

WESP-AC also evaluates non-functional attributes such as Wetland Condition, Sensitivity, Public Use, and Stressors, based solely on benefit scores. The protocol allows assessments to focus on defined portions of wetlands when full delineation is not feasible, while still incorporating broader landscape context through the Office Form.

WESP-AC results, including the WSS Interpretation Tool, are provided in subsequent sections. WESP-AC datasheets/responses are attached in Appendix E.

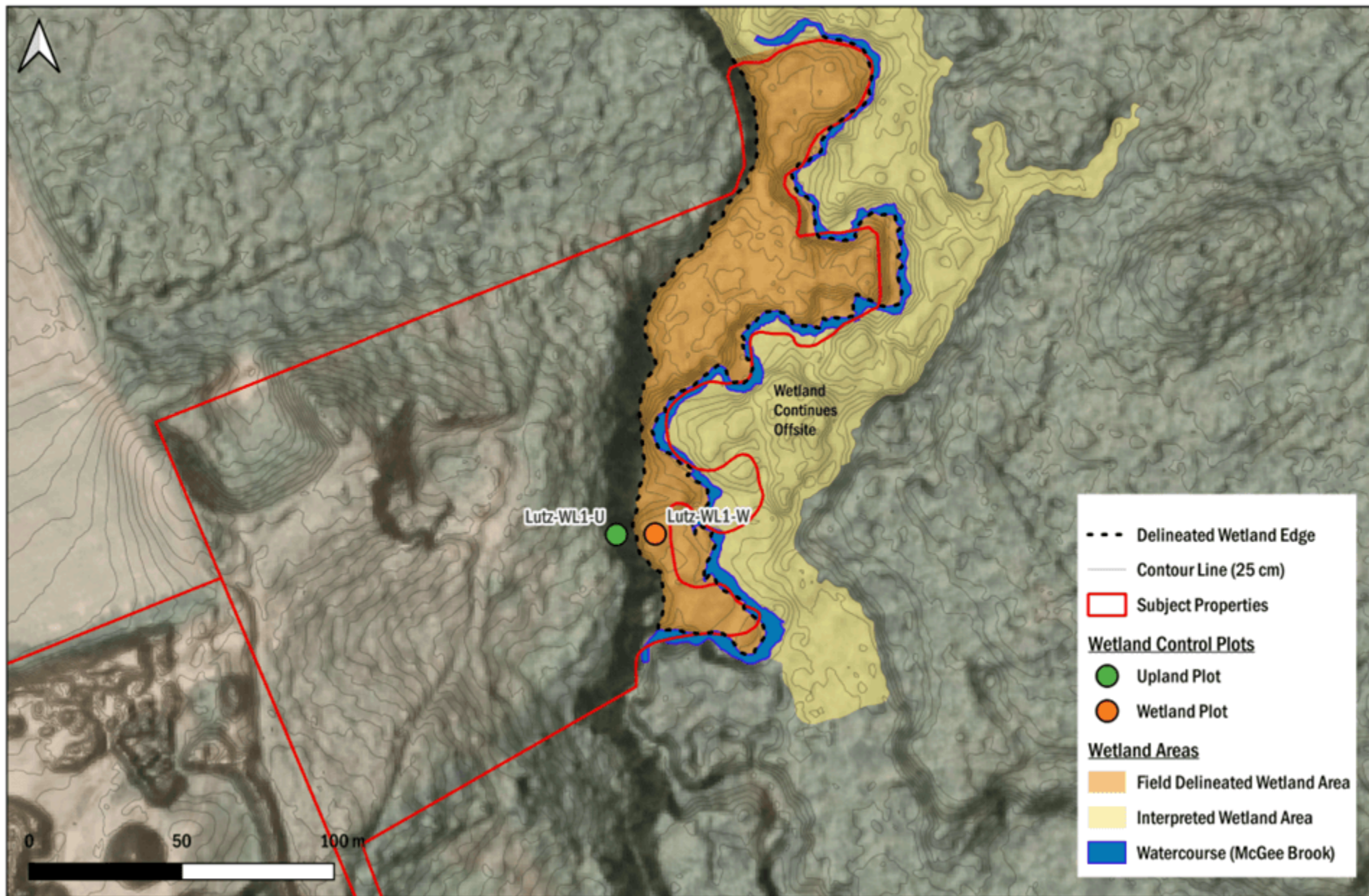
## **FIELD PROGRAMS : RESULTS**

**WETLAND DELINEATION:** Wetland surveys completed on the Project Site found one wetland (hereafter referred to as WL1) along the eastern boundary of the Project Site that is contiguous with McGee Brook (Drawing 7.1.2.4 & 7.1.2.5). This wetland complex was a floodplain throughflow wetland dominated by a combination of treed swamp and shrub swamp, with a lesser marsh component. Hydrological indicators include depleted matrix, high water table, surface water, saturated soils, water marks, sediment deposits, drift deposits, water-stained leaves, aquatic fauna, geomorphic position, drainage patterns, and moss trim lines. Adjacent upland habitat consisted of a deciduous forest with nearby disturbance from land clearing activities to the west.

**Swamp Class:** The treed swamp component is dominated by red maple (*Acer rubrum*) in the tree stratum, speckled alder (*Alnus incana*) in the shrub stratum, and reed canary grass (*Phalaris arundinacea*) in the herbaceous stratum. Scattered examples of other tree species within the swamp component include white elm (*Ulmus americana*), trembling aspen (*Populus tremuloides*), and paper birch (*Betula papyrifera*) - the latter two of which often occupy small upland inclusions within the wetland. The shrub swamp element of the wetland is dominated by species such as speckled alder, multiflora rose (*Rosa multiflora*), black cherry (*Prunus serotina*), English hawthorn (*Crataegus monogyna*), and chokecherry (*Prunus virginiana*). Herbaceous species throughout both treed and shrub swamp components include arrow-leaved smartweed (*Persicaria sagittata*), Christmas fern (*Polystichum acrostichoides*), fringed sedge (*Carex crinita*), Jack-in-the-pulpit (*Arisaema triphyllum*), and spotted jewelweed (*Impatiens capensis*).

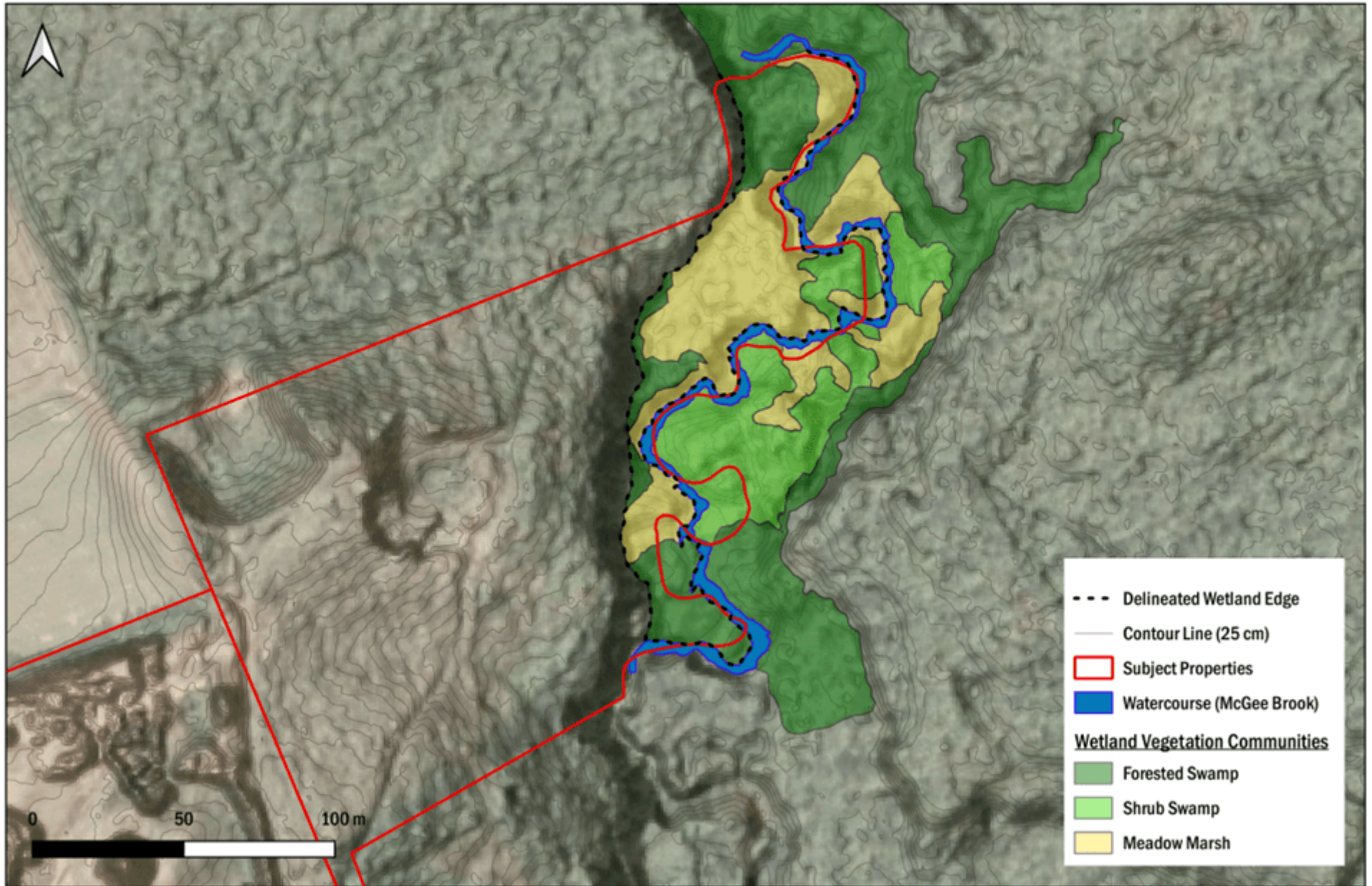
**Marsh Class:** The marsh habitat found along McGee Brook is dominated by graminoids such as reed canary grass, soft rush (*Juncus effusus*), fowl manna grass (*Glyceria striata*), fox sedge (*Carex vulpinoidea*), with an assortment of herbaceous plants that may be indicative of the highly agricultural landscape upstream of WL1, such as tufted vetch (*Vicia cracca*), alsike clover (*Trifolium hybridum*), creeping buttercup (*Ranunculus repens*), and curled dock (*Rumex crispus*). There are occasional small occurrences of open water marsh, which are attributed as seasonally detached back channels to McGee Brook - these are characteristically rimmed by graminoids such as fringed sedge, rice cutgrass (*Leersia oryzoides*), and the ubiquitous reed canary grass. Open water areas contain submerged herbaceous species such as Canada waterweed (*Elodea canadensis*), but are otherwise sparsely vegetated.

The adjacent upland habitat was dominated by red maple in the tree stratum, Northern red oak (*Quercus rubra*) in the high shrub stratum, red maple saplings in the low shrub stratum, and bracken fern (*Pteridium aquilinum*) and Eastern teaberry (*Gaultheria procumbens*) in the herbaceous stratum.



Drawing 7.1.2.4: Wetland Delineation Results. Wetland control plots are indicated by WL-1-W (wetland) and WL-1-U (upland).





Drawing 7.1.2.5: Wetland Delineation Results - Vegetation Communities





Figure 7.1.2.1: Representative photo of the treed swamp component of the wetland.



Figure 7.1.2.2: Representative photo of the meadow marsh component of the wetland. Bat detector mounted in foreground.





**Figure 7.1.2.3:** Representative photo of an open-water marsh component of the wetland, interspersed with shrub swamp.

**Wetland Functional Assessment:** WESP-AC (version 3.3) results are presented in Tables 7.3 and 7.4. The subject wetland WL1 exhibits a broad range of functional strengths and ecological values, with particularly high contributions to several key functions. Results indicate that WL1 provides strong support for water quality and hydrological regulation, as evidenced by high function ratings for Stream Flow & Temperature Support (SFTS), Nitrate Removal & Retention (NR), Organic Nutrient Export (OE), and Sediment & Toxicant Retention & Stabilization (SR). While the Surface Water Storage (WS) and Phosphorus Retention (PR) functions are rated lower in performance, the overall benefits scores (relative to reference wetlands) for these functions remain elevated, suggesting they still contribute meaningfully to downstream services and watershed integrity.

The site also ranks highly in terms of habitat provisioning, particularly for aquatic and semi-aquatic species. Notably, Anadromous Fish Habitat (FA), Amphibian Habitat (AM), Waterbird Feeding and Nesting Habitat (WBF/WBN), Pollinator Habitat (POL), and Raptor & Wetland Songbird Habitat (RSB) all scored 'Higher' on both functional and benefit scores. The extraordinarily high benefit scores for Keystone Mammal Habitat (KMH) are attributed to first-hand observations of both Beaver and Muskrat on the site. Overall, the habitat-aligned scores for WL1 highlight the site's role in supporting regional biodiversity and life history stages of multiple taxa.

Carbon sequestration and climate regulation functions show a mixed profile. Carbon Capture (CC) and Wildfire Resistance (WFR) exhibit high function scores, suggesting the wetland contributes to climate resilience and carbon storage. However, the Carbon Stock Preservation (CSP) function scored very low, indicating that the



existing soil carbon pool may be limited or that the wetland's condition does not support long-term carbon storage potential.

The wetland is characterized by high sensitivity and is currently subject to moderate levels of environmental stress. This combination suggests the area is relatively vulnerable to disturbance and may already be experiencing ecological pressures. Of particular concern is the condition of native vegetation, with results indicating significant degradation or displacement within the plant community - this is attributed to the dominance of aggressive (although technically native) species such as Reed-Canary Grass (*Phalaris arundinacea*), which, for the purposes of this assessment, is treated as invasive.

**Functional WSS Determination Tool:** The Functional WSS status of WL1 was determined using the WESP-AC Function-Benefit Product (FBP) method, which evaluates grouped functions under two supergroups: Support (hydrologic, water/climate protection, aquatic support) and Habitat (aquatic and transition habitat). Each FBP score is classified as Low, Moderate, or High based on standard thresholds, and WSS status is assigned if any of the rules in Table 7.4 are satisfied.

For WL1, the Habitat Supergroup includes one High score (Aquatic Habitat), the Support Supergroup includes one High score (Aquatic Support), with the remainder rated Low or Moderate. As a result, the Habitat Rule, Support Rule, and Hybrid Rule are not satisfied, and WL1 is not classified as a WSS.

**Table 7.4:** WESP-AC Summary Table

Specific Functions or Values	Function Score (Normalized)	Function Rating	Benefits Score (Normalized)	Benefits Rating
Surface Water Storage (WS)	2.98	Lower	7.22	Higher
Stream Flow & Temperature Support (SFTS)	8.67	Higher	8.90	Higher
Sediment & Toxicant Retention & Stabilisation (SR)	4.95	Moderate	6.18	Higher
Phosphorus Retention (PR)	0.89	Lower	7.29	Higher
Nitrate Removal & Retention (NR)	4.92	Higher	10.00	Higher
Wildfire Resistance (WFR)	6.36	Higher	10.91	Higher
Carbon Stock Preservation (CSP)	0.47	Lower		
Carbon Capture (CC)	8.46	Higher		
Organic Nutrient Export (OE)	8.45	Higher		
Aquatic Primary Productivity (APP)	11.11	Higher	8.51	Higher
Anadromous Fish Habitat (FA)	8.20	Higher	7.08	Higher
Resident & Other Fish Habitat (FR)	8.83	Higher	7.93	Higher
Amphibian Habitat (AM)	63.65	Higher	6.16	Higher
Waterbird Feeding Habitat (WBF)	7.75	Higher	27.50	Higher
Waterbird Nesting Habitat (WBN)	7.55	Moderate	27.50	Higher
Raptor & Wetland Songbird Habitat (RSB)	9.07	Higher	10.00	Higher
Keystone Mammal Habitat (KMH)	13.13	Higher	27.50	Higher

Specific Functions or Values	Function Score (Normalized)	Function Rating	Benefits Score (Normalized)	Benefits Rating
Native Plant Habitat (PH)	-19.16	Lower	-1.03	Lower
Pollinator Habitat (POL)	9.67	Higher	6.67	Higher
Cultural & Recreational Importance (CRI)			5.01	Higher
Wetland Sensitivity (Sens)			8.94	Higher
Wetland Stressors (STR)			6.51	Higher
<b>Grouped Functions</b>				
HYDROLOGIC (HYg) (WS)	2.98	Lower	7.22	Higher
WATER & CLIMATE PROTECTION (WQg) (max + average)/2 of SR, PR, NR, CSP	3.88	Higher	8.91	Higher
AQUATIC SUPPORT (ASg) (max + average)/2 of SFTS, OE, APP	10.26	Higher	8.81	Higher
AQUATIC HABITAT (AHg) (max+avg)/2 of FA, FR, AM, WBF, WBN	41.42	Higher	21.37	Higher
TRANSITION HABITAT (THg) (max + avg)/2 of RSB, PH, POL	4.77	Higher	7.61	Higher

**Table 7.5: WESP-AC Functional WSS Results**

Function-Benefit Product (FBP)	FBP Score	FBP Score Category
SUPPORT SUPERGROUP - HYDROLOGIC	21.52	Low
SUPPORT SUPERGROUP - WATER & CLIMATE PROTECTION	34.58	Moderate
SUPPORT SUPERGROUP - AQUATIC SUPPORT	90.35	High
HABITAT SUPERGROUP - AQUATIC HABITAT	885.09	High
HABITAT SUPERGROUP - TRANSITION HABITAT	36.25	Low
<b>Functional WSS Determination</b>		
Habitat Rule Satisfied?	<b>No</b>	
Support Rule Satisfied?	<b>No</b>	
Habitat/Support Hybrid Rule Satisfied?	<b>No</b>	
CONCLUSION	<b>Not a Functional WSS</b>	

### **7.1.3 FLORA**

#### **REGULATORY CONTEXT**

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to flora.



## FEDERAL

- ***Species at Risk Act (S.C. 2002, c. 29)*** - This Act protects SAR and their critical habitats across Canada, prohibiting harm to listed species and habitat destruction. For this Project, it ensures listed terrestrial flora species are safeguarded, with measures in place to prevent habitat impacts.

## PROVINCIAL

- ***Endangered Species Act (S.N.S. 1998, c. 11)*** - This Act protects SAR and their critical habitats in Nova Scotia, prohibiting harm, harassment, or destruction. For this Project, it ensures listed terrestrial flora species are safeguarded, with measures in place to prevent habitat impacts.

## DESKTOP REVIEW : METHODOLOGY

The desktop review was completed through a review of the following resources:

- ACCDC Data Report (ACCDC, 2024b; Appendix F)
- Provincial Landscape Viewer (NSNRR, n.d.-d)
- Significant Species and Habitats Database (NSNRR, 2023)

## DESKTOP REVIEW : RESULTS

According to ACCDC records, 30 SAR/SOCI flora species have been identified within 5 km of the Project, including 20 vascular and 10 nonvascular species (Table 7.6). One SAR, long-branched frostweed (*Crocanthemum canadense*), is recorded near the Project Site; however, this observation has a spatial precision of 3.7, meaning the actual occurrence could be anywhere within a 2.8-8.9 km range (ACCDC, 2024a). Given this level of uncertainty and the absence of frostweed in site-specific surveys, it is unlikely that the species is present within the Project Site, though suitable habitat may have existed historically.

**Table 7.6:** SAR/SOCI Flora Species Identified Within 5 km of the Project Based on ACCDC Records

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Distance From Site (km)
Vascular Flora						
American beech	<i>Fagus grandifolia</i>	---	---	---	S3S4	3.2 ± 0.01
Arrow-leaved violet	<i>Viola sagittata</i> var. <i>ovata</i>	---	---	---	S3S4	2.0 ± 0.5
Bicknell's crane's-bill	<i>Geranium bicknellii</i>	---	---	---	S3	2.6 ± 0.01
Blood milkwort	<i>Polygala sanguinea</i>	---	---	---	S3	2.5 ± 1.0
Climbing false	<i>Fallopia scandens</i>	---	---	---	S3S4	2.0 ± 5.0

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Distance From Site (km)
buckwheat						
Highbush blueberry	<i>Vaccinium corymbosum</i>	---	---	---	S3S4	4.4 ± 0.2
Long-branched frostweed	<i>Crocianthemum canadense</i>	---	---	Endangered	S1S2	0.4 ± 1.2
Marsh bellflower	<i>Palustricodon aparinoides</i>	---	---	---	S3	0.5 ± 1.0
Narrow-leaved panic grass	<i>Dichanthelium linearifolium</i>	---	---	---	S3	4.0 ± 0.2
Northern comandra	<i>Geocaulon lividum</i>	---	---	---	S3S4	1.4 ± 1.5
Pale false manna grass	<i>Torreyochloa pallida</i> var. <i>pallida</i>	---	---	---	S1	1.3 ± 1.5
Pinebarren golden heather	<i>Hudsonia ericoides</i>	---	---	---	S2	0.6 ± 0.1
Running serviceberry	<i>Amelanchier spicata</i>	---	---	---	S3S4	2.2 ± 1.2
Sharp-fruit rush	<i>Juncus acuminatus</i>	---	---	---	S3S4	1.7 ± 2.0
Short-awned foxtail	<i>Alopecurus aequalis</i>	---	---	---	S3S4	4.5 ± 0.01
Sleepy catchfly	<i>Silene antirrhina</i>	---	---	---	S1	4.5 ± 0.01
Slender ricegrass	<i>Piptatheropsis pungens</i>	---	---	---	S2	2.8 ± 0.0
Small-flowered bittercress	<i>Cardamine parviflora</i>	---	---	---	S3	2.9 ± 7.07
White elm	<i>Ulmus americana</i>	---	---	---	S3S4	2.6 ± 0.01
Yellow-seeded false pimpernel	<i>Lindernia dubia</i>	---	---	---	S3	4.0 ± 0.2
<b>Nonvascular Flora</b>						
Anomalous bristle moss	<i>Orthotrichum anomalum</i>	---	---	---	S2?	1.8 ± 0.2
Aspen bristle moss	<i>Orthotrichum gymnostomum</i>	---	---	---	S1	1.8 ± 0.2
Black-footed reindeer lichen	<i>Cladonia stygia</i>	---	---	---	S3?	3.8 ± 0.01
Cuspidate earth moss	<i>Tortula acaulon</i>	---	---	---	S1S2	3.0 ± 0.2



Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Distance From Site (km)
Immersed Physcomitrium moss	<i>Physcomitrium immersum</i>	---	---	---	S1?	3.3 ± 0.2
Knothole moss	<i>Anacamptodon splachnoides</i>	---	---	---	S2	1.5 ± 0.2
Lesser smoothcap moss	<i>Atrichum angustatum</i>	---	---	---	S2?	4.3 ± 0.2
Marbled screw-moss	<i>Syntrichia papillosa</i>	---	---	---	S1S2	1.5 ± 0.2
Sand-loving Icelandmoss lichen	<i>Cetraria arenaria</i>	---	---	---	S2S3	2.3 ± 0.0
Serrated earth moss	<i>Ephemerum serratum</i>	---	---	---	S3	4.1 ± 0.2

Source: ACCDC (2024b)

Further, according to the Provincial Landscape Viewer, there are several Atlantic Coastal Plain Flora (ACPF) buffers within 5 km of the Project. ACPF refers to a group of rare, primarily southern plant species found along the Atlantic coastal plain, including southwest Nova Scotia. The buffered zones represent areas within 100 m of known occurrences of 42 priority ACPF species, based on data from ACCDC and the *Recovery Strategy and Management Plan for Multiple Species of Atlantic Coastal Plain Flora in Canada* (Environment Canada & Parks Canada, 2010). These buffers support conservation and land-use planning by identifying areas adjacent to important ACPF habitat. No ACPF buffers overlap within the Project Site, and the nearest is approximately 350 m southwest.

## **FIELD PROGRAMS: METHODOLOGY**

**General Inventory:** A general vegetation (including lichens) survey was conducted within the Project Site, with numerous surveys completed through the period of mid-June to mid-September 2024. Surveys were conducted using a ‘meandering transect’ technique and were completed across multiple seasonal visits to maximize exposure to species phenology. Special emphasis was placed upon identifying SAR/SOCI and their habitats. Data was collected to the standards of the ACCDC spatial data schema, and individual observations were recorded using a Survey123 data collection form. Occurrences of rare taxa were georeferenced and documented (habitat conditions, abundance, etc.) accordingly for each individual occurrence encountered by the surveyor. Non-rare species were georeferenced at the location of their first encounter. Survey coverage and species observations are shown on Drawing 7.1.3.1.

## **FIELD PROGRAMS : RESULTS**

**General Inventory:** During the general vegetation surveys of the Project Site, 162 vascular plants and 12 nonvascular moss and lichen species were observed. Of these 174 species, none are SAR and three are SOCI (Table 7.7).

**Table 7.7:** Flora Species Identified Within the Project Site During Field Surveys

Scientific Name	Common Name	NS S-Rank	Exotic or Invasive
<b>Vascular Flora</b>			
<i>Acer rubrum</i>	Red maple	S5	-
<i>Acer spicatum</i>	Mountain maple	S5	-
<i>Achillea millefolium</i>	Common yarrow	SNA	Exotic
<i>Actaea rubra</i>	Red baneberry	S5	-
<i>Agrimonia striata</i>	Woodland agrimony	S5	-
<i>Alisma triviale</i>	Northern water plantain	S5	-
<i>Alnus incana</i>	Speckled alder	S5	-
<i>Ambrosia artemisiifolia</i>	Common ragweed	S5	-
<i>Amelanchier bartramiana</i>	Bartram's serviceberry	S5	-
<i>Amphicarpaea bracteata</i>	American hog peanut	S4	-
<i>Angelica sylvestris</i>	Woodland angelica	SNA	Exotic/ Invasive
<i>Anthoxanthum odoratum</i>	Large sweet vernal grass	SNA	Exotic
<i>Apocynum androsaemifolium</i>	Spreading dogbane	S5	-
<i>Aralia nudicaulis</i>	Wild sarsaparilla	S5	-
<i>Arctium minus</i>	Common burdock	SNA	Exotic
<i>Arenaria serpyllifolia</i>	Thyme-leaved sandwort	SNA	Exotic
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	S5	-
<i>Aronia melanocarpa</i>	Black chokeberry	S5	-
<i>Asclepias syriaca</i>	Common milkweed	SU	-
<i>Athyrium filix-femina</i>	Common lady fern	S5	-
<i>Axyris amaranthoides</i>	Russian pigweed	SNA	Exotic
<i>Betula papyrifera</i>	Paper birch	S5	-
<i>Betula populifolia</i>	Gray birch	S5	-
<i>Callitriche heterophylla</i>	Large water-starwort	S4	-
<i>Callitriche palustris</i>	Marsh water-starwort	S5	-
<i>Cardamine pensylvanica</i>	Pennsylvania bittercress	S5	-
<i>Cardamine pratensis</i>	Cuckoo flower	SNA	-
<i>Carex arctata</i>	Black sedge	S5	-
<i>Carex communis</i>	Fibrous-root sedge	S5	-
<i>Carex crinita</i>	Fringed sedge	S5	-



Scientific Name	Common Name	NS S-Rank	Exotic or Invasive
<i>Carex intumescens</i>	Bladder sedge	S5	-
<i>Carex tomsa</i>	Deep green sedge	S5	-
<i>Carex vulpinoidea</i>	Fox sedge	S4	-
<i>Cerastium arvense</i>	Mouse-ear chickweed	SU	-
<i>Circaea alpina</i>	Small enchanter's nightshade	S5	-
<i>Circaea canadensis</i>	Broad-leaved enchanter's nightshade	S4S5	-
<i>Clematis virginiana</i>	Virginia clematis	S5	-
<i>Clintonia borealis</i>	Yellow bluebead lily	S5	-
<i>Comptonia peregrina</i>	Sweet-fern	S5	-
<i>Convolvulus arvensis</i>	Field bindweed	SNA	Exotic
<i>Corema conradii</i>	Broom crowberry	S4	-
<i>Corylus cornuta</i>	Beaked hazel	S5	-
<i>Crataegus monogyna</i>	English hawthorn	SNA	Exotic
<i>Cyperus esculentus</i>	Perennial yellow nutsedge	SNA	Exotic
<i>Daucus carota</i>	Queen Anne's lace	SNA	Exotic
<i>Dianthus armeria</i>	Deptford pink	SNA	Exotic
<i>Dichanthelium boreale</i>	Northern panic grass	S5	-
<i>Diervilla lonicera</i>	Northern bush honeysuckle	S5	-
<i>Digitaria ischaemum</i>	Smooth crab grass	SNA	Exotic
<i>Dryopteris carthusiana</i>	Spinulose wood fern	S5	-
<i>Echinochloa crus-galli</i>	Large barnyard grass	SNA	Exotic
<i>Echinocystis lobata</i>	Wild cucumber	SNA	Exotic
<i>Elodea canadensis</i>	Canada waterweed	S4	-
<i>Elymus repens</i>	Quack grass	SNA	Exotic
<i>Elymus trachycaulus</i>	Slender wild rye	S4	-
<i>Epipactis helleborine</i>	Helleborine	SNA	Exotic
<i>Equisetum sylvaticum</i>	Woodland horsetail	S5	-
<i>Erechtites hieraciifolius</i>	Eastern burnweed	S5	-
<i>Erigeron annuus</i>	Annual fleabane	S4S5	-
<i>Euthamia graminifolia</i>	Grass-leaved goldenrod	S5	-
<b><i>Fagus grandifolia</i></b>	<b>American beech</b>	<b>S3S4</b>	-
<i>Fallopia cilinodis</i>	Fringed black bindweed	S5	-
<i>Galeopsis tetrahit</i>	Common hemp-nettle	SNA	Exotic
<i>Galium asprellum</i>	Rough bedstraw	S5	-
<i>Galium mollugo</i>	Smooth bedstraw	SNA	Exotic/ Invasive
<i>Galium palustre</i>	Common marsh bedstraw	S5	-
<i>Gaultheria procumbens</i>	Eastern teaberry	S5	-
<i>Gaylussacia baccata</i>	Black huckleberry	S5	-

Scientific Name	Common Name	NS S-Rank	Exotic or Invasive
<i>Geum aleppicum</i>	Yellow avens	S5	-
<i>Geum macrophyllum</i>	Large-leaved avens	S5	-
<i>Glyceria striata</i>	Fowl manna grass	S5	-
<b><i>Hudsonia ericoides</i></b>	<b>Pinebarren golden heather</b>	<b>S2</b>	-
<i>Humulus lupulus</i>	Common hop	SU	-
<i>Hypericum perforatum</i>	Common St. John's-wort	SNA	Exotic/ Invasive
<i>Impatiens capensis</i>	Spotted jewelweed	S5	-
<i>Juncus effusus</i>	Soft rush	S5	-
<i>Kalmia angustifolia</i>	Sheep laurel	S5	-
<i>Lactuca biennis</i>	Tall blue lettuce	S5	-
<i>Lechea intermedia</i>	Large-pod pinweed	S4	-
<i>Leersia oryzoides</i>	Rice cut grass	S5	-
<i>Linaria vulgaris</i>	Butter-and-eggs	SNA	Exotic
<i>Lonicera canadensis</i>	Canada fly honeysuckle	S5	-
<i>Ludwigia palustris</i>	Marsh seedbox	S5	-
<i>Luzula multiflora</i>	Common woodrush	S5	-
<i>Lysimachia borealis</i>	Northern starflower	S5	-
<i>Maianthemum canadense</i>	Wild lily-of-the-valley	S5	-
<i>Malus pumila</i>	Common apple	SNA	Exotic
<i>Matteuccia struthiopteris</i>	Ostrich fern	S5	-
<i>Melampyrum lineare</i>	American cow wheat	S5	-
<i>Mentha canadensis</i>	Canadian mint	S5	-
<i>Mitchella repens</i>	Partridgeberry	S5	-
<i>Nabalus altissimus</i>	Tall rattlesnakeroot	S5	-
<i>Nuttallanthus canadensis</i>	Canada toadflax	SNA	Exotic
<i>Oenothera biennis</i>	Common evening primrose	S5	-
<i>Onoclea sensibilis</i>	Sensitive fern	S5	-
<i>Oxalis stricta</i>	European wood sorrel	S5	-
<i>Panicum capillare</i>	Common witch grass	SNA	Exotic
<i>Parthenocissus quinquefolia</i>	Virginia creeper	SNA	Exotic/ Invasive
<i>Persicaria lapathifolia</i>	Pale smartweed	S5	-
<i>Persicaria maculosa</i>	Spotted lady's-thumb	SNA	Exotic
<i>Persicaria sagittata</i>	Arrow-leaved smartweed	S5	-
<i>Phalaris arundinacea</i>	Reed canary grass	S5	-
<i>Phleum pratense</i>	Common timothy	SNA	Exotic
<i>Picea glauca</i>	White spruce	S5	-
<i>Pilosella piloselloides</i>	Tall hawkweed	SNA	Exotic
<i>Pinus resinosa</i>	Red pine	S4S5	-

Scientific Name	Common Name	NS S-Rank	Exotic or Invasive
<i>Pinus strobus</i>	Eastern white pine	S5	-
<i>Pinus sylvestris</i>	Scotch pine	SNA	Exotic/ Invasive
<i>Plantago lanceolata</i>	English plantain	SNA	Exotic
<i>Plantago major</i>	Common plantain	SNA	Exotic
<i>Polystichum acrostichoides</i>	Christmas fern	S5	-
<i>Populus grandidentata</i>	Large-toothed aspen	S5	-
<i>Populus tremuloides</i>	Trembling aspen	S5	-
<i>Populus x jackii</i>	Balm-of-gilead	SNA	Exotic Hybrid
<i>Potamogeton epihydrus</i>	Ribbon-leaved pondweed	S5	-
<i>Potentilla simplex</i>	Old field cinquefoil	S5	-
<i>Prunus pensylvanica</i>	Pin cherry	S5	-
<i>Prunus serotina</i>	Black cherry	S5	-
<i>Prunus virginiana</i>	Chokecherry	S5	-
<i>Pteridium aquilinum</i>	Bracken fern	S5	-
<i>Quercus rubra</i>	Northern red oak	S5	-
<i>Ranunculus acris</i>	Common buttercup	SNA	Exotic
<i>Ranunculus recurvatus</i>	Hooked buttercup	S4	-
<i>Ranunculus repens</i>	Creeping buttercup	SNA	Exotic/ Invasive
<i>Raphanus raphanistrum</i>	Wild radish	SNA	Exotic
<i>Reynoutria sachalinensis</i>	Giant knotweed	SNA	Exotic
<i>Rhus typhina</i>	Staghorn sumac	S4	-
<i>Ribes hirtellum</i>	Smooth gooseberry	S5	-
<i>Rosa multiflora</i>	Multiflora rose	SNA	Exotic/ Invasive
<i>Rosa virginiana</i>	Virginia rose	S5	-
<i>Rubus allegheniensis</i>	Alleghaney blackberry	S5	-
<i>Rubus idaeus</i>	Red raspberry	S5	-
<i>Rubus setosus</i>	Bristly blackberry	S4	-
<i>Rudbeckia hirta</i>	Black-eyed susan	SNA	Exotic
<i>Rumex acetosella</i>	Sheep sorrel	SNA	Exotic
<i>Rumex britannica</i>	Greater water dock	S5	-
<i>Rumex crispus</i>	Curled dock	SNA	Exotic
<i>Sambucus racemosa</i>	Red elderberry	S5	-
<i>Scirpus cyperinus</i>	Common woolly bulrush	S5	-
<i>Setaria pumila</i>	Yellow foxtail	SNA	Exotic
<i>Silene flos-cuculi</i>	Ragged-robin	SNA	Exotic
<i>Silene latifolia</i>	White campion	SNA	Exotic
<i>Solanum dulcamara</i>	Bittersweet nightshade	SNA	Exotic
<i>Solidago bicolor</i>	White goldenrod	S5	-

Scientific Name	Common Name	NS S-Rank	Exotic or Invasive
<i>Solidago flexicaulis</i>	Zigzag goldenrod	S5	-
<i>Solidago rugosa</i>	Rough-stemmed goldenrod	S5	-
<i>Spiraea alba</i>	White meadowsweet	S5	-
<i>Tanacetum vulgare</i>	Common tansy	SNA	Exotic/ Invasive
<i>Taraxacum officinale</i>	Common dandelion	SNA	Exotic
<i>Thalictrum pubescens</i>	Tall meadow-rue	S5	-
<i>Tilia cordata</i>	Little-leaved linden	SNA	Exotic
<i>Trifolium arvense</i>	Rabbit's-foot clover	SNA	Exotic
<i>Trifolium hybridum</i>	Alsike clover	SNA	Exotic
<i>Trifolium pratense</i>	Red clover	SNA	Exotic
<i>Trillium cernuum</i>	Nodding trillium	S4	-
<i>Tussilago farfara</i>	Coltsfoot	SNA	Exotic/Invasive
<b><i>Ulmus americana</i></b>	<b>White elm</b>	<b>S3S4</b>	-
<i>Vaccinium angustifolium</i>	Late lowbush blueberry	S5	-
<i>Vaccinium myrtilloides</i>	Velvet-leaved blueberry	S5	-
<i>Verbascum thapsus</i>	Common mullein	SNA	Exotic
<i>Vicia cracca</i>	Tufted vetch	SNA	Exotic
<i>Viola cucullata</i>	Marsh blue violet	S5	-
<b>Nonvascular Flora</b>			
<i>Atrichum undulatum</i>	Common smoothcap moss	S5	-
<i>Climacium dendroides</i>	Northern tree moss	S5	-
<i>Dicranum scoparium</i>	Common broom moss	S5	-
<i>Flavoparmelia caperata</i>	Granulated greenshield lichen	S5	-
<i>Gyalolechia flavorubescens</i>	Bark sulphur-firedot lichen	S5	-
<i>Hypogymnia physodes</i>	Monk's hood lichen	S5	-
<i>Parmelia squarrosa</i>	Bottlebrush shield lichen	S5	-
<i>Polytrichum commune</i>	Bristly haircap moss	S5	-
<i>Ramalina americana</i>	Sinewed ramalina lichen	S5	-
<i>Rhytidiadelphus triquetrus</i>	Electrified cat's-tail moss	S5	-
<i>Usnea strigosa</i>	Bushy beard lichen	S5	-
<i>Xanthoria parietina</i>	Maritime sunburst lichen	S5	-

Note: Bold indicates SOCI

Of the 174 flora species observed, 52 were exotic species not native to Nova Scotia. Of these 52 exotic species, nine are considered invasive by NSECC within the WESP-AC non-tidal supplemental materials invasive species list (Table 7.8).



**Table 7.8: Invasive Flora Species Identified Within the Project Site During Field Surveys**

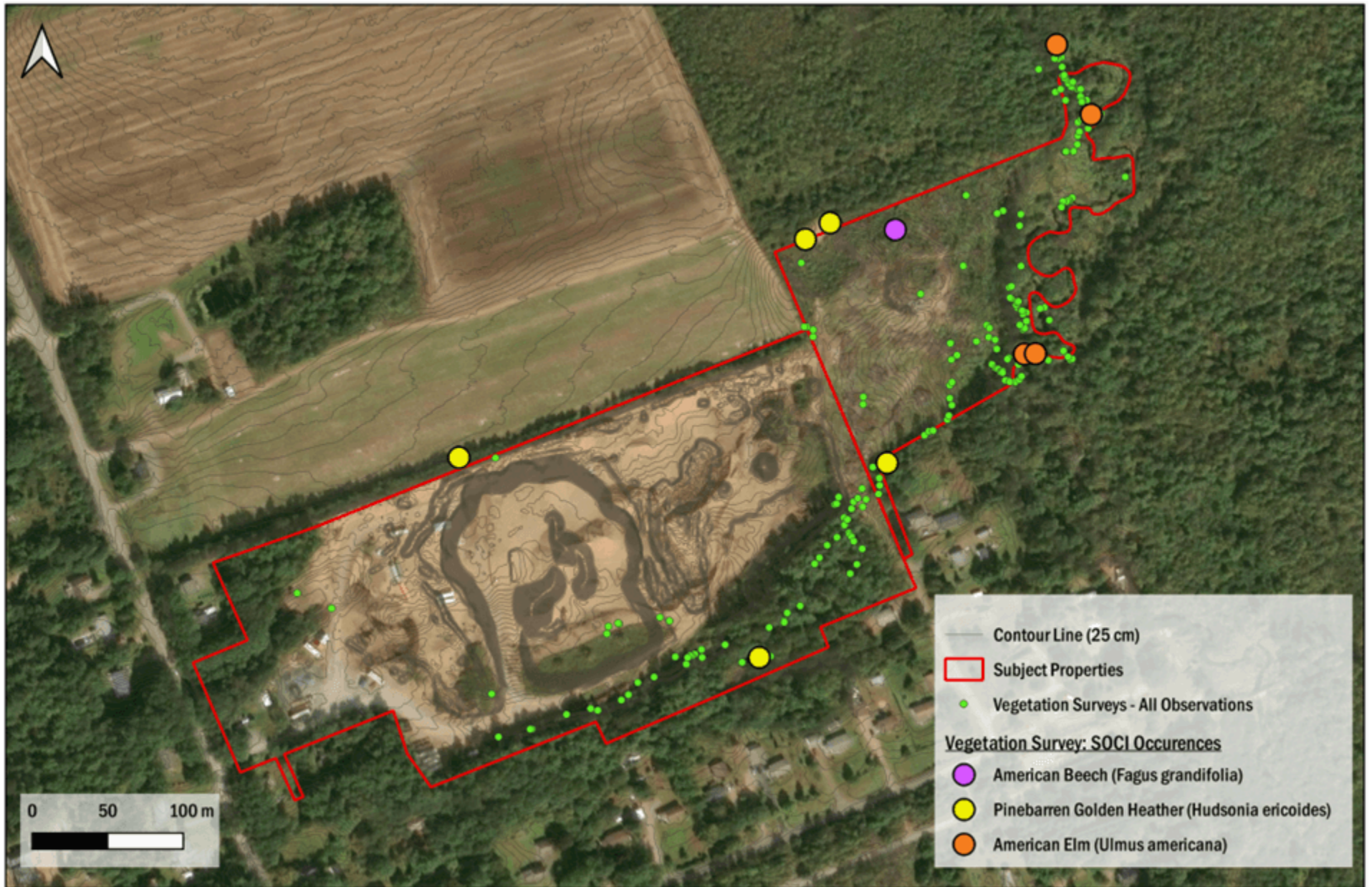
Common Name	Scientific Name	Invasiveness
Coltsfoot	<i>Tussilago farfara</i>	Moderate
Common St. John's-wort	<i>Hypericum perforatum</i>	Low-Moderate
Common tansy	<i>Tanacetum vulgare</i>	Low-Moderate
Creeping buttercup	<i>Ranunculus repens</i>	Moderate
Multiflora rose	<i>Rosa multiflora</i>	Moderate
Scotch pine	<i>Pinus sylvestris</i>	Moderate
Smooth bedstraw	<i>Galium mollugo</i>	Low-Moderate
Virginia creeper	<i>Parthenocissus quinquefolia</i>	Low-Moderate
Woodland angelica	<i>Angelica sylvestris</i>	Moderate

Source: ACCDC (2024b); NSECC (2012)



**Figure 7.1.3.1:** Pinebarren golden heather (*Hudsonia ericoides*), one of the SOCI flora species encountered on site.





Drawing 7.1.3.1: Vegetation Survey Results

#### **7.1.4 FAUNA**

##### **REGULATORY CONTEXT**

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to fauna.

##### **FEDERAL**

- ***Species at Risk Act (S.C. 2002, c. 29)*** - This Act protects SAR and their critical habitats across Canada, prohibiting harm to listed species and habitat destruction. For this Project, it ensures listed terrestrial fauna species are safeguarded, with measures in place to prevent habitat impacts.
- ***Migratory Birds Convention Act, 1994 (S.C. 1994, c. 22)*** - This Act protects migratory birds, their nests, and eggs across Canada, prohibiting disturbance or harm without appropriate authorization. For this Project, it ensures that construction and operational activities are planned to avoid disturbance to migratory birds, particularly during the breeding season, through mitigation measures such as timing restrictions and pre-construction nest surveys.
- ***Migratory Birds Regulations, 2022 (SOR/2022-105)*** - These regulations provide detailed rules for the protection of migratory birds, their nests, and eggs. They outline prohibitions on harm during key periods like nesting and include species whose nests are protected year-round, as specified in Schedule 1. The regulations set out circumstances for issuing permits and reinforce the need to avoid disruptive activities during nesting. For this Project, they support the use of mitigation measures, such as nest surveys and timing windows, to prevent harm to protected species.
- ***Canada Wildlife Act (R.S.C., 1985, c. W-9)*** - This Act provides authority for wildlife protection and management in Canada, including the establishment of wildlife areas for research and conservation. For this Project, it reinforces the need to consider general wildlife species in project planning and to minimize habitat disturbance where feasible.

##### **PROVINCIAL**

- ***Endangered Species Act (S.N.S. 1998, c. 11)*** - This Act protects SAR and their critical habitats in Nova Scotia, prohibiting harm, harassment, or destruction. For this Project, it ensures listed terrestrial fauna species are safeguarded, with measures in place to prevent habitat impacts.
- ***Wildlife Act (R.S.N.S. 1989, c. 504)*** - This Act governs wildlife protection, hunting, trapping, and habitat disturbance in Nova Scotia. For this Project, it ensures that general wildlife species are considered and protected through standard mitigation practices.

## **DESKTOP REVIEW : METHODOLOGY**

The desktop review was completed through a review of the following resources:

- ACCDC Data Report (ACCDC, 2024b)
- NatureCounts Data (NatureCounts, n.d.)
- Important Bird Areas (IBAs) (IBA Canada, n.d.-b)
- Provincial Landscape Viewer (NSNRR, n.d.-d)
- Significant Species and Habitats Database (NSNRR, 2023)
- Nova Scotia Geoscience Atlas (NSNRR, n.d.-c)

## **DESKTOP REVIEW : RESULTS**

According to ACCDC records, 39 SAR/SOCI terrestrial fauna species have been identified within 5 km of the Project, including 35 vertebrates and four invertebrates. Specifically, among the vertebrates, 32 species are avifauna, and three are herpetofauna (Table 7.9). Further, a 'bat hibernaculum or bat species occurrence' was identified by ACCDC to be within 5 km of the Project. No SAR/SOCI species have been identified by ACCDC within the Project Site.

**Table 7.9:** SAR/SOCI Terrestrial Fauna Species Identified Within 5 km of the Project Based on ACCDC Records

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Distance From Site (km)
<b>Avifauna</b>						
American Kestrel	<i>Falco sparverius</i>	---	---	---	S3B, S4S5M	2.9 ± 7.07
Baltimore Oriole	<i>Icterus galbula</i>	---	---	---	S2S3B, SUM	2.9 ± 7.07
Bank Swallow	<i>Riparia riparia</i>	Threatened	Threatened	Endangered	S2B	1.1 ± 0.5
Barn Swallow	<i>Hirundo rustica</i>	Special Concern	Threatened	Endangered	S3B	2.7 ± 0.15
Bay-breasted Warbler	<i>Setophaga castanea</i>	---	---	---	S3S4B, S4S5M	2.9 ± 7.07
Bobolink	<i>Dolichonyx oryzivorus</i>	Special Concern	Threatened	Vulnerable	S3B	2.9 ± 7.07
Boreal Chickadee	<i>Poecile hudsonicus</i>	---	---	---	S3	2.9 ± 7.07
Brown Thrasher	<i>Toxostoma rufum</i>	---	---	---	S1B	4.4 ± 0.25
Brown-headed Cowbird	<i>Molothrus ater</i>	---	---	---	S2B	2.6 ± 0.2



Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Distance From Site (km)
Canada Jay	<i>Perisoreus canadensis</i>	---	---	---	S3	2.9 ± 7.07
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	---	---	---	S2S3B	2.9 ± 7.07
Common Nighthawk	<i>Chordeiles minor</i>	Special Concern	Special Concern	Threatened	S3B	2.9 ± 7.07
Eastern Bluebird	<i>Sialia sialis</i>	Not At Risk	---	---	S3B	3.4 ± 0.2
Eastern Kingbird	<i>Tyrannus tyrannus</i>	---	---	---	S3B	2.9 ± 7.07
Eastern Wood-pewee	<i>Contopus virens</i>	Special Concern	Special Concern	Vulnerable	S3S4B	1.0 ± 0.01
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Special Concern	Special Concern	Vulnerable	S3B, S3N, S3M	2.9 ± 7.07
Fox Sparrow	<i>Passerella iliaca</i>	---	---	---	S3S4B, S5M	2.9 ± 7.07
Greater Yellowlegs	<i>Tringa melanoleuca</i>	---	---	---	S3B, S4M	1.7 ± 0.2
Killdeer	<i>Charadrius vociferus</i>	---	---	---	S3B	2.9 ± 7.07
Northern Mockingbird	<i>Mimus polyglottos</i>	---	---	---	S1B	2.8 ± 0.2
Northern Pintail	<i>Anas acuta</i>	---	---	---	S1B, SUM	2.5 ± 0.2
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Special Concern	Special Concern	Threatened	S3B	2.4 ± 0.01
Pine Grosbeak	<i>Pinicola enucleator</i>	---	---	---	S3B, S5N, S5M	2.4 ± 0.01
Pine Siskin	<i>Spinus pinus</i>	---	---	---	S3	2.9 ± 7.07
Red Crossbill	<i>Loxia curvirostra</i>	---	---	---	S3S4	4.5 ± 0.01
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	---	---	---	S3B	2.9 ± 7.07
Rusty Blackbird	<i>Euphagus carolinus</i>	Special Concern	Special Concern	Endangered	S2B	3.0 ± 0.2
Spotted Sandpiper	<i>Actitis macularius</i>	---	---	---	S3S4B, S5M	2.9 ± 7.07
Tennessee Warbler	<i>Leiothlypis peregrina</i>	---	---	---	S3S4B, S5M	2.9 ± 7.07

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Distance From Site (km)
Vesper Sparrow	<i>Poocetes gramineus</i>	---	---	---	S1S2B, SUM	4.2 ± 0.01
Willow Flycatcher	<i>Empidonax traillii</i>	---	---	---	S2B	2.9 ± 7.07
Wilson's Snipe	<i>Gallinago delicata</i>	---	---	---	S3B, S5M	2.9 ± 7.07
<b>Herpetofauna</b>						
Eastern painted turtle	<i>Chrysemys picta picta</i>	Special Concern	Special Concern	---	S4	0.5 ± 0.36
Snapping turtle	<i>Chelydra serpentina</i>	Special Concern	Special Concern	Vulnerable	S3	2.2 ± 0.2
Wood turtle	<i>Glyptemys insculpta</i>	Threatened	Threatened	Threatened	S2	1.3 ± 0.1
<b>Invertebrates</b>						
Chestnut bark long-horned beetle	<i>Strophiona nitens</i>	---	---	---	S3	4.6 ± 0.4
Monarch	<i>Danaus plexippus</i>	Endangered	Endangered	Endangered	S2?B, S3M	2.3 ± 0.05
Williamson's Emerald	<i>Somatochlora williamsoni</i>	---	---	---	S2S3	4.6 ± 0.4
Yellow-banded bumble bee	<i>Bombus terricola</i>	Special Concern	Special Concern	Vulnerable	S3	2.1 ± 0.01

Source: ACCDC (2024b)

The Project Site is located within Atlas Square 20LQ58 of the Maritimes Breeding Bird Atlas (MBBA). According to point count data from the most recent edition of the MBBA (2006 to 2010; NatureCounts, n.d.), 31 species were identified as possible breeders within square 20LQ58, including three SAR/SOCI (Table 7.10).

**Table 7.10:** SAR/SOCI Avifauna Identified Within Atlas Square 20LQ58 of the MBBA

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank
American Robin	<i>Turdus migratorius</i>	---	---	---	S5B, S3N
Barn Swallow	<i>Hirundo rustica</i>	Special Concern	Threatened	Endangered	S3B
Bobolink	<i>Dolichonyx oryzivorus</i>	Special Concern	Threatened	Vulnerable	S3B

Source: NatureCounts (n.d.)

The Project is situated between two IBAs: the Southern Bight of the Minas Basin (IBA NS020), located approximately 35 km west, and Brier Island (IBA NS021), about 129 km southeast. The Southern Bight of the

Minas Basin is a large tidal embayment within the Minas Basin, Bay of Fundy, characterized primarily by intertidal mudflats. These mudflats are divided into five sections by river channels, each differing in invertebrate fauna and substrate composition. They serve as crucial staging grounds for an estimated 1 to 2 million shorebirds during late July and early August (IBA Canada, n.d.-c). Brier Island, positioned at the westernmost tip of Nova Scotia, approximately 50 km southwest of Digby, is predominantly forested, with lowland areas that include bogs and ponds. It provides an essential year-round feeding ground for marine birds, serves as a key migration stopover for landbirds, and supports a high diversity of birds (IBA Canada, n.d.-a).

A review of the Significant Species and Habitats Database identifies three 'Species at Risk' records and two 'Other Habitat' features within 5 km of the Project, but not within the Project Site. All 'Species at Risk' records pertain to Wood turtle (*Glyptemys insculpta*) observations made in and around the Annapolis River, near wetlands along South River, and at a road crossing. The 'Other Habitat' features document Bald Eagle (*Haliaeetus leucocephalus*) nesting activity; however, Bald Eagle is not classified as a SAR or SOCI.

No abandoned mine openings (AMOs) were identified within 5 km of the Project Site.

## **FIELD PROGRAMS: METHODOLOGY**

**Breeding Bird Surveys:** Breeding bird surveys were conducted using the 10-minute point count method to inventory avian species and assess their breeding activity within the Project Site. Surveys were completed at five point count locations: Pine Forest, Cleared Pit Area, Floodplain - Grassy Meadow, Floodplain - Forested, and Young Hardwood Forest. Each location was visited twice, once on June 16, 2024, and again on July 20, 2024, to capture seasonal variations in bird activity during the core breeding season for most migratory species in Nova Scotia (early June to late July). In addition to the standard point count, additional area searches were completed within the general habitat surrounding the point count. All survey locations are shown on Drawing 7.1.4.1.

Breeding evidence was recorded using the MBBA breeding evidence codes, which include confirmed, observed, probable, and possible, to classify the breeding status of each species observed (Stewart et al., 2015).

At each survey point, a stationary observer recorded all birds observed or heard within a 100 m radius over a 10-minute period. The distance of observations was categorized as 0-50 m, 50-100 m, and 100 m+, with additional notes for flyovers. Habitat characteristics, such as vegetation type and cover, were also recorded to provide context for the bird activity at each location.

Weather conditions, including wind speed and precipitation, were recorded to account for environmental factors that might influence bird activity. All data were collected and stored digitally using ESRI Survey123, and survey points were georeferenced.

**Nightjar Survey:** Nightjar surveys were conducted on July 26, 2024, in accordance with the Canadian Nightjar Survey Protocol (Knight et al., 2019). Surveys were six minutes in duration and carried out at predetermined

stations under standardized conditions—specifically, during the period from dusk to two hours post-dusk on nights with clear skies, minimal wind, and no precipitation. Target species for these surveys are the Common Nighthawk (*Chordeiles minor*) and the Eastern Whip-Poor-Will (*Antrostomus vociferus*). All detections of target species were recorded with associated data, including estimated distance, direction of detection, and behavioural observations where applicable.

**Trail Cameras:** Trail cameras were deployed from mid-June to mid-October 2024 at various portions of the Project Site to passively document wildlife presence. Cameras were strategically placed, and periodically rotated to new locations in the proposed expansion area and near McGee Brook, and set to capture images using motion detection and infrared/night vision. They were checked regularly to replace storage cards and batteries as needed. At the end of the deployment, all photos were reviewed to identify wildlife species and assess their presence and activity patterns.

**Bat Monitoring:** An acoustic bat monitor was deployed from June 18 to September 27, 2023, capturing data across the summer and fall active seasons. The monitor, a Song Meter Mini Bat (Wildlife Acoustics), was positioned at the northeastern end of the Project Site, within a wet meadow on the McGee Brook floodplain. It was programmed to record from 20:00 to 6:00, aligning with peak bat activity, and set to an ultrasonic sample rate of 192 kHz. Regular checks ensured the monitor's functionality, with storage cards and batteries replaced as needed. The bat monitor deployment location is shown on Drawing 7.1.4.1.

The data were processed using Kaleidoscope Pro, with sonograms analyzed for potential bat-generated ultrasonic vocalizations. Calls were identified to species when possible. Initially, Kaleidoscope Pro automatically identified the calls, which were then manually verified or corrected by a biologist.

Due to the similarity in their calls, Little brown myotis (*Myotis lucifugus*) and Northern myotis (*Myotis septentrionalis*) are difficult to reliably distinguish. As a result, these calls were not identified to the species level. Additionally, sounds from non-bat sources were classified as either 'Noise' (e.g., environmental sounds such as vegetation movement, wind, or precipitation) or 'Bird'.

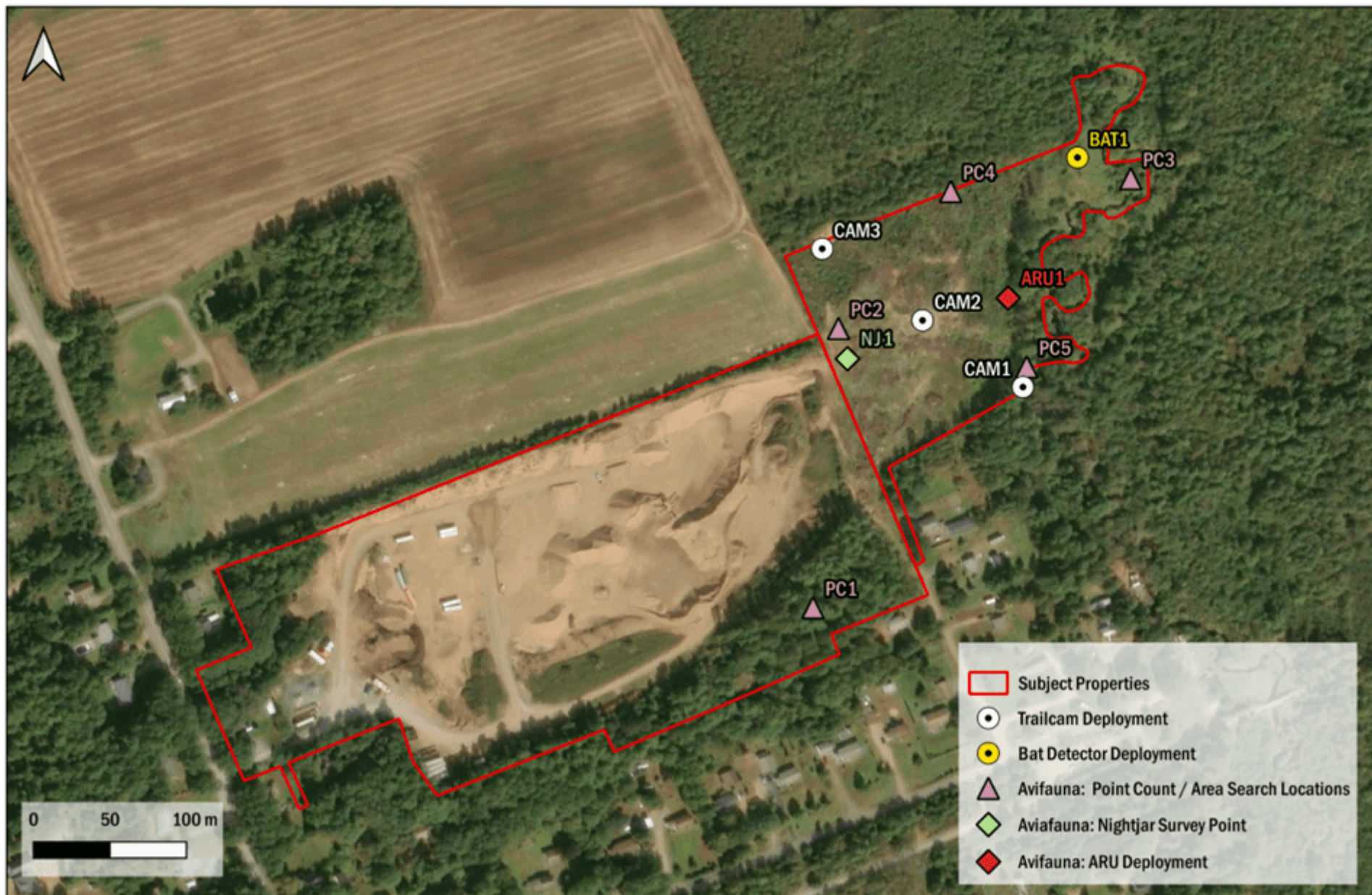
Below are the identification codes used for bat species or groups:

- MYOT - *Myotis* species (Little brown myotis or Northern myotis)
- LABO - Eastern red bat (*Lasiurus borealis*)
- LACI - Hoary bat (*Lasiurus cinereus*)
- LANO - Silver-haired bat (*Lasionycteris noctivagans*)

**Wood Turtle Surveys:** Wood turtle surveys were conducted on the Project site on May 1, 2025. Three transects were surveyed along McGee Brook. Transect 1 focused on characterizing turtle habitat within and along the banks of the brook and searching for turtles and any signs of their presence. Transects 2 and 3

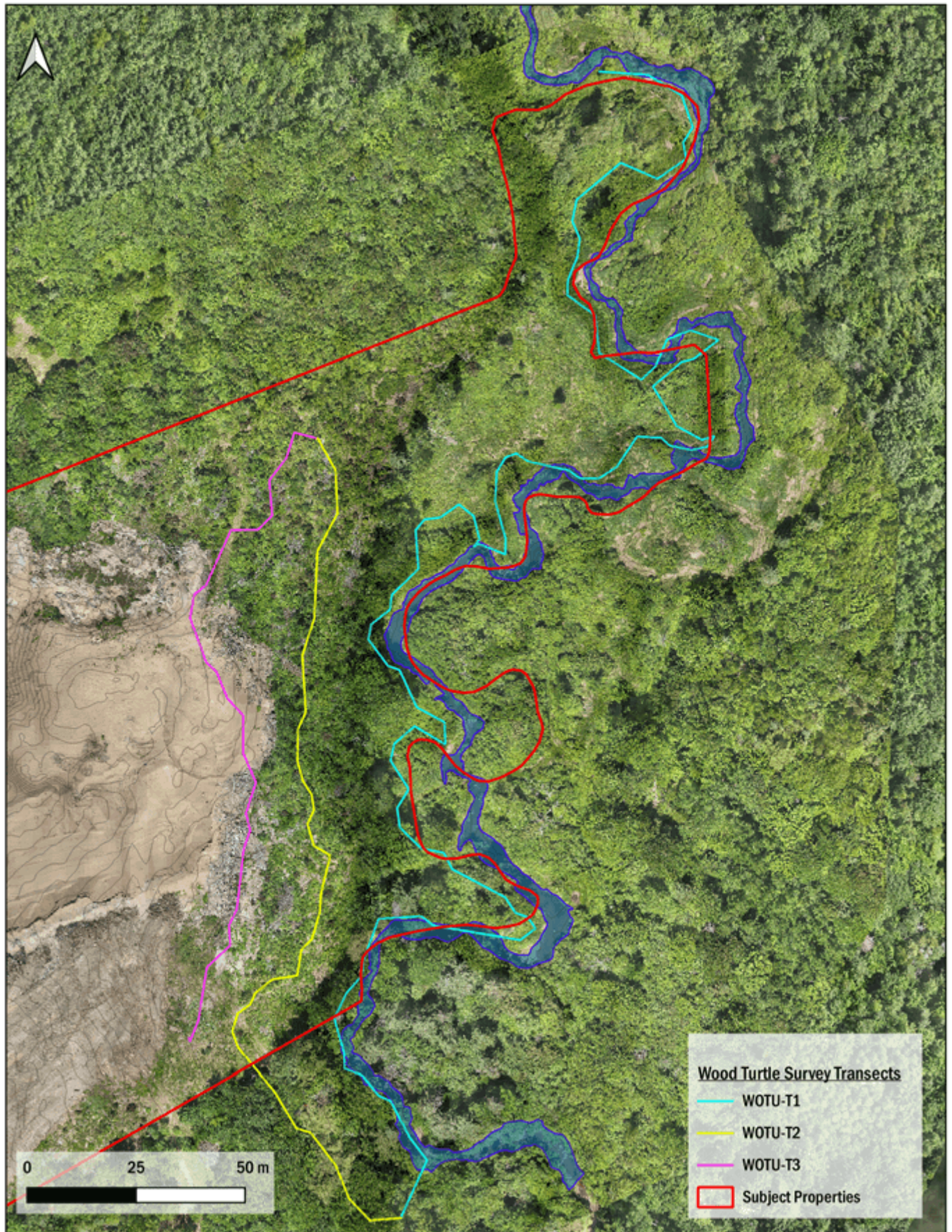
extended progressively inland to identify terrestrial foraging habitat and to search for turtles or their sign. The air temperature during the survey was 14°C, and the water temperature was 5°C. Survey Transects are shown on Drawing 7.1.4.2.





Drawing 7.1.4.1: Avian Survey Locations and Wildlife Equipment Deployments





Drawing 7.1.4.2: Wood Turtle Survey Transects



## **FIELD PROGRAMS : RESULTS**

**General:** The following outlines the results of the two rounds of avian breeding point count surveys, the Bank Swallow (*Riparia riparia*) habitat identified on site, and the results of the trail camera and bat monitor deployment.

**Breeding Bird Surveys:** A total of 31 bird species from 16 different families were observed in the two rounds of avian surveys within the Project Site (Table 7.11). Of these observed species, four were SAR/SOCI: Bank Swallow, Eastern Wood-pewee (*Contopus virens*), Purple Finch (*Haemorhous purpureus*), and Rose-breasted Grosbeak (*Pheucticus ludovicianus*). Species that were most abundantly observed between the two surveys included the Bank Swallow (22 individuals), Song Sparrow (*Melospiza melodia*; 18 individuals), American Crow (*Corvus brachyrhynchos*; 11 individuals), and Red-eyed Vireo (*Vireo olivaceus*; 10 individuals). Most species were recorded as ‘Observed (X)’, meaning they were detected during the breeding season but without any evidence of breeding. These observations were primarily auditory, and the presence of birds in suitable breeding habitat could not be confirmed. An exception was the Common Yellowthroat (*Geothlypis trichas*), which was classified as ‘Possible Breeding’ (S). This designation is used when singing male(s) or breeding calls are heard in suitable habitat during the breeding season. Bank Swallows were confirmed to be nesting on the site, around the periphery of an exploration pit dug in the middle of the expansion property (Drawing 7.1.4.3).

**Table 7.11:** Avifauna Identified During 2024 Breeding Bird Surveys

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Breeding Evidence
Alder Flycatcher	<i>Empidonax alnorum</i>	---	---	---	S5B	Observed
American Crow	<i>Corvus brachyrhynchos</i>	---	---	---	S5	Observed
American Goldfinch	<i>Spinus tristis</i>	---	---	---	S5	Observed
American Redstart	<i>Setophaga ruticilla</i>	---	---	---	S5B	Observed
American Robin*	<i>Turdus migratorius</i>	---	---	---	S5B, S3N	Observed
<b>Bank Swallow**</b>	<b><i>Riparia riparia</i></b>	<b>Threatened</b>	<b>Threatened</b>	<b>Endangered</b>	<b>S2B</b>	<b>Confirmed</b>
Black-and-White Warbler	<i>Mniotilta varia</i>	---	---	---	S5B	Observed
Black-capped Chickadee	<i>Poecile atricapillus</i>	---	---	---	S5	Observed
Blue Jay	<i>Cyanocitta cristata</i>	---	---	---	S5	Observed
Cedar Waxwing	<i>Bombycilla cedrorum</i>	---	---	---	S5B	Observed
Common Raven	<i>Corvus corax</i>	---	---	---	S5	Observed

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	Breeding Evidence
Common Yellowthroat	<i>Geothlypis trichas</i>	---	---	---	S5B	Possible
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	---	---	---	S5B	Observed
Dark-eyed Junco	<i>Junco hyemalis</i>	---	---	---	S4S5	Observed
Downy Woodpecker	<i>Dryobates pubescens</i>	---	---	---	S5	Observed
Eastern Phoebe	<i>Sayornis phoebe</i>	---	---	---	S4S5B, S4M	Observed
<b>Eastern Wood-Pewee***</b>	<b><i>Contopus virens</i></b>	<b>Special Concern</b>	<b>Special Concern</b>	<b>Vulnerable</b>	<b>S3S4B</b>	<b>Observed</b>
Grey Catbird	<i>Dumetella carolinensis</i>	---	---	---	S4B	Observed
Mourning Dove	<i>Zenaida macroura</i>	---	---	---	S5	Observed
Northern Cardinal	<i>Cardinalis cardinalis</i>	---	---	---	S4	Observed
Northern Flicker	<i>Colaptes auratus</i>	---	---	---	S5B	Observed
Ovenbird	<i>Seiurus aurocapilla</i>	---	---	---	S5B	Observed
<b>Purple Finch</b>	<b><i>Haemorhous purpureus</i></b>	---	---	---	<b>S4S5B, S3S4N, S5M</b>	<b>Observed</b>
<b>Rose-breasted Grosbeak</b>	<b><i>Pheucticus ludovicianus</i></b>	---	---	---	<b>S3B</b>	<b>Observed</b>
Red-breasted Nuthatch	<i>Sitta canadensis</i>	---	---	---	S4S5	Observed
Red-eyed Vireo	<i>Vireo olivaceus</i>	---	---	---	S5B	Observed
Song Sparrow	<i>Melospiza melodia</i>	---	---	---	S5B	Observed
White-breasted Nuthatch	<i>Sitta carolinensis</i>	---	---	---	S4	Observed
White-throated Sparrow	<i>Zonotrichia albicollis</i>	---	---	---	S4S5B, S5M	Observed
Yellow-rumped Warbler	<i>Setophaga coronata</i>	---	---	---	S5B	Observed
Yellow Warbler	<i>Setophaga petechia</i>	---	---	---	S5B	Observed

\*Observed during breeding season only (S5B); not considered SOCI

\*\*Confirmed breeding

\*\*\*This species was heard calling off-site and is likely breeding nearby, but not within the Project Site.

Note: Bold indicates SAR/SOCI



**Bank Swallow Habitat:** Bank Swallows were observed on site throughout the summer months, using nesting cavities established within the vertical face of an exploration pit in the expansion area (Drawing 7.1.4.3; Figures 7.1.4.1 & 7.1.4.2). The swallows were observed flying into and around the nesting cavities.

Follow-up monitoring was conducted in spring 2025. As of May 15, 2025, the Bank Swallows had not returned to the previously used nesting site. However, one Bank Swallow was observed flying over the site during the visit, suggesting that individuals may still be present in the area and potentially nesting elsewhere, or nesting activity on-site is imminent.

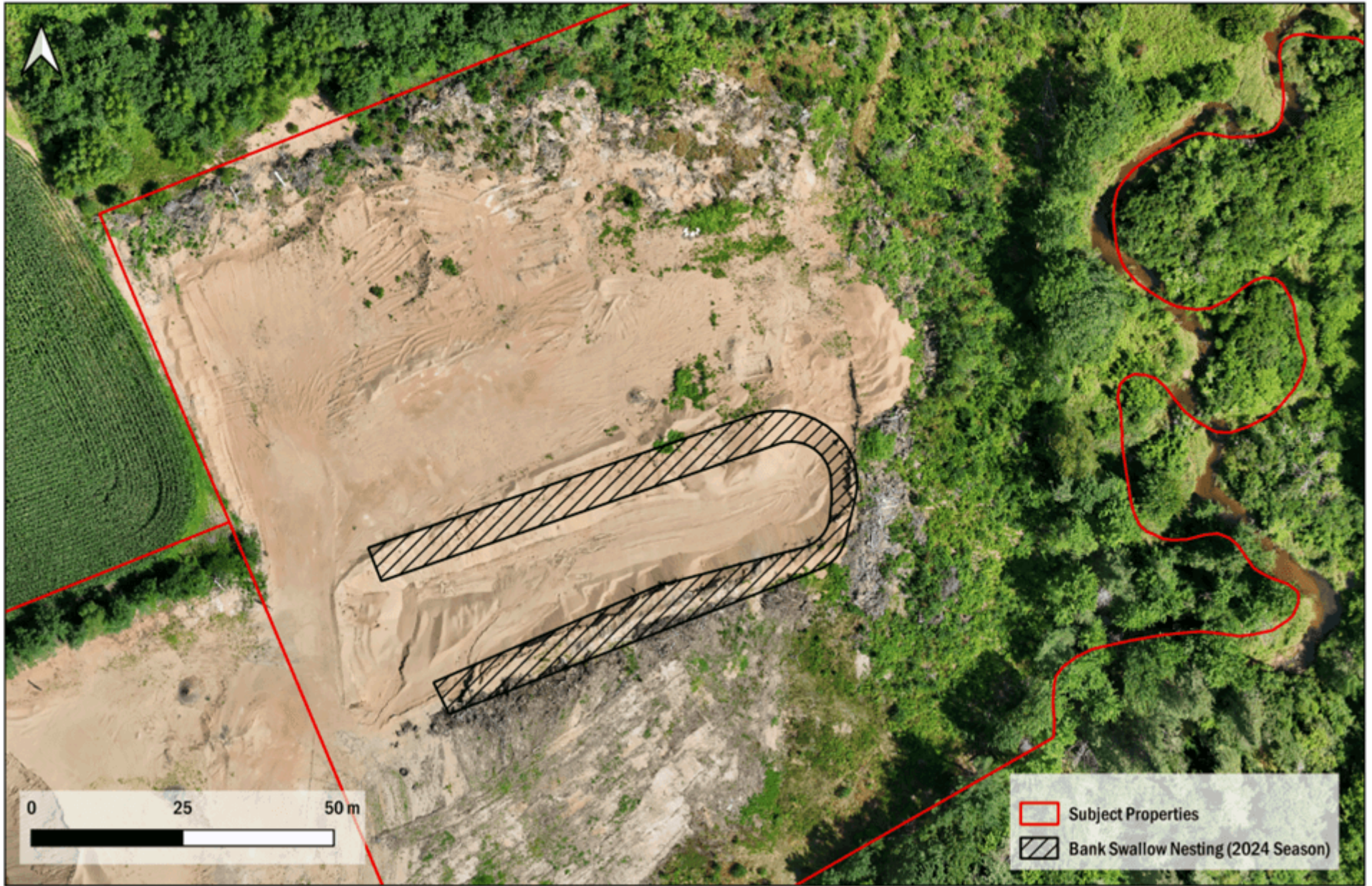


**Figure 7.1.4.1:** View looking east of exploration pit in the expansion area, with Bank Swallow nesting cavities in pit edges.



**Figure 7.1.4.2:** Direct view of nesting cavities along exploration pit edges.





Drawing 7.1.4.3: Bank Swallow Habitat Conditions Observed on Site

**Nightjar Surveys:** No occurrences of target species were noted during surveys.

**Trail Cameras:** The deployed trail cameras recorded 11 species, six birds and five mammals (Table 7.12), including one SAR, the Peregrine Falcon (*Falco peregrinus pop. 1*) (Figure 7.1.4.3). A Peregrine Falcon was also observed incidentally during a site visit on May 15th, 2025. Representative images from the trail cameras are included in the Photo Log (Appendix G).

**Table 7.12:** Trail Camera Fauna Observations

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank	# of Obs.
American Crow	<i>Corvus brachyrhynchos</i>	---	---	---	S5	3
American Robin*	<i>Turdus migratorius</i>	---	---	---	S5B, S3N	3
Common muskrat	<i>Ondatra zibethicus</i>	---	---	---	S5	3
Coyote	<i>Canis latrans</i>	---	---	---	S5	2
Duck spp. (Mallard or American Black Duck)	<i>Anas spp.</i>	---	---	---	S5B, S5N	8
Mallard	<i>Anas platyrhynchos</i>	---	---	---	S5B, S5N	1
North American beaver	<i>Castor canadensis</i>	---	---	---	S5	5
<b>Peregrine Falcon - anatum/tundrius</b>	<b><i>Falco peregrinus pop. 1</i></b>	<b>Not At Risk</b>	---	<b>Vulnerable</b>	<b>S1B, SUM</b>	<b>1</b>
Raccoon	<i>Procyon lotor</i>	---	---	---	S5	13
Red fox	<i>Vulpes vulpes</i>	---	---	---	S5	9
Sparrow spp.	---	---	---	---	---	3
Unknown bird (likely blue jay)	---	---	---	---	---	1
Unknown bird	---	---	---	---	---	1
White-tailed deer	<i>Odocoileus virginianus</i>	---	---	---	S5	9

\*Observed during breeding season only (S5B); not considered SOCI

Note: Bold indicates SAR





Figure 7.1.4.3: Peregrine Falcon (upper right).

**Bat Monitoring:** A total of 1,899 files were recorded by the bat monitor, with 977 identified as bat-generated ultrasound (Table 7.13). The remaining files were attributed to non-bat sources, including environmental noise (e.g., vegetation movement, wind, or precipitation) and bird calls. The following bat species were detected during the acoustic survey:

- *Myotis* species (MYOT)
- Eastern red bat (LABO)
- Hoary bat (LACI)
- Silver-haired bat (LANO)

All species identified are SAR, and a summary of their conservation status is provided in Table 7.14.

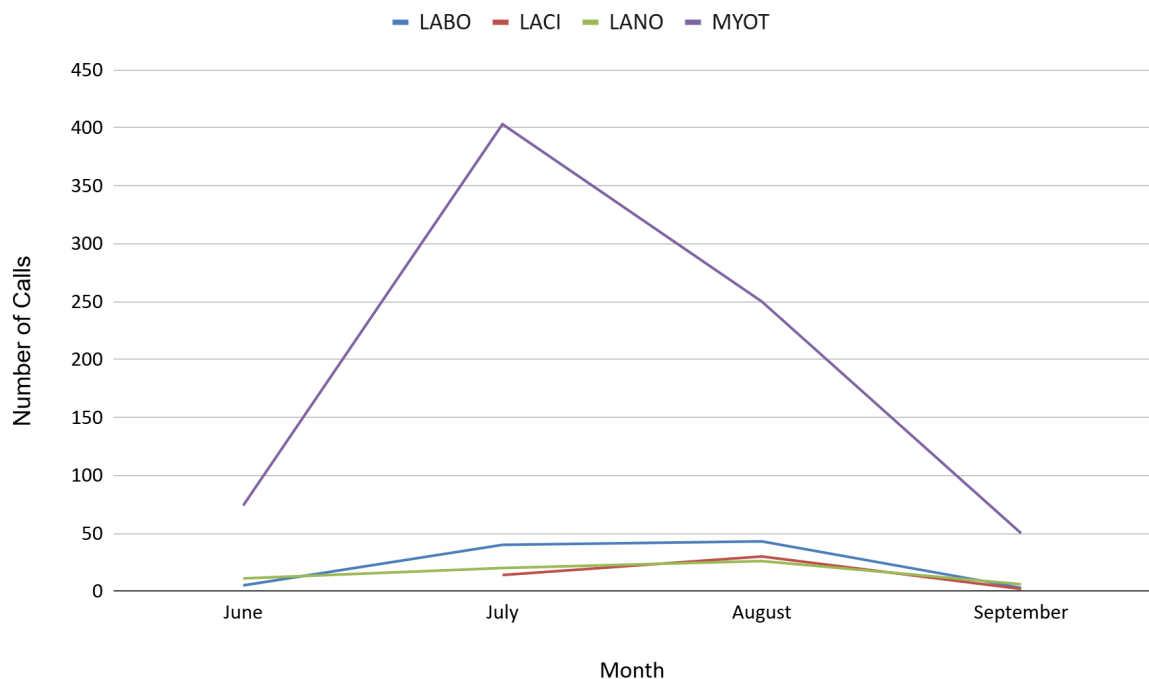
**Table 7.13:** Summary of Bat Call Detections From the Passive Acoustic Survey

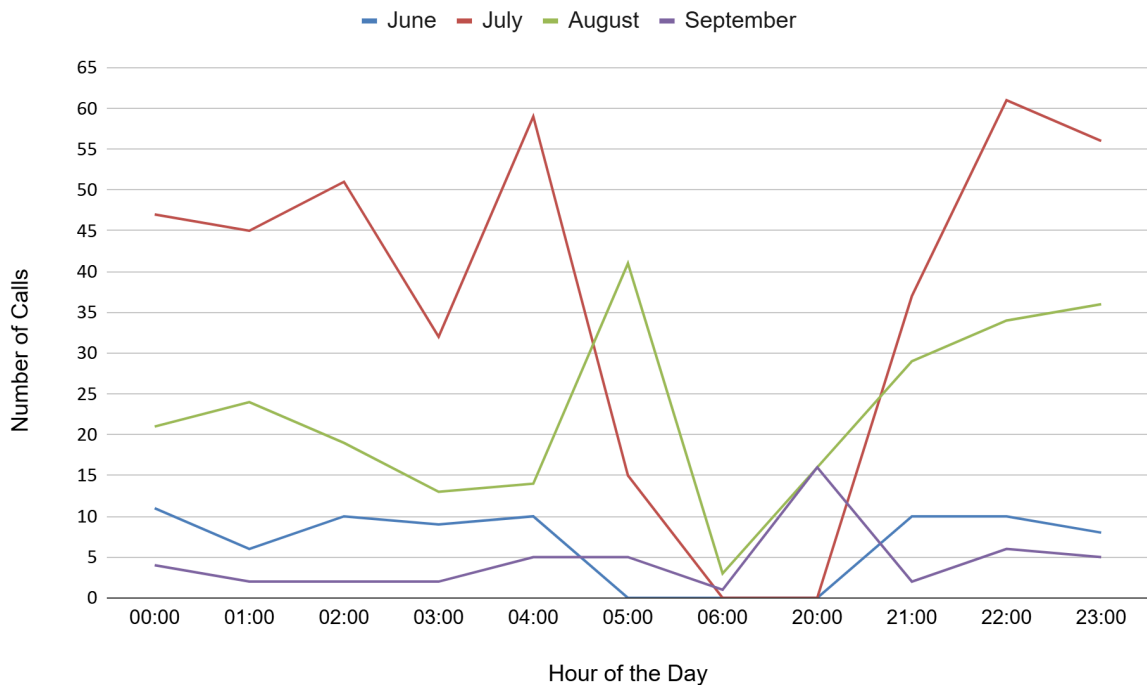
MYOT ( <i>Myotis Spp.</i> )	LABO ( <i>L. Borealis</i> )	LACI ( <i>L. cinereus</i> )	LANO ( <i>L. noctivagans</i> )	Total Calls
777	91	46	63	977

**Table 7.14:** Conservation Status of Bat Species Detected

Common Name	Scientific Name	COSEWIC	SARA	ESA	NS S-Rank
Eastern red bat	<i>Lasiurus borealis</i>	Endangered	---	---	SUB, S1M
Hoary bat	<i>Lasiurus cinereus</i>	Endangered	---	---	SUB, S1M
Little brown myotis	<i>Myotis lucifugus</i>	Endangered	Endangered	Endangered	S1
Northern myotis	<i>Myotis septentrionalis</i>	Endangered	Endangered	Endangered	S1
Silver-haired bat	<i>Lasionycteris noctivagans</i>	Endangered	---	---	SUB, S1M

Resident species (those that hibernate in caves and abandoned mines during the winter, such as *Myotis* species) accounted for 80% of calls, while migratory species (those that migrate south for the winter, such as Eastern red bat, Hoary bat, and Silver-haired bat) made up the remaining 20%. The number of calls was highest in July, with significantly fewer calls recorded during September. Notably, no calls were made by Hoary bats in June. As previously mentioned, 80% of calls were from *Myotis* species. Data is provided graphically in Figures 7.1.4.4 & 7.1.4.5.

**Figure 7.1.4.4:** Monthly bat call activity by species.



**Figure 7.1.4.5:** Hourly *Myotis* bat call activity per month.

June showed relatively low *Myotis* bat activity, with no distinct peaks. Calls were spread more evenly throughout the night, with no clear concentration at any specific time.

In July, *Myotis* bat activity increased significantly, with peak call numbers occurring at 22:00 (61 calls) and 04:00 (59 calls), suggesting heightened foraging or breeding activity during these hours.

August also showed high *Myotis* bat activity, with a notable peak at 05:00 (41 calls), indicating continued foraging or breeding behaviour during the early morning hours.

In September, *Myotis* bat activity declined, with the highest call count occurring at 20:00 (16 calls), suggesting reduced activity, likely due to seasonal changes such as migration or reduced foraging before hibernation.

Overall, *Myotis* bat activity was highest in July and August, with consistent late-night and early-morning calls.

**Wood Turtle Surveys:** No Wood turtles were observed during the surveys. However, McGee Brook and the adjacent upland areas offer suitable habitat for this species, including sunny, exposed banks and downed logs for basking. The floodplain meadow and shrub thickets associated with the brook provide potential foraging grounds. Open sandy banks along McGee Brook could be used for nesting, and the brook itself contains deep, well-oxygenated pools and fast-flowing sections that may serve as overwintering habitat.

## **7.1.5 TERRESTRIAL HABITAT**

### **REGULATORY CONTEXT**

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to the terrestrial habitat.

#### **FEDERAL**

- ***Species at Risk Act (S.C. 2002, c. 29)*** - This Act protects SAR and their critical habitats across Canada, prohibiting harm to listed species and habitat destruction. For this Project, it ensures listed terrestrial species are safeguarded, with measures in place to prevent habitat impacts.

#### **PROVINCIAL**

- ***Endangered Species Act (S.N.S. 1998, c. 11)*** - This Act protects SAR and their critical habitats in Nova Scotia, prohibiting harm, harassment, or destruction. For this Project, it ensures listed terrestrial species are safeguarded, with measures in place to prevent habitat impacts.

### **DESKTOP REVIEW : METHODOLOGY**

The desktop review was completed through a review of the following resources:

- Provincial Landscape Viewer (NSNRR, n.d.-d)
- Parks and Protected Areas (Government of NS, n.d.)
- Ecological Land Classification for Nova Scotia (Neily et al., 2017)

### **DESKTOP REVIEW : RESULTS**

The Project Site is located within Ecoregion 6, the Valley and Central Lowlands, which covers approximately 7.4% of Nova Scotia. This ecoregion includes the Annapolis Valley, the Minas Basin watersheds, and the Musquodoboit Valley. Elevations in this ecoregion typically do not exceed 50 masl, offering protection from coastal climate influences and contributing to warmer summer temperatures (Neily et al., 2017).

The Project Site lies within Ecodistrict 610, the Annapolis Valley, which extends over 140 km from Boot Island to just west of Digby. The ecodistrict is relatively flat, sloping northeast to the Minas Basin along the Cornwallis River and southwest along the Annapolis River to the Annapolis Basin. Its warm climate, deep stone-free soils, and abundant groundwater supply make it the most heavily farmed ecodistrict in the province (Neily et al., 2017).

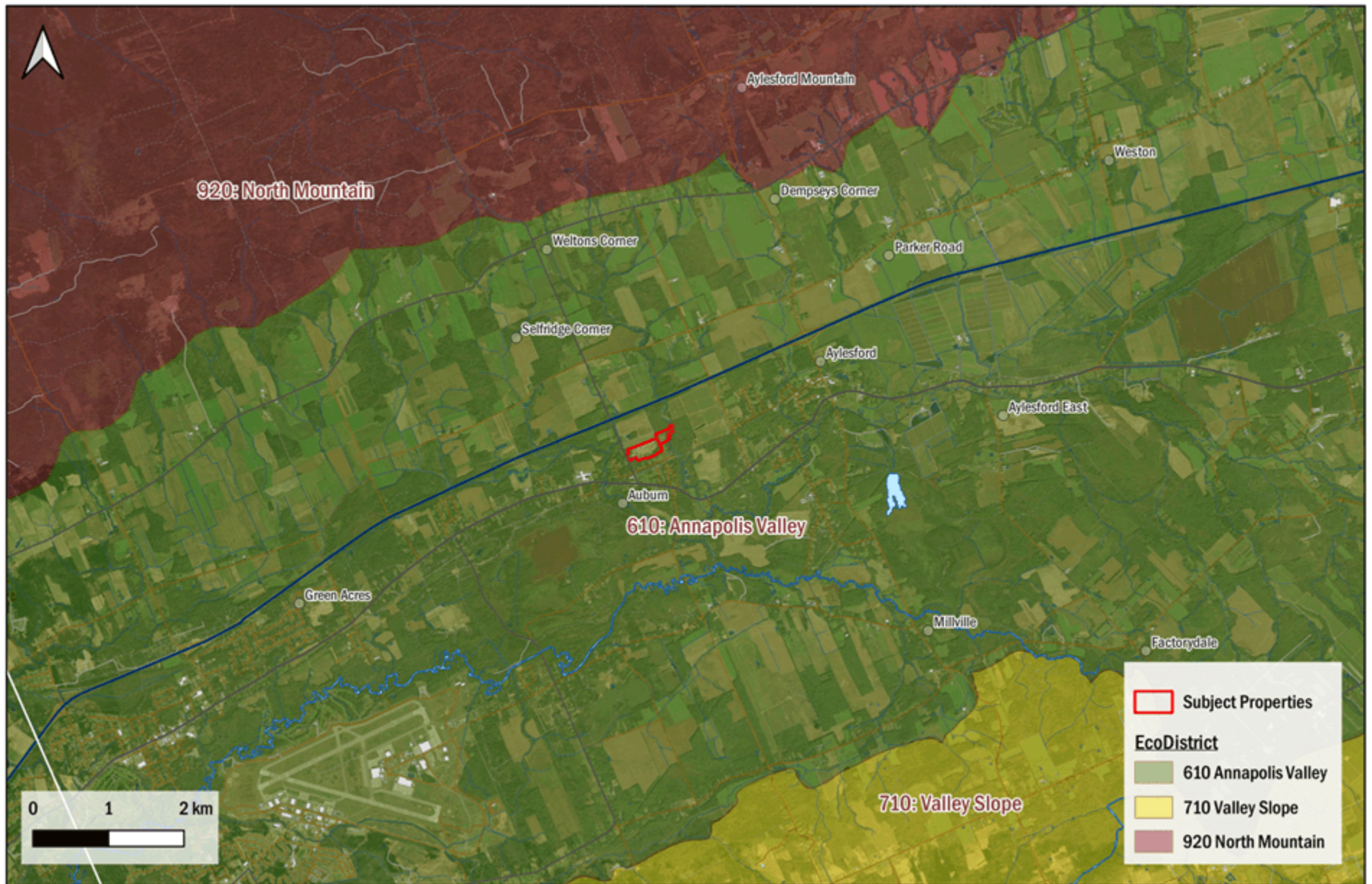
Vegetation in the Annapolis Valley ecodistrict is primarily dominated by red spruce (*Picea rubens*), eastern white pine (*Pinus strobus*), and eastern hemlock (*Tsuga canadensis*) forests on moderately well-drained,



nutrient-medium soils. The Spruce Hemlock Forest Group is found on hummocky terrain, with occasional yellow birch (*Betula alleghaniensis*), sugar maple (*Acer saccharum*), and ironwood (*Ostrya virginiana*) in richer, moister areas. Drier, sandy sites support red pine (*Pinus resinosa*), eastern white pine, and northern red oak, while floodplain areas feature remnant forests of sugar maple, northern red oak, and white ash (*Fraxinus americana*). Abandoned farmland typically reverts to early successional forests with species such as white ash, black cherry, chokecherry, alders (*Alnus spp.*), willows (*Salix spp.*), and hawthorn (Neily et al., 2017).

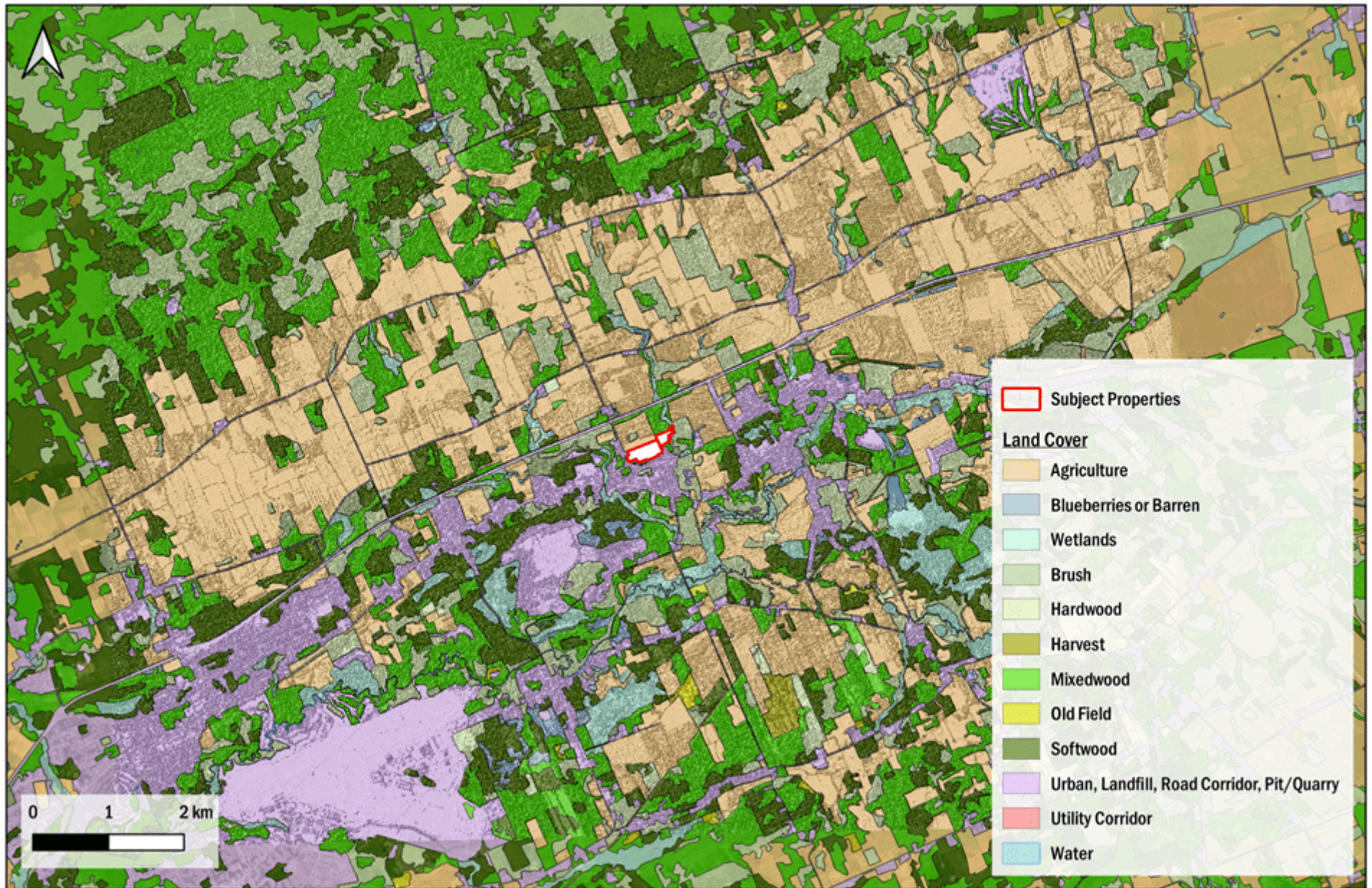
According to the Forest Inventory within the Provincial Landscape Viewer, land cover within the Project Site mostly consists of 'Urban, Landfill, Quarry, Transport Corridor' and 'Softwood', as well as 'Mixedwood' and 'Bogs or Wetlands' in the northeast. Further, the Forest Inventory identifies three forest stands within the Project Site: two white pine-dominant stands surrounding the existing pit and one aspen-dominant stand adjacent to McGee Brook. Terrestrial habitat mapping is provided on Drawing 7.1.5.1 below.

Nearby parks and protected areas include Clairmont Provincial Park (~3 km east), the North Mountain Woodlands Conservation Lands (~7 km northwest), and the Aylesford Mountain Nature Reserve (~8 km northwest).



Drawing 7.1.5.1: Ecological Land Classification





Drawing 7.1.5.2: Terrestrial Landcover (Desktop), per NSNRR Forest Inventory

## **FIELD PROGRAMS: METHODOLOGY**

**Habitat Delineation:** Through the course of the various field programs, the types and extents of the various habitats and vegetation communities were documented, classified, and mapped. This was conducted, where possible, within the context of existing frameworks for vegetation classification, such as the the NSNRR Forest Ecosystem Classification Guide (Neily et al., 2023) for forested sites; for non-forested sites, the Canadian National Vegetation Classification system (Baldwin et al., 2019), the Canadian Wetland Classification System (National Wetlands Working Group, 1997), as well as relevant frameworks from Northeastern USA, such as Natural Landscapes of Maine (Gawler & Cutko, 2018) were reviewed to determine if existing classifications were relevant to the site. Habitat polygons were digitized in GIS, based on the results of ground-truthing and low-altitude drone photography surveys.

## **FIELD PROGRAMS : RESULTS**

**Mapped Habitat Types:** The following habitat types were identified within the subject properties. Habitat polygons are shown on Drawing 7.1.5.2.

- Anthropogenic Habitats:
  - Residential
  - Active Pit Area
  - Bare Sand
  - Cutover
  - Hedgerow
  - Grubbings Piles
  - Grubbed, Sparsely Vegetated
- Natural Habitats:
  - Upland Forest (SP4 – White Pine / Blueberry / Bracken)
  - Wetland – Treed Swamp
  - Wetland – Shrub Swamp
  - Wetland – Meadow Marsh

**Active Pit Area:** An area of exposed sand, associated with ongoing extraction, including associated facilities, machinery, stockpiles, etc. Vegetation is absent or limited to early colonizing species on the margins of the pit area.

**Residential:** Lands supporting housing and related infrastructure, located along Morden Road. These areas exhibit low ecological value due to high levels of disturbance and landscape fragmentation.

**Bare Sand:** There is a large open, unvegetated patch of bare sand located on the expansion property.



**Cutover:** Located on the expansion property, terraced above the floodplain of McGee Brook. These were previously forested areas that have been cleared of merchantable timber. Evidence suggests a similar forest structure to what exists currently on the property, dominated by white pine, with scattered red oak and American beech (*Fagus grandifolia*). Current cover includes regenerating woody growth of early successional species such as pin cherry (*Prunus pensylvanica*), trembling aspen, and early-successional herbaceous vegetation.

**Hedgerow:** Located to the north of the existing pit area, there is a narrow, linear strip of woody vegetation abutting the agricultural property to the north. This feature may support habitat connectivity for small mammals and birds, though its ecological function is limited by narrow width and edge effects.

**Grubbed & Sparsely Vegetated Soil:** These are disturbed zones that have been logged and subsequently grubbed, with minimal regrowth, largely composed of early successional herbaceous vegetation, tolerant of disturbed substrates and full sun.

**Forest – SP4 (White Pine / Blueberry / Bracken):** Forested zones are most consistent with NSNRR Forest Ecosystem Classification (FEC) Type SP4. This early to mid-successional forest type occurs on dry to fresh, nutrient-poor soils, typically following stand-replacing disturbances. White pine is dominant, with an understory of ericaceous shrubs such as late lowbush blueberry (*Vaccinium angustifolium*) and sheep laurel (*Kalmia angustifolia*). Herb and bryophyte layers are relatively sparse due to the acidic soil conditions, though characteristic species at this site include bracken fern, Schreber's moss (*Pleurozium schreberi*), and wavy-leaved broom moss (*Dicranum polysetum*).

**Wetland – Treed Swamp:** Described in detail in the Wetlands section of this chapter.

**Wetland – Shrub Swamp:** Described in detail in the Wetlands section of this chapter.

**Wetland – Meadow Marsh:** Described in detail in the Wetlands section of this chapter.



Figure 7.1.5.1: Typical grubbed areas with sparse regrowth, cutover, and bare sand on expansion property.



Figure 7.1.5.2: Cutover typical conditions.



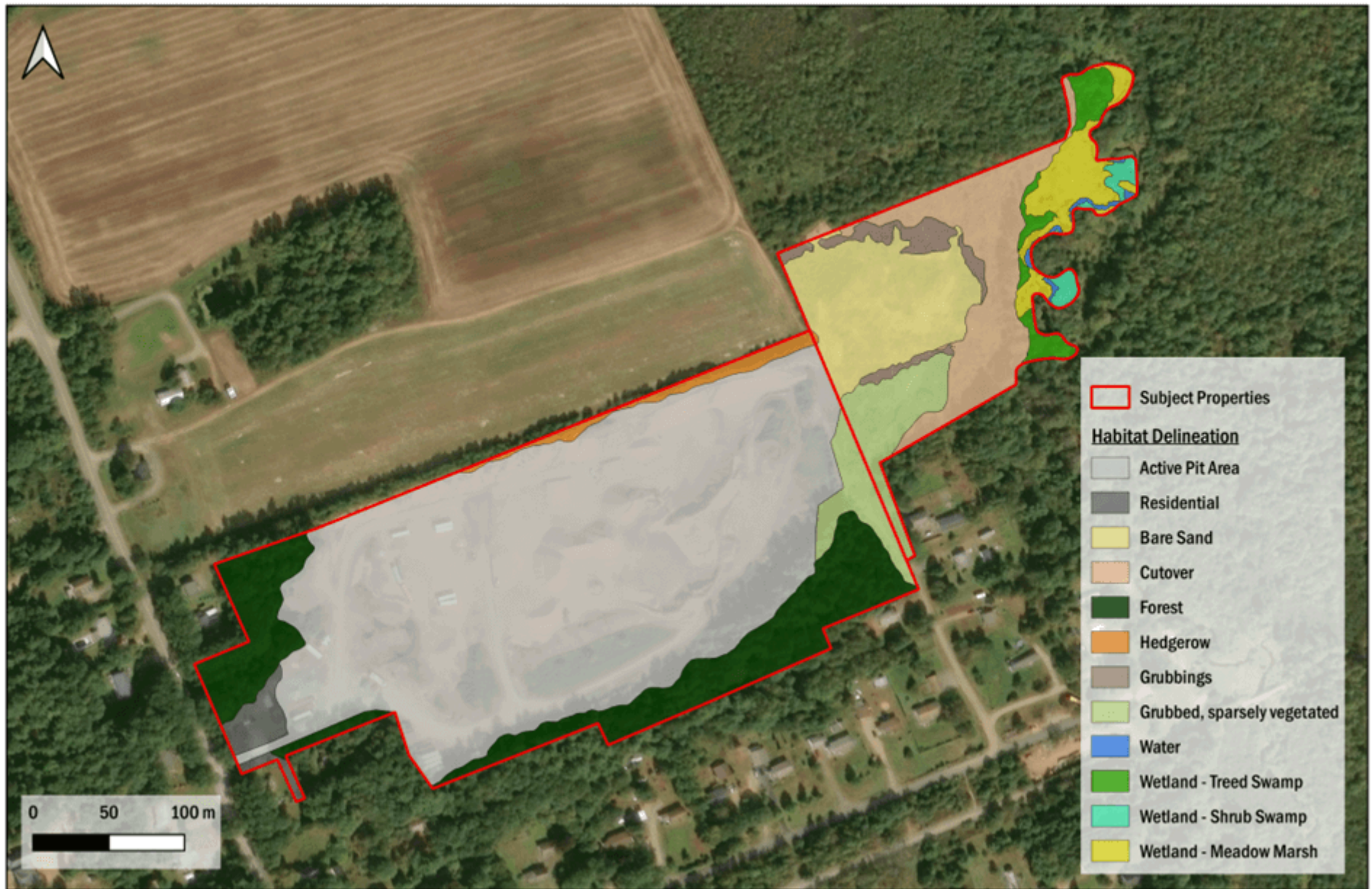


**Figure 7.1.5.3:** Existing pit, typical conditions. Hedgerow and agricultural areas are visible at right.



**Figure 7.1.5.4:** Pine-dominated forest, consistent with NSNRR FEC Type SP4.





Drawing 7.1.5.2: Terrestrial Habitat Field Delineation Results

## **7.1.6 FISH AND AQUATIC HABITAT**

### **REGULATORY CONTEXT**

Several federal and provincial laws and regulations are relevant to the operations of the Project with respect to fish and aquatic habitat.

#### **FEDERAL**

- ***Fisheries Act (R.S.C., 1985, c. F-14)*** - This Act prohibits the deposit of harmful substances into waters frequented by fish and protects fish habitat. Specifically, Section 35 prohibits the harmful alteration, disruption, or destruction of fish habitat, and Section 36 prohibits the deposit of deleterious substances into waters frequented by fish, both of which are highly relevant to sedimentation control measures and stormwater discharge.
- ***Canadian Environmental Protection Act (S.C. 1999, c. 33)*** - CEPA regulates the release of pollutants and hazardous substances that could affect surface water quality. Sand pit operations may involve activities such as fuel storage, vehicle maintenance, or the use of chemicals, all of which could introduce contaminants into nearby watercourses if not properly managed.
- ***Species at Risk Act (S.C. 2002, c. 29)*** - This Act protects SAR and their critical habitats across Canada, prohibiting harm to listed species and habitat destruction. For this project, it ensures listed aquatic species are safeguarded, with measures in place to prevent habitat impacts.

#### **PROVINCIAL**

- ***Activities Designation Regulations (N.S. Reg. 47/95)*** - These regulations list pits and quarries as designated activities that require environmental approvals from NSECC. Sand pit operations that involve watercourse alterations, groundwater withdrawal, or stormwater discharge must obtain the necessary permits. Compliance ensures that the Project adheres to best water protection and environmental management practices.
- ***Endangered Species Act (S.N.S. 1998, c. 11)*** - This Act protects SAR and their critical habitats in Nova Scotia, prohibiting harm, harassment, or destruction. For this project, it ensures listed aquatic species are safeguarded, with measures in place to prevent habitat impacts.
- ***Pit and Quarry Guidelines (1999, Revised 2003)*** - These guidelines establish specific requirements for protecting watercourses. They set minimum separation distances from watercourses, mandate sedimentation control measures, and regulate effluent discharge to prevent contamination.

Sand pit operators must follow these guidelines to ensure that operations do not negatively impact nearby water bodies.

## **DESKTOP REVIEW: METHODOLOGY**

The desktop review was completed through a review of the following resources:

- Aquatic Species at Risk Map (DFO, 2025)
- ACCDC Data Report (ACCDC, 2024b)

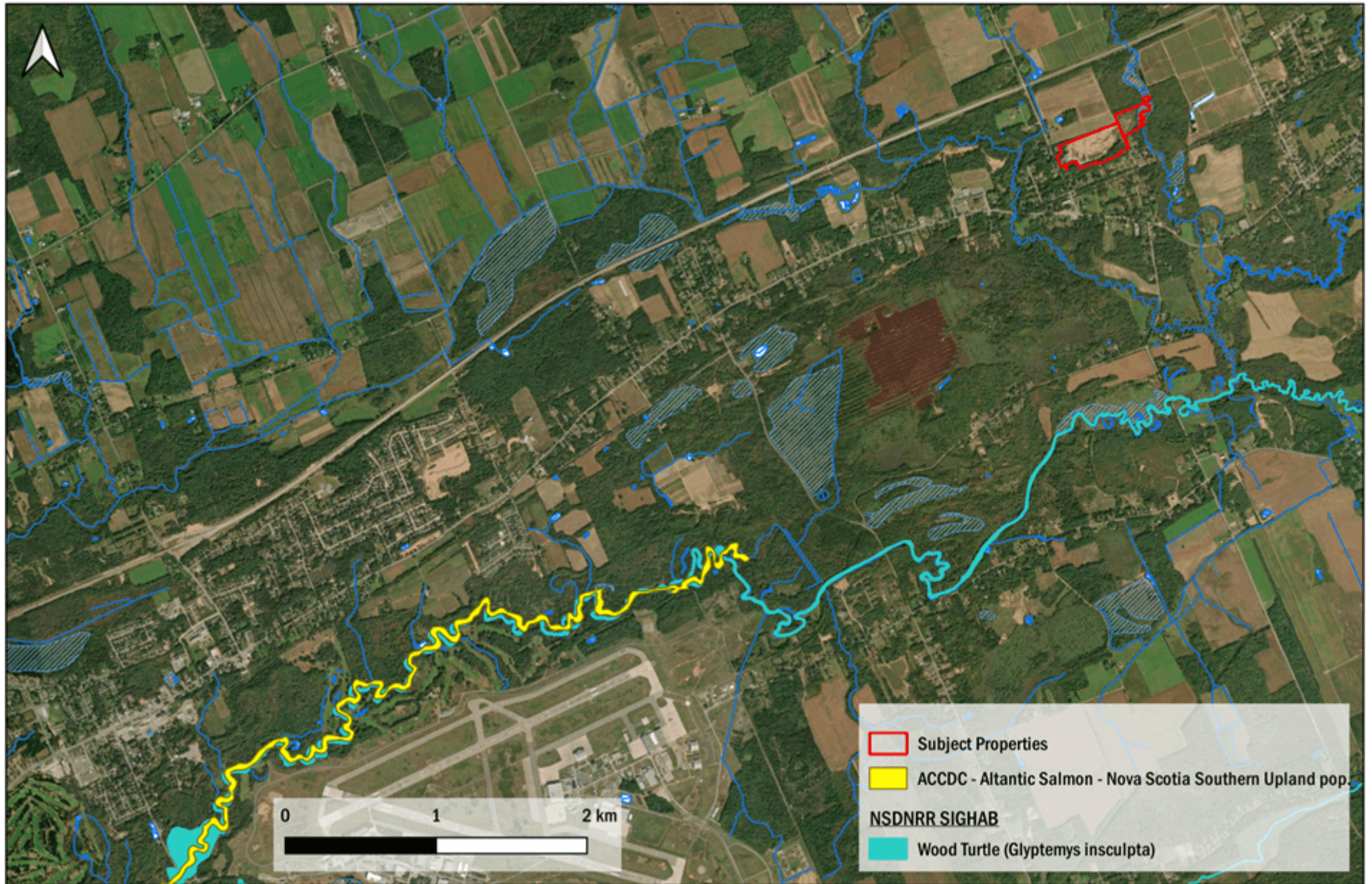
## **DESKTOP REVIEW: RESULTS**

The Project Site is within the Annapolis Primary Watershed (1DC) and the Annapolis River Secondary Watershed (1DC-3). McGee Brook, a 6 km tributary, flows along the northeasternmost edge of the Project Site before joining the Annapolis River approximately 1 km southeast. The Annapolis River is a major river system spanning approximately 120 km, ultimately draining into the Annapolis Basin and supporting various aquatic species. Further details on surface water are provided in Section 7.1.1.

A review of the Aquatic Species at Risk Map (DFO, 2025) revealed that McGee Brook does not contain any SAR. However, the Annapolis River, where McGee Brook connects to, contains, or potentially contains, Brook floater (*Alasmidonta varicosa*), a freshwater mussel listed as 'Special Concern' under COSEWIC and SARA and 'Threatened' under the ESA, with an S-Rank of 'S3' in Nova Scotia.

According to ACCDC records, Eastern pearlshell (*Margaritifera margaritifera*) (S2, SOCI) was identified within 5 km ( $2.1 \pm 8.76$  km) of the Project but not within the Project Site. Further, ACCDC also highlights Atlantic salmon - Nova Scotia Southern Upland population (*Salmo salar pop. 6*) (S1, SOCI) habitat beginning ~3 km southeast in the Annapolis River, extending to the Annapolis Basin (Drawing 7.1.6.1).





Drawing 7.1.6.1: Regional Aquatic Habitat (Desktop)