a fairly low risk of extirpation within the province and EXOTIC meaning a species that is non-native to Nova Scotia.

The Atlantic Canada Conservation Data Centre subnational status ranks, with one exception, all fall into the categories of **S5, S4 or SNA**, also indicating that most species documented on this site during this survey, are not of conservation concern (**S5 = Secure** - common, widespread, and abundant in the province; **S4 = Apparently Secure** - uncommon but not rare; some cause for long-term concern due to declines or other factors; **SNA = Not Applicable** - a conservation status rank is not applicable because the species is not a suitable target for conservation activities a for example, non-native (exotic) species.

The one exception to the above is American Beech (*Fagus grandifolia*) which is now considered to be an S3S4 species, i.e., a species considered to be vulnerable to apparently secure (ACCDC) and a vulnerable/YELLOW species (General Status Rank).

Species listed in the APPENDIX not identified to species are not expected to be of conservation concern.

APPENDIX

List of all vascular plant species observed on the Hartville Quarry property during surveys conducted on June 21st and September 8th, 2023, including the habitats in which they were found and their status ranks. Both the Nova Scotia General Status Rank*and the Atlantic Canada Conservation Data Centre Subnational S-rank** are provided for each species. Habitats surveyed include cutovers (CO), mixed woodland (MW), coniferous woodland (CW), swamp (S) and high shrub bog (B).

Additional species observed in various habitats during the Fall survey are in bold lettering.

Latin Name	**Common Name**	**Nova Scotia General Status Rank***	**ACCDC Subnational Status Rank****	**Habitat(s)**
Abies balsamea	**Balsam Fir**	**S5/secure (green)**	**S5/secure**	B, **CO,** MW, S
Acer pensylvanicum	**Striped Maple**	**S5/secure (green)**	**S5/secure**	**B**, CO, MW, S
Acer rubrum	**Red Maple**	**S5/secure (green)**	**S5/secure**	B, CO, **CW**, MW, S
Acer saccharum	Sugar Maple	S5/secure (green)	S5/secure	CO, MW
Alnus incana ssp. *rugosa*	Speckled Alder	S5/secure (green)	S5/secure	B, CO, S
Amelanchier sp.	a serviceberry	-	-	MW
Aralia nudicaulis	**Wild Sarsaparilla**	**S5/secure (green)**	**S5/secure**	**B**, CO, **CW**, MW, S
Athyrium filix-femina	Lady Fern	S5/secure (green)	S5/secure	S
Betula alleghaniensis	**Yellow Birch**	**S5/secure (green)**	**S5/secure**	**B**, CO, MW, S
Betula papyrifera	**White Birch**	**S5/secure (green)**	**S5/secure**	**B**, CO, MW
Betula populifolia	**Wire Birch**	**S5/secure (green)**	**S5/secure**	CO, **MW**
Brachylytrum aristosum	Northern Shorthusk	S5/secure (green)	S5/secure	S
Carex crinita	Fringed Sedge	S5/secure (green)	S5/secure	CO
Carex disperma	Two-seeded Sedge	S5/secure (green)	S5/secure	S
Carex intumescens	Bladder Sedge	S5/secure/green	S5/secure	S
Carex trisperma	Three-seeded Sedge	S5/secure (green)	S5/secure	B, S

Latin Name	Common Name	Nova Scotia General Status Rank*	ACCDC Subnational Status Rank**	Habitat(s)
Chrysosplenium americanum	**American Golden Saxifrage**	**S5/secure (green)**	**S5/secure**	**B**, S
Cinna latifolia	**Drooping Wood Reed Grass**	**S5/secure (green)**	**S5/secure**	**S**
Circaea alpina	Small Enchanter's Nightshade	S5/secure (green)	S5/secure	S
Claytosmunda claytoniana	Interrupted Fern	S5/secure (green)	S5/secure	CO, MW, S
Clintonia borealis	Yellow Bluebead Lily	S5/secure (green)	S5/secure	MW, S
Clintonia borealis	Bluebead Lily	S5/secure (green)	S5/secure	MW
Comptonia peregrina	**Sweet Fern**	**S5/secure (green)**	**S5/secure**	CO, **MW**
Coptis trifolia	**Goldthread**	**S5/secure (green)**	**S5/secure**	B, **MW**, S
Corallorhiza trifida	Early Coralroot	S4 apparently secure (light green)	S4/apparently secure	S
Cornus canadensis	Bunchberry	S5/secure (green)	S5/secure	B, MW
Corylus cornuta	**Beaked Hazelnut**	**S5/secure (green)**	**S5/secure**	CO, **MW**, S
Cypripedium acaule	**Pink Lady's-slipper**	**S5/secure (green)**	**S5/secure**	**CW**, MW
Denndrolycopodium dendroideum	**Round-branched Tree Clubmoss**	**S5/secure (green)**	**S5/secure**	**MW**
Dennstaedtia punctilobula	**Hay-scented Fern**	**S5/secure (green)**	**S5/secure**	**CO**, MW
Diervilla lonicera	**Northern Bush Honeysuckle**	**S5/secure (green)**	**S5/secure**	CO, **MW**
Doellingeria umbellata	**Tall White Aster**	**S5/secure (green)**	**S5/secure**	CO, **MW**, S
Dryopteris carthusiana	Spinulose Wood Fern	S5/secure (green)	S5/secure	S
Dryopteris cristata	Crested Wood Fern	S5/secure (green)	S5/secure	MW
Dryopteris internmedia	Intermediate Wood Fern	S5/secure (green)	S5/secure	MW
Epifagus virginiana	**Beechdrops**	**S4/apparently secure (light green)**	**S4/apparently secure**	**MW**
Epipactis helleborine	**Helleborine**	**NA/exotic**	**SNA/exotic**	CO, **MW**
Equisetum sylvaticum	Woodland Horsetail	S5/secure (green)	S5/secure	B, S
Erechtites hieraciifolius	**Eastern Burnweed**	**S5/secure (green)**	**S5/secure**	**S**
Euthamia graminifolia	**Grass-leaved Goldenrod**	**S5/secure (green)**	**S5/secure**	**CO**
Fagus grandifolia	**American Beech**	**S3S4/vulnerable/(yellow)**	**S3S4/vulnerable to apparently secure**	**CO, MW**
Fraxinus americana	White Ash	S4/apparently secure (light green)	S4/apparently secure	MW, S
Glyceria striata	**Fowl Manna Grass**	**S5/secure (green)**	**S5/secure**	**B**, CO, **MW**, S
Gymnocarpium dryopteris	Common Fern	S5/secure (green)	S5/secure	S
Hamamelis virginiana	**American Witch-hazel**	**S5/secure (green)**	**S5/secure**	**B**, MW
Ilex mucronata	**Mountain Holly**	**S5/secure (green)**	**S5/secure**	**MW**

Latin Name	**Common Name**	**Nova Scotia General Status Rank***	**ACCDC Subnational Status Rank****	**Habitat(s)**
Ilex verticillata	Common Winterberry	S5/secure (green)	S5/secure	B, S
Impatiens sp.	a jewellweed	-	-	S
Kalmia angustifolia	**Sheep Laurel**	**S5/secure (green)**	**S5/secure**	**B**, MW
Lactuca sp.	a wild lettuce	-	-	CO
Linnaea borealis	**Twinflower**	**S5/secure (green)**	**S5/secure**	**MW**, S
Lonicera canadensis	Canada Fly Honeysuckle	S5/secure (green)	S5/secure	CO, MW, S
Lonicera tartarica	Tartarian Honeysuckle	NA/exotic	SNA (exotic)	CO
Lycopus uniflorus	**Northern Water Horehound**	**S5/secure (green)**	**S5/secure**	**S**
Lysimachia borealis	Northern Starflower	S5/secure (green)	S5/secure	CO, MW, S
Maianthemum canadense	**Wild Lily-of-the-valley**	**S5/secure (green)**	**S5/secure**	B, CO, **CW**, MW, S
Medeola virginiana	**Cucumber Root**	**S5/secure (green)**	**S5/secure**	**MW**
Mitchella repens	**Partridgeberry**	**S5/secure (green)**	**S5/secure**	**MW**
Monotropa uniflora	Convulsion-root	S5/secure (green)	S5/secure	MW
Nabalus sp.	a rattlesnake root	-	-	S
Oclemena acuminata	**Whorled Wood Aster**	**S5/secure (green)**	**S5/secure**	**B**, MW, S
Onoclea sensibilis	**Sensitive Fern**	**S5/secure (green)**	**S5/secure**	**B**, S
Osmundastrum cinnamomeum	Cinnamon Fern	S5/secure (green)	S5/secure	B, CO, S
Oxalis montana	Common Wood Sorrel	S5/secure (green)	S5/secure	S
Parathelypteris novaeboracensis	**New York Fern**	**S5/secure (green)**	**S5/secure**	**B**, CO, **MW**, S
Phegopteris connectilis	Northern Beech Fern	S5/secure (green)	S5/secure	S
Picea glauca	**White Spruce**	**S5/secure (green)**	**S5/secure**	**CO, MW**
Picea mariana	Black Spruce	S5/secure (green)	S5/secure	B, S
Picea rubens	**Red Spruce**	**S5/secure (green)**	**S5/secure**	**CW**, MW
Pinus strobus	**White Pine**	**S5/secure (green)**	**S5/secure**	**CO**, MW
Polystichum acrostichoides	Christmas Fern	S5/secure (green)	S5/secure	CO, MW
Populus grandidentata	Large-toothed Aspen	S5/secure (green)	S5/secure	CO
Populus tremuloides	Trembling Aspen	S5/secure (green)	S5/secure	CO
Potentilla sp.	a cinquefoil	-	-	
Prunus pensylvanica	Pin Cherry	S5/secure (green)	S5/secure	MW
Pteridium aquilinum	**Bracken Fern**	**S5/secure (green)**	**S5/secure**	**B**, MW
Quercus rubra	Northern Red Oak	S5/secure (green)	S5/secure	CO, MW
Rubus hispidus	**Bristly Dewberry**	**S5/secure (green)**	**S5/secure**	**B**, S
Rubus idaeus ssp. *strigosus*	Wild Raspberry	S5/secure (green)	S5/secure	CO
Rubus pubescens	**Dwarf Red Raspberry**	**S5/secure (green)**	**S5/secure**	**MW**, S
Rubus sp.	a blackberry	-	-	CO, MW
Salix bebbiana	**Bebb's Willow**	**S5/secure (green)**	**S5/secure**	**CO**

Latin Name	Common Name	Nova Scotia General Status Rank*	ACCDC Subnational Status Rank**	Habitat(s)
Scirpus cyperinus	**Common Woolly Bulrush**	**S5/secure (green)**	**S5/secure**	**CO**
Solidago canadensis	**Canada Goldenrod**	**S5/secure (green)**	**S5/secure**	**CO, MW**
Solidago rugosa	**Rough Goldenrod**	**S5/secure (green)**	**S5/secure**	**CO**, MW
Spinulum annotinum	Stiff Clubmoss	S5/secure (green)	S5/secure	MW
Symphyotrichum cordifolium	Heart-leaved Aster	S4S5/apparently secure (light green)	S4S5	MW
Symphyotrichum lateriflorum	**Calico Aster**	**S5/secure (green)**	**S5/secure**	**CO, MW, S**
Trillium undulatum	Painted Trillium	S5/secure (green)	S5/secure	MW
Tsuga canadensis	Eastern Hemlock	S4/apparently secure (light green)	S4/apparently secure	MW
Vaccinium angustifolium	Late Lowbush Blueberry	S5/secure (green)	S5/secure	MW
Vaccinium myrtilloides	Velvet-leaved Blueberry	S5/secure (green)	S5/secure	B, MW, S
Veronica officinalis	**Common Speedwell**	**NA/exotic**	**SNA**	CO, **MW**
Viburnum cassinoides	**Northern Wild Raisin**	**S5/secure (green)**	**S5/secure**	**CW, MW**
Viburnum lantanoides	**Hobblebush**	**S5/secure (green)**	**S4/apparently secure**	**B**, MW
Viola sp.	a violet	-	-	S

*The Nova Scotia general status ranks used in this report are based on the ranks used in the 2020 Wild Species of Canada Report (available at https://www.wildspecies.ca/) ; **S5 = Secure/green** (at very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats**; S4 = Apparently secure/light green** (at a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors**; S3 = Vulnerable/yellow** (at moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors; **S2 = Imperilled/orange (**at high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors); **NA = not applicable** (non-native/exotic).

ACCDC: Atlantic Canada Conservation Data Centre explanation of status ranks used in this report (http://accdc.com/en/rank-definitions.html): **S5 = Secure (common, widespread, and abundant in the province); **S4** = **Apparently Secure** (uncommon but not rare; some cause for long-term concern due to declines or other factors); **S3 = Vulnerable** (Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.)**;** S2 = **Imperiled** (imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province. **SNA** = **Not Applicable** - a conservation status rank is not applicable because the species is not a suitable target for conservation activities, e.g., a non-native species.

APPENDIX C

MAMMAL AND WILDLIFE SURVEY

May 2023

JULY 3, 2023

A GENERAL WILDLIFE ASSESSMENT FOR THE PROPOSED HARTVILLE QUARRY EXPANSION PROJECT, HANTS COUNTY, NS

MARK PULSIFER MSC
EDGEWOOD ENVIRONMENTAL SERVICES
Antigonish, Nova Scotia

A GENERAL WILDLIFE ASSESSMENT FOR THE PROPOSED HARTVILLE QUARRY EXPANSION PROJECT, HANTS COUNTY, NS

1.0 Introduction and Background

Edgewood Environmental Services Ltd. (EES) was subcontracted by Envirosphere Consultants Ltd. to complete a general wildlife assessment to support regulatory submissions for the expansion of an aggregate quarry near Ellershouse, Hants County, Nova Scotia, UTM coordinates 20T 419064 E 4976224 N (Figure 1).

Figure 1. Google Earth image (5 September 2015) of the study area (outlined in red) for the proposed Alva Construction Ltd. Hartville Quarry expansion. A general wildlife assessment was conducted within and adjacent to the area outlined in red.

In Nova Scotia, developers of pits and quarries are required to submit an environmental assessment for developments that exceed 4 ha in size. Included within the formal environmental registration document is information on Valued Environmental Components (VECs) and potential mitigation options. One specific VEC addressed here is non-avian “wildlife”, which for the purposes of this report refers to mammals and herpetofauna. Other faunal groups are addressed separately.

Various legislation in Nova Scotia protects wildlife, and biodiversity in general. The Nova Scotia Wildlife Act (1989), Species at Risk Act (1998), and Biodiversity Act (2021) protect species and habitats within the province from adverse impacts. The results of this survey will be used (in part) to address possible mitigation strategies for wildlife in general that may arise as a result of the quarry development, and specifically for any species at risk or species of conservation concern.

Potential impacts on all biodiversity are noteworthy; however, potential impacts on "species at risk" (SAR) or "species of conservation concern" (SCC) take priority because of their conservation status and potential vulnerability to human activities. In Nova Scotia, the responsibility for conservation of SAR/SCC is jointly shared by the Nova Scotia Department of Natural Resources and Renewables (NSNRR) under the provincial Endangered Species Act (NSESA), and by Environment and Climate Change Canada (ECCC) under the federal Species at Risk Act (SARA). Both jurisdictions maintain a listing of species prioritized by level of threat. The conservation status for a species is informed in part by population data supplied by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), the Atlantic Canada Conservation Data Center (AC CDC), and the General Status of Wild Species in Canada.

AC CDC records for the area surrounding the Hartville Quarry property indicate that three bat species (Little Brown Myotis, *Myotis lucifugus;* Long-eared Myotis*, Myotis septentrionalis;* Tri-colored Bat*, Perimyotis subflavus*) and two turtle species (Snapping Turtle, *Chelydra serpentina*; Eastern Painted Turtle, *Chrysemys picta picta*) at risk have been reported within a 5 km radius (Table 1). These bat species are nationally and provincially endangered as the result of a 90% decline from White-nose Syndrome (*Pseudogymnoascus destructans*) during the winter of 2012-2013 (NS Invasive Species Council). Snapping Turtle and Eastern Painted Turtle are at risk from human activities that negatively impact important habitats. Additional provincial-level SAR occur outside of the 5 km zone, but within 50 km of the project site (Table 1). These include Mainland Moose (*Alces alces americana*), Wood Turtle (*Glyptemys insculpta*) and Blandings Turtle (*Emydoidea blandingii*) which have been reported within 19 km, 6 km and 48 km of the study site respectively. Three other nationally endangered bat species (Hoary Bat, *Lasiurus cinerius*; Eastern Red Bat, *Lasiurus borealis*; Silver-haired Bat, *Lasionycteris noctivagans*) have been reported within 50 km of the study area. In addition to the species identified in Table 1 three provincially endangered species (e.g., Eastern Ribbonsnake, *Thamnophis saurita*; American Marten, *Martes americana*; Canada Lynx, *Lynx canadensis*) have been identified within 80 km of the project area. Several other species that are not SAR but are of interest to the AC CDC are also listed in Table 1.

Table 1. Conservation status for species of conservation concern or potential interest identified by the AC CDC (26 May 2023) within 50 km of the project site.

Common Name	Scientific Name	COSEWIC Designation	SARA Designation	Provincial Designation	Provincial S Rank	Distance From Project Area (KM)
Snapping Turtle	*Chelydra serpentina*	SC	SC	V	S3	4.2 ± 10
Painted Turtle	*Chrysemys picta*	SC	SC	-	S4	6.2
Eastern Painted Turtle	*Chrysemys picta picta*	SC	SC	-	S4	3.2
Wood Turtle	*Glyptemys insculpta*	TH	TH	TH	S2	5.9
Blandings Turtle	*Emydoidea blandingii*	E	E	E	S1	48.0

Four-toed Salamander	*Hemidactylium scutatum*	Not at Risk	-	-	S3	1.8
Little Brown Myotis	*Myotis lucifugus*	E	E	E	S1	2.2
Long-eared Myotis	*Myotis septentrionalis*	E	E	E	S1	3.5
Tri-colored Bat	*Perimyotis subflavus*	E	E	E	S1	3.5
Hoary Bat	*Lasiurus cinerius*	E	-	-	SUB, S1M	17.6
Silver-haired Bat	*Lasionycteris noctivagans*	E	-	-	SUB, S1M	31.3
Eastern Red Bat	*Lasiurus borealis*	E	-	-	SUB, S1M	39.9
Long-tailed Shrew	*Sorex dispar*	Not at Risk	-	-	S2	43.3
Maritime Shrew	*Sorex maritimensis*	-	-	-	S3	31.2
Southern Bog Lemming	*Synaptomys cooperi*	-	-	-	S3	43.1
Southern Flying Squirrel	*Glaucomys volans*	Not at Risk	-	-	S3S4	28.7
Moose (Mainland)	*Alces alces americana*	-	-	E	S1	19.3
Fisher	*Pekania pennanti*	-	-	-	S3	21.1
SC = Special Concern; TH = Threatened; E = Endangered; V = Vulnerable; S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; SUB = Unrankable uncertainty within a breeding population; M = Migrant species						

2.0. Study Area and Methodology

2.1 Study Area Description

The proposed quarry expansion site is located along the Hartville Road, 2 km from Ellershouse, Hants County, Nova Scotia. The approximately 10 ha project area surrounds an existing working quarry operated by Alva Construction Ltd., and includes a mixture of cutover and regenerating lands, immature mixedwood, mature softwood, and a treed wet area (Figure 1). Approximately 6.5 ha of the area had previously been commercially harvested between 2005 and 2010 (Google Earth) prior to the quarry being established. An additional 0.5 ha was harvested around 2019 (Google Earth). An older quarry situated outside the study area lies > 100 m north of the project area. There are no defined watercourses or permanent waterbodies identified within the proposed development, but there are wet areas within the study area where water accumulates (Figures 8a, b, GIS waypoints HQ 381, 383).

2.2 Survey Methodology

A walkover survey for mammals and herpetofauna was conducted within, or adjacent to the survey area identified in red in Figure 1. The survey was conducted on-foot by a single observer, and was designed to intersect all habitat and/or forest stand types within the designated study area. Portions of existing roads and trails adjacent to the study area were also surveyed. See Figure 2 for an approximate survey route. Because this was a reconnaissance

Figure 2. General wildlife survey route completed on 29 May 2023 indicated by yellow line.

survey, effort was not standardized. Observations were made along an indeterminant survey route. Evidence of species occurrence was confirmed by visual observation of individuals or egg masses, or indirect evidence such as auditory calls, scat, tracks, dens, and foraging behaviours (grubbing, rock and log rolling, browse, seed middens). GPS waypoints for points of interest were recorded using a Garmin Oregon 750t® GPS, and all photos were recorded with an Apple iPhone 11®.

3.0. Results and Discussion

The general wildlife survey was completed on 29 May 2023 between 0915 hrs and 1236 hrs. Environmental conditions during the survey were partial sun, winds ~ 23 km/hr from the north, and temperature was consistently around 8°C. The walkover survey distance covered was approximately 2100 m in length and traversed all general habitat types (Figure 2). Photo-location waypoints for habitats and wildlife presence within or adjacent to the project survey area were provided in Figure 3.

Figure 3. Google Earth image of the project area boundaries outlined in red with GPS waypoints for habitat and wildlife photographs.

3.1 General Habitat

The study area consisted of forested stands of mixed species and maturity. Treed habitats in the project area could be categorized in one of three age groups, < 5 years old, between 13 and 18 years old, or mature. There are no defined watercourses, or waterbodies within the survey area; however, there are wet areas with saturated soils and vegetation that suggested the presence of wetlands. Figures 4-10 provide representative images of various habitats. Supplementary information on some habitats was provided with figure captions.

Figure 5a, b. Habitat photos taken at waypoints HQ 368 and HQ 370 indicating example of deadwood structures left on site following forest harvest. Ground features such as these are beneficial for small mammals and amphibians. Standing dead wood (snag trees) are especially important for cavity nesting birds. A Northern Flicker (*Colaptes auratus*) was observed exiting a nesting cavity in a Red Oak tree in the photo on the right (see red circle for location of the cavity).

Figure 6. Photo of older regenerating mixedwood stand taken near waypoint HQ 374. Tree species consisted of Red Spruce, Red Oak, Yellow Birch (*Betula alleghaniensis*), Red Maple, Ironwood (*Ostrya virginiana*), Balsam Fir, and American Beech (*Fagus grandifolia*).

Figure 7. General habitat photo of mature mixedwood stand taken at waypoint HQ 377. This stand type contains the same canopy species as Figure 6 but represents a transition between the 13-18 year-old regen and fully mature stands.

Figure 8a, b. Wet area habitat photographs taken at waypoints HQ 381, and 383. Yellow-spotted Salamander egg masses were located at HQ 383.

Figure 9a, b. General habitat photos taken at waypoints HQ 389 (a), and 391 (b) (Figure 3). Photo (a) shows large diameter coarse woody material that serves several biodiversity functions (e.g., moisture retention, foraging habitat, structural complexity, soil augmentation). Photo (b) is early successional habitat found near the gravel road adjacent the quarry. This habitat is suitable for small mammals such as Eastern Chipmunk (*Tamias striatus*).

Figure 10. Photo of mature softwood habitat taken at waypoint HQ 396.

3.2 General Wildlife Survey Results

The general wildlife survey revealed no evidence of either mammalian or herptile species at risk or conservation concern at the project site. Survey evidence confirmed the presence of White-tail Deer (*Odocoileus virginianus*), Red Squirrel (*Tamiasciurus hudsonicus*), Snowshoe Hare (*Lepus americanus*), Bobcat (*Lynx rufus*), and Yellow-spotted Salamander (*Ambystoma maculatum*)(Figures 11-13, Table 2). A single mammal den site was located and based on the size of the entrance, and the absence of olfactory clues it was presumed to belong to a Groundhog (*Marmota monax*). Additional species potentially present within or proximate to the study site were inferred from the availability of taxon-specific suitable habitats, and discussed below.

Figure 11a, b, c. Evidence of White-tail Deer presence at the project site. (a) "Rub" and broken stem on a small hardwood sapling made by a young male during the 2022 rut. Waypoint HQ 369. (b) Fecal pellets deposited during the late fall or winter 2022. Waypoint HQ 371. (c) Shed hair located at waypoint HQ 387.

Figures 12a, b, c. (a) Snowshoe Hare fecal pellets located at HQ 372, (b) Mammal tracks in soft sediment at waypoints HQ 379, 380. Size, shape, and absence of toe-nails indicates that this is likely a Bobcat track. (c) Red Squirrel seed midden at waypoint HQ 382 (see red circle).

Figure 13a, b. (a) Suspected Groundhog den located at waypoint HQ 392. (b) Amphibian egg mass at waypoint HQ 373. Similar masses were also found at HQ 383. Developing embryos were encased individually with the entire mass protected by an exterior jelly casing which is indicative of Yellow-spotted Salamanders.

Table 2. Listing of all vertebrate species encountered during the general wildlife assessment conducted on 29 May 2023 at the Hartville Quarry project area.				
Common Name	**Scientific Name**	**Evidence**	**GPS Waypoint HQ#**	**Comments**
White-tail Deer		Scat, browse, hair, trails	369, 371, 372, 376, 385, 386, 387	
Red Squirrel		Seed Middens	382	
Snowshoe Hare		Scat, browse	372, 386	
Bobcat		Tracks	379, 380	
Groundhog		Den site	392	Identification based on size of entrance and habitat. No olfactory clues to suggest red fox or skunk.
Yellow-spotted Salamander		Egg masses	373, 383	Egg masses at 373 were in old wood extraction trails made by machinery that retained some water. Masses at 383 were in wet areas.
Northern Flicker		Visual observation	368	Bird was observed exiting a nesting cavity in Red Oak tree. Figure 5b.
Chestnut Sided Warbler		Visual observation	370, 390	
American Redstart		Visual observation	374	
Red-eyed Vireo		Song	374	
Blue Jay		Song	375	
Black-throated Green Warbler		Song	376	Merlin Bird Identification app.
Pileated Woodpecker		Feeding excavation	378	
Bald Eagle		Call	379	Bird was not at this location, but call was heard from this waypoint.
Ovenbird		Song	380, 387	
Black-and-white Warbler		Visual observation	380	
Nashville Warbler		Song	387	Merlin Bird Identification app.
White-throated Sparrow		Nest and visual observation	388	

3.2.1 Mammals

By their nature, mammals tend to be nocturnal and therefore, inconspicuous. Consequently, their presence is often indicated by indirect sign (scat, tracks, calls, prey remains etc.) or inferred by habitat availability. Based on the type of habitats present at the study site there is likely a broad range of large, medium, and small mammal species present at this site.

No sign of mammal species at risk or conservation concern was observed during the survey. Although AC CDC records indicate that the closest records of endangered Mainland Moose are > 19 km from the project area, suitable habitat conditions for moose exist in the general area. Moose home ranges generally cover tens of square kilometers, and encompass both mature and regenerating forest, wetlands, and riverine habitats. The project area and surrounding habitats potentially provide a variety of foraging and cover opportunities over the short-term, so it is possible that the survey area could include a portion of moose home range. Regenerating hardwoods 10-15 years old offer preferred browse and are present within the survey area. Important moose habitats (e.g. wetlands, waterbodies, mature softwood stands) are lacking on this site; however, these habitats can be found within a kilometer of the center of

the proposed project area. NSDNRR mapping indicates the project site is not within a Mainland Moose concentration area, although it is close to mapped core habitat identified in the Mainland Moose Recovery Plan (NSDNRR, 2021).

Evidence of White-tail Deer was found within the survey area in the form of browse, scat, and rubs (Figure 11). These signs indicate that deer are using the area for foraging, travel and mating at different times of year. Regenerating early successional shrub and tree species provide abundant food resources that are capable of supporting a local population of deer. Deer generally move from high elevation areas in late fall and winter to avoid deep snow conditions; however, during mild winters snow may not reach critical depths and deer may utilize these habitats year-round.

No Black Bear (*Ursus americana*) sign was found; however, the heterogeneity and distribution of suitable bear habitats near the quarry site would indicate the potential for Black Bear to be in the area.

Mid-sized mammals such as American Marten (*Martes americana*) and Fisher generally prefer mature and late seral forests with large diameter trees and abundant coarse woody material. With past harvests and regeneration there was no evidence of these habitat elements in the project site. Both Fisher and American Marten are present in western and central Nova Scotia; however, neither species has been documented near the project area. American Marten have not been documented by the AC CDC within 80 kilometers of the study site, while Fisher have been reported within approximately 21 km of the quarry. Eastern Coyote are common throughout the province and although there was no evidence to confirm their presence they are most likely in the area. With the amount and distribution of forested habitats of various stages and stages of regeneration it is likely that Red fox (*Vulpes vulpes*) may also be present and foraging on small mammals and ground-nesting birds.

The absence of larger open-water wetlands, waterbodies, and watercourses suggests that aquatic furbearers normally associated with these habitats such as Beaver (*Castor canadensis*), Muskrat (*Ondatra zibethicus*), and River Otter (*Lontra canadensis*) are not resident within the project area. Streams and waterbodies in the general vicinity of the project area could be used by these species. Although there was no evidence of aquatic furbearers within the study site, wet drainages would provide suitable habitat for Raccoons (*Procyon lotor*), and forested upland habitats could also provide suitable habitat for Short-tailed Weasel (*Mustela erminae*).

Bat surveys were not part of the survey protocol; however, the lack of mature and old stands, with abundant standing deadwood structures (e.g., snag and cavity trees) would suggest that bats are not present or common in the project area. AC CDC records indicate that all three endangered bat species in Nova Scotia have been reported < 5 km from the study site, so it is possible that bats may occur where there are suitable foraging and roosting habitats (e.g., wetlands, wet-forest stands, mature forest stands, large diameter snag trees) nearby.

Small mammals such as Snowshoe Hare and Red Squirrel were present within the study area (Figures 12a, c). Regenerating forest stands with residual coarse woody material provides excellent cover and foraging habitat for several small mammal species such as Snowshoe Hare, Deer Mouse (*Peromyscus maniculatus*), and White-footed Mouse (*Peromyscus leucopus*). The lack of late seral mature forest conditions would suggest that the Red-backed Vole (*Myodes gapperi*) and Woodland Jumping Mouse (*Napaeozapus insignis*) are not present, or not present in any significant numbers. Grassy areas may support Meadow Vole (*Microtus pennsylvanicus*). The absence of larger mature trees with cavities and cracks in the bole would likely preclude the presence of flying squirrels on site, but the presence of these habitat features in adjacent forest stands suggests that flying squirrels may be present off-site. Insectivores such as shrews (*Blarina* sp., *Sorex* spp.) are most common where there is complex ground cover and coarse woody material present. Long-tailed Shrews are uncommon to rare in Nova Scotia, and are associated with late seral-closed canopy hardwood forests on talus slopes (Woolaver *et al*., 1998). This habitat does not exist at or adjacent to the quarry site so it is unlikely that this species occurs at this location. AC CDC records indicate one record of Long-tailed Shrews approximately 43 km from this site.

3.2.2 Herpetofauna

No reptile species were observed at the site; however, several provincial snake species are reported to occur in cutover areas, along roadsides, and in abandoned gravel pits (Gilhen, 1984). Similar habitats at or near the quarry area would indicate the potential presence of Maritime Garter Snake (*Thamnophis sirtalis*), Northern Redbelly Snake (*Storeria occipitomaculata*), and Eastern Smooth Green Snake (*Opheodrys vernalis*) in exposed sand, gravel, and waste areas, or deciduous forest adjacent to the proposed quarry (Gilhen, 1984). These areas would be used for thermoregulation (i.e., basking), while adjacent habitats with more complex vegetation structure near water could also be used for foraging. There have been occurrences of Wood Turtle, Snapping Turtle, or Eastern Painted Turtle reported by the AC CDC within 6 km of the study area; however, suitable habitat conditions (open water bodies or slow to moderately flowing streams) for these species are not present within the project area, or in the near vicinity of the quarry site. The closest natural water body that could potentially provide habitat for Snapping Turtle or Eastern Painted Turtle is 360 m east of the project area (Google Earth).

It is likely that the wet areas within the study area contain some common amphibian species. Wood Frogs (*Lithobates sylvaticus*) and Northern Spring Peeper (*Pseudacris crucifer*) are likely present in the study area where there is at least temporary standing water for breeding. The commonly occurring Green Frog (*Rana clamitans*) and American Toad (*Bufo americanus*) both require streams, or ponds for breeding which were lacking, and therefore, these species are not likely present (Gilhen, 1984). Yellow-spotted salamanders were present as indicated by several egg masses located in flooded vehicle tracks, and in wet areas. Red-backed salamanders (*Plethodon cinereus*) are common in deciduous and mixedwood forests similar to those occurring in the project area so it is likely that this species is present.

4.0 References

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