APPENDIX D
BIOPHYSICAL ASSESSMENT REPORT
(Envirosphere Consultants Limited, 2021)

Environmental Assessment Registration Document:
Whycocomagh Quarry Expansion
Stewartdale, Municipality of the County of Inverness
Nova Scotia

Biophysical Assessment: Whycocomagh Quarry Expansion Stewartdale, Cape Breton, Inverness County, Nova Scotia – PIDs 50209980

July 2021

Prepared for:

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1 INTRODUCTION

Dexter Construction Company Limited, Bedford, Nova Scotia (Dexter), is proposing to expand an existing quarry in the community of Stewartdale near Whycocomagh, Inverness County, Nova Scotia. The quarry is presently operating under an industrial approval for quarries less than four hectares (ha) in size. An approval to expand the quarry beyond the current size is required under the Environmental Assessment Regulations of the Nova Scotia Environment Act. Dexter contracted Envirosphere Consultants Limited of Windsor, Nova Scotia, to prepare a biophysical and socio-economic overview and assessment of the proposed quarry expansion in support of the Environmental Assessment application. This report contains the results of the overview and assessment. It presents a description of the methodology and scope, existing environment, environmental effects, cumulative effects, discussion, and conclusions. The assessment provides a sufficient level of detail to ensure that all information necessary to allow adequate review of the project is provided; to demonstrate how the assessment was conducted; and to document the information on which the conclusions were based.

2 INFORMATION SOURCES

Information for the biophysical and socio-economic overview and assessment was collected from various sources, including interviews with representatives of the Nova Scotia Department of Lands and Forestry (NSDLF); residents of the Stewartdale, Churchview and Whycocomagh area; contacts with organizations, businesses and individuals in Whycocomagh and the surrounding area; review of published information including soil surveys, reports on geology, archaeology (CRM 2020), and natural history (e.g. *Natural History of Nova Scotia*); use of relevant websites and databases (e.g. Nova Scotia Open Data Portal; DNR Significant Habitat and Wetland Databases, Atlantic Canada Conservation Data Centre, and Nova Scotia Museum of Natural History); and use of maps, digital data on land use, and property ownership, aerial photos, and 1:50,000 topographic maps. Site visits and walkovers by project personnel were carried out on October 20, 2020 and June 23, 2021 (fall and late spring/early summer botany surveys); June 18, 2021 (owls and breeding birds); May 25 and June 14 – 15, 2021 (site reconnaissance); and October 26, 2020 (lichen survey). Key project personnel included Patrick Stewart (M.Sc.), Hayley Doyle (B.Sc. Environmental Science), and Heather Levy (B.Sc. Hons. Environmental Science) (background review, site reconnaissance, wetlands, water quality & fish habitat assessment); Ruth Newell, M.Sc. (botany survey); Tom Neily (lichens); and Mr. Fulton Lavender and Mr. Richard Hatch (bird surveys).

3 SITE LOCATION AND STUDY AREA

The Dexter Whycocomagh Quarry in Inverness County is located on Chuggin Road off Whycocomagh Port Hood Road in the community of Stewartdale, approximately three kilometers northwest of the Village of Whycocomagh, at approximately UTM Zone 20, NAD83, Easting 642657 and Northing 5094474. The study area for the assessment is shown on Figure 1 and the site is shown in Google Earth satellite imagery from July 2019 (Figure 2). The quarry is shown in Figures 3 to 5. The proposed quarry expansion area will be located entirely within the EA study area (10 ha).

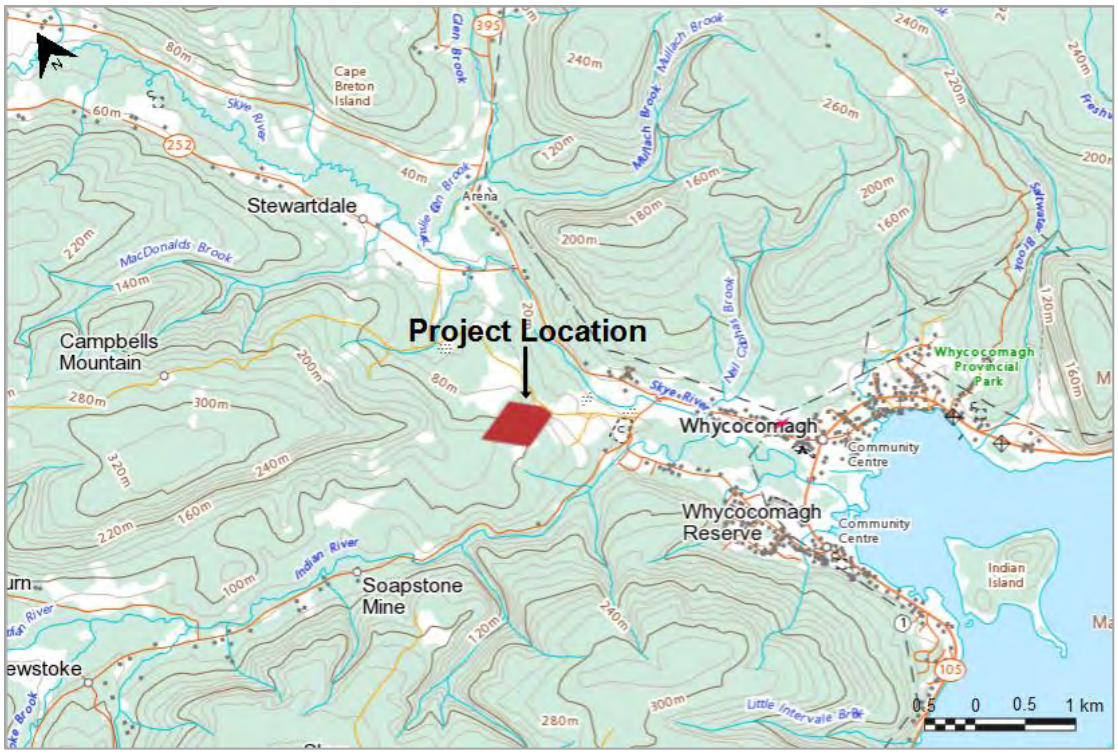

Figure 1. Project location shown on NTS 1:50,000 mapping (11F14).

Figure 2. Study area in relation to local site features in 2019 air photo.

Figure 3. View of Dexter Whycocomagh Quarry, facing southeast, June 15, 2021.

Figure 4. View of west end of Dexter Whycocomagh Quarry, June 15, 2021.

Figure 5. Stockpile areas on the southeast end (*left*) and north end (*right*) of the quarry, June 15, 2021.

4 EXISTING ENVIRONMENT

4.1 PHYSICAL ENVIRONMENT

4.1.1 CLIMATE AND WINDS

The site is expected to have a climate similar to the more exposed and severe conditions in the Ainslie Uplands ecodistrict (also referred to as the Cape Breton Hills Ecodistrict) and Cape Breton Escarpment ecoregions (Webb and Marshall 1999), both having a mean annual temperature of 6.0°C; and summer and winter temperatures of 16.7 and -4.4°C, respectively; and annual precipitation of 1410 to 1596 mm respectively, including about 500 mm of rain between May and September (Figure 6). The Lake Ainslie Uplands is noted as having the latest, coldest springs and shortest growing season in Nova Scotia (Webb and Marshall 1999). Local climate is influenced by winds from the Gulf of St. Lawrence, but the quarry is sheltered by the adjacent uplands, with average winds lower and summer temperatures higher. Winds are generally strongest in winter, predominantly from the west and south quadrants, occurring mainly from the west in winter (November to February), shifting to north and northwest (February to April), and south (spring to late summer, May to August), and returning to the west in September-October (TDC 1991).

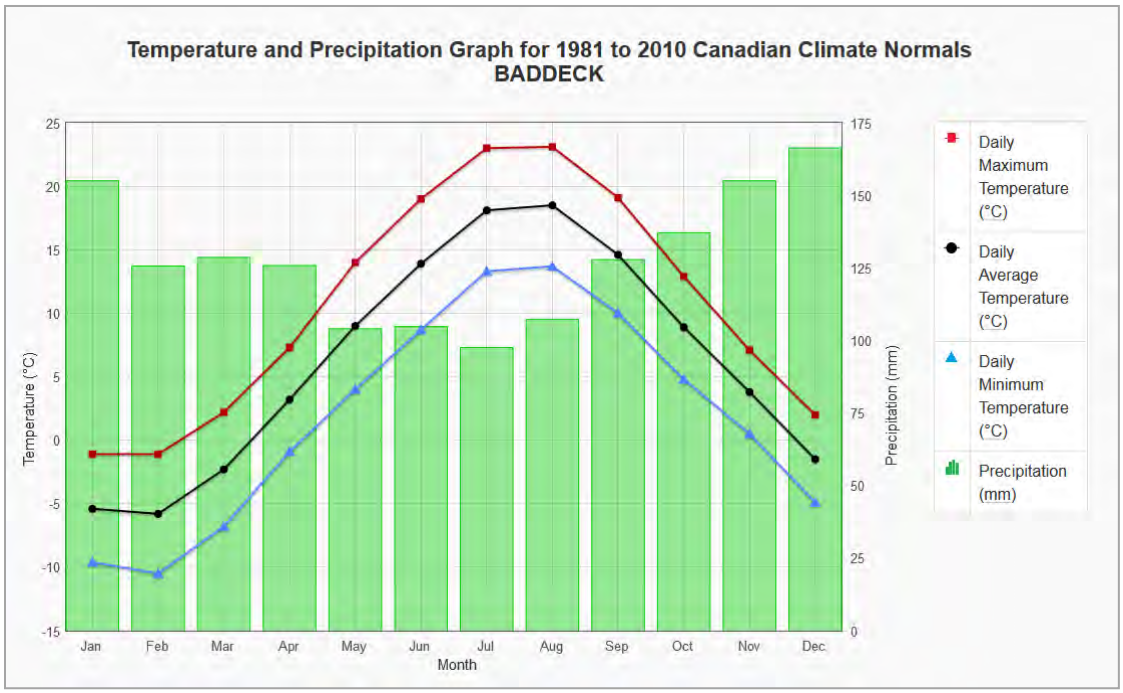

Figure 6. Annual precipitation and temperature cycle, Baddeck (1981-2010) (Canadian Climate Normals 2020).

4.1.2 TOPOGRAPHY AND GEOLOGY

Landscape

The Dexter Whycocomagh Quarry is located in the Skye River Valley, which cuts throug the broad region of hilly uplands known as the Cape Breton Hills that surrounds the Cape Breton Highlands. The site is located near the base of Campbells Mountain to the west, and is north of Skye Mountain and west of Whycocomagh Mountain, forming the uplands of the Skye River Valley. The valley leads north along the Skye River, in a network of passes which extend through Lake Ainslie to the watershed of Margaree River, and even to Mabou Harbour on western Cape Breton Island. The quarry is surrounded by steep slopes and sharply incised valleys, descending steeply toward the Skye River, and the associated valley which continues inland toward the Bras d'Or Lakes, Whycocomagh Bay. Cutover, mixed forest, forms the predominant cover (Figure 7), and locally with areas of relatively undisturbed deciduous woodland in gullies, and small areas of densely planted white pine along roadways near the quarry.

Figure 7. Forest landscape along sloped hills at Whycocomagh Quarry, July 14, 2021.

Bedrock Geology

Bedrock at the site is predominantly Horton Group (Lake Ainslie and Creignish sedimentary formations)—sandstones and conglomerates—overlying the George River suite of metamorphic rocks, consisting mainly of metamorphosed sedimentary rocks (quartzite, greywacke, slates, limestones and dolomites) with minor amounts of other sedimentary rocks and siliceous volcanic rocks (Milligan 1970). The George River Metamorphic Suite is locally intruded by Neoproterozoic and Ordovician-Silurian granites and diorites (Keppie 2000; Barr and White 2017) (Figure 8).

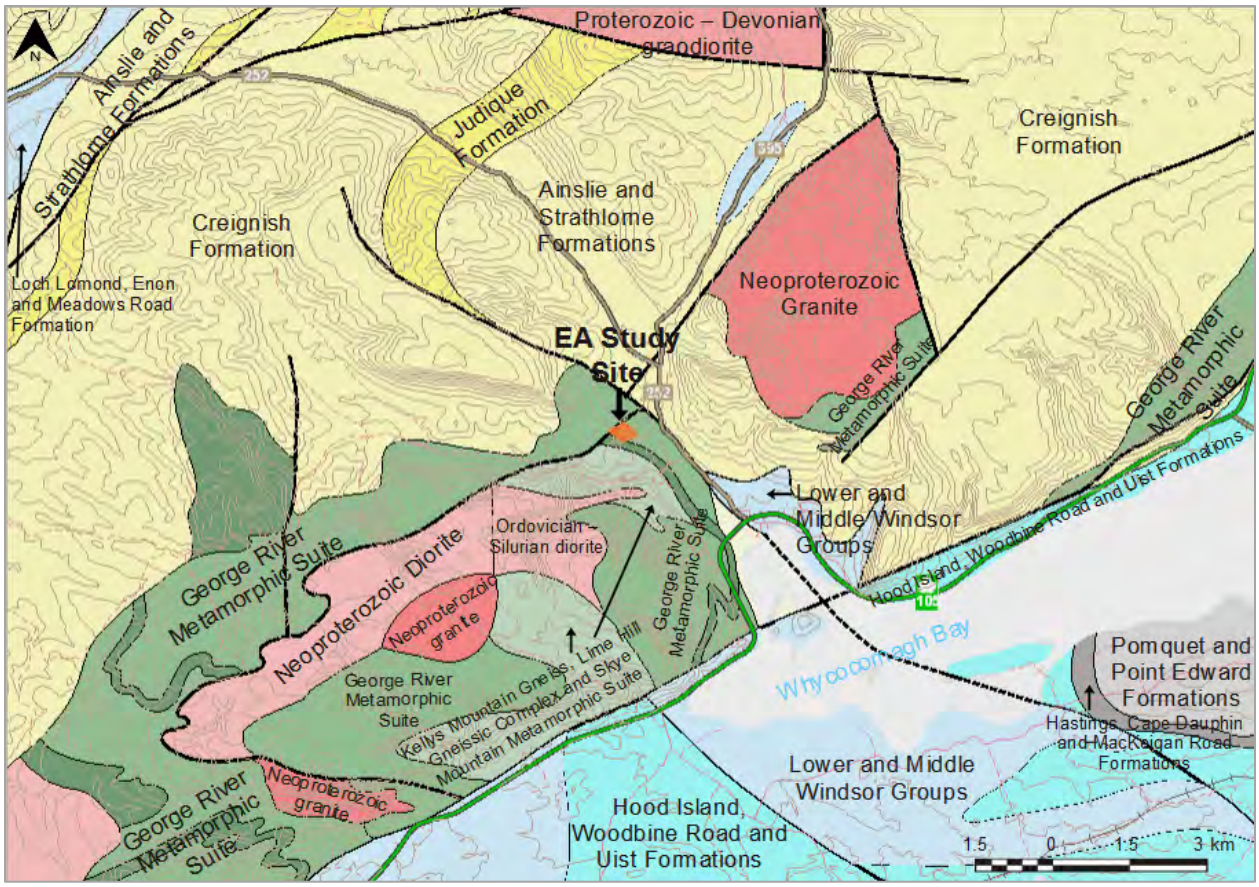

Figure 8. Bedrock formations in the vicinity of the Whycocomagh Quarry (Keppie 2000).

Surficial Geology

The Dexter Whycocomagh Quarry site is on a silty till plain thick enough to mask bedrock undulations (Stea et al 1992; Davis and Browne 1996). The silty till as well as more compact material is derived from both local and distant sources (Figure 9). The general study area features flat to rolling topography with few surface boulders. This silty till in the base of the valleys generally provides some of the best agricultural land in the province due to its moderate drainage, low stoniness, and moderate to good buffering capacity (Stea et al 1992).

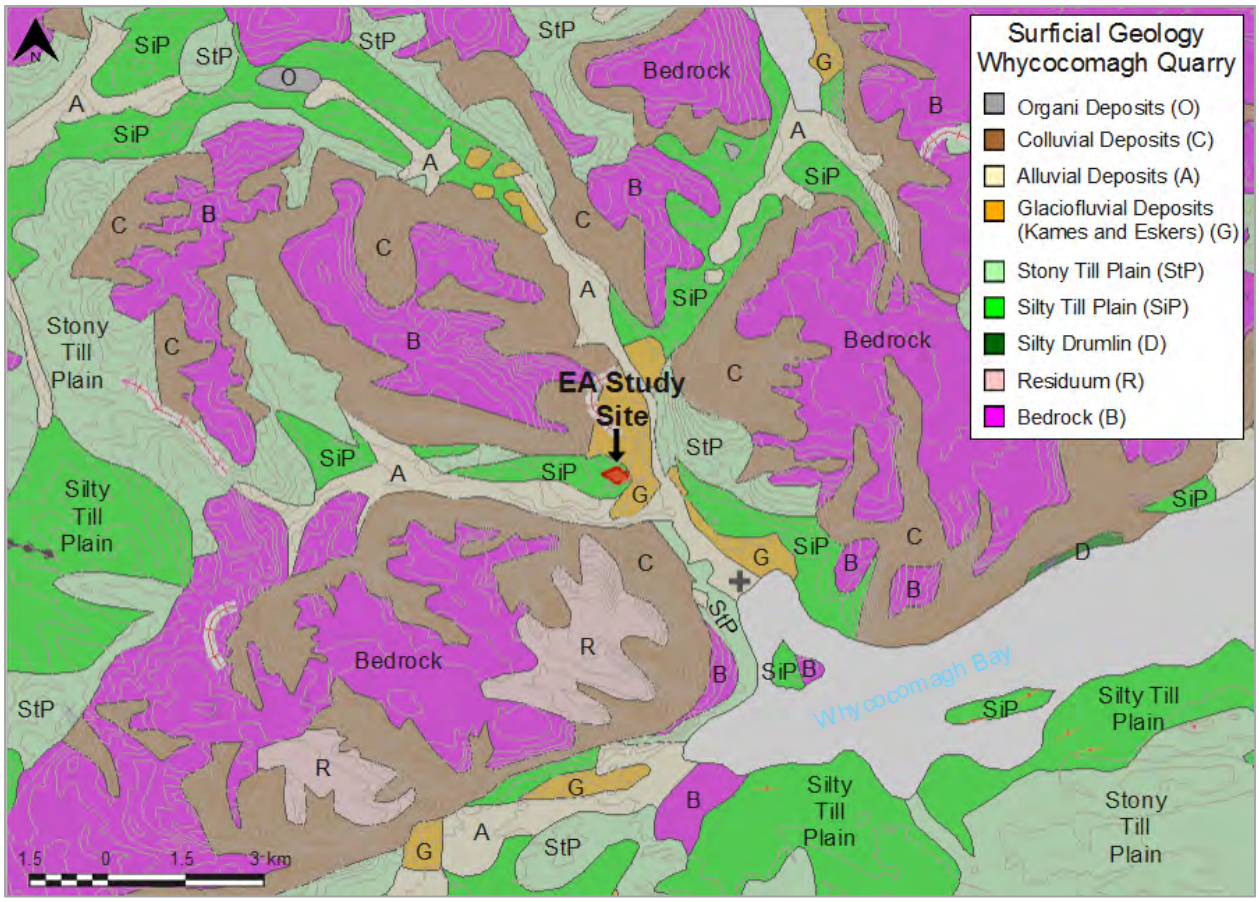

Figure 9. Surficial geology of the study area. From Stea et al. (1992) and digital version (2006).

4.1.3 AIR QUALITY, NOISE & LIGHT

The Whycocomagh area experiences moderate levels of artificial light, ambient noise, and moderate to high air quality. The community of Whycocomagh and We'koqma'q First Nation located less than one kilometer to the south are minor sources of artificial light and would be seen as sky reflections from the quarry; ambient noise levels at the quarry reflect traffic noise along adjacent roads and Highway 105, as well as noise from traffic and operations of the quarry; and air quality is expected to be good due to the rural location and predominantly forested setting.

Apart from street and business lighting in the Village of Whycocomagh, vehicle lights would be the main sources of artificial light at the site, and due to the low population density, is expected to be low. Lights at the quarry and adjacent quarries, as well as 'skyshine' from operations when low clouds occur, can probably be seen from Whycocomagh and open water areas of the Bras d'Or Lakes (St. Patrick's Channel) along sightlines to the quarry.

The Whycocomagh area is expected to have relatively high natural baseline air quality typical of areas with a high percentage occurrence of natural landscape such as neighbouring forested wilderness areas, and also to open water such as the Gulf of St. Lawrence of western Cape Breton and the largely

undeveloped areas of the Bras d'Or Lakes and central Cape Breton on the south. Low levels of human activity, including vehicle traffic along Highway 105, as well as that associated with quarry activities, have little impact on overall air quality at the site. Periodic dust and vehicle exhaust emissions from quarry activities as well as regular residential vehicle traffic are the main contributors to particulates and exhaust emissions, which are expected to be at low levels.

The quarry and associated movement of trucks and equipment would continue to provide a minor and periodic source of noise in the area. Operations at the quarry are periodic in response to demand for product and are likely one of the main noise sources in the area. Blasting occurs typically one to two times per year; operation of a portable crusher and heavy equipment may take place periodically and temporarily add to noise levels when the quarry is in operation; a portable asphalt plant may operate at the site periodically; and trucks are used to transport product and move the portable equipment as required. Typical noise includes blasting and sounds from the crusher and other heavy equipment operations (e.g. motors, generators, back-up signals etc.). Occasionally, operations at the quarry can be heard from nearby (about 4.5 kilometers northeast, across the Skye River Valley) (G. Haverstock, Iron Mountain Wilderness Cabins, pers. comm., July 2021). The scope of operations, including annual usage, for the quarry are not expected to change and ambient noise levels in general are expected to be localized. All trucks leaving the site are required to follow Dexter's best operational practices, as well as those established by Truckers Association of Nova Scotia (TANS) and the Nova Scotia Road Builders Association (NSRBA), to minimize emissions. Noise levels arising from the quarry in future will continue to meet the limits established in the Nova Scotia Pit and Quarry Guidelines and are expected to be consistent with those produced by the existing quarry operations at the site.

4.1.4 HYDROLOGY

The Dexter Whycocomagh Quarry is located at the lower reaches of the 1FG-1 secondary watershed (Skye River) that drains into Bras d'Or Lakes', Whycocomagh Bay. Several small unnamed intermittent streams arise near the quarry and flow into Skye River to the east and to the north. Gullies and swales around the site accumulate water coming off the steep-sloped landscape and help direct the flow toward lower portions of these sharply incised gullies (Figure 10). The lower portions of gullies support small, low-flowing, intermittent watercourses that become defined permanent streams at lower elevations (Figure 11). Indian River is another important surface water feature within the Skye River watershed located south of the study site. It is in a separate tertiary watershed, and no surface runoff from the quarry is directed towards it (Figure 12). Indian River flows east and joins Skye River southeast of the study area.

Flows in watercourses in the vicinity of the site are expected to follow a seasonal pattern, with highest flows in the fall (October-November) and winter, peaking after snow melt in spring (April) and dropping to low levels in summer (July-August). Much of the Skye River watershed is forested and flows are expected to be moderate from sudden precipitation events, the occurrence of which is increasing overall due to patterns of climate change. Although increased flashiness of flows leaving quarry sites in the area may be expected, the Dexter Whycocomagh Quarry site occupies only 2.2% of the sub-tertiary watershed (Skye River, 1 FG-1, 462.8 ha), and therefore is not expected to impact Skye River flow to a significant degree. Impermeable surfaces such as access roads tend to channel some of the flow into ditches which will be dissipated passing downslope towards the river.

Figure 10. Gully (*left*) within the quarry boundary upstream of a sharply incised lower portion of the gully (*right*) located near the western boundary of the quarry property leading to an intermittent stream off the study site, June 14, 2021.

Figure 11. Unnamed stream east of the quarry site flowing east toward Chuggin Road and eventually connecting with the Skye River, June 14, 2021.

An analysis of surface water drainage patterns conducted using a digital elevation model (DEM) developed from local contours[1] generally supported the flow pattern inferred in the field (Figure 12). The existing quarry site drains predominantly east along the prevailing downgradient; the north and south boundaries drain off slopes eventually connecting with gullies or ravines leading to eastward flowing unnamed watercourses. The west boundary of the quarry drains into a seasonally dry gully that leads north toward an unnamed stream that flows north before connecting with the Skye River (a flow which is only partly shown by the modeling). Slope and surface runoff leaving the quarry site is channelized into small ravines draining downslope toward gullies and intermittent streams, but all were dry at the time of the June 2021 survey (Figure 13).

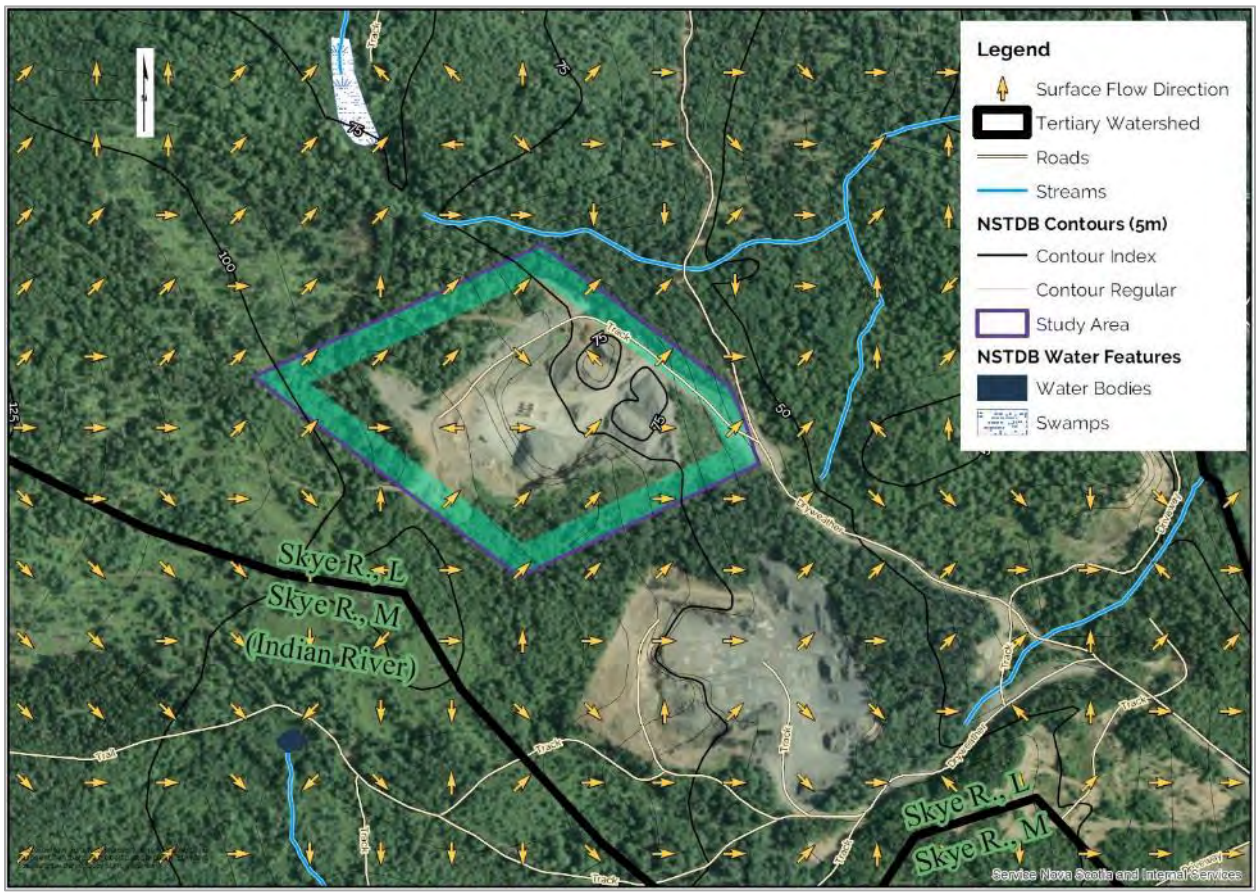

Figure 12. Modeled surface water flow direction analysis for Whycocomagh Quarry and sub-tertiary watershed boundaries. Arrows show modeled flow direction.

[1] The Multiple Flow Direction (MFD) method in ArcGIS's Raster Analysis tool box, was used to determine flow direction.

Figure 13. Steeply sloped, dry ravine coming off quarry site toward the unnamed stream that flows east to the Skye River, June 14, 2021.

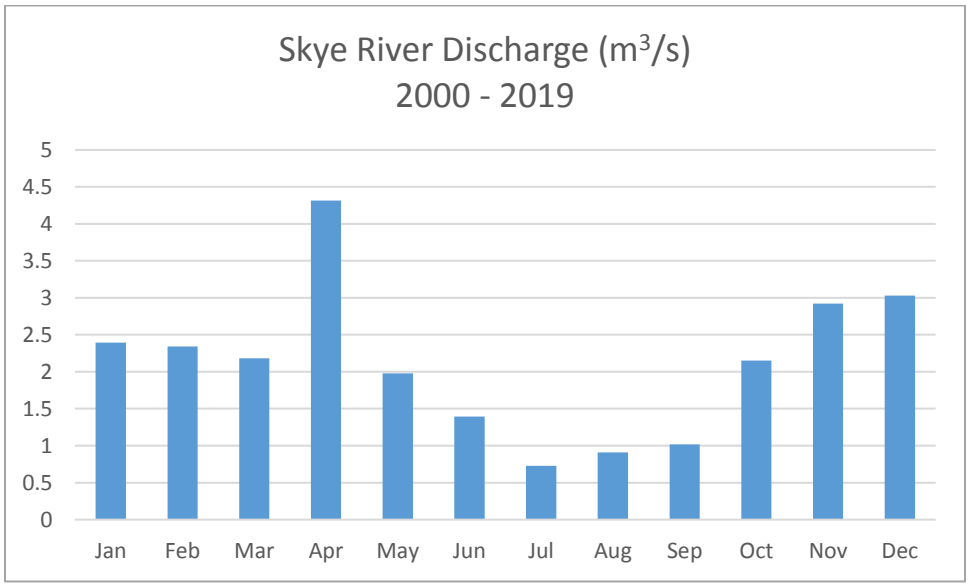

Figure 14. Average monthly flow in Skye River at Churchview. Based on River Inhabitants flows at Glenora, 2000 to 2019. River Inhabitants watershed area is 193 km^2.

4.1.5 HYDROGEOLOGY

The site is underlain predominantly by metamorphic bedrock, and groundwater develops subsurface in cracks and fractures, on horizontal surfaces between strata, and in till which is shallow at the site. The water table at the site is below the floor of the quarry based on current drainage characteristics at the site. The actual depth of the bedrock water table at the quarry site is not known, but it has not been encountered during previous quarry operations, and it is not anticipated that the quarry expansion will reach the bedrock water table. There is no evidence of groundwater intrusion from the quarry highwall or quarry floor, and there is no standing water within the quarry excavation. Surficial and shallow groundwater flow is anticipated to mirror the topographic slope, predominantly east towards Skye River. Precipitation reaching the quarry floor infiltrates the floor or leaves via ditches, outflows and ravines into the surrounding forest; while some is expected to enter groundwater as seepage through cracks and fractures.

4.1.6 SOILS

The site is located on Westbrook and Cumberland-Hebert soils – the former developed at higher elevations from reddish-brown gravelly sandy loam glacial till derived from underlying conglomerate bedrock common in the area—and the latter from reddish-brown alluvial sediments ranging in texture from silt loam to very fine sandy loam or sandy loam on valley floors. Topography is gently rolling to strongly rolling, and soils are well drained (Cann et al. 1963). Westbrook soils are moderately stony with enough stones to cause some interference with cultivation and undulating topography limits farming; while Cumberland-Herbert soils are stone-free and more suited to agriculture. Small areas, including those near the Dexter Whycocomagh Quarry, may be used for small pastures or grazing. Many areas are dissected by streams moving down slopes and hills with stony surface that interferes with tillage with occasional outcrops at the surface (Cann et al. 1963).

4.2 BIOLOGICAL RESOURCES AND HABITAT

4.2.1 TERRESTRIAL ENVIRONMENT

The study site is located in the Cape Breton Hills ecodistrict where hardwood forested slopes surround the Bras d'Or Lakes area with hills dominated by sugar maple, yellow birch, and red maple scattered with white spruce and balsam fir (NSDLF 2019). The Dexter Whycocomagh Quarry and work areas occupy most of the study area and much of the area immediately adjacent has been developed for roads and other quarries (Alva Construction Ltd. to the south; Nova Construction to the west). The forested areas surrounding the Dexter Whycocomagh Quarry support natural stands of predominantly shade-tolerant deciduous forest with additional areas that have been cutover or modified and are regenerating (Map A-3). All plant species identified within the study area were non-invasive and consisted of native species with secure populations in Nova Scotia, as well as exotic species. No species with potential to harm the environment or known to interfere with the ecological balance of the area were identified during botany and site reconnaissance surveys. For a full list of plant species identified during October 20, 2020 and June 23, 2021 (fall and late spring/early summer) botany surveys, see Appendix B.

Around the margins of the quarry and on all-terrain vehicle (ATV) trail edges, where forest cover has been removed and drainage has been affected by quarry activities, a disturbed vegetated community occurs.

These modified areas either drop abruptly or are level to gently sloping down to transition into the surrounding woodland and are usually mesic or moderately dry. These open disturbed areas are generally vegetated with a mixture of native and non-native herbaceous plant species (Figure 15; Figure 16). Herbaceous vascular plant species in these habitats include Colt's-foot (*Tussilago farfara*), reed canary grass (*Phalaris arundinacea*), field horsetail (*Equisetum arvense*), tansy ragwort (*Jacobaea vulgaris*), pearly everlasting (*Anaphalis margaritacea*) and Queen Anne's lace (*Daucus carota*). Various old-field native species are also present in these areas including grasses, asters and goldenrods.

Figure 15. Open disturbed areas of the quarry's edge vegetated primarily with both native and non-native, weedy species, and some old field species such as asters and goldenrods, R. Newell, October 2020 botany survey; June 15, 2021.

Figure 16. ATV trail within the quarry property located near the northwest boundary where Colt's-foot, dandelion, clover and common hawkweed were observed, June 14, 2021.

White pine has been planted densely along road edges near the lower east side of the existing quarry near the entrance (Figure 17) The pines are approximately 20 years old with little other vegetation within the area due to the high density of trees in the habitat.

Figure 17. Dense white pine (Pinus strobus) plantings along access road edges in vicinity of the quarry, R. Newell, October 2020 botany survey.

Cutover mixed woodland occupies slopes and areas in the vicinity of ATV trails at the site. Areas south of the existing quarry, between the quarry and an ATV trail located near the southern boundary line, have been previously cut over and disturbed (Figure 18). Cutover mixed woodland areas also occur in a small area north of the existing quarry that is encircled by an ATV trail and continues beyond the boundary of the study site (Figure 19), as well as west of the quarry, beyond the gully located immediately adjacent to the existing quarry (Figure 20). Mixed woodlands have an overstorey of white birch (*Betula papyrifera*), yellow birch (*Betula alleghaniensis*), white spruce (*Picea glauca*), black cherry (*Prunus serotina*), balsam fir (*Abies balsamea*), sugar maple (*Acer saccharum*) and red maple (*Acer rubrum*). Common shrubs include wild raspberry (*Rubus idaeus ssp. strigosus*) and wild blackberry (*Rubus* spp.). Commonly occurring herbaceous species include hay-scented fern (*Dennstaedtia punctilolula*), Canada goldenrod (*Solidago canadensis*), calico aster (*Symphyotrichum lateriflorum*), tall white aster (*Doellingeria umbellata*), sensitive fern (*Onoclea sensibilis*), wild strawberry (*Fragaria virginiana*), and large-leaved avens (*Geum macrophyllum*). These cutover areas also featured pockets of regenerated forest including regenerated coniferous forest (balsam fir) occurring on the southern margin of the quarry study area (Figure 21, *left*) and maple regeneration was observed on the western margin (Figure 21, *right*).

Figure 18. Cutover mixed woodland along the south edge of the quarry, R. Newell, October 2020 botany survey.

Figure 19. Cut logs left after earlier logging activity (*left*) and a young mixed wood forest near the west boundary of the study site, June 14, 2021.

Figure 20. Cutover mixed woodland on the north side of the quarry (*left*) and encircled by the ATV trail (*right*), R. Newell, October 2020 botany survey; June 14, 2021.

Figure 21. Regenerated balsam fir (*Abies balsamea*) forest (*left*) and regenerated maple forest (*right*), June 14-15, 2021.

Natural, undisturbed woodland occurs within and beside several gullies observed on and immediately surrounding the quarry property. Gullies occur in the vicinity of unnamed streams near the quarry property north, south and west of the existing quarry and are vegetated with primarily deciduous woodland including American beech (*Fagus grandifolia*), both white and yellow birch (*Betula papyrifera, B. alleghaniensis*), black cherry (*Prunus serotina*), moose maple (*Acer pensylvanicum*) with occasional balsam fir (*Abies balsamea*). A gully that runs parallel to the south and southeastern boundary of the site contains herbaceous species including intermediate wood fern (*Dryopteris intermedia*), whorled wood aster (*Oclemena acuminata*), Christmas fern (*Polystichum acrostichoides*), two-leaved toothwort (*Cardamine diphylla*), Braun's holly fern (*Polystichum braunii*) and silvery glade fern (*Deparia acrostichoides*) (Figure 22). Another area of deciduous woodland occurs in the west corner of the property adjacent to the existing quarry and features similar vascular plant species to the gully along the south boundary in addition to beaked hazelnut (*Corylus cornuta*), goldthread (*Coptis trifolia*), hay-scented fern (*Dennstaedtia punctilobula*), witherod (*Viburnum nudum* var. *cassinoides*) and common

speedwell (*Veronica officinalis*) (Figure 23). A third mixed woodland occurs north of the quarry in a gully that travels downslope toward the east (Figure 24). These relatively undisturbed woodland areas also support areas of sphagnum moss and moist soil suggesting that they are seasonally wet. Vascular plant species occurring within the wet section of the gully west of the quarry include ostrich fern (*Matteucia struthiopteris*), cinnamon fern (*Osmunda cinnamomea*), fringed sedge (*Carex crinita*), rough sedge (*Carex scabrata*), a touch-me-not (*Impatiens* sp.), rough aster (*Symphyotrichum puniceum*), small-flowered forget-me-not (*Myosotis laxa*) and small enchanter's nightshade (*Circaea alpina*).

Figure 22. Deciduous woodland in a dry gully along the southern edge of the survey area, R. Newell, October 2020 botany survey.

Figure 23. Relatively undisturbed, deciduous woodland occurring within the study site near the west and northwest property boundary, June 14, 2021.

Figure 24. Primarily deciduous woodland north and northeast of the quarry property, June 14, 2021.

4.2.2 AQUATIC ENVIRONMENT

The study area lacks permanent surface water features; in particular there are no permanent first order streams or water bodies on site. Most of the site is on a plateau at the base of Campbells Mountain, and the only drainage features are gullies and ravines that carry intermittent flow originating around the margin of plateaus, eventually becoming steep channels and streams fed by springs at lower elevations. Two intermittent streams that connect to the Skye River were identified north and northeast of the study

site, one that flows north and the other that flows east. A gully on the southeastern boundary of the property located adjacent to an ATV trail is at the head of an intermittent stream which flows from the northeast side of the property, and discharges in Skye River (Figure 12).

The forested gully located immediately west of the existing quarry leads to a swamp wetland located north of the study area (Figure 12) which is the source of an unnamed watercourse which leads to the Skye River. The gully is seasonally wet with dry conditions in October 2020 and mid –May 2021 but having standing waters and moist soils observed during spring surveys (June 14, 2021 and June 23, 2021) (Figure 25). The stream was small just outside the study site, with a wet width of less than 0.5 m near the quarry property (Figure 26), and likely is intermittent.

Figure 25. Moist soil and pools of water within the gully west of the existing quarry. For location see Figure 31.

Figure 26. North flowing unnamed stream north of the study site immediately off the quarry property, June 14, 2021.

The second unnamed stream northeast of the quarry flows east, having originated in a gully off-site that was dry at the time of the June 2021 survey. Surface water comes to the surface in places down the slope above the Chuggin Road, and spreads into a small wetland (Figure 28), becoming channelized again and passing through a culvert, continuing downslope where it forms small permanent stream (wet width of approximately 0.8 m) (Figure 27). Downstream of Chuggin Road, the unnamed stream has a predominantly sand and gravel substrate with boulders and woody debris. The banks are undercut with minimal overhanging vegetation, but is shaded well from canopy cover of yellow birch, fir, spruce and moose maple trees.

Figure 27. East flowing unnamed stream upstream (*left*) and downstream (*right*) of Chuggin Road.

Figure 28. Wetland where the unnamed stream spreads out immediately above the Chuggin Road before passing through a culvert. For location see Figure 31.

The gully along the southeastern boundary of the study site slopes eastward down toward a culvert under Chuggin Road (Figure 29). Occasional level areas at high elevations of the gully channel had evidence of pooling water and wet soil at times. During high precipitation events, flow through the gully is expected to feed the unnamed tributary below the culvert that eventually connects to Skye River; however the gully was dry at the time of the June 2021 survey.

Figure 29. Gully on the south end of the quarry sloped eastward down toward Chuggin Road.

4.2.3 WATER QUALITY

Water quality measurements were made during the June 14 and 15, 2021 field survey at several locations, including: the intermittent drainage feature north of the study area which flows north (WS1); a second intermittent stream northeast of the study site which flows east (WS2, WS3, and WS4 at various distances from the quarry property; Figure 30); and in Skye River, a first order river which flows south approximately 700 m east side of the quarry (WS5; Figure 31). Overall, surface water quality at all sampling sites was good. Samples on unnamed tributaries (WS1, WS2, WS3 and WS4) showed low conductivities, cool temperatures and high oxygen levels (Table 1). Suspended sediment levels were low and acidity was neutral at sites WS1, WS2, and WS3. Surface waters on the Skye River (WS5) showed high dissolved oxygen levels, higher conductivity and were slightly less acidic (Table 1). pH and dissolved oxygen levels at all sites were within guideline ranges for acceptable quality for the protection of freshwater aquatic life for all sites (CCME 1999) (Table 1).

Table 1. Water quality measurements from surface waters located at the Whycocomagh quarry and within the vicinity of Whycocomagh quarry. Site locations shown in Figure 32.

Site Location & Date	June 15, 2021				
	Whycocomagh Quarry	Whycocomagh Quarry Vicinity			
	WS1	WS2	WS3	WS4	WS5
Site Description	Head of unnamed north tributary to Skye River flowing north	Unnamed east tributary to Skye River above Chuggin Rd	Unnamed east tributary to Skye River below Chuggin Rd	Unnamed east tributary to Skye River furthest downstream	Skye River
Temperature °C	8.0	10.0	9.6	9.6	16.1
Dissolved Oxygen (mg/L)	9.8	8.9	8.1	9.6	8.4
Dissolved Oxygen (% saturation)	82.4	78.3	74.1	86.0	85.2
Conductivity (µs/cm)	65.7	60.4	62.6	29.6	98.7
Specific Conductivity (25°) (µs/cm)	97.3	84.9	88.7	42.0	118.9
pH	7.2	7.3	7.3	-	7.7
TSS (mg/L)	4.0	<0.5	0.5	-	<0.5

Note: TSS = Total Suspended Solids.

Figure 30. Skye River (WS5) looking downstream, June 15, 2021.

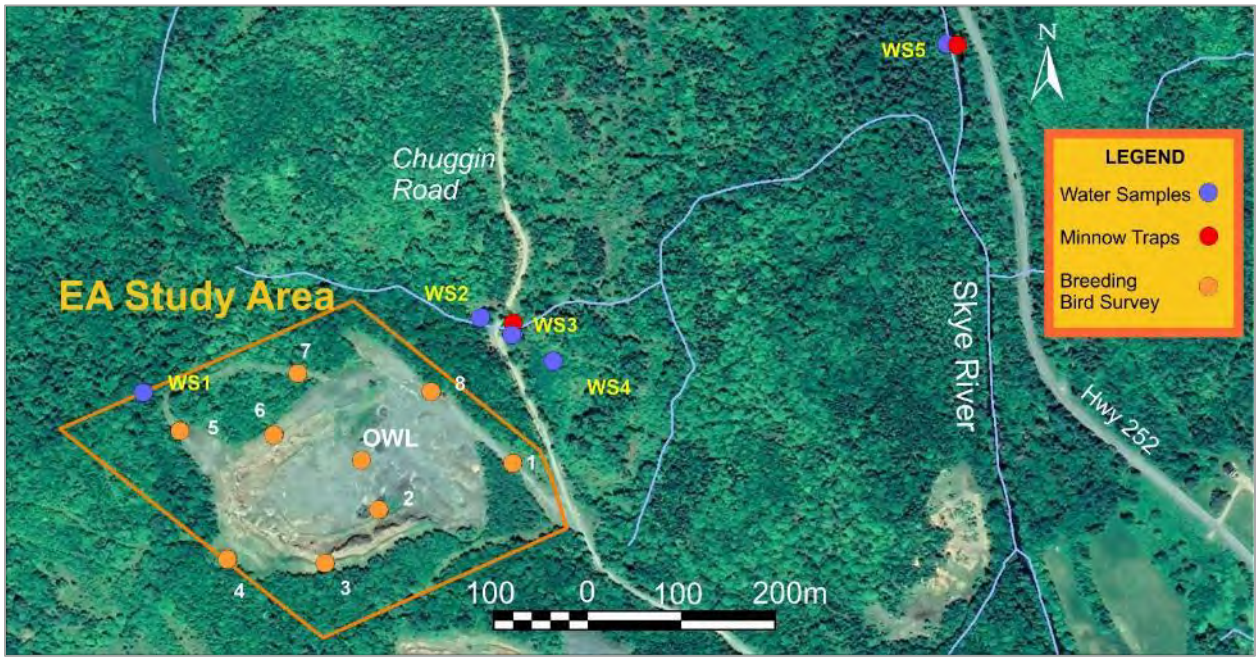

Figure 31. Whycocomagh field surveys, locations for water samples, minnow traps and breeding bird and owl surveys (June 2021).

4.2.4 WETLANDS

Wetlands are areas of land that are periodically or permanently flooded and support particular types of vegetation which are adapted to life in such environments. No wetlands were identified in the study area for the quarry. The quarry property and study area is well drained and generally moderately to steeply sloping, which typically does not lead to wetland development. In areas where the grade is greater, gullies west, north and, south of the quarry are present at the base of slopes. Gullies to the west and north transition from dry to wet, and in the 'wet' areas, standing water and some facultative wetland plants were observed. Plant communities here include: ostrich fern (*Matteucia struthiopteris*), cinnamon fern (*Osmunda cinnamomea*), fringed sedge (*Carex crinita*), rough sedge (*Carex scabrata*), a touch-me-not (*Impatiens* sp.), rough aster (*Symphyotrichum puniceum*), small-flowered forget-me-not (*Myosotis laxa*) and small enchanter's nightshade (*Circaea alpina*). Intermittent streams with adjacent riparian areas were documented downstream of these gully areas. A sedimentation control area located near the northeast corner of the existing quarry floor receives runoff from the quarry floor (Figure 32). Cattails (*Typha* sp.) and signs of hydrology (cracked soil) were present, though no standing water was observed, and there was no outflow.

Figure 32. Dry, cracked soil sediment pond located on the northern proportion of the existing quarry, June 15, 2021.

4.2.5 FISH & FISH HABITAT

No fish habitat occurs within the EA study site, or in the immediate vicinity; however the upper headwaters of two streams located adjacent to the quarry have potential fish habitat in downstream areas. Streams in the area originate from groundwater and precipitation, and because they are in upper

watershed areas can be seasonally intermittent. A gully forming an intermittent upper watershed source of the northern stream is in the northwest corner of the study area, and comparatively little of the catchment area of the stream is included. Similarly a gully on the north east side forms an intermittent source of the watercourse flowing east below Chuggin Road into Skye River and some runoff from the study area contributes to the gully (Figure 12), but there are no direct surface water connections from the quarry to these areas. The unnamed stream north of the property that flows north to connect with the Skye River potentially provides nursery habitat for fish and may support fish species including salmonids, although this does not occur within the quarry property (Figure 33). The gully at the headwaters of the stream, located west of the existing quarry pit, may seasonally become wet, but would not provide suitable habitat for fish. The unnamed stream on the northeast, below Chuggin Road, had sufficient flow to support brook trout (*Salvelinus fontinalis*) (WS3, Figures 31, 34 and 35; Map A-4)[2] and brook trout may access the short stream reach above the road temporarily during high flows. The gully located along the southeastern edge of the study site is not expected to support fish and was dry at the time of the site survey. Occasional runoff from the working quarry may enter the ditches, gullies or ravines draining the site and reach Skye River.

According to locals, brook trout are commonly fished recreationally in the lower reaches of the Skye River (Personal communications with local community members fishing the Skye River 2021; NSFA 2017). In addition to brook trout, other fish species of conservation concern potentially occurring in the area include, Atlantic salmon – Eastern Cape Breton population (endangered – COSEWIC), American eel (threatened - COSEWIC) and alewife (sub-national ranking S3). Atlantic salmon historically used the Skye River, Indian River and their tributaries (Denny et al 2013), and potentially support Atlantic salmon. Other freshwater fish typical of the Bras D'or Lakes area include brown trout, smelt and rainbow trout, the last of which are stocked seasonally within the Bras D'or Lakes, downstream of the Skye River (Iron Mountain Wilderness Cabins 2021; NSFA 2017).

[2] One 8.5-8.7 cm and one 11.5-11.7 cm brook trout were captured in the unnamed stream north of the property that runs east after a 23-hr set of a minnow trap on June 14-15, 2021.

Figure 33. Potential fish habitat located off of the study site along the unnamed tributary north of the quarry property, June 14, 2021.

Figure 34. Unnamed tributary northeast of the property flowing east, downstream of Chuggin Road, June 14, 2021.

Figure 35. Brook trout captured in the unnamed tributary northeast of the quarry property, downstream of Chuggin Road, June 15, 2021.

4.2.6 BIRDS

Birds are important in the ecosystem in the vicinity of the Dexter Whycocomagh Quarry. Breeding birds observed during the site survey are summarized in Table 2. Seventy species of birds have been recorded as potentially breeding in the study area (Maritimes Breeding Bird Atlas 2021, Southwestern Cape Breton Island Region 24, Table 3), but additional species may breed at the site from time to time. Most bird species common to the area can be observed from April to September in open, forested and wetland habitats, similar to those in the general vicinity of the site (Figure 36). Cape Breton also occupies the largest population of breeding bald eagles in Nova Scotia and is concentrated around the Bras d'Or Lakes area, including three within three kilometers of the study site (Hatcher 2018; M. Cameron-MacMillan, personal communications, 2021). Bald eagles in Cape Breton play an important role for the northeastern North America population and are sacred in Mi'kmaw culture (Hatcher 2018). Bald Eagle nest in late March to early April; tall trees suitable for nesting, such as mature eastern white pine, are not found at the quarry site. Nesting for other bird species of conservation concern that have been observed within five kilometer radius of the site, primarily occurs between May to mid-August (Figure 37).

Bird surveys were carried out using a 10-minute point count, during which all birds heard were recorded, and approximate distance indicated, consistent with standard bird survey protocols. Surveys did not record direction, which would have detracted from the objective of a complete census of the birds, due to the added time required. The bird community in mature hardwood (Sites 1 & 8, Table 2; Figure 31) was dominated by American robin (most abundant), Swainson's thrush, American redstart, American crow,

red-eyed vireo and blackburnian warbler, all of which occurred at both sites in moderate abundance. Alder flycatcher, American goldfinch, and mourning warbler occurred in low to moderate abundance, with mourning warbler moderately abundant at Site 1.

Mature mixed regenerated forest (Sites 4, 5, 6 and 7, Table 2; Figure 31) was dominated by Swainson's thrush, cedar waxwing, black-capped chickadee, American redstart, American robin and ovenbird, which all occurred at all sites, and least flycatcher, American crow, red-eyed vireo and black-and-white warbler found at three of the four sites. Swainson's thrush was most abundant, and both black-capped chickadee and cedar waxwing were relatively abundant overall in this forest type.

The bird community in mature mixed forest (Sites 2 and 3, Table 2; Figure 31) was dominated by American robin, American redstart, dark-eyed junco, least flycatcher, red-eyed vireo and ovenbird, which all occurred and were most abundant at both sites, with American Robin highest locally (five individuals per 10/minutes at Site 2).

Species richness and overall bird abundance at the sites ranged from low to moderate. Mixed hardwood had the highest average abundance overall followed by mature regenerated mixed forest; while lowest average abundance occurred in mature mixed forest sites (Table 2). Mixed hardwood forest and mature regenerated mixed forest had highest species richness, while mature mixed forest had the lowest species richness overall.

No owls were identified within 150 meters of the observation site in the centre of the quarry. Within hearing distance of the quarry during the nighttime survey were five barred owl and a long-eared owl in the west; three great horned owl in the south to southeast; and a distant call of a boreal owl beyond Skye River east of the site.

Other birds identified at or in the general area of the site during site visits included a sighting of spotted sandpiper (on the quarry floor), and calls of Wilson's snipe and American woodcock, as well as Canada geese distant from the site.

Table 2. Bird species heard or observed during dawn bird surveys conducted June 18, 2021, between 04:50 and 09:10 hrs at the Whycocomagh Quarry study site. For locations of observation points, see Figure 31.

Bird Species	Mature Hardwood (Sites 1 and 8)		Mature Regen Mixed Forest (Sites 4,5,6, and 7)		Mature Mixed Forest (Sites 2 and 3)	
	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins
Passeriformes (Songbirds)						
Alder Flycatcher	1	0.5	0	0	1	0.5
American Crow	2	2.5	3	1.5	0	0
American Goldfinch	1	1	0	0	0	0
American Redstart	2	3	4	1.75	2	1.5
American Robin	2	11	4	1.75	2	6
Blackburnian Warbler	2	2	0	0	0	0

Table 2. Bird species heard or observed during dawn bird surveys conducted June 18, 2021, between 04:50 and 09:10 hrs at the Whycocomagh Quarry study site. For locations of observation points, see Figure 31.

Bird Species	Mature Hardwood (Sites 1 and 8)		Mature Regen Mixed Forest (Sites 4,5,6, and 7)		Mature Mixed Forest (Sites 2 and 3)	
	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins
Black-capped Chickadee	1	1	4	2.25	1	0.5
Blue-Headed Vireo	0	0	1	0.25	0	0
Blue Jay	0	0	1	0.25	0	0
Black and White Warbler	0	0	3	1	0	0
Black-Throated Green Warbler	1	0.5	0	0	0	0
Cape May Warbler	1	0.5	0	0	0	0
Cedar Waxwing	0	0	4	2.25	0	0
Common Grackle	1	5	0	0	0	0
Common Raven	0	0	2	0.5	0	0
Dark-eyed Junco	1	1	2	0.5	2	1.5
Evening Grosbeak	0	0	1	0.25	0	0
Golden-Crowned Kinglet	1	0.5	0	0	0	0
Hermit Thrush	1	1	1	0.5	0	0
Least Flycatcher	1	1	3	1.5	2	1.5
Magnolia Warbler	1	1	2	0.5	0	0
Mourning Dove	1	0.5	0	0	1	0.5
Mourning Warbler	1	1.5	2	0.5	1	0.5
Ovenbird	0	0	4	1.25	2	1
Purple Flycatcher	0	0	1	0.25	0	0
Red-eyed Vireo	2	2.5	3	1.25	2	1.5
Ruby-Crowned Kinglet	0	0	1	0.25	0	0
Ruby-Throated Hummingbird	0	0	1	0.25	0	0
Song Sparrow	0	0	1	0.25	0	0
Swainson's Thrush	2	2.5	4	4.75	1	0.5
Tree Swallow	0	0	1	0.25	0	0
White-Throated Sparrow	1	0.5	0	0	0	0
Gaviiformes						
Ruffed Grouse	0	0	1	0.25	0	0
Piciformes (Woodpeckers)						
Downy Woodpecker	0	0	0	0	1	0.5
Northern Flicker	0	0	0	0	1	0.5
Pileated Woodpecker	0	0	1	0.5	0	0
Coraciiformes						
Belted Kingfisher	1	1	1	0.5	0	0
SUMMARY						

Table 2. Bird species heard or observed during dawn bird surveys conducted June 18, 2021, between 04:50 and 09:10 hrs at the Whycocomagh Quarry study site. For locations of observation points, see Figure 31.

Bird Species	Mature Hardwood (Sites 1 and 8)		Mature Regen Mixed Forest (Sites 4,5,6, and 7)		Mature Mixed Forest (Sites 2 and 3)	
	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins	No. of sites	Average/ 10 mins
AVERAGE ABUNDANCE PER SITE	**39.5**		**25**		**13**	
TOTAL SPECIES IN HABITAT	**20**		**23**		**11**	
AVERAGE NUMBER OF SPECIES PER SITE	**13.5**		**14**		**9.5**	

Table 3. Birds potentially breeding in the Whycocomagh area of the Southwest Cape Breton Island (Maritime Breeding Bird Atlas-Online 2021). Map 20PR49.

Swans, Geese & Ducks (Anseriformes: Anatidae)	
Canada Goose	Green-winged Teal
American Black Duck	Ring-necked Duck
Blue-winged Teal	Common Merganser
Pheasants, Grouse and Turkeys (Galliformes, Phasianidae)	
Ruffed Grouse	
Hawks & Falcons (Falconiformes: Accipitridae, Falconidae)	
Bald Eagle ¤	Sharp-shinned Hawk
Northern Harrier	Red-tailed Hawk
Shorebirds Sandpipers & Snipes (Charadriiformes, Scolopacidae)	
Spotted Sandpiper	Wilson's Snipe
Pigeons & Doves (Columbiformes: Columbidae)	
Rock Pigeon	
Owls (Strigiformes)	
Barred Owl	
Swifts (Apodiformes, Apodidae) and Hummingbirds (Apodiformes, Trochilidae)	
Ruby-throated Hummingbird	
Kingfishers (Coraciiformes, Alcedinidae)	
Belted Kingfisher	
Woodpeckers (Order Piciformes, Picidae)	
Yellow-bellied Sapsucker	Northern Flicker
Downy Woodpecker	Pileated Woodpecker
Hairy Woodpecker	
Songbirds (Passeriformes)	
Olive-sided Flycatcher †	Black-and-White Warbler
Eastern Wood-Pewee	Mourning Warbler
Alder Flycatcher	Common Yellowthroat
Least Flycatcher	American Redstart
Blue-headed Vireo	Northern Parula
Red-eyed Vireo	Magnolia Warbler

Table 3. Birds potentially breeding in the Whycocomagh area of the Southwest Cape Breton Island (Maritime Breeding Bird Atlas-Online 2021). Map 20PR49.	
Blue Jay	Blackburnian Warbler
American Crow	Yellow Warbler
Common Raven	Chestnut-sided Warbler
Tree Swallow	Yellow-rumped Warbler
Black-capped Chickadee	Black-throated Green Warbler
Boreal Chickadee	Wilson's Warbler
Red-breast Nuthatch	Chipping Sparrow
White-breast Nuthatch	Song Sparrow
Golden-crown Kinglet	Swamp Sparrow
Ruby-crown Kinglet	White-throat Sparrow
Veery	Dark-eyed Junco
Swainson's Thrush	Rose-breasted Grosbeak
Hermit Thrush	Red-wing Blackbird
American Robin	Common Grackle
European Starling	Purple Finch
Cedar Waxwing	White-winged Crossbill
Ovenbird	Pine Siskin
Northern Waterthrush	American Goldfinch
This list includes all species found during the Maritimes Breeding Bird Atlas (1st atlas: 1986-1990, 2nd atlas: 2006-2010) in the region #24 (Southwest Cape Breton Island). Rare/Colonial Species Report Forms should be completed for species marked: § (Colonial), ‡ (regionally rare), † (rare in the Maritimes) or ¤ (rare in the Maritimes, documentation only required for confirmed records). Current as of 12/01/2021. 20PR49.	

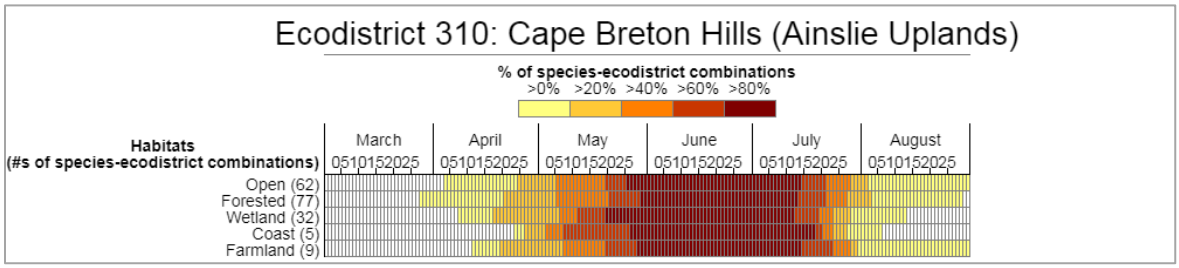

Figure 36. Nesting periods for various habitats in the Cape Breton Hills (Ainslie Uplands) Ecodistrict. Source: Birds Canada.

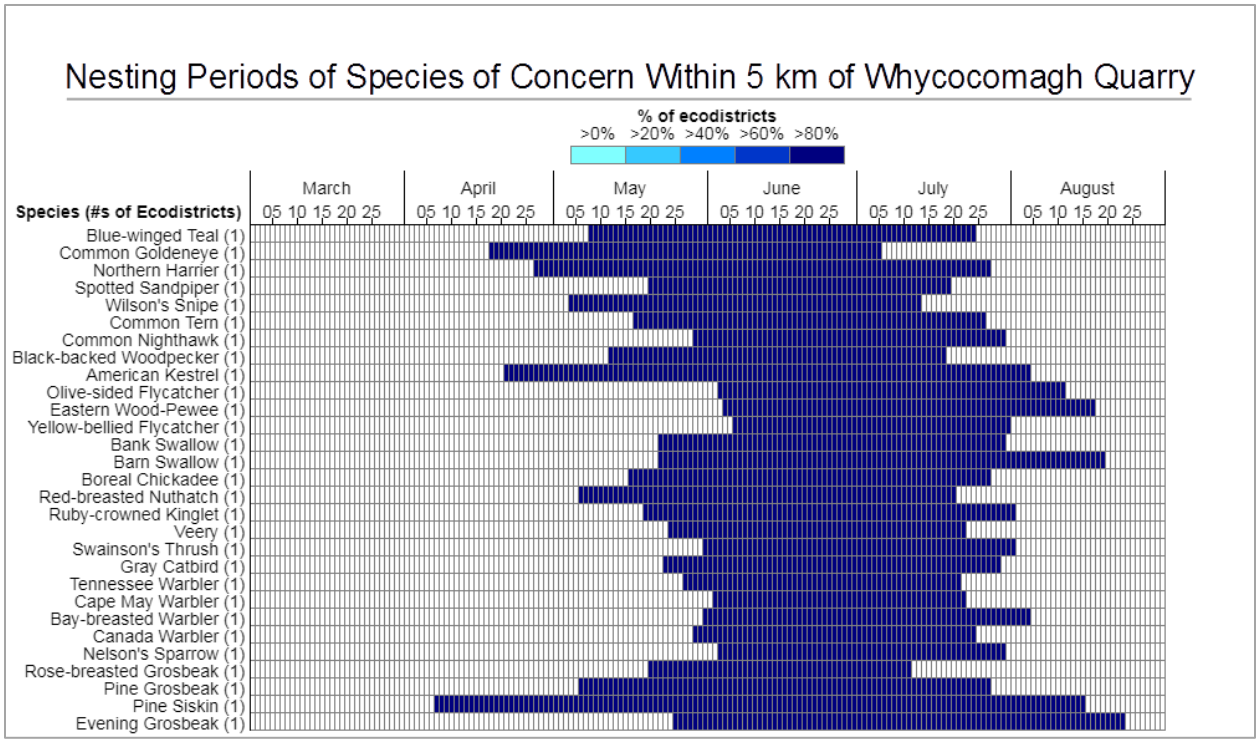

Figure 37. Nesting periods for bird Species of Concern found within five kilometers of Whycocomagh Quarry (several species not likely to occur at the site including Black-headed Gull, Canada Jay, Great Cormorant and Northern Gannet, have been omitted). Source; Birds Canada.

4.2.7 MAMMALS

Various large and small mammal species, including game and furbearing species, are found in Inverness County and may occur at the quarry site. Mammals expected to occur regularly or occasionally reflect the communities typical of the dominant terrestrial habitat in the surrounding area, which includes coniferous and mixed forest. Moose occur in the general vicinity of the quarry, and what appeared to be a moose carcass was seen off Chuggin Road near the quarry entrance June 14, 2021. A red squirrel was also observed during a site visit June 21, 2021 (M. Cameron-MacMillan, personal communications, 2021). Canada lynx and American marten (both provincially listed as Endangered) are known to occur in the general area of the study site. Other species likely to occur in the general area include carnivores such as American fisher, coyote, snowshoe hare, beaver, and white-tailed deer; as well as rodents and small mammals including red fox, red squirrel, eastern chipmunk, voles (rock vole) and bats (ACCDC 2021). Rock vole occur in upland areas in western Cape Breton but are sparsely distributed elsewhere in Nova Scotia. A deer overwintering area is located approximately two kilometers southeast of the study area. Three endangered bats (Little Brown Bat, Northern Long-eared Bat and the Tri-coloured Bat) which were formerly relatively common throughout Nova Scotia, are now federally and provincially listed as endangered due to recent population declines due to a fungus infection (White Nose Syndrome). Distributions are centred in areas where there are overwintering sites (hibernacula--where bats overwinter and raise young) which are not infected. Hibernacula are typically abandoned mine shafts, caves and old buildings. There are 12 abandoned mines within five kilometers of the quarry (Nova Scotia

2021) and the closest to the site are ~700 m and 1.4 km (Nova Scotia 2021) but are not known to be used. From hibernacula bats range widely in the summer, localizing in areas with a good food supply. Because of low population numbers overall, occurrences of significant numbers of roosting and feeding individuals in any areas in particular are unlikely.

4.2.8 REPTILES AND AMPHIBIANS

Some of the common Nova Scotian amphibians and reptiles are expected to occur at the site although there is little open water habitat present. The small ponds and intermittent streams and adjacent riparian areas likely support amphibian species such as leopard frog, wood frog, green frog, pickerel frog, American toad, spring peeper and salamanders (e.g. red-spotted newt, blue-spotted salamander, yellow-spotted salamander, eastern redback salamander). An unidentified frog species was observed in the gully located on the west boundary of the existing quarry June 14, 2021. Lands around the quarry will support snakes, including the Maritime garter snake, eastern smooth green snake and northern redbelly snakes. Wood turtles (federally and provincially listed are known to occur in the area and have been observed within three kilometers of the study site in the Skye River watershed (ACCDC 2021). Wood turtles are considered a location sensitive species according to the Nova Scotia Department of Lands and Forestry and may potentially occur at or near the quarry site (ACCDC 2021). Although river habitat is not present at the study site, wood turtles often forage inland and can travel to terrestrial and wetland habitats several kilometers from their home river (COSEWIC 2018). They can climb steep slopes and so have the potential to reach the quarry.

4.2.9 SPECIES AT RISK

Background: Species at Risk are plants or animals whose existence is threatened, or which are in danger of being threatened, by human activities or natural events. The Canadian Committee on the Status of Endangered Wildlife in Canada (COSEWIC) presently recommends species to be listed for legal federal protection under the federal *Species at Risk Act* (SARA). At the provincial level, the Nova Scotia Species at Risk Working Group completes assessments and recommendations for a species' status. Nova Scotia maintains a list of legally protected species under the *Nova Scotia Endangered Species Act*. A third status list is the *sub-national ranks (S-ranks)*, which is a provincial system used for ranking species rarity or conservation status as a tool for identifying gaps in knowledge for species for which element occurrence data are maintained. S-ranks are specific to a province and consider a variety of factors including number of element occurrences, distribution, population size, abundance trends, and threats. Species listed as "S1" (any species known to be, or believed to be critically imperiled due to extreme rarity or steep declines), and "S2" (any species known to be, or believed to be, imperiled due to restricted ranges, few populations or steep declines) are considered priority species. Species that may be at risk of extirpation or extinction are candidates for a detailed risk assessment by COSEWIC, or provincial or territorial equivalents. The Nova Scotia *Biodiversity Act* sets guidelines for activities in the vicinity of species at risk on Crown Land and also provides guidance for private land owners for working near these species.

Survey Results: The Atlantic Canada Conservation Data Centre (ACCDC) maintains a database of records of species of conservation concern listed under federal or provincial legislation as well as with general status. Species of conservation concern in the database that occur within five kilometres of the Dexter Whycocomagh Quarry site include both animals and plants (Table 4). No plants of conservation concern

were identified during spring and fall botany surveys of the site. There are no animals *per se* of particular conservation concern in the study area, however, Canada lynx and American marten which are both currently listed as "endangered" under the *NS Endangered Species Act*, are of concern due to low numbers and may occasionally occur. Bird species of particular conservation concern occurring within five kilometers of the study site include the bank swallow, barn swallow and Canada warbler (all listed federally as threatened and listed provincially as endangered); common nighthawk and olive-sided flycatcher (listed as threatened under the *Federal Species at Risk Act* and provincial *Endangered Species Act* and is listed as special concern by *COSEWIC*); and the eastern wood-pewee and evening grosbeak (listed as special concern by *SARA* and *COSEWIC* and provincially as vulnerable) (ACCDC 2021). Blue felt lichen (*Pectenia plumbea*) (listed federally as special concern and provincially as vulnerable) is the only recorded plant species of concern observed within five kilometers of the study area, but the species was not observed during a dedicated survey for lichen species at the Whycocomagh Quarry site (ACCDC 2021).

The mixed woodland and softwood habitats surrounding the open quarry and open trails on the site potentially support many of the bird species of conservation concern from time to time. Of the species listed, both Canada warbler and olive-sided flycatcher typically are found in wetland habitats, including treed and shrubby grassy swamps around bog/fen wetlands for Canada warbler, and treed (black spruce) sphagnum bogs for olive-sided flycatcher, none of which occur on the site. Olive-sided flycatcher has been observed 1.2 kilometers from the study site and may breed elsewhere in the area (ACCDC 2021). Open fields, marshes, swamps, etc. are typical habitat for barn swallow while bank swallow requires exposed banks, in low areas along rivers and streams and ocean coasts, and would not typically be found at the study site. Common nighthawk are found in open areas with little ground vegetation including logged or burned over areas, forest clearings, rocky outcrops and peat bogs. Eastern wood-pewee prefer habitat of mature, deciduous forest and evening grosbeak prefer open, mature, mixed wood forests where fir species or white spruce are dominant, neither of which are present at the site. No federally or provincially listed bird species of conservation concern were observed during dedicated surveys at the study site in June 2021.

Other animals of conservation concern in this part of Nova Scotia includes the wood turtle, a federally-listed species and "threatened" in Nova Scotia, is documented as occurring within the watershed of the study area. This species usually occurs along higher order rivers and there are records within three kilometers of the study area (ACCDC 2021). The little brown myotis (*Myotis lucifugus*) (federally and provincially listed as endangered) is another species of concern potentially occurring in the area. The species formerly was widely distributed and has been observed within 10.4 kilometers of the study site and bat hibernacula may also occur in the area (ACCDC 2021). Bats typically overwinter in abandoned mine shafts, natural caves, and old buildings and there are 12 abandoned mines within five kilometers of the quarry (Nova Scotia 2021). Numbers of bats are exceedingly low in most areas of Nova Scotia due to the White-Nose Syndrome, and occurrences are extremely unlikely at the quarry site due to the low overall numbers. Skye River and Indian River, open fields such as the nearby cemetery, and natural forests in the vicinity can be used as foraging habitat (ACCDC 2021) and forests for daytime roosting.

No plant or lichen species of conservation listed under either the federal Species-At-Risk legislation or provincial species-at-risk legislation were encountered during the various field studies for this project. One federally- and provincially-listed plant species of concern — blue felt lichen — has been reported

within five kilometres of the study area (ACCDC 2021). Blue felt lichen prefers cool, moist habitats, and is typically found on the trunks of old broad leaved trees close to stream and lake margins, which do not occur at the study site (COSEWIC 2010). Bebb's sedge (*Carex bebbii*), hooked agrimony (*Agrimonia gryposepala*), and sharp-fruited rush (*Juncus acuminatus*) have all been reported within one kilometer of the study site and have sub-national rankings of S2, S3 and S3S4, respectively, but were not noted during the spring and fall botany surveys of the study area (Appendix B). Other rare plant species with sub-national ranks of "S1S2" reported within five kilometers of the study area includes, Steller's rockbrake (*Cryptogramma stelleri*) and a moss (*Hamatocaulis vernicosus*) (ACCDC 2021; Nova Scotia Communities, Culture and Heritage 2021). A list of plants and animals of concern within a 5, 10 and 100 kilometer radius of the study site is included in Appendix C.

Table 4. Records of species of concern within a five kilometer radius of Dexter Whycocomagh Quarry, Inverness County. Atlantic Canada Conservation Data Centre (ACCDC) Database, January 2021.

Family/Scientific Name		Common Name	Status/Rank				
			SARA	COSEWIC (NPROT[1])	NS ESA (SPROT[2])	SUB-NATIONAL RARITY RANK (SRANK)[3]	GLOBAL RARITY RANKING OF SPECIES (GRANK)[4]
FLORA							
Apiaceae	*Osmorhiza longistylis*	Smooth Sweet Cicely	-	-	-	S2	G5
Aspleniaceae	*Asplenium viride*	Green Spleenwort	-	-	-	S3	G5
Balsaminaceae	*Impatiens pallida*	Pale Jewelweed	-	-	-	S2	G5
Calliergonaceae	*Hamatocaulis vernicosus*	A Moss	-	-	-	S1S2	G5
	Limprichtia revolvens	A Moss	-	-	-	S2S3	-
Campanulaceae	*Campanula aparinoides*	Marsh Bellflower	-	-	-	S3	G5
	Lobelia kalmii	Brook Lobelia	-	-	-	S2	G5
Caprifoliaceae	*Triosteum aurantiacum*	Orange-fruited Tinker's Weed	-	-	-	S2S3	G5
Collemataceae	*Leptogium acadiense*	Acadian Jellyskin Lichen	-	-	-	S3S4	GNR
Cyperaceae	*Carex atratiformis*	Scabrous Black Sedge	-	-	-	S2	G5
	Carex bebbii	Bebb's Sedge	-	-	-	S2	G5
	Carex castanea	Chestnut Sedge	-	-	-	S2	G5
Dryopteridaceae	*Polystichum lonchitis*	Norther Holly Fern	-	-	-	S2	G5
Equisetaceae	*Equisetum hyemale ssp. affine*	Common Scouring-rush	-	-	-	S3S4	G5T5
Ericaceae	*Pyrola minor*	Lesser Pyrola	-	-	-	S3	G5
Juncaceae	*Juncus acuminatus*	Sharp-fruit Rush	-	-	-	S3S4	G5
Liliaceae	*Lilium canadense*	Canada Lily	-	-	-	S2	G5

Table 4. Records of species of concern within a five kilometer radius of Dexter Whycocomagh Quarry, Inverness County. Atlantic Canada Conservation Data Centre (ACCDC) Database, January 2021.

Ophioglossaceae	*Botrychium lanceolatum ssp. angustisegmentum*	Narrow Triangle Moonwort	-	-	-	S2S3	G5T4
Orchidaceae	*Cypripedium parviflorum*	Yellow Lady's Slipper	-	-	-	S2S3	G5
	Cypripedium reginae	Showy Lady-Slipper	-	-	-	S2	G4G5
	Neottia bifolia	Southern Twayblade	-	-	-	S3	G4
	Platanthera grandiflora	Large Purple Fringed Orchid	-	-	-	S3	G5
Pannariaceae	*Pectenia plumbea*	Blue Felt Lichen	Special Concern	Special Concern	Vulnerable	S3	GNR
Physciaceae	*Phaeophyscia pusilloides*	Pompom-tipped Shadow Lichen	-	-	-	S3?	G5
Poaceae	*Poa glauca*	Glaucous Blue Grass	-	-	-	S2S3	G5T5
Polygonaceae	*Persicaria pensylvanica*	Pennsylvania Smartweed	-	-	-	S3	G5
	Rumex triangulivalvis	Triangular-valve Dock	-	-	-	S2	G5
Pteridaceae	*Cryptogramma stelleri*	Stellar's Rockbrake	-	-	-	S1S2	G5
Rhamnaceae	*Endotropis alnifolia*	Alder-leaved Buckthron	-	-	-	S3	-
Rosaceae	*Agrimonia gryposepala*	Hooked Agrimony	-	-	-	S3	G5
	Fragaria vesca ssp. americana	Woodland Strawberry	-	-	-	S3S4	G5T5
Rubiaceae	*Galium kamtschaticum*	Northern Wild Licorice	-	-	-	S3	G5
Verbenaceae	*Verbena hastata*	Blue Vervain	-	-	-	S3	G5
Woodsiaceae	*Cystopteris laurentiana*	Laurentian Bladder Fern	-	-	-	S2	G3
	Woodsia glabella	Smooth Cliff Fern	-	-	-	S2	G5
ANIMALS-BIRDS							
Accipitridae	*Circus hudsonius*	Northern Harrier	-	Not At Risk	-	S3S4B	G5
Anatidae	*Bucephala clangula*	Common Goldeneye	-	-	-	S2B,S5N	G5
	Spatula clypeata	Northern Shoveler	-	-	-	S2B	G5
	Spatula discors	Blue-winged Teal	-	-	-	S3S4B	G5
Caprimulgifromes	*Chordeiles minor*	Common Nighthawk	Threatened	Special Concern	Threatened	S2B	G5
Cardinalidae	*Pheucticus ludovicianus*	Rose-breasted Grosbeak	-	-	-	S2S3B	G5
Corvidae	*Perisoreus canadensis*	Canada Jay	-	-	-	S3	G5
Emberizidae	*Ammospiza nelson*	Nelson's Sparrow	-	Not At Risk	-	S3S4B	G5
	Passerella iliaca	Fox Sparrow	-	-	-	S3S4B	G5
Falconidae	*Falco sparverius*	American Kestrel	-	-	-	S3B	G5

Table 4. Records of species of concern within a five kilometer radius of Dexter Whycocomagh Quarry, Inverness County. Atlantic Canada Conservation Data Centre (ACCDC) Database, January 2021.

Fringillidae	*Coccothraustes vespertinus*	Evening Grosbeak	Special Concern	Special Concern	Vulnerable	S3S4B,S3N	G5
	Pinicola enucleator	Pine Grosbeak	-	-	-	S2S3B,S5N	G5
	Spinus pinus	Pine Siskin	-	-	-	S2S3	G5
Hirundinidae	*Riparia riparia*	Bank Swallow	Threatened	Threatened	Endangered	S2S3B	G5
	Hirundo rustica	Barn Swallow	Threatened	Threatened	Endangered	S2S3B	G5
Icteridae	*Icterus galbula*	Baltimore Oriole	-	-	-	S2S3B	G5
Laridae	*Chroicocephalus ridibundus*	Black-headed Gull	-	-	-	S3N	G5
	Sterna hirundo	Common Tern	-	Not At Risk	-	S3B	G5
Mimidae	*Dumetella carolinensis*	Gray Catbird	-	-	-	S3B	G5
Paridae	*Poecile hudsonicus*	Boreal Chickadee	-	-	-	S3	G5
Parulidae	*Cardellina canadensis*	Canada Warbler	Threatened	Threatened	Endangered	S3B	G5
	Cardellina pusilla	Wilson's Warbler	-	-	-	S3B	G5
	Oreothlypis peregrina	Tennessee Warbler	-	-	-	S3S4B	G5
	Setophaga castanea	Bay-breasted Warbler	-	-	-	S3S4B	G5
	Setophaga tigrina	Cape May Warbler	-	-	-	S2B	G5
Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant	-	-	-	S2S3	G5
Picidae	*Picoides arcticus*	Black-backed Woodpecker	-	-	-	S3S4	G5
Regulidae	*Regulus calendula*	Ruby-crowned Kinglet	-	-	-	S3S4B	G5
Scolopacidae	*Actitis macularius*	Spotted Sandpiper	-	-	-	S3S4B	G5
	Gallinago delicata	Wilson's Snipe	-	-	-	S3B	G5
	Tringa flavipes	Lesser Yellowlegs	-	-	-	S3M	G5
Sittidae	*Sitta canadensis*	Red-breasted Nuthatch	-	-	-	S3	G5
Sulidae	*Morus bassanus*	Northern Gannet	-	-	-	SHB,S5M	G5
Turdidae	*Catharus fuscescens*	Veery	-	-	-	S3S4B	G5
	Catharus ustulatus	Swainson's Thrush	-	-	-	S3S4B	G5
Tyrannidae	*Contopus cooperi*	Olive-sided Flycatcher	Threatened	Special Concern	Threatened	S2B	G4
	Contopus virens	Eastern Wood-Pewee	Special Concern	Special Concern	Vulnerable	S3S4B	G5
	Empidonax flaviventris	Yellow-bellied Flycatcher	-	-	-	S3S4B	G5
ANIMALS-OTHER							
Cervidae	*Alces americanus*	Moose	-	-	Endangered	S1	G5
Coenagrionidae	*Amphiagrion saucium*	Eastern Red Damsel	-	-	-	S3	G5
Emydidae	*Glyptemys insculpta*	Wood Turtle	Threatened	Threatened	Threatened	S2	G3
Lycaenidae	*Lycaena Dorcas*	Dorcas Copper	-	-	-	S1?	G5

Table 4. Records of species of concern within a five kilometer radius of Dexter Whycocomagh Quarry, Inverness County. Atlantic Canada Conservation Data Centre (ACCDC) Database, January 2021.

Salmonidae	*Salmo salar pop. 4*	Atlantic Salmon – Eastern Cape Breton pop.	-	Endangered	-	S1	G5TNR
	Salvelinus fontinalis	Brook Trout	-	-	-	S3	G5

1. NPROT, National conservation status of species, as designated by COSEWIC.
Extinct (X) - A wildlife species that no longer exists.
Extirpated (XT) - A wildlife species that no longer exists in the wild in Canada but exists elsewhere.
Endangered (E) - A wildlife species facing imminent extirpation or extinction.
Threatened (T) - A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern (SC) - A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
Data Deficient (DD)- A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
Not at Risk (NAR) - A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
2. SPROT=Provincial Rank/Status of Taxon.
3. SRANK, Sub-National (Provincial) Rarity Ranks
S1 Extremely rare throughout its range in the province (typically 5 or fewer occurrences or very few remaining individuals). May be especially vulnerable to extirpation.
S2 Rare throughout its range in the province (6 to 20 occurrences or few remaining individuals). May be vulnerable to extirpation due to rarity or other factors.
S3 Uncommon throughout its range in the province, or found only in a restricted range, even if abundant in at some locations (21 to 100 occurrences).
S4 Usually widespread, fairly common throughout its range in the province, and apparently secure with many occurrences, but the Element is of long-term concern (e.g. watch list). (100+ occurrences).
S5 Demonstrably widespread, abundant, and secure throughout its range in the province, and essentially ineradicable under present conditions.
S#S# Numeric range rank: A range between two consecutive numeric ranks. Denotes range of uncertainty about the exact rarity of the Element (e.g., S1S2).
SH Historical: Element occurred historically throughout its range in the province (with expectation that it may be rediscovered), perhaps having not been verified in the past 20 - 70 years (depending on the species) and suspected to be still extant.
SU Unrankable: Possibly in peril throughout its range in the province, but status uncertain; need more information.
SX Extinct/Extirpated: Element is believed to be extirpated within the province.
S? Unranked: Element is not yet ranked.
SA Accidental: Accidental or casual in the province (i.e., infrequent and far outside usual range). Includes species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range; a few of these species may even have bred on the one or two occasions they were recorded.
SE Exotic: An exotic established in the province (e.g., Purple Loosestrife or Coltsfoot); may be native in nearby regions.
SE# Exotic numeric: An exotic established in the province that has been assigned a numeric rank.
SP Potential: Potential that Element occurs in the province, but no occurrences reported.
4. GRANK, Global rarity rank of species, using CDC/NatureServe methods
G1 **Critically Imperiled**—At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
G2 **Imperiled**—At high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
G3 **Vulnerable**—At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
G4 **Apparently Secure**—At fairly low risk of extinction or elimination 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.
G5 **Secure**—At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.
GU **Unrankable**—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible (when the range of uncertainty is three consecutive ranks or less), a range rank (e.g., G2G3) should be used to delineate the limits (range) of uncertainty.
GNR **Unranked**—Global rank not yet assessed.

Table 4. Records of species of concern within a five kilometer radius of Dexter Whycocomagh Quarry, Inverness County. Atlantic Canada Conservation Data Centre (ACCDC) Database, January 2021.

G#G#	**Range Rank**—A numeric range rank (e.g., G2G3, G1G3) is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4).
Q	**Questionable taxonomy that may reduce conservation priority**—Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The "Q" modifier is only used at a global level and not at a national or subnational level.
C	**Captive or Cultivated Only**—Taxon or ecosystem at present is presumed or possibly extinct or eliminated in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population or ecosystem restoration, not yet established. The "C" modifier is only used at a global level and not at a national or subnational level. Possible ranks are GXC or GHC. This is equivalent to "Extinct" in the Wild (EW) in IUCN's Red List terminology (IUCN 2001).
T	**Infraspecific Taxon** (trinomial)—The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T subrank cannot imply the subspecies or variety is more abundant than the species. For example, a G1T2 subrank should not occur. A vertebrate animal population, (e.g., listed under the U.S. Endangered Species Act or assigned candidate status) may be tracked as an infraspecific taxon and given a T-rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status.
SR	Reported: Element reported in the province but without persuasive documentation, which would provide a basis for either accepting or rejecting (e.g., misidentified specimen) the report.
SRF	Reported falsely: Element erroneously reported in the province and the error has persisted in the literature.
SZ	Zero occurrences: Not of practical conservation concern in the province, because there are no definable occurrences, although the species is native and appears regularly. An NZ rank will generally be used for long distance migrants whose occurrences during their migrations are too irregular (in terms of repeated visitation to the same locations) or transitory. In other words, the migrant regularly passes through the province, but enduring, mappable Element Occurrences cannot be defined.

Table 5. Provincially listed species of concern with potential to occur in the vicinity of the project site (~10 kilometers). Nova Scotia Museum records (Nova Scotia Communities, Culture and Heritage 2021).

Scientific Name	Common Name	SARA	COSEWIC (NPROT[1])	NS ESA (SPROT[2])	SUB-NATIONAL RARITY RANK (SRANK)[3]	GLOBAL RARITY RANKING OF SPECIES (GRANK)[4]
Other						
Asplenium trichomanes-ramosum	Brightgreen Spleenwort	-	-	-	S2	G5
Botrychium lanceolatum	Triangle Grapefern	-	-	-	S2S3	G5
Carex atratiformis	Scabrous Black Sedge	-	-	-	S2	G5
Cryptogramma stelleri	Fragile Rockbrake	-	-	-	S1S2	G5
Draba arabisans	Rock Whitlow-grass	-	-	-	S2	G4G5
Heterodermia neglecta	Fringe Lichen	-	-	-	S3S4	GNR
Impatiens pallida	Pale Jewelweed	-	-	-	S2	G5
Lilium canadense	Canada Lily	-	-	-	S2	G5

Table 5. Provincially listed species of concern with potential to occur in the vicinity of the project site (~10 kilometers). Nova Scotia Museum records (Nova Scotia Communities, Culture and Heritage 2021).

Scientific Name	Common Name	SARA	COSEWIC (NPROT[1])	NS ESA (SPROT[2])	SUB-NATIONAL RARITY RANK (SRANK)[3]	GLOBAL RARITY RANKING OF SPECIES (GRANK)[4]
Listera australis	Southern Twayblade	-	-	-	S3	G4
Pectenia plumbea	Blue Felt Lichen	Special Concern	Special Concern	Vulnerable	S3	GNR
Peltigera collina	Tree Pelt Lichen	-	-	-	S2?	G4G5
Peltigera neckeri	Black-saddle Pelt Lichen	-	-	-	S1S3	G5
Rhamnus alnifolia	Alderleaf Buckthorn	-	-	-	S3	G5
Triosteum aurantiacum	Coffee Tinker's-weed	-	-	-	S2S3	G5
Viola selkirkii	Great-spurred Violet	-	-	-	S4	G5
Woodsia glabella	Smooth Woodsia	-	-	-	S2	G5

1. NPROT, National conservation status of species, as designated by COSEWIC.
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Extirpated (XT) - A wildlife species that no longer exists in the wild in Canada, but exists elsewhere.
Endangered (E) - A wildlife species facing imminent extirpation or extinction.
Threatened (T) - A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern (SC) - A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
Data Deficient (DD)- A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
Not At Risk (NAR) - A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
2. SPROT=Provincial Rank/status of taxon & Provincial GS Rank.
3. SRANK, Sub-National (Provincial) Rarity Rank.
4. GRANK, Global rarity rank of species, using CDC/Nature Serve methods

4.2.10 Natural Areas & Wilderness

The Whycocomagh area is a relatively remote and undeveloped location in Nova Scotia. Situated on Cape Breton Island in a hilly landscape at the base of the Cape Breton Highlands, the area has a relatively high proportion of wilderness and natural areas both inland and along its coast. Although settlement and consequent expansion and logging in the past changed the character of the landscape, much of the land has returned to forest in most areas. A high proportion of Crown Land in the area has been devoted to protected and managed wildlife areas, leaving many natural and untouched areas, including the Trout Brook Wilderness Area and Humes River Wilderness Area, as well as a number of nature reserves (see Figure 40). Wild land allows preservation for wildlife, hunting and outdoor recreation which are important to locals and visitors to the area. People living in these areas are exposed to the natural environment day-to-day and appreciate the presence of, and access to, undeveloped land and nature, while accepting the

usual activities needed to use the resources (e.g. aggregate quarries, forestry operations) on which many of them depend for their livelihood.

Inverness County is also one of four counties that contain parts of the Bras d'Or Lakes Biosphere Reserve (BLBR) (Figure 38). The BLBR is a UNESCO designated and internationally recognized unique region of natural and cultural heritage with a watershed of over 3,500 km^2 of forest, freshwater and estuarine ecosystems in the centre of Cape Breton Island. The designation recognizes the significance of the area when assessed against various cultural and ecological criteria. The estuarine component of the ecosystem provides habitat for species of various biogeographic ranges, including arctic, temperate, as well as sub-tropical species through its many pockets of protected waters. The people have roots in at least four different languages and cultures: Mi'kmaq, Acadian, Gaelic, and English. The terrestrial, coastal and estuarine ecosystems promotes the conservation of biological diversity and contribute to the maintenance of healthy ecosystems. The Biosphere Reserve also provides an opportunity for education about natural systems and how they are changing as well as traditional forms of land use through knowledge sharing and collaborative management (BLBR 2021). The Dexter Whycocomagh Quarry is located within the BLBR, however, is not in any specific protected areas within Biosphere.

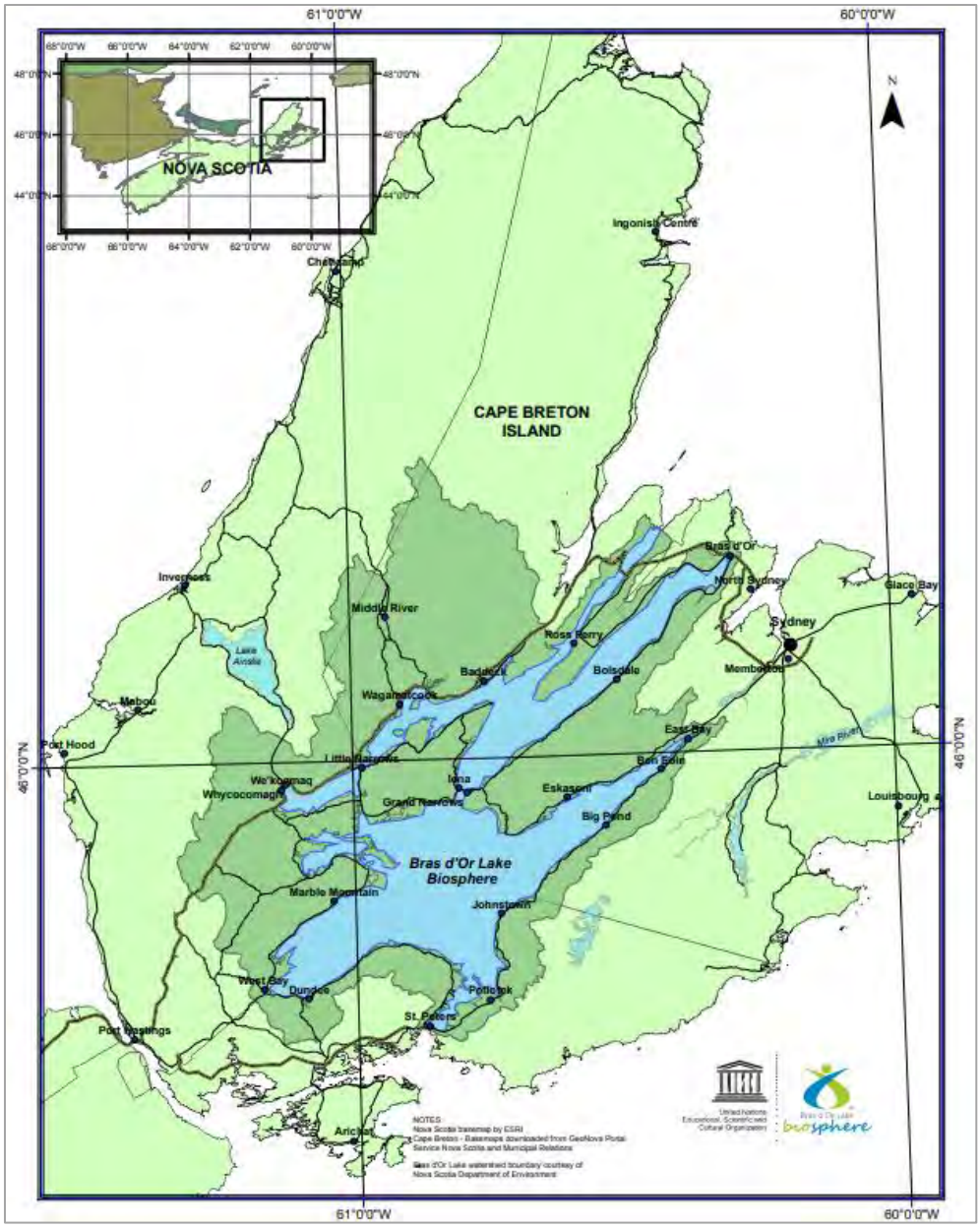

Figure 38. Bras d'Or Lake UNESCO Biosphere Reserve (BLBR).

4.3 HUMAN USES OF THE ENVIRONMENT

4.3.1 MI'KMAQ

The Mi'kmaq maintain aboriginal claim to all of the landmass of Nova Scotia, and the Province of Nova Scotia maintains a policy that proponents of industrial development projects engage with the Mi'kmaq concerning their activities. Many of Nova Scotia's Mi'kmaq reside in Cape Breton and access lands throughout the region for various uses such as hunting and fishing, as well as traditional ceremonial activities. The nearest First Nations community to the study area is We'koqma'q First Nation, situated in

Whycocomagh, Inverness County along the western side of the Bras d'Or Lake and the reserve lands are approximately two kilometers southwest of the study area. We'koma'q First Nation, originally called Whycocomagh or Waycobah, was established in 1833 under the jurisdiction of the Eskasoni Chief and Council, but was officially declared a band in 1958 (CRM 2020). A second First Nation Community near the study site is Wagmatcook First Nation, located in Victoria County approximately 34 kilometers east, as the crow flies. Five of the thirteen Nova Scotian First Nations are located on Cape Breton Island.

The study area is in what was once the Mi'kmaw territory known as *Unama'kik*, a variation of the word *Mi'kma'kik,* meaning 'Mikmaw territory'. Streams, lakes and wetlands, and in particular coastal embankments and waters of this area would have provided hunting and transportation opportunities for the Mi'kmaq, their ancestors and predecessors prior to the arrival of European settlers (CRM 2020). In particular, the Skye River and Indian River which drain into Whycocomagh Bay and Bras d'Or Lakes all would have held particular significance for facilitating travel to the seas and providing access to resources (Robertson 1955 from CRM 2020). The Bras d'Or Lakes are known as Petoobok or Pitawpo'q, meaning 'a long dish of salt water' and Whycocomagh or We'koqma'q, which means 'where land begins', was one of the largest and most significant seasonal sites within Unama'kik in the 1940s, located near the estuarine lagoons, coves and bays of the Bras d'or Lakes.

There are no registered Mi'kmaq archaeological sites within the study area, or close to it. Five registered pre-contact sites associated to Mi'kmaq land use are located within a five-kilometer radius, on the shores of Whycocomagh Bay and Indian Island (CRM 2020). Presently, no significant Mi'kmaq cultural activities were identified in or around the immediate vicinity of the study area during this assessment although cultural activities take place on the We'koqma'q reserve and the general area of Whycocomagh including traditional fishing in the Skye River and Whycocomagh Bay as well as harvesting for medicinal plants and traditional and spiritual ceremonies along the Skye River trail (Figure 39).

Figure 39. Skye River Trail located off Highway 105 in Whycocomagh, June 15, 2021.

Two tribal councils exist in Nova Scotia: The Confederacy of Mainland Mi'kmaq (CMM) and Union of Nova Scotia Indians (UNSI). CMM is a not-for-profit organization incorporated in 1986, whose mission is to promote and assist Mi'kmaq communities. The UNSI, created in 1969, was formed *to provide a cohesive political voice for Mi'kmaq people.* The Native Council of Nova Scotia (NCNS) represents Mi'kmaq living off reserve. The NCNS is a self-governing agency located in Truro. The Office of Aboriginal Affairs in Nova Scotia estimates that approximately 35% of Mi'kmaq live off reserve. The goal of NCNS is "to operate and administer a strong and effective Aboriginal Peoples Representative Organization that serves, advocates and represents our community."

The Mi'kmaq Rights Initiative (Kwilmu'kw Maw-klusuaqn; KMK) also represent a number of the First Nations in Nova Scotia. The mission of KMK—whose name means, "we are seeking consensus"— is "to address the historic and current imbalances in the relationship between Mi'kmaq and non-Mi'kmaq people in Nova Scotia and secure the basis for an improved quality of Mi'kmaq life." KMK's objective is to negotiate between the Mi'kmaq of Nova Scotia whom it represents, the Province and the Government of Canada, and operates from its main office in Millbrook. The Atlantic First Nations Environmental Network (AFNEN) is an environmental organization of Mi'kmaq communities and organizations. The CMM and UNSI are members of the AFNEN, with the Mi'kmaq Confederacy of PEI in Charlottetown currently the acting coordinator. The AFNEN includes a representative from each Mi'kmaq organization and community interested in environmental issues. The Network meets regularly during the year through meetings, conferences, and the Internet to discuss environmental matters or concerns. Two First Nations—Millbrook First Nation, and Sipekne'katik (Indian Brook) operate independently of these organizations. Millbrook is situated outside Truro and includes activities in Cole Harbour, Sheet Harbour, and Beaver

Dam. Sipekne'katik First Nation is one of 13 First Nations and is the second largest Mi'kmaq band in Nova Scotia. Sipekne'katik First Nation includes the communities of Indian Brook, New Ross, Pennal, Dodd's Lot, Wallace Hills and Grand Lake.

4.3.2 POPULATION AND ECONOMY

The Whycocomagh Quarry is located in Inverness County, occurring in Inverness Subdivision B, a subdivision of the municipality which represents the County, occupying the center section of Inverness County. Inverness, Subdivision B has a population of approximately 4,928, and population has been declining slowly over the past several decades, dropping 4.2% between 2011 and 2016 (Statistics Canada 2017[1]). The main population centers in Inverness Subdivision B are in the Town of Inverness (population 1,248 (2016)) and the community of Mabou (population approximately 1,207 (2011)), supporting almost half of the subdivision's total population (Statistics Canada 2017[1]). The village of Whycocomagh is the largest community nearest to the study site with a population of approximately 825 (2001) (EDPC 2011). Also occurring in close proximity to the Whycocomagh Quarry is the We'koqma'q First Nation reserve, which is not included in the Inverness Subdivision B statistics. In 2016, the population of the reserve was 831 with a population percentage change of 3.9% from 2011 to 2016 (Statistics Canada 2017[2]).

Traditionally, the main industries in Inverness County were fishing along the coast, and farming and forestry inland. Today, fishing, forestry, and tourism are the primary industries, along with health care, construction and other businesses and support services. Industry on the We'koqma'q First Nation reserve centres primarily around educational services along with public administration, agriculture, forestry, fishing and hunting, health care and other businesses and industries. Tourism has become an important local industry in recent years with attractions such as the Cabot Trail, Cape Breton Highlands National Park, Bras d'Or Lakes, and the Fortress of Louisbourg National Historic Site (Parks Canada) which generate tourist traffic through the area, primarily along Highway 105. Cape Breton Island has been named as a top island destination in North American for three years in a row by a leading American industry magazine (Reid 2020).

Highway 105 is the main road through the village of Whycocomagh in addition to Main Street which connects with Highway 252, a highway that travels east-west from Whycocomagh to Mabou on the West coast of the Island. Visitors to the area experience recreational and scenic features including wooded walking and hiking trails, cultural activities (music and art), camping, guided and sport fishing, and boating opportunities. Some businesses in the general area include the Whycocomagh Waterfront Center, the Farmer's Daughter Country Market, Whycocomagh Education Center, Keltic Quay Bayfront Lodge and Cottages, Firehouse Ironworks Ltd., Mi'kmaki Trading Post, Charlene's Bayside Restaurant and Café, Glenview Riverside Campground, cottage rentals, bed & breakfasts, privately-owned campgrounds and RV resorts, Whycocomagh Home Hardware and Building Centre, Whycocomagh Co-Op and Liquor Agency Store, and Ideal Concrete.

4.3.3 WATER SUPPLY AND RESIDENTIAL WELLS

Drinking water for the County of Inverness is provided by both public and private water systems. Whycocomagh is one of six communities that operates a municipal drinking water supply water and wastewater system within the municipality of Inverness (Municipality of the County of Inverness 2017).

The water supply for Whycocomagh is two groundwater wells located on Whycocomagh Mountain Road located approximately 4.6 kilometers southeast of the study site. The water treatment plant currently has the capacity to treat up to 400,000 gallons/day, although it is operating below capacity. The sewage treatment plant is located off the Trans-Canada Highway (Highway 105) near the Skye River serving both Whycocomagh and the We'koqma'q First Nation reserve, and currently has the a capacity of 200,000 gallons/day although is operating below capacity (EDPC 2011).

Drilled wells are used as the primary drinking water sources in the Whycocomagh area and We'koqma'q First Nation reserve. There are no groundwater supply wells within 800 meters of the quarry study area but there are three groundwater wells just beyond but less than one kilometer. Two of the three groundwater wells are located along Highway 252 and are drilled wells belonging to We'koqma'q First Nation; one is currently used as a municipal water supply well and the other is an abandoned, dry well. The third well is a private well located along Whycocomagh to Port Hood Road (which passes the quarry on the south). Outside of one kilometer, a drilled, municipal supply well is located within the We'koqma'q First Nation reserve along Reservation Road approximately 1.2 kilometers from the study site (Nova Scotia Environment 2021).

4.3.4 LAND USE

Land in the vicinity of the quarry is predominantly wilderness and undeveloped forest land, with rural residential use concentrated within the We'koqma'q First Nation reserve, Whycocomagh Port Hood Road and in the community of Whycocomagh (Map A-3). A handful of residences are also located along Highway 252 in the community of Churchview. There is limited forestry in the area with a number of active and inactive quarries in the vicinity of the Dexter Whycocomagh Quarry. There are a few residences, small woodlots, and home-operated businesses found nearby. Travel routes are used by tourists and outdoor recreational enthusiasts. Hunting, trapping and commercial fishing based in Whycocomagh are important local activities. Land ownership in the immediate vicinity is primarily privately-owned land with areas of Crown land at a distance of approximately 1.5 kilometers from the study area (Map A-2).

4.3.5 AQUACULTURE AND SHELLFISH HARVESTING

Rainbow trout aquaculture operations have been operating in the Whycocomagh Bay for over 40 years (NSFA 2020). In 2011, We'koqma'q First Nation re-activated rainbow trout farming in the Bras d'Or Lakes at Whycocomagh. We'koqma'q First Nation currently holds three issued marine finfish aquaculture locations in the Whycocomagh Bay for Atlantic salmon and rainbow trout and are located just off shore from the We'koqma'q First Nation reserve. We'koqma'q First Nation has proposed an additional marine finfish location for rainbow trout nearby. We'koqma'q First Nation hold additional shellfish aquaculture licenses for American oyster in Whycocomagh Bay, located on the south coast. Shellfish harvesting is prohibited in the immediate waters of Whycocomagh Bay in the vicinity of the Village of Whycocomagh, however is permitted elsewhere in the Whycocomagh Bay. Aquaculture leasing is the responsibility of the Provincial government in Nova Scotia.

4.3.6 HUNTING AND TRAPPING

Lands in the vicinity of the Dexter Whycocomagh Quarry site support many of the common game and fur-bearing species characteristic of Nova Scotia in general, including some less common fur-bearing species,

such as Canada lynx and American marten. Some hunting or trapping activity may take place in the general vicinity of the site, although trapping statistics indicate that the Inverness County has a small harvest of most species. White-tailed deer are common with significant habitat for deer wintering located in the general vicinity, although the county typically ranks among the lowest for deer harvest, as it does for black bear, in Nova Scotia. The main furbearers trapped in the five-year period (2015 to 2020) were muskrat, coyote and beaver. Inverness County had the highest squirrel harvest in the province during the five-year period. No American marten were reported trapped; however one Canada lynx was trapped incidentally. Snowshoe Hare are the most commonly hunted upland game (Table 6). Moose are an important contributor to the hunting economy both for Mi'kmaq and for non-natives in Cape Breton, and the Whycocomagh area is included in moose management zone 4, which encompasses the Cabot Trail south to Port Hawkesbury. The success rate of moose harvest in zone 4 was 47.7% in 2019.

Table 6. Five-year summary of wildlife harvested in Inverness County and Nova Scotia (NSDLF 2021).

Animal	Inverness County Reported Harvest	Provincial Reported Harvest	Percent (%) of total for province
LARGE MAMMALS			
Deer (Zone 111)	1,850	44,926	4.12%
Bear	30	1,780	1.69%
UPLAND GAME			
Snowshoe Hare	35,672	276,318	12.91%
Ruffed Grouse	13,266	150,105	8.84%
Ring-necked Pheasant	16	14,051	0.11%
FUR HARVEST			
Beaver	333	10,155	3.28%
Muskrat	1,008	29,014	3.47%
Otter	44	1,307	3.37%
Mink	61	2,783	2.19%
Bobcat	85	3,678	2.31%
Fox	79	1,645	4.80%
Racoon	43	4,327	0.99%
Skunk	10	179	5.59%
Squirrel	341	1,576	21.64%
Weasel	51	758	6.73%
Coyote	446	10,841	4.11%
Canadian Lynx*	1	20	5.00%
American Marten*	0	12	0.00%
Fisher	15	497	3.02%
Total Furbearers	**2,517**	**66,792**	**3.77%**

*Trapped incidentally. Trappers Association of Nova Scotia prepares incidental pelts for auction and all proceeds go to the NS Species at Risk Conservation Fund.

4.3.7 FORESTRY & AGRICULTURE

Forestry and farming contribute to the mix of industries in the outskirts of Inverness, but the scale is relatively small compared with the rest of Nova Scotia. Farming in Inverness County uses approximately 6% of the provincial land in agriculture; and occupies 3% of the county area. Inverness County farms reported a total of over $10.1 million in gross farm receipts in 2010, accounting for 1.7% of all receipts in Nova Scotia. Main agricultural activities in Inverness County include cattle ranching, farming for crops and other animal production, and although these farm types dominate in Inverness, the number of farms has decreased over the years (NS Federation of Agriculture 2017). Cattle ranching in Inverness County is significantly higher (32.6%) than that of the provincial percentage (14.1%), and Inverness County Subdivision B has the highest percentage of farms in the county (52.9%) (Nova Scotia Federation of Agriculture 2017). Other types of agricultural activity in Inverness County—including hog, pig, poultry, sheep, grain, and vegetable farming—fall below the provincial average largely due to the terrain and lack of agricultural land required for these activities, although in the early days of settlement, local agriculture was more important. Inverness is also home to a growing forestry industry with operations in logging, timber tract operations as well as a range of support activities, accounting for 22% of agriculture and forestry activities occurring in Inverness County (Inverness County 2015).

4.3.8 RECREATIONAL, COMMERCIAL, AND MI'KMAQ FISHING

Historically, the Bras d'Or Lakes has supported limited fisheries activities and supports species such as American Oyster as well as lobster. In 2016, 14 lobster fishing licences were held for commercial lobster fishing in the Bras d'Or Lakes (LFA 28).

The Unama'ki Institute of Natural Resources (UINR) represents five Mikmaw communities in Cape Breton including We'koqma'q, located in close proximity to the study site and employees a Commercial Fisheries Liason Coordinator. Oysters, lobster and other species have been harvested by Mi'kmaq people for many years. Atlantic Lobster is commonly commercially fished by Unama'ki community members in the Bras d'Or Lakes and is one of the key economic drivers for some communities. Although lobster have largely disappeared from Whycocomagh Bay, the Unama'ki First Nation has holdings in lobster fishing area 28, the Bras d'Or Lakes, which includes the Whycocomagh Bay, and continue to harvest in other areas of the Bras d'Or Lakes (UINR 2016). Traditionally, cod, hake, smelts, trout (rainbow, brook and brown), herring, mackerel, gaspereau, flounder, lobster, softshell clams, mussels and oysters were fished in Whycocomagh Bay, but currently, smelts, trout (brook, brown and rainbow), eels, winter flounder, striped bass, softshell clams, mussels and oysters are the main species fished (NSDFA 2020).

Recreational fishing provides an important resource and pastime for residents and visitors to Inverness County. The study area itself is not particularly important for freshwater recreational fishing but rivers and lakes in the area including Skye River, Indian River, MacDonald's Brook, Saltwater Brook, and their larger tributaries are fished recreationally primarily for brook trout. Whycocomagh Bay and Bras d'Or Lakes also offer recreational fishing for rainbow trout, brook trout, smallmouth (black) bass, white perch, yellow perch, brown bullhead, white sucker, chain pickerel, lake whitefish, striped bass, gaspereau, smelt and eel (NSDFA 2020). Although Whycocomagh Bay is included in the Salmon Fishing Area 19, there is no recreational fishing permitted in Whycocomagh Bay. Fishing off a bank or by boat are a common activities in the Village of Whycocomagh. Mi'kmaq residing in the area likely use the recreational fishing resource

as well. Other streams in the area are either too small, are not accessible, or have too steep a gradient to promote fishing.

4.3.9 Historical, Archaeological and Palaeontological Resources

The study area is part of the greater Mi'kmaw territory known as *Unama'kik* (CRM 2020). Mi'kmaq originally occupied the area, with predominantly Scottish immigrants settling around the head of the St. Patrick's Channel in the village of Whycocomagh in the 1820s, despite disputes over land cultivation between the Scotch settlers and Mi'kmaq which had begun 40 years earlier. In the early 1830s the village grew, and selling timber to Great Britain was important.

In the mid to late 1800s, several smaller communities developed northwest of Whycocomagh including Indian Rear (known today as Stewartdale, the community nearest the Dexter Whycocomagh Quarry), and Churchview, Brigend (known today as Rosedale), and a number of other small communities. The community of Indian Rear was changed to Stewartdale to honour Scottish settlers in the late 1800's. The study area was originally cultivated as farmland and several structures from the era have recently been found in the area, although none occur within the study area for the Whycocomagh Quarry (CRM 2020).

Several local community and commercial buildings were constructed in Indian Rear in the mid 1800's. One of the area's earliest churches and cemetery (MacLean Church and Stewartdale Cemetery) was built near the intersection of Wycocomagh Port Hood Road and Chuggin Road approximately 800 m from the study site, where today stands the Pioneer Memorial Cemetery. Several structures that made up the MacLean Church were originally constructed in 1857, and the cemetery was situated on a hill opposite the church, with the first headstone reportedly erected in 1843. The church was destroyed by a fire in 1960. A schoolhouse was also built in Indian Rear between 1864 and 1867 and was constructed approximately 1.2 kilometers from the study site. Indian River, formerly known as Brigend Brook or Roseburn River, historically supported several mills including a sawmill and two grist mills constructed in the late 1800's.

The Archaeology Resource Impact Assessment for the site (CRA 2020) concluded that the site exhibits low potential for encountering either Mi'kmaq (both Pre-contact and historic) or Euro-Canadian archaeological resources based on moderately to steeped slopes, the site being relatively distant from significant sources of water and historic roadways and the area containing no evidence of occupation (CRM 2020). A study conducted prior to construction of the Nova Construction quarry west of the Dexter Whycocomagh Quarry (CRA 2020) identified three archaeological features consisting of two cellar depressions and one stone foundation. In contrast, the Dexter Quarry site is largely developed and areas around the work area did not contain significant potential for archaeological resources (CRA 2020).

4.3.10 Parks and Protected Areas

The Province of Nova Scotia actively protects natural landscapes and promotes and supports nature-based recreation and conservation through its Provincial Parks and Wilderness Areas system, and through other management and protection means. Several wilderness and protected areas, and provincial parks, have been designated in the general area of the study site including four wilderness areas, two conservation lands, 13 nature reserves, and four Provincial parks (Figure 40) ([2]Nova Scotia Environment 2021). The

closest protected area to the site is Whycocomagh Provincial Park, located approximately 6 km southeast. Types of parks and protected areas shown in Table 7 include:

Wilderness Areas are provincially-significant areas that protect representative examples of natural landscapes, native biological diversity, and outstanding natural features of Nova Scotia. They are used for scientific research, education and a variety of recreation and nature-tourism related activities such as hiking, canoeing, sea-kayaking, sport-fishing and hunting. These areas are designated under Nova Scotia's *Wilderness Areas Protection Act*.

Nova Scotia Nature Trust's Conservation Lands are protected areas that are safeguarded and stewarded for the purposes of nature conservation. The properties have come under the care of the Nature Trust through donation, part-donation, purchase, or conservation easement and protects Nova Scotia's rare, outstanding and unique natural areas while fulfilling landowner wishes to permanently protect the natural legacy that so many of them have proudly stewarded for generations.

Nova Scotia Nature Reserves are established to preserve and protect areas representative of natural ecosystems and associated plant and animal species. Scientific research and education are the primary uses of nature reserves and recreation is generally restricted. These areas are protected under the *Special Places Protection Act*.

Provincial Parks protect provincially or regionally significant natural heritage values such as coastlines and beaches, scenic views, diverse landscapes, forests, and lakes and rivers, for recreational use and general enjoyment by residents and tourists. Provincial Parks are important in conserving biodiversity as well as contributing to a high quality nature experience for users of the parks and economic development for nearby communities. Provincial Parks are established under the *Provincial Parks Act*.

Table 7. Parks and protected areas within a 20 kilometer radius of Whycocomagh Quarry, Inverness County. Province of Nova Scotia, Nova Scotia Environment Database, 2021.

Name of Site	Primary Type of Protection	Protection Status	Area (ha)
Ashfield Nature Reserve	Nature Reserve	Designated (2019)	41
Ashfield Nature Reserve (*Pending*)	Nature Reserve	Pending Designation	74
Bornish Hill Nature Reserve	Nature Reserve	Designated (1993)	960
Bornish Hill Nature Reserve Addition (*Pending*)	Nature Reserve	Expansion	1,140
Cains Mountain Wilderness Area	Wilderness Area	Designated (2016)	554
Cains Mountain Wilderness Area (*Pending*)	Wilderness Area	Pending Designation	89
Glendyer Nature Reserve (*Pending*)	Nature Reserve	Pending Designation	211
Humes River Wilderness Area	Wilderness Area	Designated (2015)	3,625
Little Narrows Conservation Lands	Land Trust Property	Considered Protected (2017)	163
Mabou Provincial Park	Provincial Park	Designated; Operational	2
MacDonalds Pond Nature Reserve	Nature Reserve	Designated (2017)	37
MacFarlane Woods Nature Reserve	Nature Reserve	Designated (1988)	132
MacRitchies Brook Nature Reserve	Nature Reserve	Designated (2017)	50
Mary Harper Nature Reserve	Nature Reserve	Designated (2011)	26
McKinnons Harbour Conservation Lands	Land Trust Property	Considered Protected	18

Table 7. Parks and protected areas within a 20 kilometer radius of Whycocomagh Quarry, Inverness County. Province of Nova Scotia, Nova Scotia Environment Database, 2021.

Name of Site	Primary Type of Protection	Protection Status	Area (ha)
Orangedale Provincial Park	Provincial Park	Reserve	50
River Denys Nature Reserve	Nature Reserve	Designated (2020)	255
Seal Cove Nature Reserve	Nature Reserve	Designated (2017)	81
Southwest Mabou River Nature Reserve	Nature Reserve	Designated (2017)	93
Trout Brook Wilderness Area	Wilderness Area	Designated (1998)	3,065
Trout Brook Provincial Park	Provincial Park	Undesignated; Operational	9
Washabuck River Nature Reserve	Nature Reserve	Designated (2006)	68
Whycocomagh Provincial Park	Provincial Park	Designated; Operational	196

Figure 40. Parks and protected areas in the general vicinity of the Whycocomagh Quarry.

4.3.11 Recreational/Cultural Features

Residents and visitors to Inverness County access natural areas for a wide range of outdoor recreation activities. In the Whycocomagh area, the predominant outdoor recreational activities are sightseeing, walking/hiking, birding, camping, boating (i.e., kayaking and canoeing), hunting, angling and

snowmobiling. The Skye River Park located along Highway 105 in Whycocomagh features the Skye River trail, a 1.7 kilometer loop with access to the Skye River, and is a popular recreational fishing spot for locals (Figure 41). The Whycocomagh Mountain Trail is an 11.7 kilometer trail on the east side of Skye River located along Highway 252 that is used by tourists and locals mostly for snowmobiling as well as ATV use, snowshoeing and hiking. Glenview Riverside Campground is an RV park and campground and is frequented by locals and visitors for its central location to population centers including Baddeck, Inverness and Mabou as well as the Cabot Trail. Whycocomagh Provincial Park is a seasonal park overlooking the Skye River Valley and the Bras d'Or Lakes and offers hiking and camping, including yurt camping. The Whycocomagh Waterfront Centre and Marina offers a variety of activities and events for local community members and visitors including a Summer Festival, Canada Day activities, 'Winterlude' (a winter festival), hiking events, musical events, art shows, markets, workshops and other seasonal events encompassing recreation, music and dining.

Figure 41. The Skye River Park located in Whycocomagh offers a 1.7 kilometer walking trail and is a popular local fishing spot (located approximately 2.6 kilometer southeast of the Whycocomagh Quarry), June 15, 2021.

4.3.12 Residential Use

There are no residences in the immediate vicinity of the Dexter Whycocomagh Quarry, located on Chuggin Road (Map A-4). The nearest residences to the quarry are located along Whycocomagh Port Hood Road and within the We'koqma'q First Nations reserve as well as Highway 252. Lot sizes are large and may include surrounding tracts of forested land. Lifestyles of the residents of the general area tend towards retirees maintaining their homes and properties, residents working locally and younger individuals engaged in economic activities such as fishing in the area. Residents use the area and backcountry for recreation such as walking or hiking, canoeing or kayaking, and use of ATVs and snowmobiles, as well as for access to natural resources (e.g. firewood). The steep slopes to the east and the rural wayside quarry sites along Chuggin Road have also been used by locals as a dumpsite for garbage, as well as other locations within the area (Figure 42). The study site is located within one kilometer of the We'koqma'q First Nation reserve, a rapidly growing Mi'kmaw community. The quarry is also within two kilometers of the community of Whycocomagh, where residents can access various local services as well as recreational amenities such as walking trails and local businesses.

Figure 42. Garbage dumped down slopes off Chuggin Road (*left*) and at an inactive pit with refuse along Chuggin Road not associated with the quarry (*right*), June 14, 2021.

4.3.13 COMMERCIAL/INDUSTRIAL DEVELOPMENT

Two businesses within the immediate vicinity of the study area. Churchview Quarry (Alva Construction Ltd.) and Whycocomagh Quarry (Nova Construction) are located immediately adjacent to the site, to the south and west respectively. Logging occurs on private lands in the vicinity of the study site on Chuggin Road, Highway 252 and Whycocomagh Port Hood Road. Other local businesses along Highway 252 include a welding and heavy equipment repair operation as well as a Nova Scotia Power transformer depot. The community of Whycocomagh is a rural community adjacent to the Bras d'Or Lakes and is considered not compatible with intensive industrial development owing to its natural beauty and wildlife the area features (EDPC 2011). Most commercial activity occurs in the community of Whycocomagh and centres on tourism and fishing, including rental cottages (e.g. Glenview RV Park and Campground, 43 Highway 252), Keltic Quay Bayfront Lodge and Cottages (90 Main Street), The Farmer's Daughter Country Market (9393 Highway 105), and the Co-op Supermarket. The local First Nation reserve also supports various businesses including a fitness center, a trout fish farm (9035 Highway 105), healing center and an Irving gas station and Tim Hortons.

4.3.14 TOURISM AND VIEWSCAPE

Tourism is an important element in the economy in the vicinity of Whycocomagh, centred on nature and outdoor recreational activities, including angling and hunting, hiking, paddling, snowmobiling and ATV use. The Campbell's Mountain Look-off, located northwest of Whycocomagh between Stewartdale and Roseburn, offers a 5 km trail that follows the Campbell Mountain Road, commonly used by snowmobiles and ATVs leading to a look-off overlooking Skye Mountain (Faubert 2011). Iron Mountain Wilderness Cabins, located on Whycocomagh Mountain, is a popular tourist attraction in the Whycocomagh area that offers an off-grid camping cabin facility in addition to trails, and scenic views across the Bras d'Or Lakes and Denys Basin. Whycocomagh Provincial Park, located on Salt Mountain, overlooks the Skye River Valley and the Bras d'Or Lakes and is a place where locals and tourists can experience a number of scenic hikes, look-offs and offers yurt camping (Destination Cape Breton Association Inc. 2021). The Whycocomagh

area also offers significant views of the Bras d'Or lakes along the Highway 105 (Trans-Canada Highway) on the way to the "one of the world's most scenic destinations" the Cabot Trail (The Cabot Trail 2021).

The Dexter Whycocomagh Quarry is not visible from adjacent areas along the road network but activities and lights at night may be visible by travellers at higher elevations along Highway 252 east of the study site and the higher elevations of mountain areas further east (e.g. Whycocomagh Mountain).

Figure 43. Whycocomagh Quarry entrance along Chuggin Road, facing northwest, May 24, 2021.

4.3.15 TRANSPORTATION

Comparatively low levels of truck and equipment traffic are expected to originate from the Dexter Whycocomagh Quarry, due mainly to the generally low level of industrial and economic activity and consequent need for aggregate in the area. The Whycocomagh Quarry is accessed by Chuggin Road, a dirt road off of Whycocomagh Port Hood Road. Moderate levels of truck and equipment traffic occur along Chuggin Road to service the quarries and several trucks were heard during site visits in July 2021. The Whycocomagh Port Hood Road supports local traffic for residents entering the We'koqma'q First Nation reserve as well as traffic arising from the quarry. Highway 252, is a standard Nova Scotia trunk highway that would be commonly used by trucks and equipment from the quarry as well as local and tourist traffic enroute from Whycocomagh to communities northwest and western Cape Breton, following the Skye River to the watershed divide, and beyond to the Town of Mabou (the road was formally called the Whycocomagh-Mabou Road). Highway 395 branches off Highway 252 to the northeast toward and around Lake Ainslie. The intersection of Whycocomagh Port Hood Road and Highway 252 is important as the highway is a busy local thoroughfare. Local use of Highway 252 includes residential commuting within

Inverness County, shipping fish products, pulp logs, and gravel operations in addition to the traffic associated with the quarry, which is typically seasonal. Roads in the area support moderate traffic in comparison to the Highway 105, the main, east-west Trans-Canada Highway through Cape Breton from the Canso Causeway to Sydney, Cape Breton. Traffic volumes for Highway 252 (Whycocomagh to Stewartdale) are in the range of 1550 to 2110 (annual average daily number of vehicles per day) over the 2008 to 2020 period with peak average daily traffic at 2890 vehicles per day in August 2020 (during the pandemic). Traffic volumes on Highway 105—the main artery through western Cape Breton—were more than twice these levels, with annual average traffic volumes ranging 4,410 to 5040 vehicles per day from 2005 to 2020 (peak daily average of 7139 in July 2014 and 5547 in June 2020 (Nova Scotia Open Data Portal 2021). When assessed, the proportion of trucks on Hwy 105 was 14 to 17%, compared with 6% on Highway 252 (Nova Scotia Open Data Portal 2021).

When operating, the Whycocomagh Quarry contributes truck traffic and some heavy equipment traffic (e.g., trucks, crushers, asphalt trucks, etc.) in the vicinity of the site, typically in the summer and fall construction seasons. Most of the equipment leaving the quarry, and production equipment moved to the Dexter Whycocomagh Quarry, takes place along the Whycocomagh Port Hood Road to Highway 252 and on to Highway 105. Access to the quarry from Chuggin Road is unobstructed with good sight lines, and similarly the nearby intersection with Whycocomagh Port Hood Road is clear. Neither are expected to be hazardous. The Whycocomagh Port Hood Road where it intersects with Highway 252, has an angled intersection creating poor sight-lines and the difference in speed limit between the two roads is a potential hazard for commuting trucks and vehicles (Figure 44). The one-way bridge on Whycocomagh Porthood Road in combination with the angled intersection has caused a bottle-neck of traffic in the past (G. Macdonald, personal communications, 2021).

Figure 44. Whycocomagh Port Hood Road and Highway 252 intersection looking north (Google Earth, September 2012).

5 ENVIRONMENTAL IMPACTS, SIGNIFICANCE, AND MITIGATION

5.1 ASSESSMENT APPROACH AND METHODS

Information for the assessment was obtained from consultants' personal knowledge, from reviews of available information, and knowledge of the purpose and proposed design of the project. The environmental assessment follows *Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia* (NSE September 2009) and uses assessment methodology typical for environmental assessment screenings of this kind. For this assessment a list of valued environmental components (VECs)[3] (also known as VCs)[4], and project activities and outcomes for the proposed expansion of the existing quarry were developed, and the potential for interactions of these activities with VECs was identified. Where interactions were identified, and there was potential for significant impacts if mitigation

[3] Valued Environmental Components (VECs) are features or things in the environment, which are particularly important either ecologically, socially, economically or culturally. The environmental assessment addresses potential interactions of the project with each VEC identified and assesses potential impacts. The process followed involves identifying all the activities or outcomes of the project, which interact with each VEC, and then determining and rating the magnitude of the impact in a standard way, in this case in a manner guided by standard approaches that have been developed for environmental assessments.

[4] Valued Environmental Components (VECs) and Valued Components (VCs) are equivalent. Use of the acronym VC was used in environmental assessments carried out under the federal environmental assessment process under the Canadian Environmental Assessment Act (2012) and is recommended to be used in assessments carried out under its replacement, the federal Impact Assessment Act (IAA) (2019).

was not undertaken, mitigating actions or activities have been suggested that will avoid the impact or reduce it to acceptable levels before the project proceeds. The process ensures that potentially significant impacts on VECs are identified and potential impacts on them have been considered, and sufficient mitigation planned.

5.2 VALUED ENVIRONMENTAL COMPONENTS

The list of Valued Environmental Components considered for the assessment, and interactions with project components, are presented in Table 7. The environmental effects and potential impacts of the project along with their significance and suggested mitigations are outlined in the following and are summarized in Tables 8 and 9.

Table 8. Valued Environmental Components (VECs) for Whycocomagh Quarry Expansion.

BIOPHYSICAL	SOCIO-ECONOMIC
Air Quality, Noise and Light	Mi'kmaq
Groundwater	Recreation, Tourism & Viewscape
Hydrology	Recreational, Commercial & Mi'kmaq Fishing
Water Quality	Archaeological, Cultural and Historical
Freshwater Aquatic Environments and Wetlands	Economy, Land Use and Value
Terrestrial Environments	Transportation
Fish & Fish Habitat	Residential Use
Flora & Fauna & Habitat	Commercial /Industrial Use
Species at Risk	Water Supplies & Residential Wells
Natural Areas & Wilderness	Parks & Protected Areas
	Forestry, Hunting & Trapping

5.3 SOCIOECONOMIC IMPACTS

5.3.1 MI'KMAQ

The Mi'kmaq maintain a general interest in all lands in Nova Scotia and claim they have never surrendered, ceded, or sold the Aboriginal title, and that they claim all of Nova Scotia. As co-owners of the land and its resources, they expect that any potential impacts to rights and title be addressed. Mi'kmaq occupied much of Nova Scotia prior to European contact, and lands were used to varying degrees for habitation, hunting and fishing, as noted in Sections 4.3.1 and 4.3.8. In more recent times, treaties made with the British and continued through Canadian law have maintained their rights. Coastal areas of the Bras d'Or Lakes and rivers including Skye River and Indian River leading inland in the vicinity of Whycocomagh may have been used by Mi'kmaq, including as a transportation route as Mi'kmaq moved throughout the Province; however, there is low potential for occurrence of Mi'kmaq archaeological resources at the quarry site (CRM 2020).

The quarry is near the We'Kokma'q Reserve of We'Kokma'q First Nation (Figure 45) and activities at the quarry and transport trucks along the Whycocomagh Port Hood Road and Highway 252 likely can be heard there. Reservation Road which runs through the We'Kokma'q Reserve joins the Whycocomagh Port Hood Road and serves as a north entrance to the Reserve; residents using the road would encounter traffic

related to the quarries in the area. The quarry is some distance from the main rivers (Skye River and Indian River) and would not have significant impacts. Best management practices used at the site will reduce any potential impacts quarry activities may have on water quality and quantity and fish habitat, and will be validated through a surface water management and monitoring program that will be established through the subsequent Industrial Approval process. Land around the existing Whycocomagh Quarry which is proposed for expansion may be used by Mi'kmaq and /or other local residents for activities such as nature walks, bird watching, and hunting or fishing (either recreationally or for subsistence). The land area affected is small in relation to the available wildlife habitat in the area, and would not likely affect wildlife or fish populations, potentially used by Mi'kmaq. Since quarry operations are not expected to change in scope or increase in frequency from past use, there is unlikely to be a change in the cumulative effects of other activities in the area; consequently none of these effects are considered significant.

5.3.2 Recreational Activities

Recreational use and nature appreciation of the environment in the vicinity of the site consists principally of local walking/hiking and home-based recreation (e.g. gardening) concentrated around Highway 252 and the We'Koqma'k Reserve. Only activities associated with Whycocomagh Port Hood Road are likely to be affected by quarry activities—principally by truck traffic—and then principally when the quarry is operating. Operations at the quarry would be cyclic, likely occupying several weeks during the construction season during the years in which the site is active, and the facilities are well maintained. Although quarry operations could likely be heard and residents would experience truck traffic and other effects of quarry operations, the frequency and scope of the quarry is not expected to increase from past use, and any impact on normal activities of residents as a result of the proposed quarry expansion are expected to be negligible.

5.3.3 Tourism and Viewscape

Expansion of the existing Whycocomagh Quarry is not expected to have an impact on tourism and viewscape. Highway 252 is an important local travel and tourist route to western Cape Breton and operations at the quarry and associated truck traffic would interact with tourist traffic using it. Truck and equipment traffic accessing and exiting the site from the Whycocomagh Port Hood Road and Highway 252 is expected to be the main interaction with tourists. This traffic is expected be occasional, will be similar now as in the future, and would likely be only a minor impediment to tourist vehicle traffic in the area. The intersection of Hwy 252 and the Whycocomagh Port Hood Road has a sharp angle of approach (Figure 44) which may present a safety concern; however, use of signage (e.g. "Trucks Turning") during periods of onsite activity, would improve safety by alerting travelers. While it is not visible from Highway 252, the Quarry may be visible from lookoffs on the Whycocomagh Mountain Trail, which in the western section of its route runs parallel to Highway 252 at an elevation of about 50 m; and from highest elevations in Salt Mountain in Whycocomagh Provincial Park. Overall, however, the impacts on viewscape and tourism are expected to be negligible.

5.3.4 Recreational, Commercial & Mi'kmaq Fishing

Recreational fishing in Skye River and Indian River is not expected to be affected by activities at the quarry. The amount of runoff from the quarry is small and high quality, and will have a negligible impact on the

watercourses and fish habitat downstream. Surface waters at the site have high quality, including low turbidity and neutral pH, which would lead to good quality of waters downstream for fish. Overall a negligible impact of the quarry on recreational, commercial, and Mi'Kmaq fishing is expected.

5.3.5 ARCHAEOLOGICAL/CULTURAL/HISTORICAL

The land proposed for the quarry expansion has low potential for pre-contact and/or early historic native or European archaeological resources (CRM 2020). The site itself was at one time occupied by European settlers but development of the existing quarry and modifications to the land due to other activities such as forestry have removed all traces. The site is not expected to have been a prime area used by Mi'Kmaq pre-contact. If an archaeological feature of significance is encountered during quarry activities, particularly evidence of Mi'kmaq occupation, the effects will be reduced by halting operations and consulting with experts in the field to ensure the artifact or feature is not disturbed and is adequately documented and preserved.

5.3.6 ECONOMY, LAND USE AND VALUE

Activities at the Whycocomagh Quarry do not restrict industrial activity in the area and in fact support construction activities, through use of aggregate from the quarry for projects in the area. The quarry provides employment for locals and generates tax revenue. The existing quarry has been operating at the site with little to no impact, while providing economic development and a source of aggregate for local construction projects.

5.3.7 TRANSPORTATION

The Whycocomagh Quarry currently generates a comparatively low level of truck traffic on highways in the area, and activity levels are not expected to increase significantly. Consequently the quarry is not expected to change the existing traffic volumes significantly. The angled intersection of Whycocomagh Port Hood Road with Hwy 252, and the one-lane bridge on Skye River, leads to potentially traffic bottlenecks which may restrict local traffic at times. A resident of the area noted a concern over the one-lane bridge over the Skye River on the Whycocomagh Port Hood Road (B. MacDonald, personal communication 2021). During periods of site operation, signage for truck and equipment operators, as well as the surrounding communities will be placed to help avoid dangerous situations at the quarry entrance. Safe use of the road and avoidance of accidents is essential, both for human impacts and the potential impacts of vehicle accidents and spills on the local watercourses and environments. Warning signs and speed limits can be placed in areas leading to the quarry, in particular when the quarry is operating, to improve safety. Equipment and truck operators for the quarry will be given instruction on safe and environmentally acceptable procedures. With suitable foresight and care, overall the impact of the project on transportation and safety is expected to be minimal, will little or no change from previous operations at the quarry.

5.3.8 RESIDENTIAL USE

Quarry activities can potentially interfere with normal use and enjoyment of nearby residential properties including those on the We'koqma'q Reserve by creating background noise, and through truck and equipment traffic and dust, which some residents may find objectionable. The property is located

approximately one kilometer from the We'koqma'q Reserve, and there are few residents in the vicinity, located along Highway 252 and the Whycocomagh Port Hood Road Road. Noise and dust from routine operations in the quarry will be within regulated limits and will not normally disturb residents living nearby; truck movements along Highway 252 may result in periodic elevated noise levels. One homeowner about one kilometer from the quarry on a subdivision on the opposite side of Highway 252 was aware of noise and lights from the Alva Quarry south of the Dexter Whycocomagh Quarry, but had not been inconvenienced, and dust was not an issue (B. MacDonald, personal communication 2021). Mitigation measures such as maintaining appropriate operational buffers, controlling vehicle speed and engine braking, securing equipment to prevent banging (e.g. doors and chains), covering loads, wetting working areas, etc. will be practiced to ensure that quarry operations comply with noise and dust limits according to the Pit and Quarry Guidelines. Noise and dust monitoring will be conducted as per the terms and conditions of the Industrial Approval for the quarry. Normal traffic noise on Highway 252 Road would likely exceed any noise coming from the quarry for homes located nearby. Traffic volumes from the site would be moderate when the Quarry is in use, and a high frequency of truck traffic would be an irregular occurrence, depending on the supply requirements for particular projects. Dust from operations may be seen but is not likely to reach residential areas, and attention will be given to dust management through standard dust mitigation strategies (water spray, reducing speeds, gravelling working areas, etc.). Lights, if present, at the site could be seen from immediate residents, but would be controlled by proper environmental management practices at the site (i.e. downward directional lighting).

Figure 45. Properties and activities within 800 m radius of Dexter Whycocomagh Quarry.

Quarry activities such as blasting, are not expected to impact residential water supplies, as most homes are located at a significant distance from the site, typically around one kilometer. All blasting events will continue to be monitored for concussion and ground vibration to ensure blasting limits are achieved. A groundwater monitoring program will be implemented through the Industrial Approval process to establish baseline groundwater quality and provide on-going monitoring to ensure that any possible effects of the quarry are identified.

Most operations at the site occur during daylight hours. On rare circumstances when they are undertaken at night, activities will involve minimal additional lighting, and are unlikely to be a significant disturbance to residents. The quarry includes signage with phone numbers and contact persons should any members of the community have inquiries. A complaint resolution procedure will be put in place by Dexter to address complaints and concerns.

5.3.9 COMMERCIAL/INDUSTRIAL USE

An industrial repair yard at the corner of Chuggin Road and the Whycocomagh Port Hood Road, and the Alva Quarry are unlikely to be affected by traffic and related operations arising from the Quarry. The Whycocomagh Quarry has been operating alongside the other quarries safely and without interference. The quarry contributes to net economic benefit in the community through supporting local trucking operations and providing access to aggregate and other quarry products.

5.3.10 WATER SUPPLIES AND RESIDENTIAL WELLS

Nearby residents use drilled wells and dug surface wells for potable water supply; however there are no wells within 800 m of the quarry study area, and none are between the Quarry and nearby watercourses (e.g. Skye River). Groundwater recharge generated by the quarry is likely to be of high quality (low conductivity and dissolved solids and neutral in pH). Best management practices surrounding blasting will be followed, established operational procedures for fueling will be followed, and a contingency plan will be maintained to mitigate reasonable impacts on aquifers at the site.

5.3.11 PARKS AND PROTECTED AREAS

The proposed expansion of the Whycocomagh Quarry site is not expected to make the site visible by tourists traveling by road. With no change in the scope or frequency of quarry activity, road traffic activity due to the quarry is not expected to change, or be high enough in volume to disrupt tourist traffic. Occasional blasting may be heard locally along Highway 252, on the We'Koqma'q Reserve and in Whycocomagh (e.g. at the Whycocomagh Provincial Park and the Skye River picnic park along Highway 105), but occurrences are likely to be brief, and distant, and not likely to be a significant concern to visitors/users of those areas. The quarry will be reclaimed at the end of its useful life. Expansion of the quarry will not affect the integrity of any nearby protected areas.

5.3.12 RESOURCE USE—FORESTRY, HUNTING & TRAPPING

Use of the land in the expansion area will remove the potential for future forestry use of the site, at least until after the quarry is closed and rehabilitated in future; however the area occupied by the quarry is relatively small in relation to the available forest resources in the area, and the overall impact on economic

return is expected to be small. The quarry will occupy a relatively small area of habitat for furbearing and game species and will not have a significant impact on hunting and trapping.

5.4 Biophysical Impacts—Impacts of the Project on the Environment

5.4.1 Air Quality, Noise, and Light

Quarry activities are not expected to change from the previous scope of operations, however various project activities have the potential to generate dust, combustion emissions, noise, and light. In particular, operation of heavy equipment (e.g. earth movers, crushers), rock drilling and blasting, as well as onsite routine operations contribute to increased dust and particulate levels. Noise levels can impact human use and enjoyment of the environment. Dust emissions are expected to be localized and short term and are expected to be minimal from routine operations. Dust management will be undertaken, including use of water spray and covering working and laydown areas with blasted rock, dust suppression systems on crusher equipment, and reducing equipment and vehicles speeds. Monitoring of airborne particulate emissions will be conducted at the request of NSE and in accordance with the site Industrial Approval, the Pit and Quarry Guidelines, and the Nova Scotia Air Quality Regulations. Industry standards and best practices will be followed during all phases of operations.

Exhaust emissions are generated by the operation of vehicles and equipment. Vehicles and heavy equipment are expected to follow efficient operating procedures such as not idling unnecessarily when not in use. Given the relatively small size of the quarry and the scope of the planned operations, these emissions will be minimal (i.e. restricted to several pieces of heavy equipment, earth movers, trucks etc. as well as operation of crushers and asphalt plant) and will be localized and similar in type and amount to those produced during previous operations. Ambient air quality monitoring will be conducted at the request of NSE, in accordance with the terms and conditions of the Industrial Approval.

With no anticipated change in scope or frequency of operation, noise levels from the expanded quarry are expected to be similar to those already produced at the site. Noise mitigation will include maintaining appropriate operational buffers, maintaining vehicles and heavy equipment in proper working order, and giving attention to traffic patterns around the site to reduce the need for heavy equipment to back up (thus reducing the frequency of backup signals). The operator should ensure that heavy equipment does not exceed the noise limits specified in the Nova Scotia Pit and Quarry Guidelines. Blasting is expected to occur infrequently (1-2 times per year). All blasting events will be monitored for concussion and ground vibrations. Noise monitoring will be conducted at the request of NSE, in accordance with the terms and conditions of the Industrial Approval.

Occasional nighttime operations may be required. Light during nighttime operations— particularly during times of low-hanging cloud and fog—can attract migrating birds traveling over water towards the rest of the mainland of Nova Scotia. If nighttime operations are required then directional lighting will be used to minimize emanation of light upward and laterally over the horizon.

5.4.2 Groundwater

Activities associated with the project including forest clearing, grubbing and removal of overburden, and blasting, influence groundwater flow locally in the vicinity of the quarry, but are not expected to influence

groundwater aquifers over a broader area. The amount of recharge area involved in project activities is small in relation to the overall size of the aquifers in the general vicinity; however the quarry floor will continue to add recharge in approximately the same amount as at present. A contingency plan is expected to be established to manage any spill or release occurrences potentially impacting groundwater in the area. As part of the subsequent Industrial Approval process following the EA, a groundwater monitoring program will be established to determine baseline groundwater quality and provide on-going monitoring to ensure that any possible effects of the quarry are identified. Overall, the effect on overall groundwater flow patterns are expected to be negligible.

5.4.3 HYDROLOGY

As part of the EA process a Water Balance Assessment will be prepared to assess the estimated effects of quarry expansion on local hydrology. Expansion of the quarry is expected to have negligible effects on the existing hydrology at the site. The proposed expansion area is small and consequently the effect on supply to surface waters in the vicinity is not expected to be disrupted significantly. Surface water runoff from the quarry is inherently intermittent and most is expected to enter the water table directly through percolation through cracks and fissures in the bedrock; however surface flows will be moderated by the surface water management system and will ensure that flow characteristics in downstream areas are not affected significantly. Runoff will be managed to ensure that it meets acceptable environmental standards. Dexter will maintain the drainage management system which is currently in place and continue to manage the flow in a natural way and minimize damage to the local environment.

5.4.4 WATER QUALITY

Water quality leaving the quarry is expected to be high, and is not expected to impact downslope areas, in particular the Skye River. Quality of water leaving the site and entering groundwater is high, due to the onsite management and the low-contaminant characteristics of the bedrock and location of the site high in the local catchment area. Quarry rock is within acceptable limits for sulphur and acid-generating potential. Blasting is not expected to result in groundwater quality changes. Forest clearing and grubbing activities can lead to releases of fines from the soil, resulting locally in elevated suspended sediment levels but little surface water flow from grubbed areas is expected off the site in part due to the small area involved, and sediments will be removed during flow through the adjacent landscapes. Possible release of other contaminants such as oils and lubricants from operating equipment is expected to be mitigated by normal precautions on equipment operations and fuelling locations. Contaminants arising from operations of the quarry are expected to be exceedingly low. All activities will conform to the Nova Scotia Erosion and Sedimentation Control Handbook (NSE 1988) and the Nova Scotia Pit & Quarry Guidelines (NSE 1999). Runoff from road surfaces potentially can lead to temporarily elevated suspended sediment levels in flows in ditches adjacent to them, although effects would be short term. Impact of the quarry on water quality in adjacent streams and other waters is expected to be negligible. A surface water management and monitoring program will be established through the Industrial Approval process.

5.4.5 FRESHWATER AQUATIC ENVIRONMENTS AND WETLANDS

There are no permanent streams or wetlands in the study area. Riparian wetlands along the small intermittent watercourses downstream from the quarry are not expected to be impacted significantly.

Quantities of runoff arising from the site in future from the outer slopes of berms and grubbings piles will be approximately the same as at present and will remain in the same watershed. The quarry is unlikely to generate significant quantities of contaminants or suspended sediments that could impact any freshwater habitat.

5.4.6 Terrestrial Environments

Proposed expansion will utilize areas which are mainly medium-aged deciduous and mixed forest—types which are common in the general vicinity, and in particular locally at the site—and the quarry will not remove a large proportion of either type. No unique habitats were identified at the site. Dust from operations may affect adjacent forest communities although the impacts are likely to be negligible.

5.4.7 Fish and Fish Habitat

None of the proposed project activities will physically impact potentially fish bearing streams. There is no fish habitat on site. Surface runoff from the site enters the headwaters of two local catchments on the north and northeast side of the existing quarry. Brook trout and potential habitat for other species can access the watercourse east of the quarry at a point below Chuggin Road in one of the catchments, and there is expected to be fish habitat in the watercourse in the north catchment as well; however the quarry expansion will occupy a relatively small area in relation to both watersheds. A Water Balance Assessment has been completed as part of the EA process (separate report) which estimates that changes in infiltration and runoff due to the quarry expansion are expected to be minimal and within the anticipated range of seasonal variance. This suggests that there will be little / no change in the quantity of runoff from the quarry possibly contributing flow to fish bearing streams. Water quality typically found in runoff from the quarry will be monitored and is expected to meet NSECC guidelines and limits stipulated in the Industrial Approval. All fish habitat found is more distant than 100 meters from the study area which is considered a safe separation from blasting activities. All guidelines for activities and timing of blasting in the quarry will be followed. Overall the effects of the quarry construction and operations are expected to be negligible.

5.4.8 Flora and Fauna and Habitat

Expanding the Dexter Whycocomagh Quarry will remove existing terrestrial ecosystem (plants and animals) in the footprint of the quarry. With time, areas no longer suitable for quarry operations will be remediated, through a site reclamation plan which has been established as a condition of quarry Industrial approval. Plant and animal communities that arise in remediated areas will likely differ to some degree from those at present; however, a goal of remediation will be to ensure that conditions (e.g. soil types and topography) are reasonably restored to pre-existing conditions, to allow natural communities to regenerate. During recovery and revegetation of abandoned areas, the forest succession will provide habitat for a moderate diversity of species. Removal of forest cover is a feature that quarry development shares with logging activities, which affects local ecosystems to a moderate degree, and is allowed in Nova Scotia. Normal management practices regarding forest clearing, such as avoidance of cutting or major clearing activities during critical breeding periods of songbirds from mid-April to mid-September, will reduce loss of nesting birds in forest areas. Expansion of the Whycocomagh Quarry will result in only a comparatively small change in the coverage of natural and mature forest stands in the area and is

expected to have comparatively small impact on interior forest birds and wildlife. During operations, modified areas of the quarry offer potential nesting sites for certain species of birds and other wildlife, including hunting spaces for species such as owls and nesting for ground nesting birds such as nighthawks. Quarry employees should be educated on the need to check areas for activity and nests including both ground- and tree-nesting birds, before undertaking activities which would disturb established surfaces. Night operations and use of lights have various effects, including attracting insects which otherwise would need darkness to mate and reproduce; light pollution is considered to be an important factor globally in decline of songbird populations, through declines in populations of some insects. If nightime operations are required, in particular during migration periods (August – September) which would attract migrating birds, downward directional lighting will be used which focuses downward and below the normal horizon, to limit visibility by birds and insects from a distance.

5.4.9 Species at Risk

No federally or provincially-listed species at risk, or species more sensitive than S3 ranking (vulnerable), were found in the study area. American marten and Canada lynx (both provincially listed as Endangered) are known to occur in the general area of the study site. Common nighthawk, a ground-nesting species, potentially could nest in grubbed and marginal but open areas of the quarry; employees should be made aware of the need to check areas for activity and nests before undertaking activities which would disturb established surfaces. Activities such as logging and site clearing should be scheduled outside the April to August nesting period for breeding birds. Lights during night operations during migration periods (April – June, August – September) would attract various bird species and insects, which could include species at risk. Lighting used at the site should focus downward and below the normal horizon, to limit visibility from a distance.

5.4.10 Natural Areas & Wilderness

Natural areas in the vicinity of the site such as the Skye River and Indian River are appreciated by locals and tourists alike, and this region of Cape Breton Island is dominated by natural environments, including some of the most remote and wild areas of Nova Scotia. The proposed expansion of the Whycocomagh Quarry will affect a small proportion of the natural landscape at the site and will have a limited effect on visitors to the area who are looking for nature experiences. Dexter is committed to minimizing potential effects of the quarry, in particular to reduce traffic, noise, dust and light from operations. Restoration should also consider values important in conservation of biological communities and ecosystems, as well as changes in physical conditions that could affect those communities. Normal procedures such as dust control and light management will help to minimize impacts on natural and wilderness values at the site.

6 Impacts of the Environment on the Project

The operating quarry will not be impacted in general by weather, including high rainfall and precipitation. Quarry design, which includes site water management, will account for extreme rainfall events. As part of the Industrial Approval process a Stormwater Management Plan and Erosion and Sediment Control Plan will be established for the site. Aggregate and other rock products produced and stored at the site are stable under varying conditions of rainfall. Although extreme rainfall events may currently lead to high

flows in watercourses leaving the site, such flows will be manageable through site design and infrastructure.

Table 9. Potential interactions between project activities and operations and Valued Environmental Components (VECs) for Whycocomagh Quarry expansion.

General Category of VEC	Biophysical									Socioeconomic										
Project Component (potential interactions shown by ✓)	Air Quality, Noise and Light	Groundwater & Hydrology	Water Quality	Freshwater Aquatic Environments and Wetlands	Terrestrial Environments	Natural Areas & Wilderness	Fish and Fish Habitat	Flora & Fauna Species & Habitat	Species at Risk	Mi'kmaq	Cultural/Historical	Recreation, Tourism & Viewscape	Residential Use	Recreational, Commercial & Mi'kmaq Fishing	Water Supplies/ Residential Wells	Economy, Land Use, and Value	Transportation	Commercial /Industrial Use	Parks & Protected Areas	Forestry Hunting /Trapping
Construction																				
Site Acquisition, Use/Removal of Resources	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓				✓	✓	✓		✓
Site Clearing/Grubbing	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓						✓	✓
Drilling	✓	✓	✓			✓				✓		✓	✓						✓	
Blasting	✓	✓	✓			✓	✓	✓		✓		✓	✓		✓				✓	
Lights & Noise	✓					✓		✓		✓		✓	✓						✓	
Operation																				
Moving/Transporting Rock and Product	✓					✓		✓		✓		✓	✓			✓	✓	✓	✓	
Crushing	✓					✓				✓		✓	✓						✓	
Washing		✓	✓	✓			✓			✓				✓						
Lights & Noise	✓					✓		✓	✓	✓		✓	✓						✓	
Site Runoff Management		✓	✓	✓			✓							✓						
Portable Asphalt Plant	✓					✓				✓		✓	✓				✓		✓	
Onsite Materials Storage			✓															✓		
Accidents (Fires/Oil & Fuel Spills)	✓	✓	✓	✓		✓	✓	✓				✓	✓		✓				✓	✓

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
BIOPHYSICAL COMPONENTS						
Air Quality, Noise & Light	Construction	Noise and dust from heavy equipment during site clearing and grubbing.	Significant	Negative	Take steps to reduce noise sources such as engine braking. Maintain vehicles and equipment to reduce noise and emissions generated from worn parts.	Not significant.
		Drilling and blasting.	Significant	Negative	Monitor noise levels and undertake to avoid exceedances of regulatory levels.	Not significant.
		Light from the quarry can be seen in neighbouring areas.	Significant	Negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry during night operations.	Not significant.
	Operation	Noise from drilling and blasting; crusher; heavy equipment operation; dust.	Significant	Negative	Monitor noise levels and undertake to avoid exceedances of regulatory levels. Institute measures for dust control.	Not significant.
		Noise from engine braking of trucks on Chuggin Road interfering with local enjoyment of Pioneer Memorial Cemetery.	Significant	Negative	Instruct truck operators to avoid use engine braking leaving the quarry and in populated areas.	Not significant.
		Light from the quarry can be seen in neighbouring areas.	Significant	Negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry at night.	Not significant.
		Dust from crushing operations and site activities.	Significant	Negative	Water spray systems on crushing spreads to reduce dust. Water spray or other approved dust suppressant on quarry access road and working areas to reduce the resuspension of dust.	Not significant
Groundwater/ Hydrology	Construction	Forest and soil removal changes surface and ground water flow levels and patterns.	Negligible	Negative	Use site runoff management to minimize impacts. Likely changes in groundwater and runoff patterns will be small.	Not significant.
	Operation	Blasting fractures bedrock, disturbs till, and changes groundwater flow patterns. Drilled wells	Significant	Negative	Analyse groundwater quality and movement to determine changes.	Not significant.

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
		in bedrock and surface wells can be disturbed				
	Operation	Quarry and work areas change surface water flows. Increased peak stormwater flows. Washing product creates silt-laden surface flows.	Significant	Negative	Onsite water management to moderate extreme surface water runoff and suspended sediment levels; measures to maintain normal flow regime. Aggregate washing arranged in closed loop system to retain all wash water onsite.	Not significant.
	Operation	Accidental hydrocarbon spills and blasting residues contaminate groundwater.	Significant	Negative	Measures to minimize danger of spills; monitor and control nitrates from blasting; proper fuel handling strategies, onsite emergency numbers, spill kits etc.; Avoid refueling near watercourses.	Not significant.
Water Quality	Construction	Altered surface water flows and turbidity in watershed flowages from site runoff.	Negligible	Negative	Erosion and sedimentation controls in work areas. Onsite water management to moderate surface water runoff and suspended sediment levels.	Not significant.
	Operation	Dust & suspended sediment from operations potentially enters local watershed. Chemicals (e.g. nitrates) from explosives entering runoff.	Significant	Negative	Onsite dust control and water management to moderate surface water runoff and suspended sediment levels. Erosion & sedimentation controls. Closely monitor chemical residues after blasting.	Not significant.
	Operation	Water chemistry changes in runoff from stockpiles stored on site.	Negligible	Negative	Best management practice allows leaving piles exposed to the environment. Monitor settling ponds; storm-water management.	Not significant.
Natural Areas & Wilderness	Construction & Operation	Presence of quarry, emissions, dust etc., detracts from public perception of wild quality of area (e.g. enjoyment of Whycocomagh Mountain Trail). Site is not near popular wilderness areas.	Negligible	Negative	Area affected is small in relation to remaining natural areas, and previous development and logging has occurred in the area, diminishing value of natural areas and wilderness. Attempt to minimize footprint and avoid damage to areas that contribute most to	Not significant.

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
					supporting the natural ecosystem and enhancing values. Manage releases of dust and light, and control noise.	
Freshwater Aquatic Environments	Construction	Potential for local high suspended sediments and nutrient levels from grubbings, road construction, and locally-diverted flows.	Negligible	Negative	Preserve wooded buffer areas for quarry. Onsite water management and sedimentation controls to moderate surface water runoff and suspended sediment levels.	Not significant.
	Operation	Site is in vicinity of Skye River. Surface runoff with dust, nutrients and contaminants. Residues from aggregate washing. Reduced water availability from evaporation from pit floor and exposed surfaces.	Negligible	Negative	Maintain forested buffers. Onsite water management. Sedimentation ponds and store wash water during off peak season. Minimize unvegetated areas.	Not significant.
	Operation	Higher peak flows and suspended sediment during activities.	Significant	Negative	Onsite water management to store wash water. Preserve woodland in buffer areas of quarry.	Not significant.
	Operation	Releases of chemicals from blasting and runoff from materials stored on site.	Negligible	Negative	Isolate and treat runoff from work areas and stored materials piles.	Not significant.
	Construction & Operation	Accidental spills of hydrocarbons on site.	Significant	Negative	Provide pollution prevention and emergency measures.	Not significant.
Terrestrial Environments	Construction	Grubbing, road construction, pit preparation. Damage to natural forest ecosystem, and associated species.	Significant	Negative	Maintain property boundary buffers. Conduct species specific breeding bird surveys prior to development stages. Monitor species-at-risk birds. Conduct forest removal in small stages corresponding to site development and not in breeding period for birds.	Not significant.
	Operation	Dust, nutrient inputs from runoff, changes	Negligible	Negative	Maintain property boundary buffers.	Not significant.

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
		to environment and functioning of forest communities.			Conduct species specific breeding bird surveys prior to excavation. Be aware of critical times for rare species which might occur.	
Fish & Fish Habitat	Construction	Change runoff patterns at site in local and adjacent watersheds.	Negligible	Negative	Runoff management to maintain flow to natural watersheds and to avoid sudden runoff events.	Not significant.
	Operation	Site runoff management and water use affects hydrological and groundwater regime.	Negligible	Negative	Ensure the runoff from the site is managed to avoid sudden runoff events.	Not significant.
	Construction & Operation	Small releases of oils, hydraulic fluids etc. from operating equipment. Accidental spills of hydrocarbons on site.	Negligible	Negative	Maintain equipment to minimize loss of lubricants and fuels. Provide pollution prevention and emergency measures.	Not significant.
	Operation	Accidental spills into watercourses due to vehicle accidents on roads in area.	Negligible	Negative	Recommend safe driving practices for truckers and staff and reduce speed in vicinity of quarry key intersections. Provide pollution prevention and emergency measures.	Not significant.
Terrestrial Flora & Fauna & Habitat	Construction	Removal of Existing Forest Communities	Negligible	Negative	Restore damaged and unused parts of the site (e.g. grubbings and waste rock piles) as soon as possible. Long-term site rehabilitation plan developed with NSE. Cut forest short term only as needed to expand quarry. Conduct species specific breeding bird survey in northeast part the property prior to excavation.	Not significant.
	Construction & Operation	Accidental contaminant releases, contamination of habitat.	Significant	Negative	Provide pollution prevention and emergency measures & response capability. Remediate areas affected by spills.	Not significant.
		Artificial light from operations influences movements of birds and insects.	Significant	Negative	Use directional lighting with downward focus to minimize light leaving the quarry.	Not significant.

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
		Removal of potential forest and wildlife resource (i.e. wildlife habitat)	Negligible	Negative	Small area affected relative to total available. Minimize footprint of quarry. Restore and rehabilitate areas not used. Leave mature standing trees where possible as nest cavities.	Not significant.
		Quarry affects wildlife movement patterns and connectivity of habitats.	Negligible	Negative.	Restoration should include consideration for wildlife movement through the restored site.	Not significant.
Species at Risk	Construction	Removal of potential habitat for American Marten and Canada Lynx	Negligible	Negative	Small area affected relative to total available. Minimize footprint of quarry.	Not significant.
	Operation	Sound from blasting can harm bats and birds.	Negligible	Negative	Minimize blasting activity and concentrate in summer (outside breeding and migratory periods for birds and bats).	Not significant.
		Light influences movements of species at risk birds migrating overland.	Significant	Negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry.	Not significant.
		Open and revegetated areas and grubbings piles may be occupied by nesting species such as nighthawks.	Significant	Negative	Educate personnel to look for bird life prior to activities; periodically conduct nesting bird survey at site to identify bird issues.	Not significant.
SOCIOECONOMIC COMPONENTS						
Mi'kmaq	Construction and Operation	Any land use conflicts with Mi'kmaq Right to Use land	Significant	Neutral	Engage with Mi'kmaq in developing quarry.	Not significant.
		Noise and light impacts; traffic affecting We'Koqma'q Reserve	Not significant	Negative	Best management practices to minimize noise and light levels.	Not significant.
		Contamination of surface waters may affect fish populations in Skye River potentially used by Mi'kmaq.	Negligible	Negative	Employ surface water monitoring program. Use Best Management Practices for quarries. Avoid accidental releases of contaminants. Avoid vehicle accidents.	Not significant.
Archaeological, Cultural and Historical Significance	Construction	Expansion may affect undiscovered artifacts.	Not significant	Negligible	Unlikely that artifacts occur at site. Stop work and report discoveries. Minimize project footprint.	Not significant.

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
Recreation	Construction & Operation	Quarry traffic & activities affects local low impact recreation (e.g. walking and ATVs along Chuggins Road.	Not significant	Negative	Users will be aware of activity at quarry but will not be otherwise impacted by it. Signage of truck use, dangers, and quarry activity.	Not significant.
Tourism and Viewscape	Construction & Operation	Presence of quarry affects public perception of wilderness values. View from Whycocomagh Mountain Trail	Negligible	Negative	Small feature in the landscape. Dust & noise control. Maintain a clean operation. Rehabilitate areas no longer needed for activity and future development.	Not significant.
Residential Use	Construction & Operation	Noise; light pollution; dust; odours; operation of trucks and transportation of heavy equipment.	Significant	Negative	Use best management practices to reduce disturbance to nearby residents. Inform residents about quarry operations. Provide community with safety information for truck traffic and quarry operations.	Not significant.
Recreational and Mi'kmaq Hunting and Fishing	Construction & Operation	Accidental hydrocarbon spills and blasting residues contaminate surface waters.	Negligible	Negative	Not an important local activity. Provide pollution prevention, emergency measures & response capability. Identify and control contaminant releases.	Not significant.
	Construction	Loss of forested area under quarry footprint.	Not significant	Negative	Small area affected. Rehabilitate areas no longer needed for activity and future development. Minimize cutting outside quarry footprint.	Not significant.
Water Supplies & Residential Wells	Construction and Operation	Blasting potentially impacts local aquifers.	Negligible	Negative	Few wells within 1 km. Develop groundwater-monitoring plan in consultation with NSE. Monitor local wells.	Not significant.
Economy, Land Use and Value	Construction & Operation	Removal of potential forest and wildlife resource (e.g. forestry & trapping).	Not significant	Negative	Small area affected relative to total land available. Minimize footprint of quarry. Restore and rehabilitate areas not used.	Not significant.
Transportation	Operation	Wear on highway	Negligible	Negative	Current levels low and will not increase.	Not significant.
	Operation	Collisions with trucks and equipment on Hwy 252.	Not significant	No Change	Use good signage, have speed policy in vicinity of quarry. Safety training for truck drivers.	Not significant

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
Industrial & Commercial Use	Operation	Businesses in the area are industrial and have similar impacts.	Negligible	Neutral	Quarry helps to maintain access roads to site for future development.	Not significant.
Resource Use Forestry, Hunting & Trapping	Construction & Operation	Removes woodland; game habitat.	Not significant	Negative	Relatively small area is used. Minimize footprint.	Not significant.
Parks and Protected areas	Construction & Operation	Noise and blasting can be heard from Whycocomagh Provincial Park and other parks and nature areas in the general viicnity.	Not significant	Neutral	Employ best management practices for all aspects of quarry operation, in particular control of noise, light, & dust.	Not significant.

Table 11. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
BIOPHYSICAL COMPONENTS						
Air Quality, Noise & Light	Construction	Noise and dust from heavy equipment during site clearing and grubbing.	Significant	Negative	Take steps to reduce noise sources such as engine braking. Maintain vehicles and equipment to reduce noise and emissions generated from worn parts.	Not significant.
		Drilling and blasting.	Significant	Negative	Monitor noise levels and undertake to avoid exceedances of regulatory levels.	Not significant.
		Light from the quarry can be seen in neighbouring areas.	Significant	Negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry during night operations.	Not significant.
	Operation	Noise from drilling and blasting; crusher; heavy equipment operation; dust.	Significant	Negative	Monitor noise levels and undertake to avoid exceedances of regulatory levels. Institute measures for dust control.	Not significant.
		Noise from engine braking of trucks on Chuggin Road interfering with local enjoyment of Pioneer Memorial Cemetery.	Significant	Negative	Instruct truck operators to avoid use engine braking leaving the quarry and in populated areas.	Not significant.
		Light from the quarry can be seen in neighbouring areas.	Significant	Negative	Use directional lighting with downward and lateral focus to minimize	Not significant.

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
					light leaving the quarry at night.	
		Dust from crushing operations and site activities.	Significant	Negative	Water spray systems on crushing spreads to reduce dust. Water spray or other approved dust suppressant on quarry access road and working areas to reduce the resuspension of dust.	Not significant
Groundwater/ Hydrology	Construction	Forest and soil removal changes surface and ground water flow levels and patterns.	Negligible	Negative	Use site runoff management to minimize impacts. Likely changes in groundwater and runoff patterns will be small.	Not significant.
	Operation	Blasting fractures bedrock, disturbs till, and changes groundwater flow patterns. Drilled wells in bedrock and surface wells can be disturbed	Significant	Negative	Analyse groundwater quality and movement to determine changes.	Not significant.
	Operation	Quarry and work areas change surface water flows. Increased peak stormwater flows. Washing product creates silt-laden surface flows.	Significant	Negative	Onsite water management to moderate extreme surface water runoff and suspended sediment levels; measures to maintain normal flow regime. Aggregate washing arranged in closed loop system to retain all wash water onsite.	Not significant.
	Operation	Accidental hydrocarbon spills and blasting residues contaminate groundwater.	Significant	Negative	Measures to minimize danger of spills; monitor and control nitrates from blasting; proper fuel handling strategies, onsite emergency numbers, spill kits etc.; Avoid refueling near watercourses.	Not significant.
Water Quality	Construction	Altered surface water flows and turbidity in watershed flowages from site runoff.	Negligible	Negative	Erosion and sedimentation controls in work areas. Onsite water management to moderate surface water runoff and suspended sediment levels.	Not significant.
	Operation	Dust & suspended sediment from operations potentially enters local	Significant	Negative	Onsite dust control and water management to moderate surface water runoff and suspended	Not significant.

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
		watershed. Chemicals (e.g. nitrates) from explosives entering runoff.			sediment levels. Erosion & sedimentation controls. Closely monitor chemical residues after blasting.	
	Operation	Water chemistry changes in runoff from stockpiles stored on site.	Negligible	Negative	Best management practice allows leaving piles exposed to the environment. Monitor settling ponds; storm-water management.	Not significant.
Natural Areas & Wilderness	Construction & Operation	Presence of quarry, emissions, dust etc., detracts from public perception of wild quality of area (e.g. enjoyment of Whycocomagh Mountain Trail). Site is not near popular wilderness areas.	Negligible	Negative	Area affected is small in relation to remaining natural areas, and previous development and logging has occurred in the area, diminishing value of natural areas and wilderness. Attempt to minimize footprint and avoid damage to areas that contribute most to supporting the natural ecosystem and enhancing values. Manage releases of dust and light, and control noise.	Not significant.
Freshwater Aquatic Environments	Construction	Potential for local high suspended sediments and nutrient levels from grubbings, road construction, and locally-diverted flows.	Negligible	Negative	Preserve wooded buffer areas for quarry. Onsite water management and sedimentation controls to moderate surface water runoff and suspended sediment levels.	Not significant.
	Operation	Site is in vicinity of Skye River. Surface runoff with dust, nutrients and contaminants. Residues from aggregate washing. Reduced water availability from evaporation from pit floor and exposed surfaces.	Negligible	Negative	Maintain forested buffers. Onsite water management. Sedimentation ponds and store wash water during off peak season. Minimize unvegetated areas.	Not significant.
	Operation	Higher peak flows and suspended sediment during activities.	Significant	Negative	Onsite water management to store wash water. Preserve woodland in buffer areas of quarry.	Not significant.

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
	Operation	Releases of chemicals from blasting and runoff from materials stored on site.	Negligible	Negative	Isolate and treat runoff from work areas and stored materials piles.	Not significant.
	Construction & Operation	Accidental spills of hydrocarbons on site.	Significant	Negative	Provide pollution prevention and emergency measures.	Not significant.
Terrestrial Environments	Construction	Grubbing, road construction, pit preparation. Damage to natural forest ecosystem, and associated species.	Significant	Negative	Maintain property boundary buffers. Conduct species specific breeding bird surveys prior to development stages. Monitor species-at-risk birds. Conduct forest removal in small stages corresponding to site development and not in breeding period for birds.	Not significant.
	Operation	Dust, nutrient inputs from runoff, changes to environment and functioning of forest communities.	Negligible	Negative	Maintain property boundary buffers. Conduct species specific breeding bird surveys prior to excavation. Be aware of critical times for rare species which might occur.	Not significant.
Fish & Fish Habitat	Construction	Change runoff patterns at site in local and adjacent watersheds.	Negligible	Negative	Runoff management to maintain flow to natural watersheds and to avoid sudden runoff events.	Not significant.
	Operation	Site runoff management and water use affects hydrological and groundwater regime.	Negligible	Negative	Ensure the runoff from the site is managed to avoid sudden runoff events.	Not significant.
	Construction & Operation	Small releases of oils, hydraulic fluids etc. from operating equipment. Accidental spills of hydrocarbons on site.	Negligible	Negative	Maintain equipment to minimize loss of lubricants and fuels. Provide pollution prevention and emergency measures.	Not significant.
	Operation	Accidental spills into watercourses due to vehicle accidents on roads in area.	Negligible	Negative	Recommend safe driving practices for truckers and staff and reduce speed in vicinity of quarry key intersections. Provide pollution prevention and emergency measures.	Not significant.
Terrestrial Flora & Fauna & Habitat	Construction	Removal of Existing Forest Communities	Negligible	Negative	Restore damaged and unused parts of the site (e.g. grubbings and waste	Not significant.

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
					rock piles) as soon as possible. Long-term site rehabilitation plan developed with NSE. Cut forest short term only as needed to expand quarry. Conduct species specific breeding bird survey in northeast part the property prior to excavation.	
	Construction & Operation	Accidental contaminant releases, contamination of habitat.	Significant	Negative	Provide pollution prevention and emergency measures & response capability. Remediate areas affected by spills.	Not significant.
		Artificial light from operations influences movements of birds and insects.	Significant	Negative	Use directional lighting with downward focus to minimize light leaving the quarry.	Not significant.
		Removal of potential forest and wildlife resource (i.e. wildlife habitat)	Negligible	Negative	Small area affected relative to total available. Minimize footprint of quarry. Restore and rehabilitate areas not used. Leave mature standing trees where possible as nest cavities.	Not significant.
		Quarry affects wildlife movement patterns and connectivity of habitats.	Negligible	Negative.	Restoration should include consideration for wildlife movement through the restored site.	Not significant.
Species at Risk	Construction	Removal of potential habitat for American Marten and Canada Lynx	Negligible	Negative	Small area affected relative to total available. Minimize footprint of quarry.	Not significant.
	Operation	Sound from blasting can harm bats and birds.	Negligible	Negative	Minimize blasting activity and concentrate in spring and fall (outside breeding and migratory periods) when species are absent.	Not significant.
		Light influences movements of species at risk birds migrating overland.	Significant	Negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry.	Not significant.
		Open and revegetated areas and grubbings piles may be occupied by nesting species such as nighthawks.	Significant	Negative	Educate personnel to look for bird life prior to activities; periodically conduct nesting bird survey at site to identify bird issues.	Not significant.

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
SOCIOECONOMIC COMPONENTS						
Mi'kmaq	Construction and Operation	Any land use conflicts with Mi'kmaq Right to Use land	Significant	Neutral	Consult with Mi'kmaq in developing quarry.	Not significant.
		Noise and light impacts; traffic affecting We'Koqma'q Reserve	Not significant	Negative	Best management practices to minimize noise and light levels.	Not significant.
		Contamination of surface waters may affect fish populations in Skye River potentially used by Mi'kmaq.	Negligible	Negative	Employ surface water monitoring program. Use Best Management Practices for quarries. Avoid accidental releases of contaminants. Avoid vehicle accidents.	Not significant.
Archaeological, Cultural and Historical Significance	Construction	Expansion may affect undiscovered artifacts.	Not significant	Negligible	Unlikely that artifacts occur at site. Stop work and report discoveries. Minimize project footprint.	Not significant.
Recreation	Construction & Operation	Quarry traffic & activities affects local low impact recreation (e.g. walking and ATVs along Chuggins Road.	Not significant	Negative	Users will be aware of activity at quarry but will not be otherwise impacted by it. Signage of truck use, dangers, and quarry activity.	Not significant.
Tourism and Viewscape	Construction & Operation	Presence of quarry affects public perception of wilderness values. View from Whycocomagh Mountain Trail	Negligible	Negative	Small feature in the landscape. Dust & noise control. Maintain a clean operation. Rehabilitate areas no longer needed for activity and future development.	Not significant.
Residential Use	Construction & Operation	Noise; light pollution; dust; odours; operation of trucks and transportation of heavy equipment.	Significant	Negative	Use best management practices to reduce disturbance to nearby residents. Inform residents about quarry operations. Provide community with safety information for truck traffic and quarry operations.	Not significant.
Recreational and Mi'kmaq Hunting and Fishing	Construction & Operation	Accidental hydrocarbon spills and blasting residues contaminate surface waters.	Negligible	Negative	Not an important local activity. Provide pollution prevention, emergency measures & response capability. Identify and control contaminant releases.	Not significant.

Table 10. Summary of impacts and mitigation on Valued Environmental Components, Whycocomagh Quarry Expansion.

VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Suggested Mitigation	Significance after Mitigation
	Construction	Loss of forested area under quarry footprint.	Not significant	Negative	Small area affected. Rehabilitate areas no longer needed for activity and future development. Minimize cutting outside quarry footprint.	Not significant.
Water Supplies & Residential Wells	Construction and Operation	Blasting potentially impacts local aquifers.	Negligible	Negative	Few wells within 1 km. Develop groundwater-monitoring plan in consultation with NSE. Monitor local wells.	Not significant.
Economy, Land Use and Value	Construction & Operation	Removal of potential forest and wildlife resource (e.g. forestry & trapping).	Not significant	Negative	Small area affected relative to total land available. Minimize footprint of quarry. Restore and rehabilitate areas not used.	Not significant.
Transportation	Operation	Wear on highway	Negligible	Negative	Current levels low and will not increase.	Not significant.
	Operation	Collisions with trucks and equipment on Hwy 252.	Not significant	No Change	Use good signage, have speed policy in vicinity of quarry. Safety training for truck drivers.	Not significant
Industrial & Commercial Use	Operation	Businesses in the area are industrial and have similar impacts.	Negligible	Neutral	Quarry helps to maintain access roads to site for future development.	Not significant.
Resource Use Forestry, Hunting & Trapping	Construction & Operation	Removes woodland; game habitat.	Not significant	Negative	Relatively small area is used. Minimize footprint.	Not significant.
Parks and Protected areas	Construction & Operation	Noise and blasting can be heard from Whycocomagh Provincial Park and other parks and nature areas in the general viicnity.	Not significant	Neutral	Employ best management practices for all aspects of quarry operation, in particular control of noise, light, & dust.	Not significant.

Integrity of any runoff management structures at the site must be maintained and appropriately designed to remove the possibility of catastrophic failure. Changing climate may increase the operating season for transportation projects, and the need for aggregates produced by the quarry.

7 Cumulative Effects

Because of the remoteness of the location, all the potential impacts of the quarry operation (dust, noise, lights, blasting, traffic volume, etc.) are unlikely to be compounded by other development or human activity. Two other quarries currently operate next to the Dexter Whycocomagh quarry. The added area proposed for the expansion will not expand the impact, and further, since site operations are not expected

to increase in frequency or scope from past use, the cumulative effect of the quarry and other local activity is not expected to change and will be negligible.

8 MONITORING

As part of the subsequent Industrial Approval (following successful EA approval) Dexter will establish several management and monitoring programs to validate the environmental mitigation strategies that will be implemented at the site. Monitoring programs will include:

- Surface water monitoring plan to monitor water quality in local water resources which may be impacted by the quarry;
- Groundwater monitoring plan to monitor hydrogeological conditions and groundwater quality;
- Blast monitoring plan (noise and concussion) for all blasting events conducted at the site;
- Noise monitoring plan (at NSE request);
- Dust monitoring plan (at NSE request); and
- Additional monitoring for select species and/or other environmental features (as necessary).

9 PUBLIC CONSULTATION

Informing the public and Mi'kmaq about proposed industrial activities which potentially affect them is an important part of environmental and project management. Potential benefits include exposure to local knowledge, which may improve environmental performance, and overall operations of the project; and public involvement and support in subsequent operations. In addition to contacts already made in developing this assessment and in conducting operations in the Whycocomagh area, Dexter will be undertaking consultations with the local community through public notices, contacts with municipal and provincial government officials, and engagement with the Mi'kmaq about the project and its implications; as well as the plans for using the resources at the site in an environmentally acceptable manner.

10 PERSONAL COMMUNICATIONS

Mr. G. Bernard MacDonald, Stewartdale, July 2021.

Mr. Grant Haverstock, Owner and Operator, Iron Mountain Wilderness Cabins, July 2021.

Local community members fishing the Skye River, July 2021.

Ms. Maureen Cameron-MacMillan, Regional Biologist, Nova Scotia Department of Lands and Forestry, May 2021.

Mr. Myles MacInnis, Whycocomagh, July 2021.

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12 LIMITING CONDITIONS

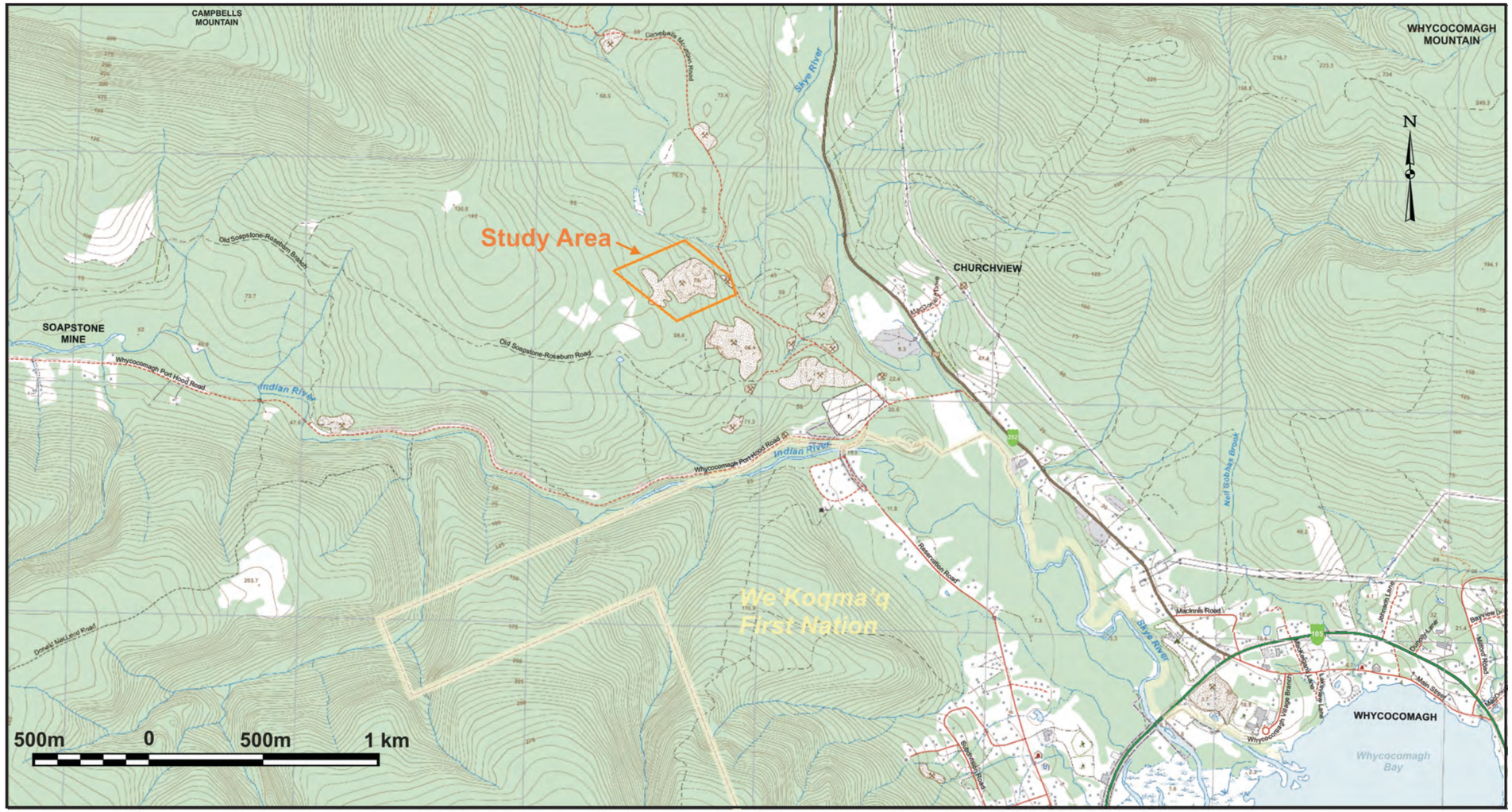
The American Society for Testing and Materials Standards of Practice and the Canadian Standards Association state that no environmental assessment can wholly eliminate uncertainty regarding the recognition of potential environmental liabilities. The intent of the assessment is to reduce, but not eliminate, uncertainty regarding projects, giving reasonable limits of time and costs.

The conclusions of this report are based in part on the information provided by others, which is assumed to be correct. The potential exists that unexpected environmental conditions may be encountered at the site and with the project, not specifically investigated. Should this occur, the proponent and regulatory authorities must be notified so that we may decide if modifications to our conclusions are necessary.

The findings of this investigation are based on research and investigations carried out in October 2020 – September 2021 and the generally accepted assessment practices of our industry. No other warranty is made.

APPENDIX A

MAPS



THE MUNICIPAL GROUP OF COMPANIES

DEXTER CONSTRUCTION COMPANY LTD.

WHYCOCOMAGH QUARRY EXPANSION

Whycocomagh, Nova Scotia

Site Location and Features

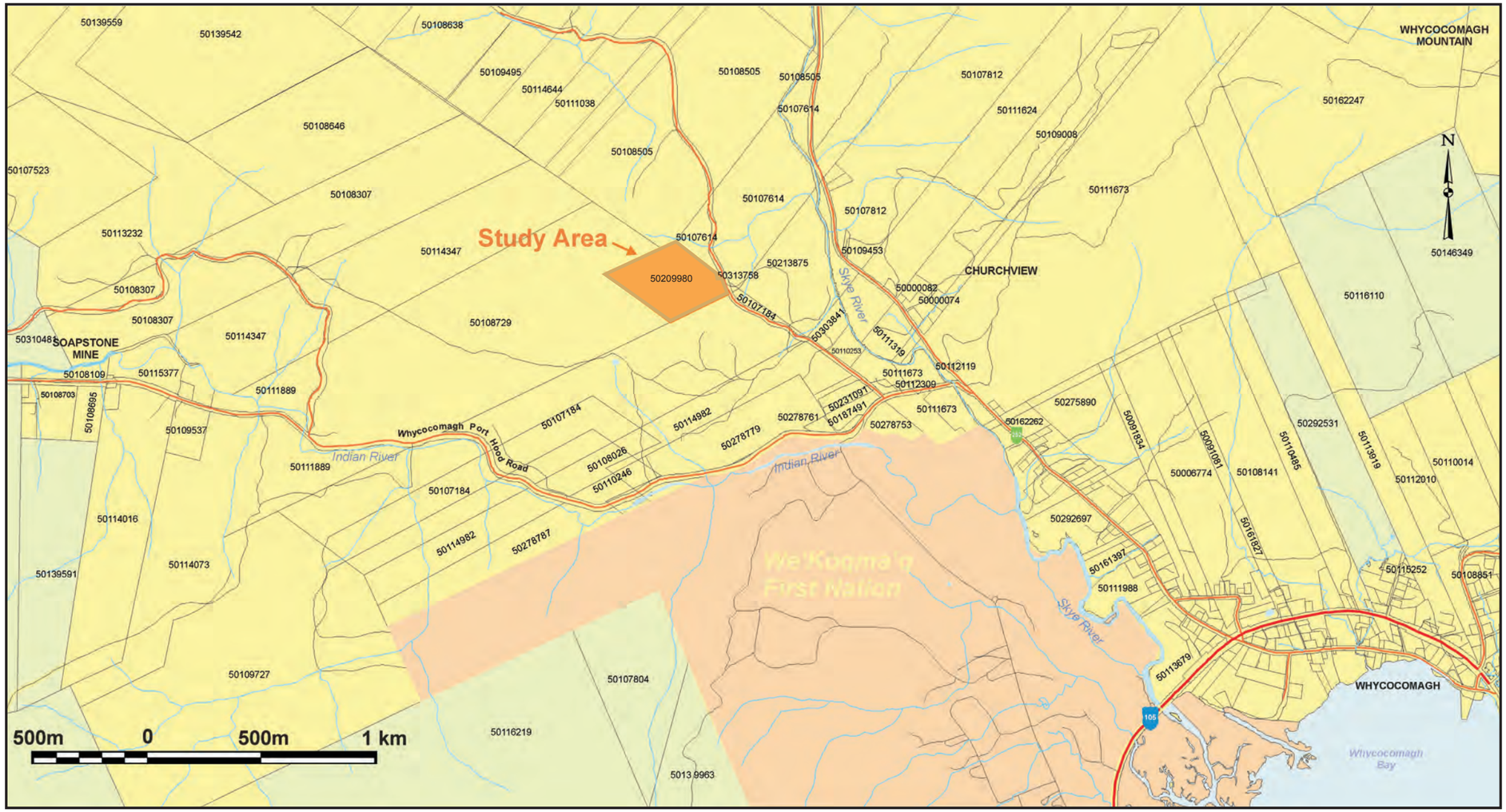
EA Study Area

Mapping by:
Envirosphere Consultants Ltd.
Windsor, Nova Scotia
April 2021

Base Map: Whycocomagh
Province of Nova Scotia 1:10,000
Sheet: 10 49500 61100,
Based on Air Photo 2005

DEXTER
DEXTER CONSTRUCTION COMPANY LIMITED

Map A-1



THE MUNICIPAL GROUP OF COMPANIES

DEXTER CONSTRUCTION COMPANY LTD.

WHYCOCOMAGH QUARRY EXPANSION

Cape Beton Island, Nova Scotia

Property Ownership

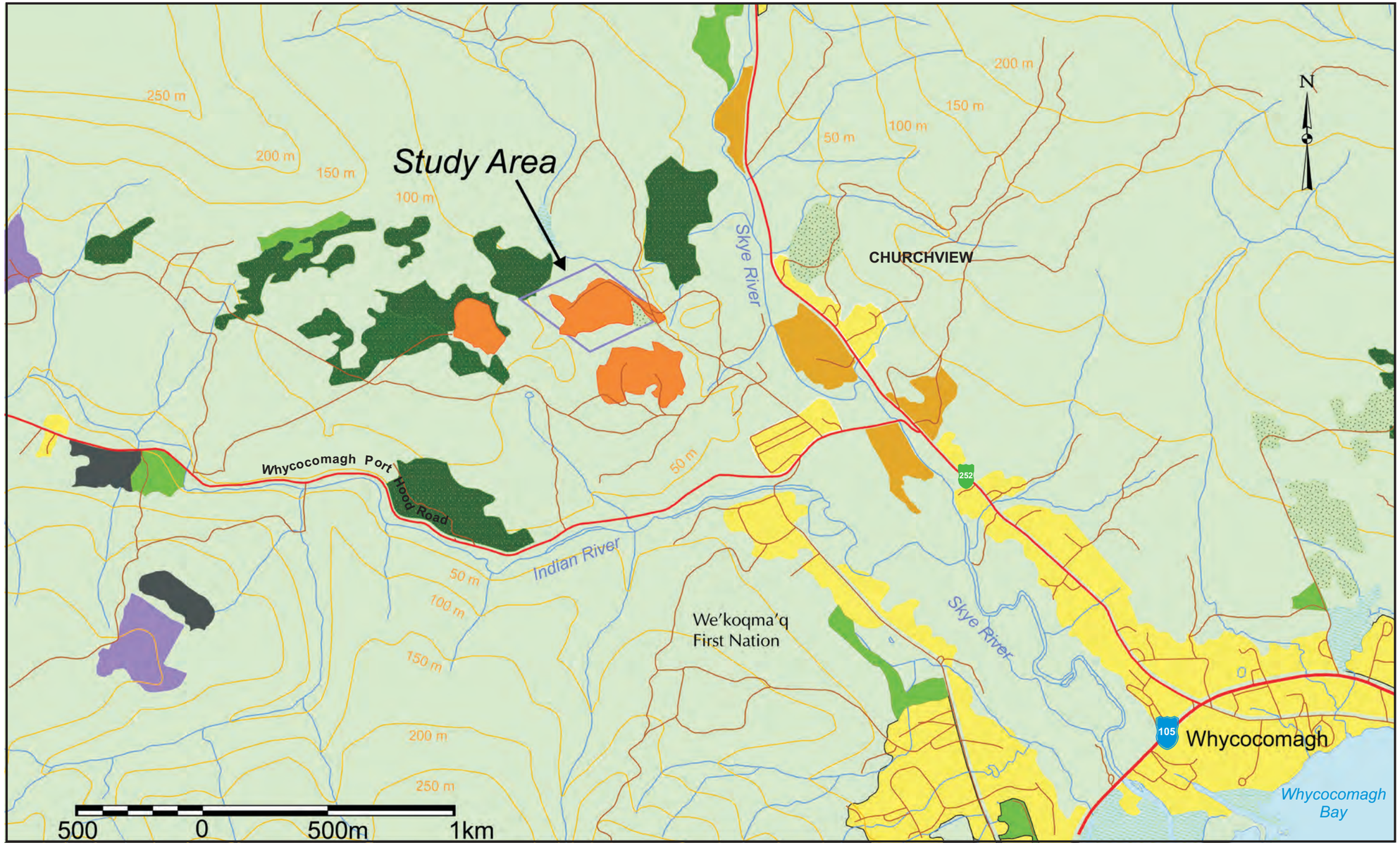
- Crown Land
- Quarry Property
- Property Boundaries
- Major Roads
- 50209980 Property Identification Number (PID)

Mapping by:
Envirosphere Consultants Ltd.
Windsor, Nova Scotia
April 2021

Property Mapping: Province of Nova Scotia, Updated January 2017

DEXTER
DEXTER CONSTRUCTION COMPANY LIMITED

Map A-2



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DEXTER CONSTRUCTION COMPANY LTD.

WHYCOCOMAGH QUARRY EXPANSION
Cape Breton Island, N.S.

Land Use Classification

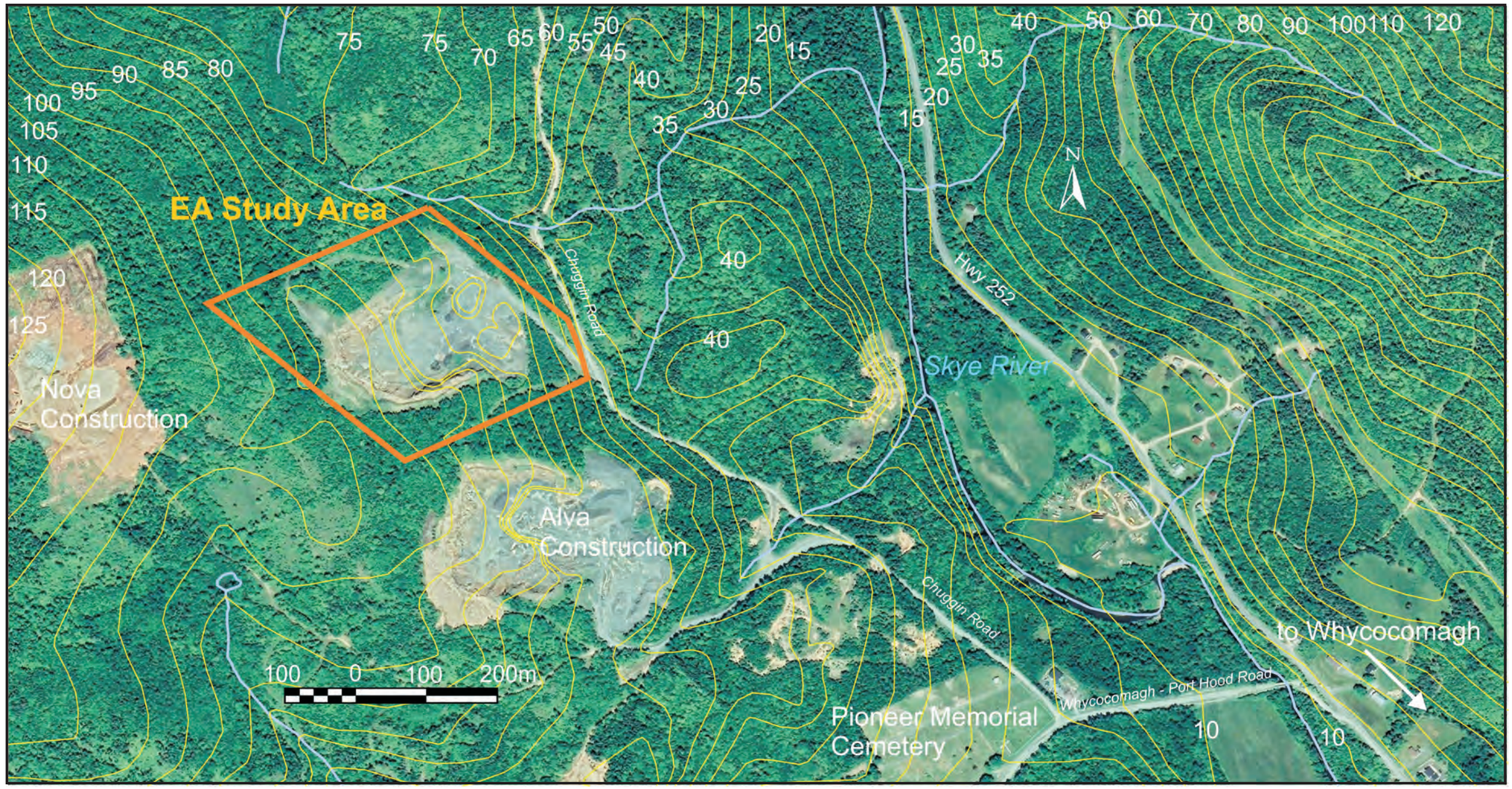
(based on NS Forestry Inventory, 2016)

- Agriculture / Old Field
- Urban
- Stand c/w Dead Trees
- Plantation
- Alders
- Clear / Partial Cut
- Natural Stand
- Quarry
- Wetlands General
- Blueberries
- Watercourse
- Main Highway
- Trunk Highway
- Secondary Roads & Trails

Map by:
Envirosphere Consultants Limited.
Windsor, Nova Scotia, May 2021

DEXTER
DEXTER CONSTRUCTION COMPANY LIMITED

Map A-3



THE MUNICIPAL GROUP OF COMPANIES

DEXTER CONSTRUCTION COMPANY LTD.

WHYCOCOMAGH QUARRY EXPANSION

Cape Beton Island, Nova Scotia

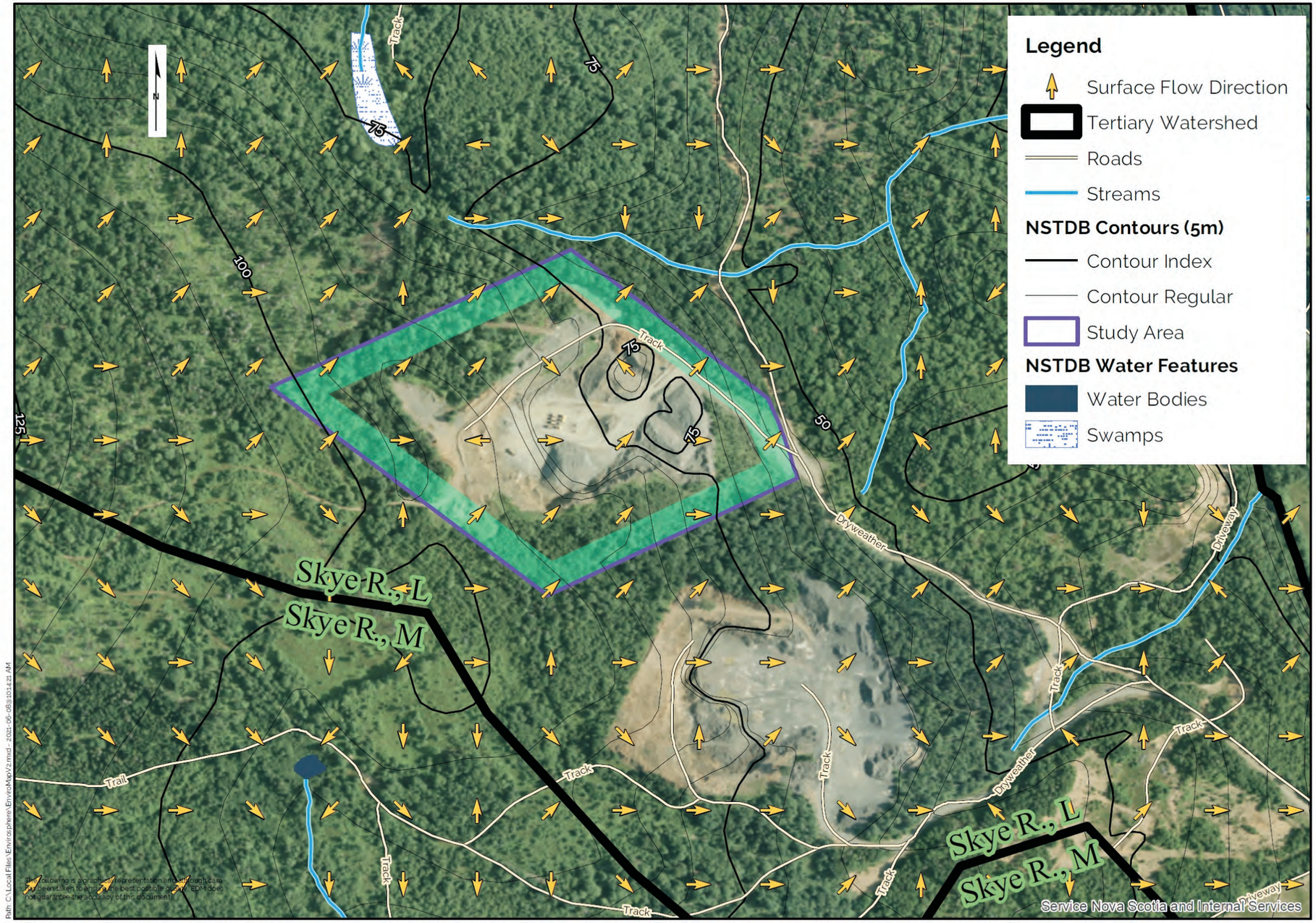
Site Features

- Watercourses
- Contours (m above MSL)
- Study Area

Mapping by:
Envirosphere Consultants Ltd.
Windsor, Nova Scotia
July 2021

DEXTER
DEXTER CONSTRUCTION COMPANY LIMITED

Map A-4



Envirosphere CONSULTANTS LIMITED

EDM PLANNING SERVICES LTD

Data Source: EDM, Envirosphere, Service NS

Coordinate System: NAD 1983 CSRS UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983 CSRS
June 2021

0 100 200
Metres

WHYCOCOMAGH QUARRY
Tertiary Watersheds &
Surface Flow Direction

Map A-5

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DEXTER CONSTRUCTION COMPANY LTD.

WHYCOCOMAGH QUARRY EXPANSION

Stewartdale, Inverness County Nova Scotia

Surface Flow Direction & Tertiary Watersheds

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DEXTER CONSTRUCTION COMPANY LIMITED

APPENDIX B

BOTANICAL SURVEYS

Fall 2020 & Spring/Early Summer 2021

Fall & Spring Botanical Surveys for a Proposed Dexter Quarry Expansion in Whycocomagh, Inverness County, Nova Scotia

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Introduction

Fall and spring botanical surveys of vascular plants were conducted at the site of a proposed quarry expansion by Dexter Construction Company Limited on Chuggin Road in Whycocomagh, Inverness County, Nova Scotia. These surveys were conducted on October 20th, 2020, and June 23rd, 2021. Both surveys were carried out by botanist Ruth E. Newell, B.Sc. (Hons.), M.Sc. and observations from both surveys are presented in this report.

The survey area is indicated by the yellow boundary shown in Figure 1 and is approximately 11 ha in size (includes the quarry).

Primary habitats present within the survey area include (1) open, disturbed areas such as quarry and ATV trail edges (Fig. 2), (2) several small areas of densely planted White Pine (*Pinus strobus*) along the roadside (Fig. 3), (3) several areas of cutover, mesic, mixed woodland located northwest, north and southeast of the quarry (Fig. 5), (4) relatively undisturbed deciduous woodland in a dry, wooded gully along the southeast boundary (Fig. 6) and similar deciduous woodland, including a partially wet gully, occurring adjacent to the upper west edge of the open quarry area (Fig. 7).

Although no wetlands or wet areas were observed on site during the fall survey, the spring survey revealed that the wooded gully located adjacent to the upper west edge of the open quarry area, is at least seasonally wet (Fig. 8).

Figure 1. The Whycocomagh Quarry showing the survey area as delineated by the yellow border.

All vascular plants observed during this survey as well as the habitats in which they occur and both their provincial general status ranks and the Atlantic Canada Conservation Data Centre (ACCDC) subnational status ranks 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 2015, 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) Open disturbed areas (e.g., quarry edges, woodland clearings, ATV trail edges)

Open disturbed areas such as quarry edges, all-terrain vehicle (ATV) trail edges and woodland clearings are generally vegetated with a mixture of both non-native and native, herbaceous plant species (Fig. 2). Herbaceous vascular plant species observed in these habitats include Colt's-foot (*Tussilago farfara*), Reed Canary Grass (*Phalaris arundinacea*), Field Horsetail (*Equisetum arvense*), Tansy Ragwort (*Jacobaea vulgaris*), Pearly Everlasting (*Anaphalis margaritacea*) and Queen Anne's Lace (*Daucus carota*). A variety of old-field native species are also present including grasses, asters and goldenrods. Tree species present include wild cherries (*Prunus* spp.), White Spruce (*Picea glauca*), Balsam Fir (*Abies balsamea*), etc.

Species of conservation concern:

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

Figure 2. Open edges of the quarry pit vegetated primarily with both native and non-native, weedy species, and some old field species such as asters and goldenrods (October 20, 2020).

2) White Pine (*Pinus strobus*) Plantation

White Pine (*Pinus strobus*) has been densely planted along road edges along the lower east side of the existing quarry (Figure 3). The pines are approximately 20 years old. Due to the high tree density within this area, essentially little other vegetation can grow within this habitat.

Figure 3. Dense White pine (*Pinus strobus*) plantings along access road edges in vicinity of the quarry October 20, 2020).

Species of conservation concern:

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

3) Cutover mixed woodland

Cutover mixed woodland occurs along the south side of the quarry, between the quarry and an ATV trail (Fig. 4). Additional areas of cutover, mixed woodland occur to the west and north of the quarry pit (Fig. 5). Common tree species occurring within this habitat include White Birch (*Betula papyrifera*), Yellow Birch (*Betula alleghaniensis*), White Spruce (*Picea glauca*), Black Cherry (*Prunus serotina*), Balsam Fir (*Abies balsamea*), Sugar Maple (*Acer saccharum*) and Red Maple (*Acer rubrum*). Commonly occurring shrub species include Wild Raspberry (*Rubus idaeus ssp. strigosus*) and Wild Blackberry (*Rubus* spp.). Commonly occurring herbaceous species within these areas include Hay-scented Fern (*Dennstaedtia punctilolula*), Canada Goldenrod (*Solidago canadensis*), Calico Aster (*Symphyotrichum lateriflorum*), Tall

White Aster (*Doellingeria umbellata*), Sensitive Fern (*Onoclea sensibilis*), Wild Strawberry (*Fragaria virginiana*), and Large-leaved Avens (*Geum macrophyllum*).

Figure 4. Cutover mixed woodland occurring adjacent to the south edges of the quarry (October 20, 2020).

Figure 5. Cutover mixed woodland occurring on the north side of the quarry (October 20, 2020).

Species of conservation concern:

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

4) Relatively Undisturbed Deciduous Woodland

Mostly undisturbed, primarily deciduous woodland occurs in several locations on the quarry property.

One such woodland occurs within and beside a dry gully which follows the southern (southeastern) boundary line of the survey area (Fig. 6).

Commonly occurring tree species in this deciduous woodland documented during the fall survey, include American Beech (*Fagus grandifolia*), both White and Yellow Birch (*Betula papyrifera, B. alleghaniensis*), Black Cherry (*Prunus serotina*), Moose Maple (*Acer pensylvanicum*) and Balsam Fir (*Abies balsamea*). Herbaceous species present include Intermediate Woodfern (*Dryopteris intermedia*), Whorled Wood Aster (*Oclemena acuminata*) and Christmas Fern (*Polystichum acrostichoides*). Additional species observed in this gully in the spring include Two-leaved Toothwort (*Cardamine diphylla*), Braun's Holly Fern (*Polystichum braunii*) and Silvery Glade Fern (*Deparia acrostichoides*).

Another area of deciduous woodland occurs in the west corner of the property adjacent to the existing quarry. Similar vascular plant species to those documented in the dry gully described above, occur within this area (Fig. 7). Additional plant species documented in this second deciduous woodland include Beaked Hazelnut (*Corylus cornuta*), Goldthread (*Coptis trifolia*), Hay-scented Fern (*Dennstaedtia punctilobula*), Witherod (*Viburnum nudum* var. *cassinoides*) and Common Speedwell (*Veronica officinalis*).

A gully also occurs within this second area of deciduous woodland (Figs. 8 & 9). This wooded gully is located immediately adjacent to the existing quarry and associated disturbed areas, and runs parallel to it. Unlike the first qully described above which appears to be dry year-round, the substrate of the second gully appears to range from mesic to wet in terms of soil moisture levels.

This second gully was originally thought to be a dry gully and is reported as such in the fall survey report. However, a more thorough survey of this area during the spring survey revealed that although a small section is dry (mesic) a significant proportion of this gully is wet to varying degrees. Standing water was observed in one area of this gully during the spring survey), while much of the remaining substrate was relatively moist (Figs. 8 & 9).

Vascular plant species occurring within the wet section of this gully include Ostrich Fern (*Matteucia struthiopteris*) (Fig. 9), Cinnamon Fern (*Osmunda cinnamomea*), Fringed Sedge (*Carex crinita*), Rough Sedge (*Carex scabrata*), a touch-me-not (*Impatiens* sp.), Rough Aster (*Symphyotrichum puniceum*), Small-flowered Forget-me-not (*Myosotis laxa*) and Small Enchanter's Nightshade (*Circaea alpina*).

Species of conservation concern:

There were no species of conservation concern observed in deciduous woodland habitat during this survey.

Figure 6. Deciduous woodland in a dry gully along the southern edge of the survey area (October 20, 2020).

Figure 7. Relatively undisturbed, deciduous woodland occurring west and northwest of the quarry (October 20, 2020).

Figure 8. Wet gully (standing water was observed here during the spring survey) in deciduous woodland on west side of open quarry area (near northwest boundary of the survey area) (June 23, 2021).

Figure 9. Ostrich Fern (*Matteucia struthiopteris*) in moist soil in a gully adjacent to upper west side of open quarry area (June 23, 2021).

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.

All the vascular plant species observed and recorded during this current survey 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 considered to be non-native to Nova Scotia. The Atlantic Canada Conservation Data Centre subnational status ranks all fall into the categories of S5, S4 or SNA, also indicating that all species documented on 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.

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

None of the species documented during these surveys that have any degree of conservation concern.

This spring survey (June 23, 2021) was conducted as a follow-up to the vascular plant survey conducted on October 20, 2020. It was highly recommended that a late spring/early summer survey be conducted as a follow up to the October study to ensure early flowering or fruiting plants are documented that are not readily apparent in the fall due to their specific life cycle.

APPENDIX

List of vascular plant species observed on the Whycocomagh Quarry property during surveys conducted on October 20, 2020, and June 23, 2021. Also provided are 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: open disturbed areas such as the quarry and woodland edges or clearings and ATV trails (Q), White Pine plantation (WPP), cutover mixed woodland (MW), relatively undisturbed, deciduous woodland (DW).

Additional species documented during the spring survey are marked with the following symbol: †.

Species with a rarity ranking (and accompanying information) are in bold font.

Latin Name	**Common Name**	**Nova Scotia General Status Rank***	**ACCDC Subnational Status Rank****	**Habitat(s)**
Abies balsamea	Balsam Fir	S5/secure (green)	S5/secure	DW, MW, Q
Acer pensylvanicum	Moose Maple	S5/secure (green)	S5/secure	DW
Acer rubrum	Red Maple	S5/secure (green)	S5/secure	DW, MW, Q
Acer saccharum	Sugar Maple	S5/secure (green)	S5/secure	DW, MW
Acer spicatum†	Mountain Maple	S5/secure (green)	S5/secure	DW
Actaea rubra†	Red Baneberry	S5/secure (green)	S5/secure	DW
Agrostis spp.†	bent grasses	NA/exotic	SNA	Q
Anaphalis margaritacea	Pearly Everlasting	S5/secure (green)	S5/secure	Q
Anthoxanthum odoratum†	Sweet vernal Grass	NA/exotic	SNA	Q
Aralia nudicaulis†	Wild Sarsaparilla	S5/secure (green)	S5/secure	MW, Q
Athyrium filix-femina†	Lady Fern	S5/secure (green)	S5/secure	DW
Betula alleghaniensis	Yellow Birch	S5/secure (green)	S5/secure	DW, MW, Q
Betula papyrifera	White Birch	S5/secure (green)	S5/secure	DW, MW, Q
Betula populifolia†	Wire Birch	S5/secure (green)	S5/secure	Q
Cardamine diphylla†	Two-leaved Toothwort	S5/secure (green)	S4/apparently secure	DW
Carex arctata†	Black Sedge	S5/secure (green)	S4/apparently secure	DW, MW
Carex communis†	Fibrous-root Sedge	S5/secure (green)	S5/secure	Q
Carex crinita sl	Fringed Sedge	S5/secure (green)	S5/secure	DW
Carex gracillima†	Graceful Sedge	S4/S5/apparently secure	S4/S5	DW
Carex intumescens†	Bladder Sedge	S5/secure (green)	S5/secure	Q
Carex leptonervia†	Finely nerved Sedge	S5/secure (green)	S5/secure	DW
Carex pallescens†	Pale Sedge	S5/secure (green)	S5/secure	Q
Carex scabrata†	Rough Sedge	S5/secure (green)	S5/secure	DW

Latin Name	Common Name	Nova Scotia General Status Rank*	ACCDC Subnational Status Rank**	Habitat(s)
Centaurea nigra	Black Knapweed	NA/exotic	SNA	Q
Cerastium fontanum ssp. *vulgare*†	Common Chickweed	NA/exotic	SNA	Q
Chamaenerion angustifolium†	Fireweed	S5/secure (green)	S5/secure	Q
Coptis trifolia	Goldthread	S5/secure (green)	S5/secure	MW
Corallorhiza maculata†	Spotted Coralroot	S4/apparently secure (light green)	S4/apparently secure	DW
Cornus alternifolia†	Alternate-leaved Dogwood	S5/secure (green)	S5/secure	MW
Corylus cornuta	Beaked Hazelnut	S5/secure (green)	S5/secure	MW
Daucus carota	Queen Anne's Lace	NA/exotic	SNA	Q
Dennstaedtia punctilobula	Hay-scented Fern	S5/secure (green)	S5/secure	MW, Q
Deparia acrostichoides†	Silvery Glade Fern	S4/ apparently secure (light green)	S4/apparently secure	DW
Doellingeria umbellata	Tall White Aster	S5/secure (green)	S5/secure	MW, Q
Dryopteris carthusiana†	Spinulose Wood Fern	S5/secure (green)	S5/secure	DW
Dryopteris intermedia	Evergreen Wood Fern	S5/secure (green)	S5/secure	DW, MW
Epipactis helleborine†	Helleborine	NA/exotic	SNA	DW
Equisetum arvense	Field Horsetail	S5/secure (green)	S5/secure	Q
Fagus grandifolia	American Beech	S5/secure (green)	S5/secure	DW
Fragaria virginiana	Wild Strawberry	S5/secure (green)	S5/secure	Q
Fraxinus americana†	White Ash	S5/secure (green)	S5/secure	DW
Galium sp.	a bedstraw	S5/secure (green)	S5/secure	DW
Geum macrophylum	Large-leaved Avens	S5/secure (green)	S5/secure	MW
Geum rivale†	Water Avens	S5/secure (green)	S5/secure	MW
Hieracium lachenalii†	Common Hawkweed	NA/exotic	SNA	Q
Hypericum perforatum†	Common St. John's-wort	NA/exotic	SNA	Q
Impatiens sp.†	a touch-me-not	S5/secure (green)	S5/secure	DW
Jacobaea vulgaris	Tansy ragwort	NA/exotic	SNA	Q
Juncus effusus†	Soft Rush	S5/secure (green)	S5/secure	Q
Juncus tenuis†	Slender Rush	S5/secure (green)	S5/secure	Q
Larix laricina	Larch	S5/secure (green)	S5/secure	Q
Leucanthemum vulgare	Oxeye Daisy	NA/exotic	SNA	Q

Latin Name	Common Name	Nova Scotia General Status Rank*	ACCDC Subnational Status Rank**	Habitat(s)
Lotus corniculatus†	Bird's-foot Trefoil	NA/exotic	SNA	Q
Luzula acuminata†	Hairy Woodrush	S5/secure (green)	S5/secure	DW, MW
Luzula multiflora†	Common Woodrush	S5/secure (green)	S5/secure	Q
Lysimachia borealis†	Northern Starflower	S5/secure (green)	S5/secure	DW, MW
Maianthemum canadense†	Wild Lily-of-the-Valley	S5/secure (green)	S5/secure	DW, MW
Matteucia struthiopteris†	Ostrich Fern	S5/secure (green)	S5/secure	DW
Nabalus sp.†	a rattlesnakeroot	S5/secure (green)	S5/secure	DW, MW
Mitchella repens†	Partridgeberry	S5/secure (green)	S5/secure	DW
Myosotis laxa †	Small Forget-me-not	S5/secure (green)	S5/secure	DW
Oclemena acuminata	Whorled Wood Aster	S5/secure (green)	S5/secure	DW, MW
Onoclea sensibilis	Sensitive Fern	S5/secure (green)	S5/secure	DW, MW
Osmundastrum cinnamomeum†	Cinnamon Fern	S5/secure (green)	S5/secure	DW
Osmunda sp.†	a fern	S5/secure (green)	S5/secure	MW
Packera schweinitziana	Schweinitz's Groundsel	S4/apparently secure (light green)	S4	MW
Parathelypteris noveboracensis†	New York Fern	S5/secure (green)	S5/secure	DW
Phalaris arundinacea	Reed Canary Grass	S5/secure (green)	S5/secure	Q
Phegopteris connectilis†	Northern Beech Fern	S5/secure (green)	S5/secure	DW
Picea glauca	White Spruce	S5/secure (green)	S5/secure	DW, MW, Q
Pinus strobus	White Pine	S5/secure (green)	S5/secure	Q, WPP
Plantago lanceolata	English Plantain	NA/exotic	SNA	Q
Poa compressa†	Canada Blue Grass	NA/exotic	SNA	Q
Polystichum acrostichoides	Christmas Fern	S5/secure (green)	S5/secure	DW
Polystichum braunii†	Braun's Holly Fern	S4/apparently secure (light green)	S4	DW
Prunus pensylvanica†	Pin Cherry	S5/secure (green)	S5/secure	Q
Prunus serotina	Black Cherry	S5/secure (green)	S5/secure	DW, MW
Prunus virginiana†	Chokecherry	S5/secure (green)	S5/secure	MW, Q
Pteridium aquilinum†	Bracken Fern	S5/secure (green)	S5/secure	MW, Q

Latin Name	Common Name	Nova Scotia General Status Rank*	ACCDC Subnational Status Rank**	Habitat(s)
Ranunculus repens†	Creeping Buttercup	NA/exotic	SNA	DW
Rubus pubescens†	Dwarf Red Raspberry	S5/secure (green)	S5/secure	DW
Ranunculus repens	Creeping Buttercup	NA/exotic	SNA	DW, MW
Rubus idaeus ssp. *strigosus*	Wild Raspberry	S5/secure (green)	S5	Q
Rubus sp.	a blackberry	S5/secure (green)	S5/secure	Q
Rumex acetosella†	Sheep Sorrel	NA/exotic	SNA	Q
Salix spp.	willows	S5/secure (green)	S5/secure	MW, Q
Sambucus racemosa var. *pubens*	Red Elderberry	S5/secure (green)	S5/secure	DW, Q
Solanum dulcamara	Bittersweet Nightshade	NA/exotic	SNA	DW, MW
Solidago canadensis	Canada Goldenrod	S5/secure (green)	S5/secure	Q
Solidago rugosa	Rough Goldenrod	S5/secure (green)	S5/secure	Q
Symphyotrichum lateriflorum	Calico Aster	S5/secure (green)	S5/secure	Q
Symphyotrichum puniceum†	Purple-stemmed Aster	S5/secure (green)	S5/secure	DW
Taraxacum officinale†	Common Dandelion	NA/exotic	SNA	Q
Trifolium pratense	Red Clover	NA/exotic	SNA	Q
Trifolium repens	White Clover	NA/exotic	SNA	Q
Tussilago farfara	Colts-foot	NA/exotic	SNA	DW, Q
Veronica chamaedrys†	Germander Speedwell	NA/exotic	SNA	Q
Veronica officinalis	Common Speedwell	NA/exotic	SNA	MW, Q
Viburnum nudum var. *cassinoides*	Witherod	S5/secure (green)	S5/secure	MW
Vicia cracca†	Tufted Vetch	NA/exotic	SNA	Q

*The Nova Scotia general status ranks used in this report are based on the ranks used in the 2015 Wild Species of Canada Report (available at https://www.wildspecies.ca/) ; S**5 = 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

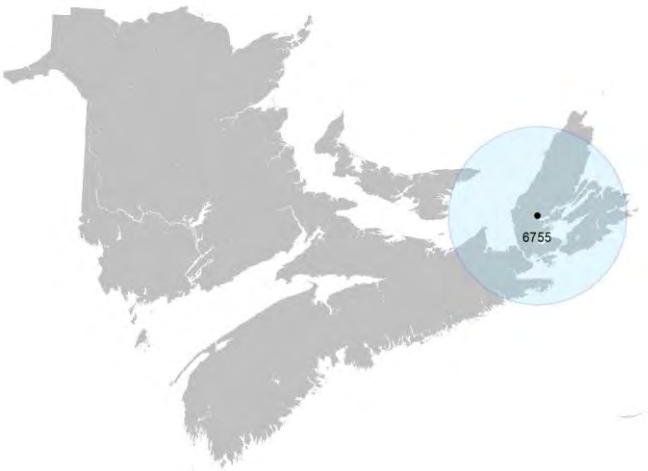
ATLANTIC CANADA CONSERVATION DATA CENTRE REPORT

Atlantic Canada Conservation Data Centre
Centre de données sur la conservation du Canada atlantique

DATA REPORT 6755: Whycocomagh, NS

Prepared 15 January 2021
by C. Robicheau, Data Manager

CONTENTS OF REPORT



Map 1. A 100 km buffer around the study area

1.0 PREFACE

The Atlantic Canada Conservation Data Centre (AC CDC; www.accdc.com) is part of a network of NatureServe data centres and heritage programs serving 50 states in the U.S.A, 10 provinces and 1 territory in Canada, plus several Central and South American countries. The NatureServe network is more than 30 years old and shares a common conservation data methodology. The AC CDC was founded in 1997, and maintains data for the jurisdictions of New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. Although a non-governmental agency, the AC CDC is supported by 6 federal agencies and 4 provincial governments, as well as through outside grants and data processing fees.

Upon request and for a fee, the AC CDC queries its database and produces customized reports of the rare and endangered flora and fauna known to occur in or near a specified study area. As a supplement to that data, the AC CDC includes locations of managed areas with some level of protection, and known sites of ecological interest or sensitivity.

1.1 DATA LIST

Included datasets:

Filename	Contents
WhycocomaghNS_6755ob.xls	Rare or legally-protected Flora and Fauna in your study area
WhycocomaghNS_6755ob100km.xls	A list of Rare and legally protected Flora and Fauna within 100 km of your study area
WhycocomaghNS_6755ff_py.xls	Rare Freshwater Fish in your study area (DFO database)

1.2 RESTRICTIONS

The AC CDC makes a strong effort to verify the accuracy of all the data that it manages, but it shall not be held responsible for any inaccuracies in data that it provides. By accepting AC CDC data, recipients assent to the following limits of use:

a) Data is restricted to use by trained personnel who are sensitive to landowner interests and to potential threats to rare and/or endangered flora and fauna posed by the information provided.
b) Data is restricted to use by the specified Data User; any third party requiring data must make its own data request.
c) The AC CDC requires Data Users to cease using and delete data 12 months after receipt, and to make a new request for updated data if necessary at that time.
d) AC CDC data responses are restricted to the data in our Data System at the time of the data request.
e) Each record has an estimate of locational uncertainty, which must be referenced in order to understand the record's relevance to a particular location. Please see attached Data Dictionary for details.
f) AC CDC data responses are not to be construed as exhaustive inventories of taxa in an area.
g) The absence of a taxon cannot be inferred by its absence in an AC CDC data response.

1.3 ADDITIONAL INFORMATION

The accompanying Data Dictionary provides metadata for the data provided.

Please direct any additional questions about AC CDC data to the following individuals:

Plants, Lichens, Ranking Methods, All other Inquiries
Sean Blaney, Senior Scientist, Executive Director
Tel: (506) 364-2658
sean.blaney@accdc.ca

Animals (Fauna)
John Klymko, Zoologist
Tel: (506) 364-2660
john.klymko@accdc.ca

Plant Communities
Sarah Robinson, Community Ecologist
Tel: (506) 364-2664
sarah.robinson@accdc.ca

Data Management, GIS
James Churchill, Data Manager
Tel: (902) 679-6146
james.churchill@accdc.ca

Billing
Jean Breau
Tel: (506) 364-2657
jean.breau@accdc.ca

Questions on the biology of Federal Species at Risk can be directed to AC CDC: (506) 364-2658, with questions on Species at Risk regulations to: Samara Eaton, Canadian Wildlife Service (NB and PE): (506) 364-5060 or Julie McKnight, Canadian Wildlife Service (NS): (902) 426-4196.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in New Brunswick, please contact Hubert Askanas, Energy and Resource Development: (506) 453-5873.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in Nova Scotia, please contact Donna Hurlburt, NS DLF: (902) 679-6886. To determine if location-sensitive species (section 4.3) occur near your study site please contact a NS DLF Regional Biologist:

Western: Emma Vost
(902) 670-8187
Emma.Vost@novascotia.ca

Western: Sarah Spencer
(902) 541-0081
Sarah.Spencer@novascotia.ca

Central: Shavonne Meyer
(902) 893-0816
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Central: Kimberly George
(902) 890-1046
Kimberly.George@novascotia.ca

Eastern: Harrison Moore
(902) 497-4119
Harrison.Moore@novascotia.ca

Eastern: Maureen Cameron-MacMillan
(902) 295-2554
Maureen.Cameron-MacMillan@novascotia.ca

Eastern: Elizabeth Walsh
(902) 563-3370
Elizabeth.Walsh@novascotia.ca

For provincial information about rare taxa and protected areas, or information about game animals, fish habitat etc., in Prince Edward Island, please contact Garry Gregory, PEI Dept. of Communities, Land and Environment: (902) 569-7595.

2.0 RARE AND ENDANGERED SPECIES

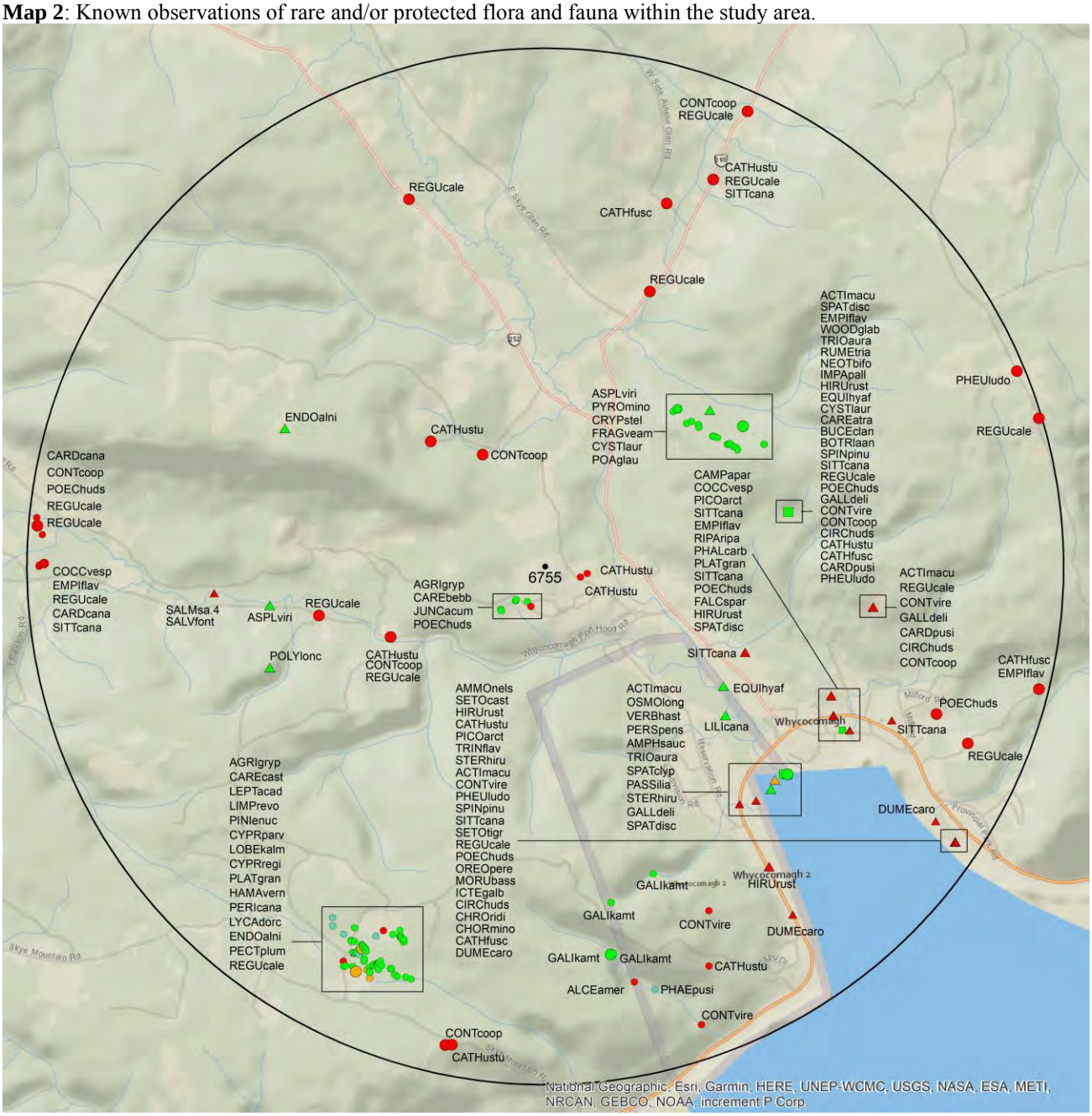
2.1 FLORA

The study area contains 133 records of 30 vascular and 9 records of 5 nonvascular flora (Map 2 and attached: *ob.xls).

2.2 FAUNA

The study area contains 144 records of 41 vertebrate and 7 records of 2 invertebrate fauna (Map 2 and attached data files - see 1.1 Data List). Please see section 4.3 to determine if "location-sensitive" species occur near your study site.

Map 2: Known observations of rare and/or protected flora and fauna within the study area.



RESOLUTION
- 4.7 within 50s of kilometers
- 4.0 within 10s of kilometers
- 3.7 within 5s of kilometers
- 3.0 within kilometers
- 2.7 within 500s of meters
- 2.0 within 100s of meters
- 1.7 within 10s of meters

HIGHER TAXON
- vertebrate fauna
- invertebrate fauna
- vascular flora
- nonvascular flora

3.0 SPECIAL AREAS

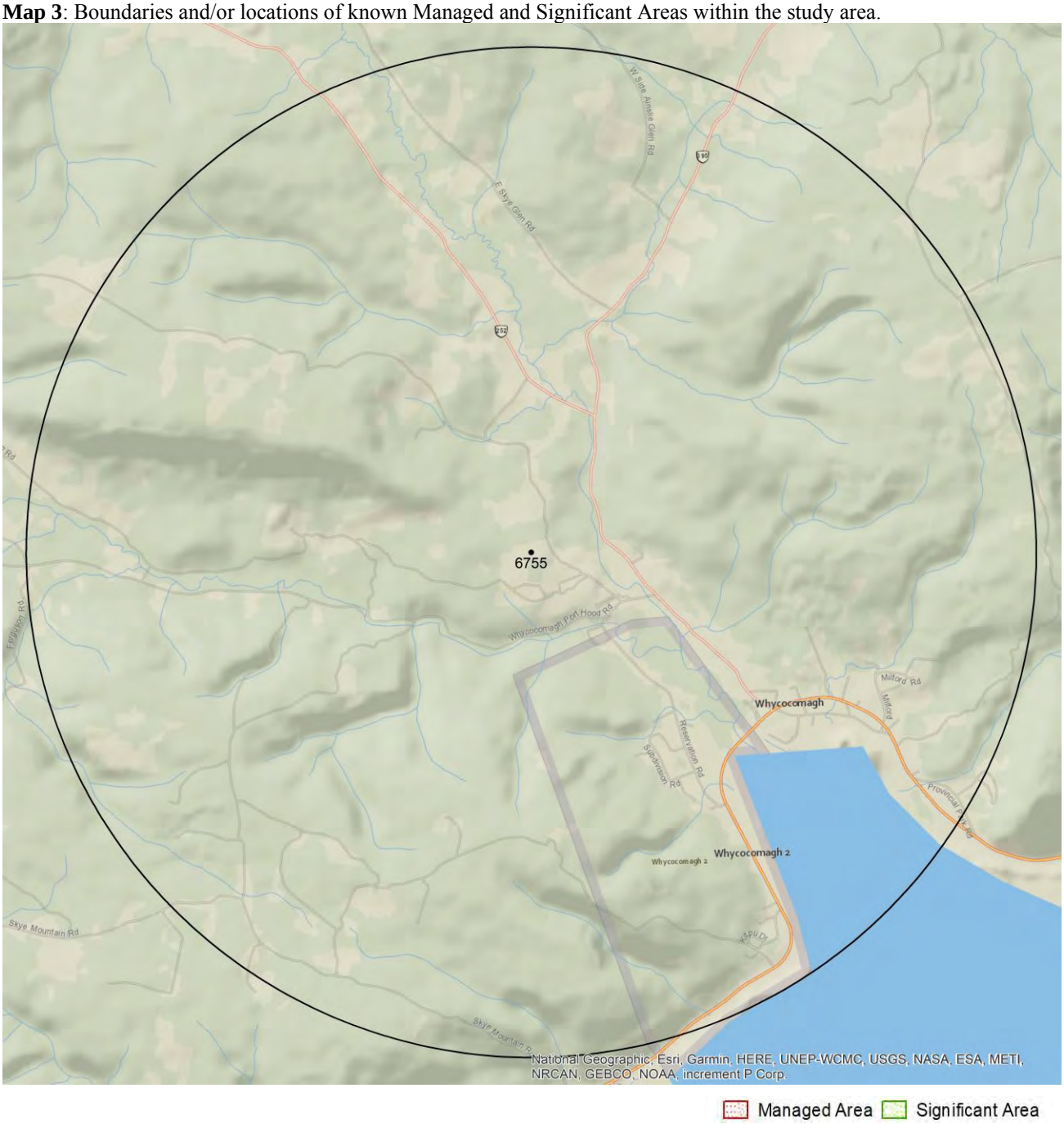
3.1 MANAGED AREAS

The GIS scan identified no managed areas in the vicinity of the study area (Map 3 and attached file: *ma*.xls).

3.2 SIGNIFICANT AREAS

The GIS scan identified no biologically significant sites in the vicinity of the study area (Map 3 and attached file: *sa*.xls).

Map 3: Boundaries and/or locations of known Managed and Significant Areas within the study area.



4.0 RARE SPECIES LISTS

Rare and/or endangered taxa (excluding “location-sensitive” species, section 4.3) within the study area listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (± the precision, in km, of the record). [P] = vascular plant, [N] = nonvascular plant, [A] = vertebrate animal, [I] = invertebrate animal, [C] = community. Note: records are from attached files *ob.xls/*ob.shp only.

4.1 FLORA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
N	*Pectenia plumbea*	Blue Felt Lichen	Special Concern	Special Concern	Vulnerable	S3	2	4.0 ± 0.0
N	*Hamatocaulis vernicosus*	a Moss				S1S2	1	4.2 ± 0.0
N	*Limprichtia revolvens*	a Moss				S2S3	3	3.9 ± 0.0
N	*Phaeophyscia pusilloides*	Pompom-tipped Shadow Lichen				S3?	1	4.2 ± 0.0
N	*Leptogium acadiense*	Acadian Jellyskin Lichen				S3S4	2	4.0 ± 0.0
P	*Cryptogramma stelleri*	Steller's Rockbrake				S1S2	10	1.9 ± 0.0
P	*Osmorhiza longistylis*	Smooth Sweet Cicely				S2	1	3.1 ± 10.0
P	*Impatiens pallida*	Pale Jewelweed				S2	2	2.4 ± 7.0
P	*Lobelia kalmii*	Brook Lobelia				S2	13	3.8 ± 0.0
P	*Rumex triangulivalvis*	Triangular-valve Dock				S2	1	2.4 ± 7.0
P	*Carex bebbii*	Bebb's Sedge				S2	1	0.4 ± 0.0
P	*Carex castanea*	Chestnut Sedge				S2	6	3.8 ± 0.0
P	*Carex atratiformis*	Scabrous Black Sedge				S2	1	2.4 ± 7.0
P	*Lilium canadense*	Canada Lily				S2	1	2.3 ± 1.0
P	*Cypripedium reginae*	Showy Lady's-Slipper				S2	16	3.8 ± 0.0
P	*Cystopteris laurentiana*	Laurentian Bladder Fern				S2	3	2.1 ± 0.0
P	*Polystichum lonchitis*	Northern Holly Fern				S2	1	2.8 ± 1.0
P	*Woodsia glabella*	Smooth Cliff Fern				S2	1	2.4 ± 7.0
P	*Triosteum aurantiacum*	Orange-fruited Tinker's Weed				S2S3	2	2.4 ± 7.0
P	*Cypripedium parviflorum*	Yellow Lady's-slipper				S2S3	4	4.1 ± 0.0
P	*Poa glauca*	Glaucous Blue Grass				S2S3	4	2.0 ± 0.0
P	*Botrychium lanceolatum ssp. angustisegmentum*	Narrow Triangle Moonwort				S2S3	1	2.4 ± 7.0
P	*Campanula aparinoides*	Marsh Bellflower				S3	1	3.3 ± 5.0
P	*Persicaria pensylvanica*	Pennsylvania Smartweed				S3	1	3.1 ± 3.0
P	*Pyrola minor*	Lesser Pyrola				S3	1	2.2 ± 2.0
P	*Endotropis alnifolia*	alder-leaved buckthorn				S3	13	2.8 ± 5.0
P	*Agrimonia gryposepala*	Hooked Agrimony				S3	3	0.4 ± 0.0
P	*Galium kamtschaticum*	Northern Wild Licorice				S3	4	3.1 ± 0.0
P	*Verbena hastata*	Blue Vervain				S3	1	3.1 ± 0.0
P	*Neottia bifolia*	Southern Twayblade				S3	1	2.4 ± 7.0
P	*Platanthera grandiflora*	Large Purple Fringed Orchid				S3	3	3.3 ± 5.0
P	*Asplenium viride*	Green Spleenwort				S3	12	1.9 ± 0.0
P	*Fragaria vesca ssp. americana*	Woodland Strawberry				S3S4	1	2.4 ± 0.0
P	*Juncus acuminatus*	Sharp-Fruit Rush				S3S4	2	0.4 ± 0.0
P	*Equisetum hyemale ssp. affine*	Common Scouring-rush				S3S4	2	2.1 ± 3.0

4.2 FAUNA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
A	*Salmo salar pop. 4*	Atlantic Salmon - Eastern Cape Breton pop.	Endangered			S1	1	3.2 ± 0.0
A	*Riparia riparia*	Bank Swallow	Threatened	Threatened	Endangered	S2S3B	2	3.3 ± 0.0
A	*Hirundo rustica*	Barn Swallow	Threatened	Threatened	Endangered	S2S3B	7	2.4 ± 7.0
A	*Cardellina canadensis*	Canada Warbler	Threatened	Threatened	Endangered	S3B	2	4.9 ± 0.0
A	*Chordeiles minor*	Common Nighthawk	Special Concern	Threatened	Threatened	S2B	1	4.8 ± 2.0
A	*Contopus cooperi*	Olive-sided Flycatcher	Special Concern	Threatened	Threatened	S2B	8	1.2 ± 0.0

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
A	*Contopus virens*	Eastern Wood-Pewee	Special Concern	Special Concern	Vulnerable	S3S4B	9	2.4 ± 7.0
A	*Coccothraustes vespertinus*	Evening Grosbeak	Special Concern	Special Concern	Vulnerable	S3S4B,S3N	2	3.3 ± 0.0
A	*Sterna hirundo*	Common Tern	Not At Risk			S3B	3	3.0 ± 0.0
A	*Circus hudsonius*	Northern Harrier	Not At Risk			S3S4B	4	2.4 ± 7.0
A	*Ammospiza nelsoni*	Nelson's Sparrow	Not At Risk			S3S4B	2	4.8 ± 1.0
A	*Alces americanus*	Moose			Endangered	S1	1	4.1 ± 0.0
A	*Spatula clypeata*	Northern Shoveler				S2B	1	3.0 ± 0.0
A	*Setophaga tigrina*	Cape May Warbler				S2B	1	4.8 ± 1.0
A	*Bucephala clangula*	Common Goldeneye				S2B,S5N	1	2.4 ± 7.0
A	*Phalacrocorax carbo*	Great Cormorant				S2S3	1	3.3 ± 0.0
A	*Spinus pinus*	Pine Siskin				S2S3	4	2.4 ± 7.0
A	*Pheucticus ludovicianus*	Rose-breasted Grosbeak				S2S3B	4	2.4 ± 7.0
A	*Icterus galbula*	Baltimore Oriole				S2S3B	1	4.8 ± 1.0
A	*Pinicola enucleator*	Pine Grosbeak				S2S3B,S5N	1	3.8 ± 0.0
A	*Perisoreus canadensis*	Canada Jay				S3	1	4.2 ± 0.0
A	*Poecile hudsonicus*	Boreal Chickadee				S3	9	0.4 ± 0.0
A	*Sitta canadensis*	Red-breasted Nuthatch				S3	10	2.1 ± 1.0
A	*Salvelinus fontinalis*	Brook Trout				S3	1	3.2 ± 0.0
A	*Falco sparverius*	American Kestrel				S3B	1	3.3 ± 0.0
A	*Gallinago delicata*	Wilson's Snipe				S3B	5	2.4 ± 7.0
A	*Dumetella carolinensis*	Gray Catbird				S3B	3	4.1 ± 0.0
A	*Cardellina pusilla*	Wilson's Warbler				S3B	2	2.4 ± 7.0
A	*Tringa flavipes*	Lesser Yellowlegs				S3M	1	4.8 ± 0.0
A	*Chroicocephalus ridibundus*	Black-headed Gull				S3N	1	4.8 ± 1.0
A	*Picoides arcticus*	Black-backed Woodpecker				S3S4	3	3.1 ± 1.0
A	*Spatula discors*	Blue-winged Teal				S3S4B	4	2.4 ± 7.0
A	*Actitis macularius*	Spotted Sandpiper				S3S4B	5	2.4 ± 7.0
A	*Empidonax flaviventris*	Yellow-bellied Flycatcher				S3S4B	4	2.4 ± 7.0
A	*Regulus calendula*	Ruby-crowned Kinglet				S3S4B	17	1.6 ± 0.0
A	*Catharus fuscescens*	Veery				S3S4B	5	2.4 ± 7.0
A	*Catharus ustulatus*	Swainson's Thrush				S3S4B	12	0.4 ± 0.0
A	*Oreothlypis peregrina*	Tennessee Warbler				S3S4B	1	4.8 ± 1.0
A	*Setophaga castanea*	Bay-breasted Warbler				S3S4B	1	4.8 ± 1.0
A	*Passerella iliaca*	Fox Sparrow				S3S4B	1	3.0 ± 0.0
A	*Morus bassanus*	Northern Gannet				SHB,S5M	1	4.8 ± 1.0
I	*Lycaena dorcas*	Dorcas Copper				S1?	6	4.1 ± 0.0
I	*Amphiagrion saucium*	Eastern Red Damsel				S3	1	3.0 ± 1.0

4.3 LOCATION SENSITIVE SPECIES

The Department of Natural Resources in each Maritimes province considers a number of species "location sensitive". Concern about exploitation of location-sensitive species precludes inclusion of precise coordinates in this report. Those intersecting your study area are indicated below with "YES".

Nova Scotia

Scientific *Name*	Common Name	SARA	Prov Legal Prot	Known within the Study Site?
Fraxinus nigra	Black Ash		Threatened	No
Emydoidea blandingii	*Blanding's Turtle - Nova Scotia pop.*	Endangered	Vulnerable	No
Glyptemys insculpta	**Wood Turtle**	**Threatened**	**Threatened**	**YES**
Falco peregrinus pop. 1	Peregrine Falcon - anatum/tundrius pop.	Special Concern	Vulnerable	No
Bat hibernaculum or bat species occurrence		**[Endangered][1]**	**[Endangered][1]**	**YES**

1 *Myotis lucifugus* (Little Brown Myotis), *Myotis septentrionalis* (Long-eared Myotis), and *Perimyotis subflavus* (Tri-colored Bat or Eastern Pipistrelle) are all Endangered under the Federal Species at Risk Act and the NS Endangered Species Act.

4.4 SOURCE BIBLIOGRAPHY

The recipient of these data shall acknowledge the AC CDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

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5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 27,464 records of 154 vertebrate and 614 records of 56 invertebrate fauna; 7285 records of 295 vascular and 1632 records of 152 nonvascular flora (attached: *ob100km.xls).

Taxa within 100 km of the study site that are rare and/or endangered in the province in which the study site occurs (including “location-sensitive” species). All ranks correspond to the province in which the study site falls, even for out-of-province records. Taxa are listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (± the precision, in km, of the record).

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Myotis lucifugus*	Little Brown Myotis	Endangered	Endangered	Endangered	S1	69	10.4 ± 0.0	NS
A	*Myotis septentrionalis*	Northern Long-eared Myotis	Endangered	Endangered	Endangered	S1	7	86.0 ± 0.0	PE
A	*Salmo salar pop. 4*	Atlantic Salmon - Eastern Cape Breton pop.	Endangered			S1	65	3.2 ± 0.0	NS
A	*Salmo salar pop. 6*	Altantic Salmon - Nova Scotia Southern Upland pop.	Endangered			S1	9	60.5 ± 1.0	NS
A	*Eubalaena glacialis*	North Atlantic Right Whale	Endangered	Endangered		S1	1	31.0 ± 1.0	NS
A	*Charadrius melodus melodus*	Piping Plover melodus ssp	Endangered	Endangered	Endangered	S1B	1068	22.2 ± 0.0	NS
A	*Sterna dougallii*	Roseate Tern	Endangered	Endangered	Endangered	S1B	13	79.8 ± 7.0	NS
A	*Dermochelys coriacea (Atlantic pop.)*	Leatherback Sea Turtle - Atlantic pop.	Endangered	Endangered		S1S2N	2	43.5 ± 0.0	NS
A	*Calidris canutus rufa*	Red Knot rufa ssp	Endangered	Endangered	Endangered	S2M	159	43.8 ± 7.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Rangifer tarandus pop. 2*	Woodland Caribou (Atlantic-Gasp├─sie pop.)	Endangered	Endangered	Extirpated	SX	1	94.3 ± 0.0	NS
A	*Antrostomus vociferus*	Eastern Whip-Poor-Will	Threatened	Threatened	Threatened	S1?B	3	28.1 ± 0.0	NS
A	*Catharus bicknelli*	Bicknell's Thrush	Threatened	Threatened	Endangered	S1S2B	224	33.7 ± 7.0	NS
A	*Limosa haemastica*	Hudsonian Godwit	Threatened			S1S2M	102	24.7 ± 20.0	NS
A	*Glyptemys insculpta*	Wood Turtle	Threatened	Threatened	Threatened	S2	157	2.8 ± 0.0	NS
A	*Acipenser oxyrinchus*	Atlantic Sturgeon	Threatened			S2	1	67.8 ± 0.0	NS
A	*Anguilla rostrata*	American Eel	Threatened			S2	12	6.9 ± 0.0	NS
A	*Chaetura pelagica*	Chimney Swift	Threatened	Threatened	Endangered	S2B,S1M	81	14.8 ± 0.0	NS
A	*Riparia riparia*	Bank Swallow	Threatened	Threatened	Endangered	S2S3B	1031	3.3 ± 0.0	NS
A	*Hirundo rustica*	Barn Swallow	Threatened	Threatened	Endangered	S2S3B	650	2.4 ± 7.0	NS
A	*Cardellina canadensis*	Canada Warbler	Threatened	Threatened	Endangered	S3B	354	4.9 ± 0.0	NS
A	*Dolichonyx oryzivorus*	Bobolink	Threatened	Threatened	Vulnerable	S3S4B	270	9.5 ± 0.0	NS
A	*Sturnella magna*	Eastern Meadowlark	Threatened	Threatened		SHB	2	79.8 ± 7.0	NS
A	*Hylocichla mustelina*	Wood Thrush	Threatened	Threatened		SUB	8	59.9 ± 0.0	NS
A	*Salmo salar pop. 12*	Atlantic Salmon - Gaspe - Southern Gulf of St Lawrence pop.	Special Concern			S1	24	13.3 ± 1.0	NS
A	*Passerculus sandwichensis princeps*	Savannah Sparrow princeps ssp	Special Concern	Special Concern		S1B	3	57.7 ± 0.0	NS
A	*Bucephala islandica (Eastern pop.)*	Barrow's Goldeneye - Eastern pop.	Special Concern	Special Concern		S1N	96	37.9 ± 4.0	NS
A	*Asio flammeus*	Short-eared Owl	Special Concern	Special Concern		S1S2B	8	31.6 ± 0.0	NS
A	*Euphagus carolinus*	Rusty Blackbird	Special Concern	Special Concern	Endangered	S2B	203	10.8 ± 7.0	NS
A	*Chordeiles minor*	Common Nighthawk	Special Concern	Threatened	Threatened	S2B	144	4.8 ± 2.0	NS
A	*Contopus cooperi*	Olive-sided Flycatcher	Special Concern	Threatened	Threatened	S2B	642	1.2 ± 0.0	NS
A	*Histrionicus histrionicus pop. 1*	Harlequin Duck - Eastern pop.	Special Concern	Special Concern	Endangered	S2N	56	52.0 ± 7.0	NS
A	*Balaenoptera physalus*	Fin Whale	Special Concern	Special Concern		S2S3	3	64.1 ± 0.0	NS
A	*Phalaropus lobatus*	Red-necked Phalarope	Special Concern	Special Concern		S2S3M	1	99.4 ± 0.0	NS
A	*Morone saxatilis pop. 1*	Striped Bass- Southern Gulf of St Lawrence pop.	Special Concern			S2S3N	1	71.1 ± 1.0	NS
A	*Chelydra serpentina*	Snapping Turtle	Special Concern	Special Concern	Vulnerable	S3	119	24.3 ± 0.0	NS
A	*Contopus virens*	Eastern Wood-Pewee	Special Concern	Special Concern	Vulnerable	S3S4B	241	2.4 ± 7.0	NS
A	*Coccothraustes vespertinus*	Evening Grosbeak	Special Concern	Special Concern	Vulnerable	S3S4B,S3N	536	3.3 ± 0.0	NS
A	*Phocoena phocoena pop. 1*	Harbour Porpoise - Northwest Atlantic pop.	Special Concern			S4	5	43.5 ± 0.0	NS
A	*Podiceps auritus*	Horned Grebe	Special Concern	Special Concern		S4N	13	43.1 ± 10.0	NS
A	*Chrysemys picta picta*	Eastern Painted Turtle	Special Concern			S4S5	1	89.5 ± 1.0	NS
A	*Ammodramus savannarum pratensis*	Grasshopper Sparrow, pratensis subspecies	Special Concern	Special Concern			1	44.6 ± 4.0	NS
A	*Lynx canadensis*	Canadian Lynx	Not At Risk		Endangered	S1	147	14.4 ± 1.0	NS
A	*Accipiter cooperii*	Cooper's Hawk	Not At Risk			S1?B	3	73.1 ± 7.0	NS
A	*Fulica americana*	American Coot	Not At Risk			S1B	14	27.6 ± 0.0	NS
A	*Chlidonias niger*	Black Tern	Not At Risk			S1B	2	60.0 ± 0.0	NS
A	*Falco peregrinus pop. 1*	Peregrine Falcon - anatum/tundrius	Not At Risk	Special Concern	Vulnerable	S1B,SNAM	7	31.3 ± 0.0	NS
A	*Sorex dispar*	Long-tailed Shrew	Not At Risk			S2	18	10.3 ± 1.0	NS
A	*Aegolius funereus*	Boreal Owl	Not At Risk			S2?B	12	38.3 ± 7.0	NS
A	*Globicephala melas*	Long-finned Pilot Whale	Not At Risk			S2S3	10	71.8 ± 14.0	NS
A	*Hemidactylium scutatum*	Four-toed Salamander	Not At Risk			S3	18	22.6 ± 1.0	NS
A	*Megaptera novaeangliae*	Humpback Whale (NW Atlantic pop.)	Not At Risk			S3	3	43.0 ± 0.0	NS
A	*Sterna hirundo*	Common Tern	Not At Risk			S3B	696	3.0 ± 0.0	NS
A	*Sialia sialis*	Eastern Bluebird	Not At Risk			S3B	14	37.8 ± 7.0	NS
A	*Buteo lagopus*	Rough-legged Hawk	Not At Risk			S3N	10	5.3 ± 0.0	NS
A	*Accipiter gentilis*	Northern Goshawk	Not At Risk			S3S4	91	8.1 ± 0.0	NS
A	*Lagenorhynchus acutus*	Atlantic White-sided Dolphin	Not At Risk			S3S4	6	42.8 ± 0.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Circus hudsonius*	Northern Harrier	Not At Risk			S3S4B	289	2.4 ± 7.0	NS
A	*Ammospiza nelsoni*	Nelson's Sparrow	Not At Risk			S3S4B	109	4.8 ± 1.0	NS
A	*Morone saxatilis*	Striped Bass	E,SC			S2S3	8	28.7 ± 3.0	NS
A	*Martes americana*	American Marten			Endangered	S1	30	10.1 ± 1.0	NS
A	*Alces americanus*	Moose			Endangered	S1	22	4.1 ± 0.0	NS
A	*Picoides dorsalis*	American Three-toed Woodpecker				S1?	8	7.4 ± 0.0	NS
A	*Passerina cyanea*	Indigo Bunting				S1?B	9	58.4 ± 7.0	NS
A	*Uria aalge*	Common Murre				S1?B,S5N	17	43.5 ± 0.0	NS
A	*Nycticorax nycticorax*	Black-crowned Night-heron				S1B	2	33.6 ± 1.0	NS
A	*Anas acuta*	Northern Pintail				S1B	24	45.3 ± 0.0	NS
A	*Oxyura jamaicensis*	Ruddy Duck				S1B	9	36.6 ± 4.0	NS
A	*Haematopus palliatus*	American Oystercatcher				S1B	7	70.6 ± 7.0	NS
A	*Myiarchus crinitus*	Great Crested Flycatcher				S1B	1	27.4 ± 3.0	NS
A	*Mimus polyglottos*	Northern Mockingbird				S1B	22	29.6 ± 7.0	NS
A	*Toxostoma rufum*	Brown Thrasher				S1B	3	60.5 ± 0.0	NS
A	*Vireo gilvus*	Warbling Vireo				S1B	7	30.5 ± 7.0	NS
A	*Setophaga pinus*	Pine Warbler				S1B	5	44.0 ± 0.0	NS
A	*Calidris minutilla*	Least Sandpiper				S1B,S3M	304	24.8 ± 5.0	NS
A	*Charadrius semipalmatus*	Semipalmated Plover				S1B,S3S4M	514	20.2 ± 1.0	NS
A	*Vespertilionidae sp.*	bat species				S1S2	137	4.5 ± 0.0	NS
A	*Pluvialis dominica*	American Golden-Plover				S1S2M	108	43.8 ± 1.0	NS
A	*Microtus chrotorrhinus*	Rock Vole				S2	26	10.3 ± 1.0	NS
A	*Vireo philadelphicus*	Philadelphia Vireo				S2?B	17	17.8 ± 0.0	NS
A	*Spatula clypeata*	Northern Shoveler				S2B	12	3.0 ± 0.0	NS
A	*Mareca strepera*	Gadwall				S2B	9	61.9 ± 7.0	NS
A	*Empidonax traillii*	Willow Flycatcher				S2B	5	63.3 ± 0.0	NS
A	*Setophaga tigrina*	Cape May Warbler				S2B	82	4.8 ± 1.0	NS
A	*Piranga olivacea*	Scarlet Tanager				S2B	10	8.0 ± 0.0	NS
A	*Pooecetes gramineus*	Vesper Sparrow				S2B	12	30.5 ± 7.0	NS
A	*Molothrus ater*	Brown-headed Cowbird				S2B	42	20.8 ± 1.0	NS
A	*Alca torda*	Razorbill				S2B,S4N	115	27.8 ± 0.0	NS
A	*Bucephala clangula*	Common Goldeneye				S2B,S5N	262	2.4 ± 7.0	NS
A	*Branta bernicla*	Brant				S2M	9	68.4 ± 16.0	NS
A	*Phalacrocorax carbo*	Great Cormorant				S2S3	685	3.3 ± 0.0	NS
A	*Asio otus*	Long-eared Owl				S2S3	23	38.3 ± 7.0	NS
A	*Spinus pinus*	Pine Siskin				S2S3	643	2.4 ± 7.0	NS
A	*Cathartes aura*	Turkey Vulture				S2S3B	14	20.6 ± 0.0	NS
A	*Rallus limicola*	Virginia Rail				S2S3B	6	40.6 ± 7.0	NS
A	*Tringa semipalmata*	Willet				S2S3B	624	15.6 ± 7.0	NS
A	*Petrochelidon pyrrhonota*	Cliff Swallow				S2S3B	180	9.3 ± 1.0	NS
A	*Pheucticus ludovicianus*	Rose-breasted Grosbeak				S2S3B	165	2.4 ± 7.0	NS
A	*Icterus galbula*	Baltimore Oriole				S2S3B	23	4.8 ± 1.0	NS
A	*Pinicola enucleator*	Pine Grosbeak				S2S3B,S5N	207	3.8 ± 0.0	NS
A	*Numenius phaeopus hudsonicus*	Hudsonian Whimbrel				S2S3M	143	29.7 ± 0.0	NS
A	*Calidris melanotos*	Pectoral Sandpiper				S2S3M	98	43.8 ± 1.0	NS
A	*Phalaropus fulicarius*	Red Phalarope				S2S3M	1	78.3 ± 0.0	NS
A	*Perisoreus canadensis*	Canada Jay				S3	467	4.2 ± 0.0	NS
A	*Poecile hudsonicus*	Boreal Chickadee				S3	1002	0.4 ± 0.0	NS
A	*Sitta canadensis*	Red-breasted Nuthatch				S3	1278	2.1 ± 1.0	NS
A	*Alosa pseudoharengus*	Alewife				S3	50	8.7 ± 0.0	NS
A	*Salvelinus fontinalis*	Brook Trout				S3	77	3.2 ± 0.0	NS
A	*Menidia menidia*	Atlantic Silverside				S3	2	42.6 ± 0.0	NS
A	*Synaptomys cooperi*	Southern Bog Lemming				S3	10	10.3 ± 1.0	NS
A	*Pekania pennanti*	Fisher				S3	7	35.8 ± 0.0	NS
A	*Calidris maritima*	Purple Sandpiper				S3?N	44	44.9 ± 10.0	NS
A	*Calcarius lapponicus*	Lapland Longspur				S3?N	12	65.7 ± 0.0	NS

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A	*Falco sparverius*	American Kestrel				S3B	283	3.3 ± 0.0	NS
A	*Charadrius vociferus*	Killdeer				S3B	219	9.8 ± 7.0	NS
A	*Gallinago delicata*	Wilson's Snipe				S3B	478	2.4 ± 7.0	NS
A	*Sterna paradisaea*	Arctic Tern				S3B	117	28.4 ± 0.0	NS
A	*Coccyzus erythropthalmus*	Black-billed Cuckoo				S3B	24	12.2 ± 7.0	NS
A	*Tyrannus tyrannus*	Eastern Kingbird				S3B	90	12.4 ± 7.0	NS
A	*Dumetella carolinensis*	Gray Catbird				S3B	153	4.1 ± 0.0	NS
A	*Cardellina pusilla*	Wilson's Warbler				S3B	104	2.4 ± 7.0	NS
A	*Tringa melanoleuca*	Greater Yellowlegs				S3B,S3S4M	609	6.7 ± 0.0	NS
A	*Oceanodroma leucorhoa*	Leach's Storm-Petrel				S3B,S5M	16	43.9 ± 0.0	NS
A	*Rissa tridactyla*	Black-legged Kittiwake				S3B,S5N	95	24.7 ± 0.0	NS
A	*Fratercula arctica*	Atlantic Puffin				S3B,S5N	106	24.7 ± 1.0	NS
A	*Pluvialis squatarola*	Black-bellied Plover				S3M	544	22.6 ± 0.0	NS
A	*Tringa flavipes*	Lesser Yellowlegs				S3M	342	4.8 ± 0.0	NS
A	*Arenaria interpres*	Ruddy Turnstone				S3M	227	22.4 ± 0.0	NS
A	*Calidris pusilla*	Semipalmated Sandpiper				S3M	395	11.8 ± 32.0	NS
A	*Calidris fuscicollis*	White-rumped Sandpiper				S3M	210	43.8 ± 1.0	NS
A	*Limnodromus griseus*	Short-billed Dowitcher				S3M	233	43.8 ± 22.0	NS
A	*Calidris alba*	Sanderling				S3M,S2N	280	29.4 ± 0.0	NS
A	*Chroicocephalus ridibundus*	Black-headed Gull				S3N	173	4.8 ± 1.0	NS
A	*Somateria mollissima*	Common Eider				S3S4	562	24.7 ± 40.0	NS
A	*Picoides arcticus*	Black-backed Woodpecker				S3S4	89	3.1 ± 1.0	NS
A	*Loxia curvirostra*	Red Crossbill				S3S4	57	6.0 ± 0.0	NS
A	*Sorex palustris*	American Water Shrew				S3S4	7	77.0 ± 1.0	NS
A	*Botaurus lentiginosus*	American Bittern				S3S4B	123	10.7 ± 0.0	NS
A	*Spatula discors*	Blue-winged Teal				S3S4B	122	2.4 ± 7.0	NS
A	*Actitis macularius*	Spotted Sandpiper				S3S4B	759	2.4 ± 7.0	NS
A	*Empidonax flaviventris*	Yellow-bellied Flycatcher				S3S4B	719	2.4 ± 7.0	NS
A	*Regulus calendula*	Ruby-crowned Kinglet				S3S4B	1746	1.6 ± 0.0	NS
A	*Catharus fuscescens*	Veery				S3S4B	207	2.4 ± 7.0	NS
A	*Catharus ustulatus*	Swainson's Thrush				S3S4B	1151	0.4 ± 0.0	NS
A	*Oreothlypis peregrina*	Tennessee Warbler				S3S4B	170	4.8 ± 1.0	NS
A	*Setophaga castanea*	Bay-breasted Warbler				S3S4B	209	4.8 ± 1.0	NS
A	*Setophaga striata*	Blackpoll Warbler				S3S4B	215	12.2 ± 7.0	NS
A	*Passerella iliaca*	Fox Sparrow				S3S4B	302	3.0 ± 0.0	NS
A	*Mergus serrator*	Red-breasted Merganser				S3S4B,S5N	224	15.6 ± 7.0	NS
A	*Bucephala albeola*	Bufflehead				S3S4N	354	17.2 ± 0.0	NS
A	*Lanius borealis*	Northern Shrike				S3S4N	17	24.8 ± 0.0	NS
A	*Leucophaeus atricilla*	Laughing Gull				SHB	7	51.5 ± 0.0	NS
A	*Eremophila alpestris*	Horned Lark				SHB,S4S5N	10	76.9 ± 0.0	NS
A	*Morus bassanus*	Northern Gannet				SHB,S5M	260	4.8 ± 1.0	NS
A	*Aythya americana*	Redhead				SHB,SNAM	22	72.4 ± 0.0	NS
I	*Danaus plexippus*	Monarch	Endangered	Special Concern	Endangered	S2B	41	10.8 ± 0.0	NS
I	*Lampsilis cariosa*	Yellow Lampmussel	Special Concern	Special Concern	Threatened	S1	40	65.7 ± 0.0	NS
I	*Alasmidonta varicosa*	Brook Floater	Special Concern	Special Concern	Threatened	S1S2	4	74.3 ± 0.0	NS
I	*Bombus terricola*	Yellow-banded Bumblebee	Special Concern	Special Concern	Vulnerable	S3	32	20.4 ± 0.0	NS
I	*Quedius spelaeus*	Spelean Rove Beetle				S1	1	67.9 ± 1.0	NS
I	*Papilio brevicauda bretonensis*	Short-tailed Swallowtail				S1	15	33.3 ± 2.0	NS
I	*Somatochlora albicincta*	Ringed Emerald				S1	7	67.5 ± 0.0	NS
I	*Somatochlora brevicincta*	Quebec Emerald				S1	7	97.7 ± 0.0	NS
I	*Leucorrhinia patricia*	Canada Whiteface				S1	1	70.6 ± 0.0	NS
I	*Coenagrion interrogatum*	Subarctic Bluet				S1	2	49.3 ± 0.0	NS
I	*Leptodea ochracea*	Tidewater Mucket				S1	19	64.7 ± 1.0	NS
I	*Lycaena dorcas*	Dorcas Copper				S1?	30	4.1 ± 0.0	NS
I	*Polygonia satyrus*	Satyr Comma				S1?	3	26.1 ± 2.0	NS
I	*Strymon melinus*	Grey Hairstreak				S1S2	2	42.7 ± 1.0	NS
I	*Nymphalis l-album*	Compton Tortoiseshell				S1S2	1	37.6 ± 2.0	NS

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I	*Coenagrion resolutum*	Taiga Bluet				S1S2	1	92.8 ± 1.0	PE
I	*Haematopota rara*	Shy Cleg				S1S3	2	56.8 ± 0.0	NS
I	*Lycaena hyllus*	Bronze Copper				S2	2	75.3 ± 0.0	NS
I	*Lycaena dospassosi*	Salt Marsh Copper				S2	1	21.7 ± 0.0	NS
I	*Boloria chariclea*	Arctic Fritillary				S2	5	37.1 ± 0.0	NS
I	*Aglais milberti*	Milbert's Tortoiseshell				S2	4	33.9 ± 2.0	NS
I	*Somatochlora septentrionalis*	Muskeg Emerald				S2	26	29.2 ± 0.0	NS
I	*Somatochlora williamsoni*	Williamson's Emerald				S2	10	35.5 ± 0.0	NS
I	*Margaritifera margaritifera*	Eastern Pearlshell				S2	100	15.5 ± 0.0	NS
I	*Pantala hymenaea*	Spot-Winged Glider				S2?B	2	35.5 ± 0.0	NS
I	*Thorybes pylades*	Northern Cloudywing				S2S3	10	14.2 ± 0.0	NS
I	*Amblyscirtes hegon*	Pepper and Salt Skipper				S2S3	1	15.8 ± 1.0	NS
I	*Euphydryas phaeton*	Baltimore Checkerspot				S2S3	25	27.9 ± 2.0	NS
I	*Gomphus descriptus*	Harpoon Clubtail				S2S3	16	10.9 ± 0.0	NS
I	*Ophiogomphus aspersus*	Brook Snaketail				S2S3	5	14.6 ± 0.0	NS
I	*Ophiogomphus mainensis*	Maine Snaketail				S2S3	1	89.7 ± 0.0	NS
I	*Somatochlora forcipata*	Forcipate Emerald				S2S3	9	26.2 ± 1.0	NS
I	*Alasmidonta undulata*	Triangle Floater				S2S3	5	52.4 ± 0.0	NS
I	*Naemia seriata*	a Ladybird beetle				S3	1	76.8 ± 0.0	NS
I	*Iphthiminus opacus*	a Darkling Beetle				S3	2	9.7 ± 0.0	NS
I	*Monochamus marmorator*	a Longhorned Beetle				S3	1	74.5 ± 0.0	NS
I	*Callophrys henrici*	Henry's Elfin				S3	2	97.4 ± 0.0	NS
I	*Speyeria aphrodite*	Aphrodite Fritillary				S3	6	16.2 ± 2.0	NS
I	*Polygonia faunus*	Green Comma				S3	15	14.4 ± 0.0	NS
I	*Megisto cymela*	Little Wood-satyr				S3	1	26.8 ± 1.0	NS
I	*Oeneis jutta*	Jutta Arctic				S3	13	15.0 ± 0.0	NS
I	*Aeshna clepsydra*	Mottled Darner				S3	1	38.9 ± 0.0	NS
I	*Boyeria grafiana*	Ocellated Darner				S3	2	77.4 ± 0.0	NS
I	*Gomphaeschna furcillata*	Harlequin Darner				S3	3	10.9 ± 0.0	NS
I	*Somatochlora tenebrosa*	Clamp-Tipped Emerald				S3	2	45.8 ± 0.0	NS
I	*Nannothemis bella*	Elfin Skimmer				S3	3	30.9 ± 0.0	NS
I	*Sympetrum danae*	Black Meadowhawk				S3	17	27.8 ± 1.0	NS
I	*Enallagma vernale*	Vernal Bluet				S3	8	10.9 ± 0.0	NS
I	*Amphiagrion saucium*	Eastern Red Damsel				S3	23	3.0 ± 1.0	NS
I	*Polygonia interrogationis*	Question Mark				S3B	17	33.9 ± 2.0	NS
I	*Lepturopsis biforis*	a Longhorned Beetle				S3S4	1	93.9 ± 0.0	NS
I	*Erynnis juvenalis*	Juvenal's Duskywing				S3S4	1	76.1 ± 1.0	NS
I	*Amblyscirtes vialis*	Common Roadside-Skipper				S3S4	4	78.8 ± 0.0	NS
I	*Polygonia progne*	Grey Comma				S3S4	22	12.1 ± 0.0	NS
I	*Lanthus parvulus*	Northern Pygmy Clubtail				S3S4	24	26.2 ± 1.0	NS
I	*Lampsilis radiata*	Eastern Lampmussel				S3S4	15	15.2 ± 0.0	NS
N	*Erioderma pedicellatum (Atlantic pop.)*	Boreal Felt Lichen - Atlantic pop.	Endangered	Endangered	Endangered	S1	290	15.6 ± 0.0	NS
N	*Peltigera hydrothyria*	Eastern Waterfan	Threatened	Threatened	Threatened	S1	2	41.9 ± 0.0	NS
N	*Pannaria lurida*	Wrinkled Shingle Lichen	Threatened	Threatened	Threatened	S1S2	1	51.2 ± 0.0	NS
N	*Fuscopannaria leucosticta*	White-rimmed Shingle Lichen	Threatened			S2S3	1	61.4 ± 0.0	NS
N	*Anzia colpodes*	Black-foam Lichen	Threatened	Threatened	Threatened	S3	1	83.0 ± 1.0	NS
N	*Sclerophora peronella (Atlantic pop.)*	Frosted Glass-whiskers (Atlantic population)	Special Concern	Special Concern		S1?	10	37.6 ± 1.0	NS
N	*Pectenia plumbea*	Blue Felt Lichen	Special Concern	Special Concern	Vulnerable	S3	116	4.0 ± 0.0	NS
N	*Fissidens exilis*	Pygmy Pocket Moss	Not At Risk			S1S2	6	17.7 ± 0.0	NS
N	*Pseudevernia cladonia*	Ghost Antler Lichen	Not At Risk			S2S3	1	89.7 ± 0.0	NS
N	*Cinclidium stygium*	Sooty Cupola Moss				S1	2	9.4 ± 0.0	NS
N	*Cladonia brevis*	Short Peg Lichen				S1	1	57.9 ± 0.0	NS
N	*Collema cristatum*	Fingered Tarpaper Lichen				S1	1	22.5 ± 0.0	NS
N	*Peltigera lepidophora*	Scaly Pelt Lichen				S1	2	23.3 ± 0.0	NS
N	*Cetraria laevigata*	Pin-striped Icelandmoss				S1	3	87.6 ± 0.0	NS

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		Lichen							
N	*Gowardia nigricans*	Gray Witch's Beard Lichen				S1	1	85.8 ± 1.0	NS
N	*Hypogymnia hultenii*	Powdered Honeycomb Lichen				S1	1	91.8 ± 0.0	NS
N	*Metacalypogeia schusterana*	Schuster's Pouchwort				S1?	2	40.4 ± 0.0	NS
N	*Moerckia hibernica*	Irish Ruffwort				S1?	2	40.4 ± 0.0	NS
N	*Brachythecium erythrorrhizon*	Taiga Ragged Moss				S1?	4	40.0 ± 0.0	NS
N	*Calliergon richardsonii*	Richardson's Spear Moss				S1?	1	88.9 ± 0.0	NS
N	*Campylostelium saxicola*	a Moss				S1?	1	99.9 ± 0.0	PE
N	*Conardia compacta*	Coast Creeping Moss				S1?	2	15.7 ± 2.0	NS
N	*Entodon concinnus*	Lime Entodon Moss				S1?	2	83.5 ± 0.0	NS
N	*Grimmia laevigata*	a Moss				S1?	2	77.7 ± 0.0	NS
N	*Grimmia pilifera*	a Moss				S1?	2	83.5 ± 0.0	NS
N	*Hygrohypnum smithii*	Smith's Brook Moss				S1?	1	83.6 ± 0.0	NS
N	*Oligotrichum hercynicum*	Hercynian Hair Moss				S1?	3	55.8 ± 0.0	NS
N	*Orthothecium strictum*	Shiny Erect-capsule Moss				S1?	2	83.5 ± 0.0	NS
N	*Paludella squarrosa*	Tufted Fen Moss				S1?	1	32.6 ± 5.0	NS
N	*Seligeria recurvata*	a Moss				S1?	1	98.7 ± 1.0	NS
N	*Seligeria tristichoides*	a Moss				S1?	1	98.7 ± 1.0	NS
N	*Timmia norvegica*	a moss				S1?	1	92.1 ± 50.0	NS
N	*Syntrichia ruralis*	a Moss				S1?	1	60.8 ± 1.0	NS
N	*Ulota curvifolia*	a Moss				S1?	1	77.7 ± 0.0	NS
N	*Plagiomnium ellipticum*	Marsh Leafy Moss				S1?	1	83.1 ± 2.0	NS
N	*Flavocetraria nivalis*	Crinkled Snow Lichen				S1?	18	66.5 ± 0.0	NS
N	*Polychidium muscicola*	Eyed Mossthorns Woollybear Lichen				S1?	1	53.1 ± 0.0	NS
N	*Parmeliella parvula*	Poor-man's Shingles Lichen				S1?	7	54.1 ± 0.0	NS
N	*Buxbaumia minakatae*	Hump-Backed Elves				S1S2	1	37.3 ± 100.0	NS
N	*Dicranodontium denudatum*	Beaked Bow Moss				S1S2	2	83.5 ± 0.0	NS
N	*Dicranoweisia crispula*	Mountain Thatch Moss				S1S2	1	74.6 ± 0.0	NS
N	*Didymodon ferrugineus*	a moss				S1S2	2	96.2 ± 0.0	NS
N	*Mnium thomsonii*	Thomson's Leafy Moss				S1S2	2	96.2 ± 0.0	NS
N	*Plagiobryum zieri*	a Moss				S1S2	6	83.5 ± 0.0	NS
N	*Platydictya confervoides*	a Moss				S1S2	1	64.7 ± 3.0	NS
N	*Seligeria calcarea*	Chalk Brittle Moss				S1S2	2	96.2 ± 0.0	NS
N	*Sphagnum platyphyllum*	Flat-leaved Peat Moss				S1S2	4	19.4 ± 0.0	NS
N	*Tetrodontium brownianum*	Little Georgia				S1S2	1	99.9 ± 0.0	PE
N	*Hamatocaulis vernicosus*	a Moss				S1S2	2	4.2 ± 0.0	NS
N	*Schistidium trichodon*	a Moss				S1S2	2	96.2 ± 0.0	NS
N	*Collema bachmanianum*	Bachman's Tarpaper Lichen				S1S2	1	26.6 ± 0.0	NS
N	*Peltigera malacea*	Veinless Pelt Lichen				S1S2	1	98.2 ± 3.0	NS
N	*Barbilophozia lycopodioides*	Greater Pawwort				S1S3	1	51.9 ± 0.0	NS
N	*Odontoschisma sphagni*	Bog-Moss Flapwort				S1S3	1	66.6 ± 0.0	NS
N	*Cladonia rappii*	Slender Ladder Lichen				S1S3	1	99.4 ± 3.0	NS
N	*Peltigera neckeri*	Black-saddle Pelt Lichen				S1S3	1	78.3 ± 0.0	NS
N	*Stereocaulon grande*	Grand Foam Lichen				S1S3	1	58.5 ± 0.0	NS
N	*Anaptychia crinalis*	Hanging Fringed Lichen				S2	5	78.0 ± 0.0	NS
N	*Anacamptodon splachnoides*	a Moss				S2?	2	51.1 ± 0.0	NS
N	*Anomodon viticulosus*	a Moss				S2?	8	17.7 ± 0.0	NS
N	*Atrichum angustatum*	Lesser Smoothcap Moss				S2?	3	43.9 ± 30.0	NS
N	*Campylium polygamum*	a Moss				S2?	2	43.5 ± 0.0	NS
N	*Campylium radicale*	Long-stalked Fine Wet Moss				S2?	1	12.0 ± 0.0	NS
N	*Dicranum condensatum*	Condensed Broom Moss				S2?	2	84.9 ± 0.0	PE
N	*Fissidens taxifolius*	Yew-leaved Pocket Moss				S2?	2	17.7 ± 0.0	NS
N	*Fontinalis hypnoides*	a moss				S2?	2	85.2 ± 1.0	NS
N	*Fontinalis sullivantii*	a Moss				S2?	1	37.3 ± 100.0	NS
N	*Grimmia anomala*	Mountain Forest Grimmia				S2?	3	52.1 ± 0.0	NS

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N	*Kiaeria starkei*	Starke's Fork Moss				S2?	1	98.7 ± 1.0	NS
N	*Orthotrichum anomalum*	Anomalous Bristle Moss				S2?	1	77.7 ± 0.0	NS
N	*Philonotis marchica*	a Moss				S2?	3	59.8 ± 0.0	NS
N	*Platydictya jungermannioides*	False Willow Moss				S2?	6	17.7 ± 0.0	NS
N	*Pohlia sphagnicola*	a moss				S2?	1	81.0 ± 0.0	NS
N	*Pseudoleskea patens*	Patent Leskea Moss				S2?	4	94.3 ± 0.0	NS
N	*Pseudoleskea stenophylla*	Narrow-leaved Leskea Moss				S2?	6	92.8 ± 1.0	NS
N	*Rhytidium rugosum*	Wrinkle-leaved Moss				S2?	4	82.4 ± 0.0	NS
N	*Scorpidium scorpioides*	Hooked Scorpion Moss				S2?	11	12.0 ± 0.0	NS
N	*Seligeria donniana*	Donian Beardless Moss				S2?	3	94.7 ± 2.0	NS
N	*Sematophyllum marylandicum*	a Moss				S2?	4	83.1 ± 0.0	NS
N	*Sphagnum subnitens*	Lustrous Peat Moss				S2?	2	47.9 ± 0.0	NS
N	*Tetraplodon angustatus*	Toothed-leaved Nitrogen Moss				S2?	3	53.6 ± 0.0	NS
N	*Tortella fragilis*	Fragile Twisted Moss				S2?	11	15.2 ± 0.0	NS
N	*Anomobryum filiforme*	a moss				S2?	5	82.4 ± 0.0	NS
N	*Cyrtomnium hymenophylloides*	Short-pointed Lantern Moss				S2?	6	37.7 ± 0.0	NS
N	*Platylomella lescurii*	a Moss				S2?	1	83.2 ± 1.0	NS
N	*Leptogium teretiusculum*	Beaded Jellyskin Lichen				S2?	2	68.1 ± 0.0	NS
N	*Cladonia labradorica*	Labrador Lichen				S2?	1	89.0 ± 0.0	NS
N	*Leptogium imbricatum*	Scaly Jellyskin Lichen				S2?	1	29.6 ± 0.0	NS
N	*Nephroma arcticum*	Arctic Kidney Lichen				S2?	10	42.6 ± 0.0	NS
N	*Peltigera collina*	Tree Pelt Lichen				S2?	26	19.5 ± 0.0	NS
N	*Platydictya subtilis*	Bark Willow Moss				S2S3	1	94.3 ± 0.0	NS
N	*Tetraplodon mnioides*	Entire-leaved Nitrogen Moss				S2S3	10	75.4 ± 0.0	NS
N	*Limprichtia revolvens*	a Moss				S2S3	7	3.9 ± 0.0	NS
N	*Collema leptaleum*	Crumpled Bat's Wing Lichen				S2S3	1	85.4 ± 0.0	NS
N	*Solorina saccata*	Woodland Owl Lichen				S2S3	7	41.9 ± 0.0	NS
N	*Usnocetraria oakesiana*	Yellow Band Lichen				S2S3	1	98.4 ± 0.0	PE
N	*Cetraria muricata*	Spiny Heath Lichen				S2S3	26	50.9 ± 0.0	NS
N	*Cladonia wainioi*	False Reindeer Lichen				S2S3	8	72.9 ± 0.0	NS
N	*Leptogium tenuissimum*	Birdnest Jellyskin Lichen				S2S3	13	23.3 ± 0.0	NS
N	*Melanelia hepatizon*	Rimmed Camouflage Lichen				S2S3	2	86.3 ± 0.0	NS
N	*Racodium rupestre*	Rockhair Lichen				S2S3	1	98.5 ± 0.0	NS
N	*Umbilicaria hyperborea*	Blistered Rocktripe Lichen				S2S3	3	86.3 ± 0.0	NS
N	*Umbilicaria polyphylla*	Petalled Rocktripe Lichen				S2S3	9	86.2 ± 0.0	NS
N	*Usnea mutabilis*	Bloody Beard Lichen				S2S3	1	12.7 ± 0.0	NS
N	*Usnea rubicunda*	Red Beard Lichen				S2S3	1	96.0 ± 0.0	NS
N	*Stereocaulon condensatum*	Granular Soil Foam Lichen				S2S3	2	95.6 ± 0.0	NS
N	*Cladonia coccifera*	Eastern Boreal Pixie-cup Lichen				S2S3	13	39.4 ± 2.0	NS
N	*Cladonia deformis*	Lesser Sulphur-cup Lichen				S2S3	1	83.5 ± 0.0	NS
N	*Collema tenax*	Soil Tarpaper Lichen				S3	4	23.2 ± 0.0	NS
N	*Sticta fuliginosa*	Peppered Moon Lichen				S3	6	40.5 ± 0.0	NS
N	*Leptogium subtile*	Appressed Jellyskin Lichen				S3	7	20.2 ± 0.0	NS
N	*Fuscopannaria ahlneri*	Corrugated Shingles Lichen				S3	38	20.1 ± 0.0	NS
N	*Heterodermia speciosa*	Powdered Fringe Lichen				S3	1	61.1 ± 0.0	NS
N	*Heterodermia squamulosa*	Scaly Fringe Lichen				S3	1	86.8 ± 0.0	NS
N	*Leptogium corticola*	Blistered Jellyskin Lichen				S3	1	59.1 ± 0.0	NS
N	*Leptogium lichenoides*	Tattered Jellyskin Lichen				S3	12	23.3 ± 0.0	NS
N	*Nephroma bellum*	Naked Kidney Lichen				S3	4	6.3 ± 1.0	NS
N	*Platismatia norvegica*	Oldgrowth Rag Lichen				S3	147	28.6 ± 3.0	NS
N	*Moelleropsis nebulosa*	Blue-gray Moss Shingle Lichen				S3	12	50.9 ± 0.0	NS
N	*Fuscopannaria sorediata*	a Lichen				S3	4	56.5 ± 0.0	NS

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N	*Ephebe lanata*	Waterside Rockshag Lichen				S3	1	58.1 ± 0.0	NS
N	*Calliergon giganteum*	Giant Spear Moss				S3?	3	17.0 ± 0.0	NS
N	*Drummondia prorepens*	a Moss				S3?	5	73.5 ± 2.0	NS
N	*Anomodon tristis*	a Moss				S3?	2	73.9 ± 0.0	NS
N	*Mnium stellare*	Star Leafy Moss				S3?	3	40.0 ± 0.0	NS
N	*Sphagnum riparium*	Streamside Peat Moss				S3?	4	40.6 ± 0.0	NS
N	*Phaeophyscia pusilloides*	Pompom-tipped Shadow Lichen				S3?	5	4.2 ± 0.0	NS
N	*Cladonia pocillum*	Rosette Pixie-cup Lichen				S3?	4	40.4 ± 0.0	NS
N	*Cladonia stygia*	Black-footed Reindeer Lichen				S3?	3	72.9 ± 0.0	NS
N	*Anomodon rugelii*	Rugel's Anomodon Moss				S3S4	1	96.1 ± 0.0	NS
N	*Dicranella varia*	a Moss				S3S4	4	20.7 ± 0.0	NS
N	*Dicranum leioneuron*	a Dicranum Moss				S3S4	12	54.0 ± 0.0	NS
N	*Encalypta procera*	Slender Extinguisher Moss				S3S4	9	15.5 ± 0.0	NS
N	*Myurella julacea*	Small Mouse-tail Moss				S3S4	2	83.5 ± 0.0	NS
N	*Sphagnum lindbergii*	Lindberg's Peat Moss				S3S4	4	42.6 ± 0.0	NS
N	*Splachnum ampullaceum*	Cruet Dung Moss				S3S4	4	56.5 ± 0.0	NS
N	*Thamnobryum alleghaniense*	a Moss				S3S4	5	75.9 ± 1.0	NS
N	*Schistidium agassizii*	Elf Bloom Moss				S3S4	4	74.6 ± 0.0	NS
N	*Hylocomiastrum pyrenaicum*	a Feather Moss				S3S4	1	21.2 ± 3.0	NS
N	*Arctoparmelia incurva*	Finger Ring Lichen				S3S4	13	66.8 ± 1.0	NS
N	*Hypogymnia vittata*	Slender Monk's Hood Lichen				S3S4	132	19.6 ± 0.0	NS
N	*Leptogium acadiense*	Acadian Jellyskin Lichen				S3S4	18	4.0 ± 0.0	NS
N	*Cladonia floerkeana*	Gritty British Soldiers Lichen				S3S4	5	56.3 ± 0.0	NS
N	*Vahliella leucophaea*	Shelter Shingle Lichen				S3S4	1	93.7 ± 0.0	NS
N	*Sphaerophorus fragilis*	Fragile Coral Lichen				S3S4	6	77.4 ± 0.0	NS
N	*Coccocarpia palmicola*	Salted Shell Lichen				S3S4	328	42.6 ± 0.0	NS
N	*Physcia tenella*	Fringed Rosette Lichen				S3S4	2	89.1 ± 2.0	NS
N	*Anaptychia palmulata*	Shaggy Fringed Lichen				S3S4	14	6.3 ± 1.0	NS
N	*Bryoria pikei*	Pike's Horsehair Lichen				S3S4	1	100.0 ± 0.0	PE
N	*Evernia prunastri*	Valley Oakmoss Lichen				S3S4	2	65.0 ± 0.0	NS
N	*Dermatocarpon luridum*	Brookside Stippleback Lichen				S3S4	8	24.8 ± 2.0	NS
N	*Heterodermia neglecta*	Fringe Lichen				S3S4	10	18.7 ± 2.0	NS
P	*Fraxinus nigra*	Black Ash	Threatened		Threatened	S1S2	139	7.3 ± 0.0	NS
P	*Juncus caesariensis*	New Jersey Rush	Special Concern	Special Concern	Vulnerable	S2	240	50.0 ± 0.0	NS
P	*Isoetes prototypus*	Prototype Quillwort	Special Concern	Special Concern	Vulnerable	S2	14	68.4 ± 0.0	NS
P	*Floerkea proserpinacoides*	False Mermaidweed	Not At Risk			S2	21	20.3 ± 1.0	NS
P	*Salix candida*	Sage Willow			Endangered	S1	47	19.5 ± 0.0	NS
P	*Thuja occidentalis*	Eastern White Cedar			Vulnerable	S1	4	16.0 ± 0.0	NS
P	*Sanicula odorata*	Clustered Sanicle				S1	5	16.4 ± 3.0	NS
P	*Zizia aurea*	Golden Alexanders				S1	7	69.6 ± 1.0	NS
P	*Arnica lonchophylla*	Northern Arnica				S1	11	41.4 ± 7.0	NS
P	*Bidens hyperborea*	Estuary Beggarticks				S1	3	40.6 ± 7.0	NS
P	*Erigeron compositus*	Cut-leaved Fleabane				S1	2	87.2 ± 0.0	NS
P	*Nabalus racemosus*	Glaucous Rattlesnakeroot				S1	1	77.5 ± 3.0	NS
P	*Ageratina altissima*	White Snakeroot				S1	2	67.7 ± 1.0	NS
P	*Betula glandulosa*	Glandular Birch				S1	5	82.3 ± 7.0	NS
P	*Cardamine dentata*	Toothed Bittercress				S1	5	16.5 ± 0.0	NS
P	*Cochlearia tridactylites*	Limestone Scurvy-grass				S1	4	85.1 ± 0.0	NS
P	*Draba glabella*	Rock Whitlow-Grass				S1	3	77.8 ± 0.0	NS
P	*Draba norvegica*	Norwegian Whitlow-Grass				S1	8	51.7 ± 2.0	NS
P	*Stellaria crassifolia*	Fleshy Stitchwort				S1	2	10.7 ± 2.0	NS
P	*Hudsonia tomentosa*	Woolly Beach-heath				S1	8	63.2 ± 1.0	NS
P	*Diapensia lapponica*	Diapensia				S1	1	76.6 ± 0.0	NS
P	*Rhododendron lapponicum*	Lapland Rosebay				S1	1	84.0 ± 0.0	NS
P	*Pinguicula vulgaris*	Common Butterwort				S1	7	75.9 ± 3.0	NS

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P	*Utricularia ochroleuca*	Yellowish-white Bladderwort				S1	1	62.0 ± 1.0	NS
P	*Fraxinus pennsylvanica*	Red Ash				S1	2	59.0 ± 0.0	NS
P	*Oxyria digyna*	Mountain Sorrel				S1	8	93.5 ± 0.0	NS
P	*Bistorta vivipara*	Alpine Bistort				S1	1	43.0 ± 1.0	NS
P	*Montia fontana*	Water Blinks				S1	2	44.4 ± 1.0	NS
P	*Anemone multifida*	Cut-leaved Anemone				S1	5	77.0 ± 1.0	NS
P	*Anemone parviflora*	Small-flowered Anemone				S1	2	78.0 ± 0.0	NS
P	*Potentilla litoralis*	Coastal Cinquefoil				S1	4	82.1 ± 1.0	NS
P	*Salix uva-ursi*	Bearberry Willow				S1	2	84.0 ± 0.0	NS
P	*Salix vestita*	Hairy Willow				S1	1	83.7 ± 0.0	NS
P	*Saxifraga aizoides*	Yellow Mountain Saxifrage				S1	9	83.7 ± 0.0	NS
P	*Saxifraga oppositifolia*	Purple Mountain Saxifrage				S1	2	82.9 ± 1.0	NS
P	*Agalinis purpurea var. parviflora*	Small-flowered Purple False Foxglove				S1	1	12.8 ± 0.0	NS
P	*Scrophularia lanceolata*	Lance-leaved Figwort				S1	2	38.8 ± 1.0	NS
P	*Carex alopecoidea*	Foxtail Sedge				S1	2	62.5 ± 0.0	NS
P	*Carex granularis*	Limestone Meadow Sedge				S1	21	12.6 ± 0.0	NS
P	*Carex gynocrates*	Northern Bog Sedge				S1	16	9.0 ± 0.0	NS
P	*Carex haydenii*	Hayden's Sedge				S1	3	9.8 ± 0.0	NS
P	*Carex rariflora*	Loose-flowered Alpine Sedge				S1	1	92.5 ± 5.0	NS
P	*Carex tenuiflora*	Sparse-Flowered Sedge				S1	3	56.2 ± 0.0	NS
P	*Carex tincta*	Tinged Sedge				S1	1	62.5 ± 1.0	NS
P	*Carex viridula var. elatior*	Greenish Sedge				S1	54	7.3 ± 0.0	NS
P	*Carex grisea*	Inflated Narrow-leaved Sedge				S1	6	72.8 ± 0.0	NS
P	*Carex saxatilis*	Russet Sedge				S1	3	96.0 ± 7.0	NS
P	*Cyperus lupulinus*	Hop Flatsedge				S1	5	62.6 ± 0.0	NS
P	*Cyperus lupulinus ssp. macilentus*	Hop Flatsedge				S1	8	63.2 ± 1.0	NS
P	*Eleocharis erythropoda*	Red-stemmed Spikerush				S1	6	11.7 ± 0.0	NS
P	*Rhynchospora capillacea*	Slender Beakrush				S1	8	7.3 ± 10.0	NS
P	*Scirpus atrovirens*	Dark-green Bulrush				S1	1	20.8 ± 0.0	NS
P	*Blysmopsis rufa*	Red Bulrush				S1	1	68.9 ± 1.0	NS
P	*Iris prismatica*	Slender Blue Flag				S1	2	23.7 ± 0.0	NS
P	*Luzula spicata*	Spiked Woodrush				S1	1	72.9 ± 0.0	NS
P	*Triantha glutinosa*	Sticky False-Asphodel				S1	15	19.5 ± 0.0	NS
P	*Malaxis monophyllos var. brachypoda*	North American White Adder's-mouth				S1	1	56.7 ± 7.0	NS
P	*Bromus latiglumis*	Broad-Glumed Brome				S1	11	30.8 ± 0.0	NS
P	*Elymus wiegandii*	Wiegand's Wild Rye				S1	9	27.6 ± 1.0	NS
P	*Elymus hystrix*	Spreading Wild Rye				S1	1	98.1 ± 4.0	NS
P	*Hordeum brachyantherum*	Meadow Barley				S1	1	58.4 ± 0.0	NS
P	*Phleum alpinum*	Alpine Timothy				S1	7	56.8 ± 0.0	NS
P	*Torreyochloa pallida var. pallida*	Pale False Manna Grass				S1	2	77.7 ± 1.0	NS
P	*Graphephorum melicoides*	Purple False Oats				S1	4	45.5 ± 0.0	NS
P	*Sparganium androcladum*	Branching Bur-Reed				S1	3	22.9 ± 0.0	NS
P	*Equisetum palustre*	Marsh Horsetail				S1	8	22.5 ± 0.0	NS
P	*Botrychium lunaria*	Common Moonwort				S1	2	64.3 ± 1.0	NS
P	*Epilobium lactiflorum*	White-flowered Willowherb				S1?	1	92.7 ± 5.0	NS
P	*Carex rostrata*	Narrow-leaved Beaked Sedge				S1?	1	84.7 ± 0.0	NS
P	*Bolboschoenus robustus*	Sturdy Bulrush				S1?	2	33.2 ± 5.0	NS
P	*Dichanthelium lindheimeri*	Lindheimer's Panicgrass				S1?	1	94.8 ± 1.0	NS
P	*Huperzia selago*	Northern Firmoss				S1?	1	70.3 ± 2.0	NS
P	*Rudbeckia laciniata*	Cut-Leaved Coneflower				S1S2	1	69.9 ± 7.0	NS
P	*Arabis pycnocarpa*	Cream-flowered Rockcress				S1S2	7	64.3 ± 4.0	NS

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P	*Cornus suecica*	Swedish Bunchberry				S1S2	22	73.0 ± 0.0	NS
P	*Anemone virginiana var. alba*	Virginia Anemone				S1S2	8	13.0 ± 0.0	NS
P	*Ranunculus sceleratus*	Cursed Buttercup				S1S2	1	30.6 ± 7.0	NS
P	*Parnassia parviflora*	Small-flowered Grass-of-Parnassus				S1S2	17	25.9 ± 1.0	NS
P	*Carex livida*	Livid Sedge				S1S2	28	47.3 ± 5.0	NS
P	*Juncus greenei*	Greene's Rush				S1S2	1	63.3 ± 1.0	NS
P	*Juncus alpinoarticulatus ssp. americanus*	Northern Green Rush				S1S2	13	17.1 ± 5.0	NS
P	*Juncus bulbosus*	Bulbous Rush				S1S2	13	83.5 ± 0.0	NS
P	*Platanthera huronensis*	Fragrant Green Orchid				S1S2	6	7.8 ± 0.0	NS
P	*Calamagrostis stricta ssp. stricta*	Slim-stemmed Reed Grass				S1S2	2	32.9 ± 1.0	NS
P	*Cinna arundinacea*	Sweet Wood Reed Grass				S1S2	24	28.6 ± 0.0	NS
P	*Festuca prolifera*	Proliferous Fescue				S1S2	6	74.7 ± 0.0	NS
P	*Sparganium hyperboreum*	Northern Burreed				S1S2	12	20.4 ± 1.0	NS
P	*Cryptogramma stelleri*	Steller's Rockbrake				S1S2	17	1.9 ± 0.0	NS
P	*Woodsia alpina*	Alpine Cliff Fern				S1S2	9	65.8 ± 2.0	NS
P	*Selaginella selaginoides*	Low Spikemoss				S1S2	8	45.9 ± 0.0	NS
P	*Carex vacillans*	Estuarine Sedge				S1S3	2	62.5 ± 0.0	NS
P	*Conioselinum chinense*	Chinese Hemlock-parsley				S2	3	83.2 ± 0.0	NS
P	*Osmorhiza longistylis*	Smooth Sweet Cicely				S2	21	3.1 ± 10.0	NS
P	*Erigeron philadelphicus*	Philadelphia Fleabane				S2	9	15.6 ± 7.0	NS
P	*Solidago multiradiata*	Multi-rayed Goldenrod				S2	12	67.2 ± 2.0	NS
P	*Symphyotrichum ciliolatum*	Fringed Blue Aster				S2	3	52.0 ± 7.0	NS
P	*Impatiens pallida*	Pale Jewelweed				S2	13	2.4 ± 7.0	NS
P	*Caulophyllum thalictroides*	Blue Cohosh				S2	19	14.8 ± 0.0	NS
P	*Boechera stricta*	Drummond's Rockcress				S2	6	53.7 ± 0.0	NS
P	*Cardamine parviflora*	Small-flowered Bittercress				S2	7	63.5 ± 1.0	NS
P	*Draba arabisans*	Rock Whitlow-Grass				S2	14	5.2 ± 1.0	NS
P	*Lobelia kalmii*	Brook Lobelia				S2	95	3.8 ± 0.0	NS
P	*Stellaria humifusa*	Saltmarsh Starwort				S2	4	84.5 ± 1.0	PE
P	*Stellaria longifolia*	Long-leaved Starwort				S2	1	30.8 ± 0.0	NS
P	*Oxybasis rubra*	Red Goosefoot				S2	3	49.2 ± 2.0	NS
P	*Hudsonia ericoides*	Pinebarren Golden Heather				S2	14	82.7 ± 0.0	PE
P	*Hypericum majus*	Large St John's-wort				S2	2	23.3 ± 1.0	NS
P	*Crassula aquatica*	Water Pygmyweed				S2	6	45.4 ± 7.0	NS
P	*Oxytropis campestris var. johannensis*	Field Locoweed				S2	5	77.8 ± 0.0	NS
P	*Myriophyllum farwellii*	Farwell's Water Milfoil				S2	2	48.2 ± 7.0	NS
P	*Myriophyllum verticillatum*	Whorled Water Milfoil				S2	6	15.7 ± 0.0	NS
P	*Utricularia resupinata*	Inverted Bladderwort				S2	1	54.2 ± 0.0	NS
P	*Oenothera fruticosa ssp. tetragona*	Narrow-leaved Evening Primrose				S2	1	24.3 ± 1.0	NS
P	*Persicaria arifolia*	Halberd-leaved Tearthumb				S2	6	74.5 ± 0.0	NS
P	*Rumex triangulivalvis*	Triangular-valve Dock				S2	9	2.4 ± 7.0	NS
P	*Primula mistassinica*	Mistassini Primrose				S2	10	74.4 ± 1.0	NS
P	*Anemonastrum canadense*	Canada Anemone				S2	12	44.8 ± 3.0	NS
P	*Anemone quinquefolia*	Wood Anemone				S2	9	26.6 ± 1.0	NS
P	*Anemone virginiana*	Virginia Anemone				S2	30	14.7 ± 0.0	NS
P	*Caltha palustris*	Yellow Marsh Marigold				S2	49	24.1 ± 1.0	NS
P	*Galium labradoricum*	Labrador Bedstraw				S2	94	9.8 ± 0.0	NS
P	*Salix pedicellaris*	Bog Willow				S2	12	12.7 ± 0.0	NS
P	*Comandra umbellata*	Bastard's Toadflax				S2	36	22.3 ± 7.0	NS
P	*Saxifraga paniculata*	White Mountain Saxifrage				S2	2	87.2 ± 0.0	NS
P	*Saxifraga paniculata ssp. laestadii*	Laestadius' Saxifrage				S2	16	7.7 ± 7.0	NS

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P	*Tiarella cordifolia*	Heart-leaved Foamflower				S2	1	43.8 ± 3.0	NS
P	*Viola nephrophylla*	Northern Bog Violet				S2	12	10.2 ± 0.0	NS
P	*Carex bebbii*	Bebb's Sedge				S2	32	0.4 ± 0.0	NS
P	*Carex capillaris*	Hairlike Sedge				S2	14	76.1 ± 1.0	NS
P	*Carex castanea*	Chestnut Sedge				S2	23	3.8 ± 0.0	NS
P	*Carex comosa*	Bearded Sedge				S2	1	32.1 ± 1.0	NS
P	*Carex hystericina*	Porcupine Sedge				S2	37	7.5 ± 5.0	NS
P	*Carex scirpoidea*	Scirpuslike Sedge				S2	13	54.2 ± 4.0	NS
P	*Carex tenera*	Tender Sedge				S2	3	49.5 ± 1.0	NS
P	*Carex tuckermanii*	Tuckerman's Sedge				S2	2	35.7 ± 0.0	NS
P	*Carex atratiformis*	Scabrous Black Sedge				S2	19	2.4 ± 7.0	NS
P	*Eleocharis quinqueflora*	Few-flowered Spikerush				S2	30	9.8 ± 0.0	NS
P	*Vallisneria americana*	Wild Celery				S2	2	59.6 ± 10.0	NS
P	*Juncus stygius ssp. americanus*	Moor Rush				S2	38	31.5 ± 7.0	NS
P	*Allium schoenoprasum*	Wild Chives				S2	1	74.6 ± 0.0	NS
P	*Allium schoenoprasum var. sibiricum*	Wild Chives				S2	7	51.0 ± 7.0	NS
P	*Lilium canadense*	Canada Lily				S2	23	2.3 ± 1.0	NS
P	*Cypripedium parviflorum var. pubescens*	Yellow Lady's-slipper				S2	34	12.5 ± 0.0	NS
P	*Cypripedium parviflorum var. makasin*	Small Yellow Lady's-Slipper				S2	18	15.2 ± 0.0	NS
P	*Cypripedium reginae*	Showy Lady's-Slipper				S2	371	3.8 ± 0.0	NS
P	*Platanthera flava*	Southern Rein-Orchid				S2	2	73.0 ± 0.0	NS
P	*Platanthera flava var. herbiola*	Pale Green Orchid				S2	2	65.7 ± 1.0	NS
P	*Platanthera macrophylla*	Large Round-Leaved Orchid				S2	1	99.0 ± 0.0	NS
P	*Spiranthes lucida*	Shining Ladies'-Tresses				S2	27	14.6 ± 0.0	NS
P	*Calamagrostis stricta*	Slim-stemmed Reed Grass				S2	5	84.1 ± 0.0	PE
P	*Piptatheropsis canadensis*	Canada Ricegrass				S2	4	70.7 ± 0.0	NS
P	*Piptatheropsis pungens*	Slender Ricegrass				S2	1	92.2 ± 10.0	NS
P	*Potamogeton friesii*	Fries' Pondweed				S2	12	20.6 ± 7.0	NS
P	*Potamogeton richardsonii*	Richardson's Pondweed				S2	9	10.8 ± 7.0	NS
P	*Cystopteris laurentiana*	Laurentian Bladder Fern				S2	24	2.1 ± 0.0	NS
P	*Dryopteris fragrans*	Fragrant Wood Fern				S2	11	51.9 ± 7.0	NS
P	*Polystichum lonchitis*	Northern Holly Fern				S2	23	2.8 ± 1.0	NS
P	*Woodsia glabella*	Smooth Cliff Fern				S2	24	2.4 ± 7.0	NS
P	*Symphyotrichum boreale*	Boreal Aster				S2?	59	7.3 ± 0.0	NS
P	*Cuscuta cephalanthi*	Buttonbush Dodder				S2?	5	61.9 ± 7.0	NS
P	*Epilobium coloratum*	Purple-veined Willowherb				S2?	2	68.2 ± 0.0	NS
P	*Rumex persicarioides*	Peach-leaved Dock				S2?	1	22.8 ± 0.0	NS
P	*Crataegus submollis*	Quebec Hawthorn				S2?	2	87.1 ± 7.0	NS
P	*Eleocharis ovata*	Ovate Spikerush				S2?	3	72.1 ± 0.0	NS
P	*Scirpus pedicellatus*	Stalked Bulrush				S2?	3	30.3 ± 0.0	NS
P	*Hieracium robinsonii*	Robinson's Hawkweed				S2S3	44	53.0 ± 1.0	NS
P	*Iva frutescens*	Big-leaved Marsh-elder				S2S3	1	96.9 ± 4.0	NS
P	*Senecio pseudoarnica*	Seabeach Ragwort				S2S3	13	40.1 ± 0.0	NS
P	*Betula michauxii*	Michaux's Dwarf Birch				S2S3	12	88.8 ± 0.0	NS
P	*Sagina nodosa*	Knotted Pearlwort				S2S3	1	73.6 ± 5.0	NS
P	*Sagina nodosa ssp. borealis*	Knotted Pearlwort				S2S3	1	84.6 ± 5.0	PE
P	*Hypericum x dissimulatum*	Disguised St. John's-wort				S2S3	2	55.6 ± 2.0	NS
P	*Triosteum aurantiacum*	Orange-fruited Tinker's Weed				S2S3	160	2.4 ± 7.0	NS
P	*Shepherdia canadensis*	Soapberry				S2S3	150	21.4 ± 0.0	NS
P	*Empetrum atropurpureum*	Purple Crowberry				S2S3	9	73.8 ± 3.0	NS
P	*Euphorbia polygonifolia*	Seaside Spurge				S2S3	13	26.5 ± 1.0	NS
P	*Halenia deflexa*	Spurred Gentian				S2S3	35	12.2 ± 0.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
P	*Hedeoma pulegioides*	American False Pennyroyal				S2S3	2	74.7 ± 1.0	NS
P	*Polygonum aviculare ssp. buxiforme*	Box Knotweed				S2S3	1	50.6 ± 7.0	NS
P	*Polygonum oxyspermum ssp. raii*	Ray's Knotweed				S2S3	15	12.4 ± 5.0	NS
P	*Amelanchier fernaldii*	Fernald's Serviceberry				S2S3	7	26.9 ± 1.0	NS
P	*Potentilla canadensis*	Canada Cinquefoil				S2S3	1	50.5 ± 2.0	NS
P	*Galium aparine*	Common Bedstraw				S2S3	1	72.9 ± 0.0	NS
P	*Salix pellita*	Satiny Willow				S2S3	5	15.2 ± 2.0	NS
P	*Carex adusta*	Lesser Brown Sedge				S2S3	1	96.0 ± 7.0	NS
P	*Carex hirtifolia*	Pubescent Sedge				S2S3	11	16.2 ± 0.0	NS
P	*Eleocharis flavescens var. olivacea*	Bright-green Spikerush				S2S3	3	76.3 ± 5.0	NS
P	*Eriophorum gracile*	Slender Cottongrass				S2S3	8	12.0 ± 0.0	NS
P	*Oreojuncus trifidus*	Highland Rush				S2S3	16	17.8 ± 0.0	NS
P	*Coeloglossum viride*	Long-bracted Frog Orchid				S2S3	18	93.6 ± 1.0	NS
P	*Cypripedium parviflorum*	Yellow Lady's-slipper				S2S3	104	4.1 ± 0.0	NS
P	*Poa glauca*	Glaucous Blue Grass				S2S3	19	2.0 ± 0.0	NS
P	*Stuckenia filiformis*	Thread-leaved Pondweed				S2S3	49	12.4 ± 7.0	NS
P	*Botrychium lanceolatum ssp. angustisegmentum*	Narrow Triangle Moonwort				S2S3	14	2.4 ± 7.0	NS
P	*Botrychium simplex*	Least Moonwort				S2S3	9	15.7 ± 5.0	NS
P	*Ophioglossum pusillum*	Northern Adder's-tongue				S2S3	1	61.3 ± 5.0	NS
P	*Angelica atropurpurea*	Purple-stemmed Angelica				S3	33	20.4 ± 0.0	NS
P	*Erigeron hyssopifolius*	Hyssop-leaved Fleabane				S3	110	15.2 ± 0.0	NS
P	*Bidens beckii*	Water Beggarticks				S3	8	14.8 ± 0.0	NS
P	*Packera paupercula*	Balsam Groundsel				S3	154	15.2 ± 0.0	NS
P	*Betula pumila var. pumila*	Bog Birch				S3	13	13.0 ± 7.0	NS
P	*Betula pumila*	Bog Birch				S3	28	12.5 ± 0.0	NS
P	*Campanula aparinoides*	Marsh Bellflower				S3	4	3.3 ± 5.0	NS
P	*Mononeuria groenlandica*	Greenland Stitchwort				S3	1	83.1 ± 0.0	NS
P	*Viburnum edule*	Squashberry				S3	75	52.0 ± 7.0	NS
P	*Empetrum eamesii*	Pink Crowberry				S3	64	41.7 ± 0.0	NS
P	*Vaccinium boreale*	Northern Blueberry				S3	112	7.7 ± 7.0	NS
P	*Vaccinium cespitosum*	dwarf bilberry				S3	28	44.5 ± 7.0	NS
P	*Vaccinium uliginosum*	Alpine Bilberry				S3	56	71.5 ± 0.0	NS
P	*Bartonia virginica*	Yellow Bartonia				S3	1	42.4 ± 0.0	NS
P	*Proserpinaca palustris*	Marsh Mermaidweed				S3	53	9.1 ± 0.0	NS
P	*Teucrium canadense*	Canada Germander				S3	63	6.4 ± 0.0	NS
P	*Decodon verticillatus*	Swamp Loosestrife				S3	5	19.9 ± 7.0	NS
P	*Epilobium hornemannii*	Hornemann's Willowherb				S3	30	34.3 ± 2.0	NS
P	*Epilobium strictum*	Downy Willowherb				S3	20	9.0 ± 0.0	NS
P	*Polygala sanguinea*	Blood Milkwort				S3	2	65.9 ± 7.0	NS
P	*Persicaria pensylvanica*	Pennsylvania Smartweed				S3	11	3.1 ± 3.0	NS
P	*Fallopia scandens*	Climbing False Buckwheat				S3	12	29.4 ± 0.0	NS
P	*Plantago rugelii*	Rugel's Plantain				S3	1	12.6 ± 0.0	NS
P	*Primula laurentiana*	Laurentian Primrose				S3	1	46.3 ± 7.0	NS
P	*Samolus parviflorus*	Seaside Brookweed				S3	21	14.2 ± 0.0	NS
P	*Pyrola asarifolia*	Pink Pyrola				S3	42	11.3 ± 0.0	NS
P	*Pyrola minor*	Lesser Pyrola				S3	21	2.2 ± 2.0	NS
P	*Ranunculus gmelinii*	Gmelin's Water Buttercup				S3	110	10.8 ± 0.0	NS
P	*Endotropis alnifolia*	alder-leaved buckthorn				S3	470	2.8 ± 5.0	NS
P	*Agrimonia gryposepala*	Hooked Agrimony				S3	254	0.4 ± 0.0	NS
P	*Amelanchier spicata*	Running Serviceberry				S3	10	40.5 ± 0.0	NS
P	*Galium kamtschaticum*	Northern Wild Licorice				S3	58	3.1 ± 0.0	NS
P	*Geocaulon lividum*	Northern Comandra				S3	90	47.5 ± 2.0	NS
P	*Limosella australis*	Southern Mudwort				S3	8	50.3 ± 0.0	NS
P	*Lindernia dubia*	Yellow-seeded False				S3	4	31.2 ± 0.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
		Pimperel							
P	*Laportea canadensis*	Canada Wood Nettle				S3	18	16.4 ± 2.0	NS
P	*Verbena hastata*	Blue Vervain				S3	30	3.1 ± 0.0	NS
P	*Carex cryptolepis*	Hidden-scaled Sedge				S3	17	12.8 ± 5.0	NS
P	*Carex eburnea*	Bristle-leaved Sedge				S3	166	14.4 ± 0.0	NS
P	*Carex lupulina*	Hop Sedge				S3	9	68.0 ± 0.0	NS
P	*Carex rosea*	Rosy Sedge				S3	6	16.2 ± 0.0	NS
P	*Carex tribuloides*	Blunt Broom Sedge				S3	14	28.0 ± 0.0	NS
P	*Carex wiegandii*	Wiegand's Sedge				S3	91	15.1 ± 0.0	NS
P	*Carex foenea*	Fernald's Hay Sedge				S3	3	92.8 ± 0.0	NS
P	*Schoenoplectus americanus*	Olney's Bulrush				S3	2	72.9 ± 0.0	NS
P	*Elodea canadensis*	Canada Waterweed				S3	8	19.3 ± 0.0	NS
P	*Juncus subcaudatus*	Woods-Rush				S3	9	54.5 ± 0.0	NS
P	*Juncus dudleyi*	Dudley's Rush				S3	64	11.9 ± 0.0	NS
P	*Goodyera oblongifolia*	Menzies' Rattlesnake-plantain				S3	33	30.6 ± 7.0	NS
P	*Goodyera repens*	Lesser Rattlesnake-plantain				S3	36	13.0 ± 0.0	NS
P	*Neottia bifolia*	Southern Twayblade				S3	46	2.4 ± 7.0	NS
P	*Platanthera grandiflora*	Large Purple Fringed Orchid				S3	48	3.3 ± 5.0	NS
P	*Platanthera hookeri*	Hooker's Orchid				S3	8	12.0 ± 0.0	NS
P	*Platanthera orbiculata*	Small Round-leaved Orchid				S3	27	14.6 ± 0.0	NS
P	*Spiranthes ochroleuca*	Yellow Ladies'-tresses				S3	14	8.8 ± 0.0	NS
P	*Alopecurus aequalis*	Short-awned Foxtail				S3	19	23.7 ± 1.0	NS
P	*Potamogeton obtusifolius*	Blunt-leaved Pondweed				S3	24	14.8 ± 0.0	NS
P	*Potamogeton praelongus*	White-stemmed Pondweed				S3	18	19.2 ± 0.0	NS
P	*Potamogeton zosteriformis*	Flat-stemmed Pondweed				S3	13	10.8 ± 7.0	NS
P	*Sparganium natans*	Small Burreed				S3	19	9.0 ± 0.0	NS
P	*Asplenium trichomanes*	Maidenhair Spleenwort				S3	30	11.4 ± 0.0	NS
P	*Asplenium viride*	Green Spleenwort				S3	36	1.9 ± 0.0	NS
P	*Equisetum pratense*	Meadow Horsetail				S3	22	14.7 ± 0.0	NS
P	*Equisetum variegatum*	Variegated Horsetail				S3	38	13.2 ± 0.0	NS
P	*Isoetes tuckermanii ssp. acadiensis*	Acadian Quillwort				S3	12	64.7 ± 1.0	NS
P	*Diphasiastrum sitchense*	Sitka Ground-cedar				S3	202	30.3 ± 5.0	NS
P	*Huperzia appressa*	Mountain Firmoss				S3	29	16.7 ± 1.0	NS
P	*Sceptridium dissectum*	Dissected Moonwort				S3	4	61.3 ± 5.0	NS
P	*Polypodium appalachianum*	Appalachian Polypody				S3	6	12.2 ± 0.0	NS
P	*Persicaria amphibia var. emersa*	Long-root Smartweed				S3?	1	88.0 ± 0.0	NS
P	*Diphasiastrum x sabinifolium*	Savin-leaved Ground-cedar				S3?	12	5.2 ± 1.0	NS
P	*Atriplex glabriuscula var. franktonii*	Frankton's Saltbush				S3S4	10	32.3 ± 2.0	NS
P	*Suaeda calceoliformis*	Horned Sea-blite				S3S4	4	48.7 ± 1.0	NS
P	*Myriophyllum sibiricum*	Siberian Water Milfoil				S3S4	18	15.0 ± 2.0	NS
P	*Sanguinaria canadensis*	Bloodroot				S3S4	177	10.1 ± 0.0	NS
P	*Polygonum fowleri*	Fowler's Knotweed				S3S4	2	69.3 ± 0.0	NS
P	*Rumex fueginus*	Tierra del Fuego Dock				S3S4	2	84.4 ± 0.0	PE
P	*Fragaria vesca ssp. americana*	Woodland Strawberry				S3S4	72	2.4 ± 0.0	NS
P	*Fragaria vesca*	Woodland Strawberry				S3S4	2	21.4 ± 0.0	NS
P	*Salix petiolaris*	Meadow Willow				S3S4	8	12.7 ± 0.0	NS
P	*Agalinis neoscotica*	Nova Scotia Agalinis				S3S4	2	93.6 ± 0.0	NS
P	*Carex argyrantha*	Silvery-flowered Sedge				S3S4	3	22.4 ± 0.0	NS
P	*Eriophorum russeolum*	Russet Cottongrass				S3S4	5	20.2 ± 0.0	NS
P	*Sisyrinchium atlanticum*	Eastern Blue-Eyed-Grass				S3S4	1	78.0 ± 0.0	NS
P	*Triglochin gaspensis*	Gasp├─ Arrowgrass				S3S4	9	25.1 ± 0.0	NS
P	*Juncus acuminatus*	Sharp-Fruit Rush				S3S4	5	0.4 ± 0.0	NS
P	*Luzula parviflora*	Small-flowered Woodrush				S3S4	50	31.5 ± 10.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
P	*Liparis loeselii*	Loesel's Twayblade				S3S4	20	14.5 ± 1.0	NS
P	*Panicum philadelphicum*	Philadelphia Panicgrass				S3S4	1	22.7 ± 0.0	NS
P	*Trisetum spicatum*	Narrow False Oats				S3S4	20	17.8 ± 0.0	NS
P	*Cystopteris bulbifera*	Bulblet Bladder Fern				S3S4	428	10.6 ± 0.0	NS
P	*Equisetum hyemale*	Common Scouring-rush				S3S4	1	12.8 ± 0.0	NS
P	*Equisetum hyemale ssp. affine*	Common Scouring-rush				S3S4	49	2.1 ± 3.0	NS
P	*Equisetum scirpoides*	Dwarf Scouring-Rush				S3S4	76	14.5 ± 0.0	NS
P	*Diphasiastrum complanatum*	Northern Ground-cedar				S3S4	6	19.9 ± 5.0	NS
P	*Schizaea pusilla*	Little Curlygrass Fern				S3S4	53	28.0 ± 0.0	NS
P	*Viola canadensis*	Canada Violet				SH	1	15.3 ± 0.0	NS
P	*Poa alpina*	Alpine Blue Grass				SH	2	71.4 ± 0.0	NS
P	*Botrychium minganense*	Mingan Moonwort				SH	1	66.3 ± 1.0	NS

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The recipient of these data shall acknowledge the AC CDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

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44	Knapton, R. & Power, T.; Williams, M. 2001. SAR Inventory: Fortress Louisbourg NP. Parks Canada, Atlantic, SARINV01-13. 157 recs.
44	Staicer, C. & Bliss, S.; Achenbach, L. 2017. Occurrences of tracked breeding birds in forested wetlands. , 303 records.
42	anon. 2001. S.. H.. NS Freshwater Mussel Fieldwork. Nova Scotia Dept Natural Resources, 76 recs.
42	iNaturalist. 2018. iNaturalist Data Export 2018. iNaturalist.org and iNaturalist.ca, Web site: 11700 recs.
41	Pulsifer, M.D. 2002. NS Freshwater Mussel Fieldwork. Nova Scotia Dept Natural Resources, 369 recs.
40	Scott, F.W. 2002. Nova Scotia Herpetofauna Atlas Database. Acadia University, Wolfville NS, 8856 recs.
38	Parker, G.R., Maxwell, J.W., Morton, L.D. & Smith,G.E.J. 1983. The ecology of Lynx , Lynx canadensis, on Cape Breton Island. Canadian Journal of Zoology, 61:770-786. 51 recs.
34	Sollows, M.C,. 2008. NBM Science Collections databases: mammals. New Brunswick Museum, Saint John NB, download Jan. 2008, 4983 recs.
33	Neily, T.H. 2010. Erioderma Pedicellatum records 2005-09. Mersey Tobiatic Research Institute, 67 recs.
30	Blaney, C.S.; Spicer, C.D.; Mazerolle, D.M. 2005. Fieldwork 2005. Atlantic Canada Conservation Data Centre. Sackville NB, 2333 recs.
29	Basquill, S.P., Porter, C. 2019. Bryophyte and lichen specimens submitted to the E.C. Smith Herbarium. NS Department of Lands and Forestry.
29	LaPaix, R.W.; Crowell, M.J.; MacDonald, M. 2011. Stantec rare plant records, 2010-11. Stantec Consulting, 334 recs.
29	Neily, T.H. & Pepper, C.; Toms, B. 2020. Nova Scotia lichen database [as of 2020-03-18]. Mersey Tobeatic Research Institute.
29	Neily, T.H. 2017. Maritmes Lichen and Bryophyte records. Atlantic Canada Conservation Data Centre, 1015 recs.
27	Neily, T.H. 2019. Tom Neily NS Bryophyte records (2009-2013). T.H. Neily, Atlantic Canada Conservation Data Centre, 1029 specimen records.
26	Parks Canada. 2010. Specimens in or near National Parks in Atlantic Canada. Canadian National Museum, 3925 recs.
24	Layberry, R.A. & Hall, P.W., LaFontaine, J.D. 1998. The Butterflies of Canada. University of Toronto Press. 280 pp+plates.
24	Neily, T.H. 2013. Email communication to Sean Blaney regarding Listera australis observations made from 2007 to 2011 in Nova Scotia. , 50.
23	Wilhelm, S.I. et al. 2019. Colonial Waterbird Database. Canadian Wildlife Service.
22	Benjamin, L.K. 2009. Boreal Felt Lichen, Mountain Avens, Orchid and other recent records. Nova Scotia Dept Natural Resources, 105 recs.
21	Belland, R.J. & W.B. Schofield. 1993. Salix vestita Pursh & Saxifraga oppositifolia L.: arctic-alpine species new to Nova Scotia. Rhodora, 95: 76-78.
21	Cameron, R.P. 2017. 2017 rare species field data. Nova Scotia Environment, 64 recs.
21	Catling, P.M., Erskine, D.S. & MacLaren, R.B. 1985. The Plants of Prince Edward Island with new records, nomenclatural changes & corrections & deletions, 1st Ed. Research Branch, Agriculture Canada, Ottawa, Publication 1798. 22pp.
21	Hill, N.M. 1994. Status report on the Long's bulrush Scirpus longii in Canada. Committee on the Status of Endangered Wildlife in Canada, 7 recs.
20	Cameron, R.P. 2012. Rob Cameron 2012 vascular plant data. NS Department of Environment, 30 recs.
20	Gillis, J. 2015. Rare plant records from Cape Breton gypsum sites. Pers. comm., 25 rare plant records.
20	Klymko, J.J.D. 2016. 2015 field data. Atlantic Canada Conservation Data Centre.
19	Cameron, R.P. 2013. 2013 rare species field data. Nova Scotia Department of Environment, 71 recs.
19	Pepper, C. 2013. 2013 rare bird and plant observations in Nova Scotia. , 181 records.

# recs	CITATION
18	Manthorne, A. 2014. MaritimesSwiftwatch Project database 2013-2014. Bird Studies Canada, Sackville NB, 326 recs.
18	Misc. rare species records gathered by NSDNR staff or communicated to NSDNR and forwared to ACCDC
17	Adams, J. & Herman, T.B. 1998. Thesis, Unpublished map of C. insculpta sightings. Acadia University, Wolfville NS, 88 recs.
17	Benjamin, L.K. 2011. NSDNR fieldwork & consultant reports 1997, 2009-10. Nova Scotia Dept Natural Resources, 85 recs.
17	Bryson, I., Douglas, M., Kennedy, C. 2013. Nova Scotia rare plant observations. CBCL.
17	Whittam, R.M. 2006. Bicknell's Thrush in CBHNP, BSC database. Bird Studies Canada, 21 recs.
16	Basquill, S.P. 2012. 2012 rare vascular plant field data. Nova Scotia Department of Natural Resources, 37 recs.
15	Blaney, C.S.; Mazerolle, D.M. 2008. Fieldwork 2008. Atlantic Canada Conservation Data Centre. Sackville NB, 13343 recs.
15	Chapman, C.N. (Cody). 2020. Nova Scotia Black Ash (Fraxinus nigra) field observations by Confederacy of Mainland Mi'kmaq. Forestry Program, Confederacy of Mainland Mi'kmaq.
15	Newell, R.E. 2004. Assessment and update status report on the New Jersey Rush (Juncus caesariensis) in Canada. Committee on the Status of Endangered Wildlife in Canada, 15 recs.
14	Basquill, S.P. 2012. 2012 Bryophyte specimen data. Nova Scotia Department of Natural Resources, 37 recs.
14	Blaney, C.S. 2000. Fieldwork 2000. Atlantic Canada Conservation Data Centre. Sackville NB, 1265 recs.
14	Downes, C. 1998-2000. Breeding Bird Survey Data. Canadian Wildlife Service, Ottawa, 111 recs.
13	Burns, L. 2013. Personal communication concerning bat occurrence on PEI. Winter 2013. Pers. comm.
13	Ogden, K. Nova Scotia Museum butterfly specimen database. Nova Scotia Museum. 2017.
13	White, S. 2018. Notable species sightings, 2016-2017. East Coast Aquatics.
12	Holder, M.L.; Kingsley, A.L. 2000. Kinglsey and Holder observations from 2000 field work.
12	Robinson, S.L. 2011. 2011 ND dune survey field data. Atlantic Canada Conservation Data Centre, 2715 recs.
11	Blaney, C.S.; Mazerolle, D.M.; Oberndorfer, E. 2007. Fieldwork 2007. Atlantic Canada Conservation Data Centre. Sackville NB, 13770 recs.
11	Klymko, J.J.D. 2012. Insect fieldwork & submissions, 2011. Atlantic Canada Conservation Data Centre. Sackville NB, 760 recs.
11	MacDonald, M. 2008. PEI Power Corridor Floral Surveys, 2004-08. Jacques Whitford Ltd, 2238 recs (979 rare).
11	Neily, T.H. 2012. 2012 Erioderma pedicellatum records in Nova Scotia.
11	Neily, T.H. Tom Neily NS Sphagnum records (2009-2014). T.H. Neily, Atlantic Canada Conservation Data Centre. 2019.
10	Murphy, S. 2006. Juncus caesariensis data from Yava Technologies In Situ Leach Mining Environmental Assessment. Jacques Whitford Inc., 10 recs.
9	Bryson, I. 2020. Nova Scotia and Newfoundland rare species observations, 2018-2020. Nova Scotia Environment.
9	e-Butterfly. 2016. Export of Maritimes records and photos. Maxim Larrivee, Sambo Zhang (ed.) e-butterfly.org.
9	Goltz, J.P. & Bishop, G. 2005. Confidential supplement to Status Report on Prototype Quillwort (Isoetes prototypus). Committee on the Status of Endangered Wildlife in Canada, 111 recs.
9	Hinds, H.R. 1984. Additions to the flora of Cape Breton Highlands National Park, Nova Scotia. Rhodora, 86:67-72.
8	Clayden, S. Digitization of Wolfgang Maass Nova Scotia forest lichen collections, 1964-2004. New Brunswick Museum. 2018.
8	NatureServe Canada. 2019. iNaturalist Maritimes Butterfly Records. iNaturalist.org and iNaturalist.ca.
8	Oldham, M.J. 2000. Oldham database records from Maritime provinces. Oldham, M.J; ONHIC, 487 recs.
7	Cameron, R.P. 2018. Degelia plumbea records. Nova Scotia Environment.
7	Chaput, G. 2002. Atlantic Salmon: Maritime Provinces Overview for 2001. Dept of Fisheries & Oceans, Atlantic Region, Science Stock Status Report D3-14. 39 recs.
7	Ferguson, D.C. 1954. The Lepidoptera of Nova Scotia. Part I, macrolepidoptera. Proceedings of the Nova Scotian Institute of Science, 23(3), 161-375.
7	NS DNR. 2017. Black Ash records from NS DNR Permanent Sample Plots (PSPs), 1965-2016. NS Dept of Natural Resources.
7	Robinson, S.L. 2014. 2013 Field Data. Atlantic Canada Conservation Data Centre.
7	Taylor, B.R., and Tam, J.C. 2012. Local distribution of the rare plant Triosteum aurantiacum in northeastern Nova Scotia, Canada. Rhodora, 114(960): 366-382.
6	Cameron, R.P. 2009. Erioderma pedicellatum database, 1979-2008. Dept Environment & Labour, 103 recs.
6	Nussey, Pat & NCC staff. 2019. AEI tracked species records, 2016-2019. Chapman, C.J. (ed.) Atlantic Canada Conservation Data Centre, 333.
6	Olsen, R. Herbarium Specimens. Nova Scotia Agricultural College, Truro. 2003.
6	Scott, F.W. 1988. Status Report on the Gaspé Shrew (Sorex gaspensis) in Canada. Committee on the Status of Endangered Wildlife in Canada, 12 recs.
5	Amirault, D.L. 1997-2000. Unpublished files. Canadian Wildlife Service, Sackville, 470 recs.
5	Blaney, C.S.; Mazerolle, D.M.; Klymko, J; Spicer, C.D. 2006. Fieldwork 2006. Atlantic Canada Conservation Data Centre. Sackville NB, 8399 recs.
5	Cameron, R.P. 2009. Cyanolichen database. Nova Scotia Environment & Labour, 1724 recs.
5	Dibblee, R.L. 1999. PEI Cormorant Survey. Prince Edward Island Fisheries, Aquaculture & Environment, 1p. 21 recs.
5	Lawrence Benjamin. 2009. Wood Anemone records from Victoria Co., from personal communication with S. Ferguson. Nova Scotia Department of Natural Resources, 5 records.
5	Marshall, L. 1998. Atlantic Salmon: Cape Breton SFA 18 (part) & SFA 19. Dept of Fisheries & Oceans, Atlantic Region, Science. Stock Status Report D3-09. 5 recs.
5	Plissner, J.H. & Haig, S.M. 1997. 1996 International piping plover census. US Geological Survey, Corvallis OR, 231 pp.
5	Porter, K. 2013. 2013 rare and non-rare vascular plant field data. St. Mary's University, 57 recs.
5	Power, T. 2019. Cape Breton Wood Turtle records. NS Lands and Forestry.
4	Bagnell, B.A. 2001. New Brunswick Bryophyte Occurrences. B&B Botanical, Sussex, 478 recs.
4	Blaney, C.S.; Mazerolle, D.M. 2011. Fieldwork 2011. Atlantic Canada Conservation Data Centre. Sackville NB.
4	Clayden, S.R. 2007. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, download Mar. 2007, 6914 recs.
4	Erskine, D. 1960. The plants of Prince Edward Island, 1st Ed. Research Branch, Agriculture Canada, Ottawa., Publication 1088. 1238 recs.
4	Neily, T.H. & Pepper, C.; Toms, B. 2015. Nova Scotia lichen location database [as of 2015-02-15]. Mersey Tobeatic Research Institute, 1691 records.
4	Newell, R.E. 2001. Fortress Louisbourg Species at Risk Survey 2001. Parks Canada, 4 recs.
4	Popma, T.M. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre. Sackville NB, 113 recs.
4	Porter, C.J.M. 2014. Field work data 2007-2014. Nova Scotia Nature Trust, 96 recs.

# recs	CITATION
4	Rousseau, J. 1938. Notes Floristiques sur l'est de la Nouvelle-Ecosse in Contributions de l'Institut Botanique de l'Universite de Montreal. Universite de Montreal, 32, 13-62. 11 recs.
4	Sollows, M.C,. 2009. NBM Science Collections databases: molluscs. New Brunswick Museum, Saint John NB, download Jan. 2009, 6951 recs (2957 in Atlantic Canada).
3	Baechler, Lynn. 2012. Plant observations & photos, 2012. Pers. comm. to S. Blaney, July 2012, 4 recs.
3	Belland, R.J. 2012. PEI moss records from Devonian Botanical Garden. DBG Cryptogam Database, Web site: https://secure.devonian.ualberta.ca/bryo_search.php 748 recs.
3	Gilhen, J. 1984. Amphibians & Reptiles of Nova Scotia, 1st Ed. Nova Scotia Museum, 164pp.
3	Klymko, J. 2019. Atlantic Canada Conservation Data Centre zoological fieldwork 2018. Atlantic Canada Conservation Data Centre.
3	Layberry, R.A. 2012. Lepidopteran records for the Maritimes, 1974-2008. Layberry Collection, 1060 recs.
3	McMullin, R.T. 2015. Prince Edward Island's lichen biodiversity and proposed conservation status in a report prepared for the province of PEI. Biodiversity Institute of Ontario Herbarium, University of Guelph, 776 records.
3	Neily, T.H. 2016. Email communication (May 6, 2016) to Sean Blaney regarding Fissidens exilis observations made in 2016 in Nova Scotia. Pers. Comm., 3 recs.
3	Whittam, R.M. 1999. Status Report on the Roseate Tern (update) in Canada. Committee on the Status of Endangered Wildlife in Canada, 36 recs.
2	Benedict, B. Connell Herbarium Specimens (Data) . University New Brunswick, Fredericton. 2003.
2	Blaney, C.S.; Mazerolle, D.M.; Hill, N.M. 2011. Nova Scotia Crown Share Land Legacy Trust Fieldwork. Atlantic Canada Conservation Data Centre, 5022 recs.
2	Blaney, C.S.; Spicer, C.D.; Rothfels, C. 2004. Fieldwork 2004. Atlantic Canada Conservation Data Centre. Sackville NB, 1343 recs.
2	Christie, D.S. 2000. Christmas Bird Count Data, 1997-2000. Nature NB, 54 recs.
2	Clayden, S.R. 1998. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 19759 recs.
2	Gillis, J. 2007. Botanical observations from bog on Skye Mountain, NS. Pers. comm., 8 recs.
2	Hall, R.A. 2001. S.. NS Freshwater Mussel Fieldwork. Nova Scotia Dept Natural Resources, 178 recs.
2	Hill, N. 2003. Floerkea proserpinacoides at Heatherdale, Antigonish Co. 2002. , Pers. comm. to C.S. Blaney. 2 recs.
2	Klymko, J. Henry Hensel's Butterfly Collection Database. Atlantic Canada Conservation Data Centre. 2016.
2	Klymko, J.J.D. 2012. Insect field work & submissions. Atlantic Canada Conservation Data Centre, 852 recs.
2	Lock, A.R., Brown, R.G.B. & Gerriets, S.H. 1994. Gazetteer of Marine Birds in Atlantic Canada. Canadian Wildlife Service, Atlantic Region, 137 pp.
2	Munden, C. 2018. Email communication on Cypripedium parviflorum. Amateur naturalist, 2.
2	Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia. 2014.
2	Neily, T.H. & Pepper, C.; Toms, B. 2018. Nova Scotia lichen database Update. Mersey Tobeatic Research Institute, 14 recs.
2	O'Neil, S. 1998. Atlantic Salmon: Northumberland Strait Nova Scotia part of SFA 18. Dept of Fisheries & Oceans, Atlantic Region, Science. Stock Status Report D3-08. 9 recs.
2	Ogden, J. NS DNR Butterfly Collection Dataset. Nova Scotia Department of Natural Resources. 2014.
2	Quigley, E.J. 2006. Plant records, Mabou & Port Hood. Pers. comm. to S.P. Basquill, Jun. 12. 4 recs, 4 recs.
2	Selva, S.B. 2002. Status Report on frosted glass-whiskers, Sclerophora peronella. Committee on the Status of Endangered Wildlife in Canada, Draft Revision, May 2002. 2 recs.
2	Zahavich, J. 2017. Canada Warbler and Olive-sided Flycatcher records 2017. Island Nature Trust, 14 recs.
1	Anderson, D. 2019. Black Ash observation, Baddeck, Nova Scotia. pers. comm. to J.L. Churchill.
1	Anderson, D.G. 2011. New site for showy ladyslipper on Cape Breton. Nova Scotia Department of Natural Resources, pers.comm. to R. Lautenschlager, Jul 5, 2011.
1	Anon. 2017. Export of Maritimes Butterfly records. Global Biodiversity Information Facility (GBIF).
1	Anon. Dataset of butterfly records for the Maritime provinces. Museum of Comparative Zoology, Harvard University. 2017.
1	Archibald, D.R. 2003. NS Freshwater Mussel Fieldwork. Nova Scotia Dept Natural Resources, 213 recs.
1	Baechler, Lynn. 2016. Plant observations & photos, 2016. Pers. comm. to S. Blaney, May 2016, 2 recs.
1	Basquill, S.P. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre, Sackville NB, 69 recs.
1	Beaulieu-Bouchard, M. 2014. Email to S. Blaney regarding Salix reticulata & vestita in NS. Canadian Museum of Nature, 1 obs.
1	Benjamin, L.K. 2009. NSDNR Fieldwork & Consultants Reports. Nova Scotia Dept Natural Resources, 143 recs.
1	Cameron, R.P. 2009. Nova Scotia nonvascular plant observations, 1995-2007. Nova Scotia Dept Natural Resources, 27 recs.
1	Chapman, C.J. 2019. Atlantic Canada Conservation Data Centre 2019 botanical fieldwork. Atlantic Canada Conservation Data Centre, 11729 recs.
1	COSEWIC (Committee on the Status of Wildlife in Canada). 2013. COSEWIC Assessment and Status Report on the Eastern Waterfan Peltigera hydrothyria in Canada. COSEWIC, 46 pp.
1	Crowell, M. 2013. email to Sean Blaney regarding Listera australis at Bear Head and Mill Cove Canadian Forces Station. Jacques Whitford Environmental Ltd., 2.
1	Curley, F.R. 2005. PEF&W Collection 2003-04. PEI Fish & Wildlife Div., 716 recs.
1	Doucet, D.A. 2007. Lepidopteran Records, 1988-2006. Doucet, 700 recs.
1	Doucet, D.A. 2009. Census of Globally Rare, Endemic Butterflies of Nova Scotia Gulf of St Lawrence Salt Marshes. Nova Scotia Dept of Natural Resources, Species at Risk, 155 recs.
1	e-Butterfly. 2018. Selected Maritimes butterfly records from 2016 and 2017. Maxim Larrivee, Sambo Zhang (ed.) e-butterfly.org.
1	Edsall, J. 2007. Personal Butterfly Collection: specimens collected in the Canadian Maritimes, 1961-2007. J. Edsall, unpubl. report, 137 recs.
1	Gilman, A.; Testo, W. 2015. Use of Gemma Characters to Identify North American Huperzia (Lycopodiaceae). American Fern Journal, 105(3):145-161.
1	Island Nature Trust. 2016. Farmland birds project. Mader, Shannon (ed.) .
1	Kelly, Glen 2004. Botanical records from 2004 PEI Forestry fieldwork. Dept of Environment, Energy & Forestry, 71 recs.
1	Klymko, J.J.D. 2012. Maritimes Butterfly Atlas, 2010 and 2011 records. Atlantic Canada Conservation Data Centre, 6318 recs.
1	Klymko, J.J.D. 2018. 2017 field data. Atlantic Canada Conservation Data Centre.
1	Lautenschlager, R.A. 2010. Miscellaneous observations reported to ACCDC (zoology). Pers. comm. from various persons, 2 recs.
1	MacQuarrie, K. 1991-1999. Site survey files, maps. Island Nature Trust, Charlottetown PE, 60 recs.
1	Manthorne, A. 2019. Incidental aerial insectivore observations. Birds Canada.
1	McKendry, Karen. 2016. Rare species observations, 2016. Nova Scotia Nature Trust, 19 recs.
1	McNeil, J.A. 2019. Snapping Turtle records, 2019. Mersey Tobeatic Research Institute.
1	NatureServe Canada. 2018. iNaturalist Butterfly Data Export . iNaturalist.org and iNaturalist.ca.

# recs	CITATION
1	Neily, T.H. & Pepper, C.; Toms, B. 2019. Boreal Felt Lichen Observation, January 2019. Mersey Tobeatic Research Institute, 1 rec.
1	New York Botanical Garden. 2006. Virtual Plant Herbarium - Vascular Plant Types Catalog. Sylva, S.; Kallunki, J. (ed.) International Plant Science Centre, Web site: http://sciweb.nybg.org/science2/vii2.asp. 4 recs.
1	Newell, R.B.; Sam, D. 2014. 2014 Bloodroot personal communication report, Antigonish, NS. NS Department of Natural Resources.
1	Phinney, Lori; Toms, Brad; et. al. 2016. Bank Swallows (Riparia riparia) in Nova Scotia: inventory and assessment of colonies. Merset Tobeiatc Research Institute, 25 recs.
1	Richardson, D., Anderson, F., Cameron, R, McMullin, T., Clayden, S. 2014. Field Work Report on Black Foam Lichen (Anzia colpodes). COSEWIC.
1	Schmidt, B.C. 2017. Details about a Speyeria aphrodite specimen at the Canadian National Collection from Baddeck, NS, sent via email on 15 February 2017.
1	Schori, M. 2003. Hieracium robinsonii locations in Atlantic Canada. Pers. comm. to C.S. Blaney. Gray Herbarium, Harvard University, 1 rec.
1	Shortt, R. UNB specimen data for various tracked species formerly considered secure. Connell Memorial Herbarium, UNB, Fredericton NB. 2019.
1	Spicer, C.D. 2004. Specimens from CWS Herbarium, Mount Allison Herbarium Database. Mount Allison University, 5939 recs.
1	Standley, L.A. 2002. Carex haydenii in Nova Scotia. , Pers. comm. to C.S. Blaney. 4 recs.
1	White, S. 2019. Notable species sightings, 2018. East Coast Aquatics.
1	Zahavich, J.L. 2017. Locations of Round-leaved Orchid (Platanthera orbiculata) at Townshend Woodlot and Bird Island. Island Nature Trust, 2 records.

APPENDIX D

NOVA SCOTIA MUSEUM REPORT

HERITAGE AND BIOLOGICAL RESOURCES

NOVA SCOTIA

Communities, Culture & Heritage

1741 Brunswick Street
3rd Floor
P.O. Box 456
Halifax, NS
B3J 2R5

Tel: (902) 424-6475
Fax: (902) 424-0560

April 26, 2021

Hayley Doyle
Envirosphere Consultants Ltd.
PO Box 2906 Unit 5 - 120 Morison Drive
Windsor, NS B0N 2T0

Dear Hayley Doyle:

RE: Environmental Screening 2021-04-13b
Whycocomagh Quarry

Further to your request of April 13, 2021 staff at Communities, Culture and Heritage has reviewed their files for reference to the presence of natural and heritage resources in the study area. Please be aware that the information is not comprehensive and may include varying degrees of accuracy with respect to the precise location and condition of natural and heritage resources.

It should be noted that the amount and degree of disturbance from previous developments could have a significant role in establishing the presence, absence or condition of natural and heritage resources in this area.

Botany

Staff have reviewed their records for species of concern in the area of the Whycocomagh Quarry. The following list of species that are classified as "rare", according to natureserve rarity rankings between S1 and S3 or provincial rankings of at least "yellow"-level, was prepared based on data held at the Nova Scotia Museum. The following species are located within 10 km of the proposed project:

Table 1: Occurrences from publicly accessible data

Group	Species list	Rank	SARA status	COSEWIC status	NS Status
Lichen	*Heterodermia neglecta*	S3S4			
Lichen	*Pectenia plumbea*	S3	Special Concern	Special Concern	Vulnerable
Lichen	*Peltigera collina*	S2?			
Lichen	*Peltigera neckeri*	S1S3			

Table 2: Occurrences based on Nova Scotia Museum Database search for place names within vicinity of project

Genus	species	taxonomic authority	Location	Location description	Date collected
Viola	*selkirkii*	Pursh.	Brigend	near Whycocomagh	1952-06-01

Table 3: Occurrences based on Rare Plants maps held at the Nova Scotia Museum

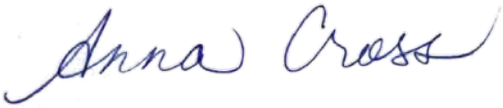
Genus	species	taxonomic authority	Status
Asplenium	*trichomanes-ramosum*	L.	yellow
Botrychium	*lanceolatum*	(Gmel.) Angstr.	yellow
Carex	*atratiformis*	Britton	yellow
Cryptogramma	*stelleri*	(Gmel.) Prantl.	orange
Draba	*arabisans*	Michx.	yellow
Impatiens	*pallida*	Nutt.	yellow
Lilium	*canadense*	L.	yellow
Listera	*australis*	Lindl.	orange
Rhamnus	*alnifolia*	L'Hér.	yellow
Triosteum	*aurantiacum*	Nickn.	yellow
Woodsia	*glabella*	R. Br.	yellow

Palaeontology

Staff have reviewed their files and consulted the regional geology mapping of the area on Geoscience Atlas. Based on the surficial and bedrock geology of this site there do not appear to be significant risks of encountering fossil material in the overlying units or quarry bedrock.

If you have any questions, please contact me at anna.cross@novascotia.ca.

Sincerely,



Anna Cross
Special Places Assistant

APPENDIX E

LABORATORY RESULTS

TSS & pH

Envirosphere Consultants Limited

Unit 5—120 Morison Drive, Box 2906, Windsor, Nova Scotia, B0N 2T0

ph: (902) 798-4022, fax: (902) 798-2614, e-mail: enviroco@ns.sympatico.ca, website: www.envirosphere.ca

Environmental Sample Analysis Report

Report Date: 24-Jun-21 Report Number: A0846

Envirosphere Consultants Ltd
Unit 5 - 120 Morison Drive
Windsor, NS | B0N 2T0

Lab #	Sample ID	Sample Details	Sample Material	Date Received	Date Analyzed	TSS (mg/L)	Type of Sample	Detection Limit	Sample Comments
L2021-41	MT #1	Whycocomagh	surface water	6/18/2021	6/23/2021	0.5	REG	0.5 mg/L	
L2021-41	N Corner Stream	Whycocomagh	surface water	6/18/2021	6/23/2021	4.0	REG	0.5 mg/L	
L2021-41	Above Culvert	Whycocomagh	surface water	6/18/2021	6/23/2021	<0.5	REG	0.5 mg/L	
L2021-41	Skye R	Whycocomagh	surface water	6/18/2021	6/23/2021	<0.5	REG	0.5 mg/L	
L2021-41	Skye R (DUP)	Whycocomagh	surface water	6/18/2021	6/23/2021	0.5	DUP	0.5 mg/L	
L2021-41	CRM	Whycocomagh	CRM		6/23/2021	215.5	STD	0.5 mg/L	CRM TSS = 209 mg/L
L2021-41	Blank	Whycocomagh	dH2O		6/23/2021	<0.5	BLANK	0.5 mg/L	

Name of Analyst: M H Hilchbrand Analyses reviewed by: J H L Director / Lab Manager (circle one)

This laboratory applies standard practice in conformance with ISO/IEC 17025:2017, "General Requirements for the Competence of Testing and Calibration Laboratories".

Validation Range: 1-1000 mg/L The results in this report relate only to the items tested. More information is available upon request. The quality of the results is dependent on the quality of sample provided.

Samples for TSS analysis should be kept cool until delivery to the lab unless they are analyzed immediately. A minimum sample volume of 500 ml is preferred. Place sample in a clean plastic container free of cracks or contamination. Fill the bottle to the top and then cap. Samples should reach the lab within 24 hours of sampling, but will be accepted up to 7 days.

Methods: Modified from Standard Methods for the Examination of Water and Wastewater 23rd Edition. 2017 and online version. 2540D. Total Suspended Solids. ECL method 3, Total Suspended Solids.

Type of Sample: REG = regular; STD = standard; DUP = duplicate; CRM = certified reference material.

Sample Comments: BDL = Below Detection limit; QR = Qualified result; NR = No result, damaged or insufficient sample; MAC = Maximum Allowable Concentration.

Envirosphere Consultants Limited

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Envirosphere Consultants
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Environmental Sample Analysis Report

Report Date: 24-Jun-21 Report Number: A0848

Lab #	Sample ID	Sample Details	Sample Material	Date Received	Date Analyzed	pH	Type of Sample	Detection Limit	Sample Comments
L2021-41	MT #1	Whycocomagh	surface water	6/18/2021	6/19/2021	7.3	REG	0.1	
L2021-41	MT #1 (DUP)	Whycocomagh	surface water	6/18/2021	6/19/2021	7.3	DUP	0.1	
L2021-41	N Corner Stream	Whycocomagh	surface water	6/18/2021	6/19/2021	7.2	REG	0.1	
L2021-41	Above Culvert	Whycocomagh	surface water	6/18/2021	6/19/2021	7.3	REG	0.1	
L2021-41	Skye R	Whycocomagh	surface water	6/18/2021	6/19/2021	7.7	REG	0.1	
L2021-41	CRM	Whycocomagh	CRM		6/19/2021	7.0	STD	0.1	CRM pH=7.0

Name of Analyst: MHicdonald Analyses reviewed by: HL Director / Lab Manager (circle one)

This laboratory applies standard practice in conformance with ISO/IEC 17025:2017, "General Requirements for the Competence of Testing and Calibration Laboratories".

Validation Range: 3-10 units The results in this report relate only to the items tested. More information is available upon request.

The quality of the results is dependent on the quality of sample provided.

Comment: Samples for pH should be kept cool until delivery to the lab unless the samples are analyzed immediately. Preferably samples should be analyzed within 24 hours. Hach manual recommends filling bottle completely and capping tightly; cooling to 4°C for storage and analyzing within 6 hours. If this can't be done, Hach manual recommends reporting the holding time with results.

Method: Standard Methods for the Examination of Water and Wastewater 23rd Edition. 2017 and online version., 4500-HB. Electrometric measurement of pH. ECL Method 8, pH.

Type of Sample: REG = regular; STD = standard; DUP = duplicate; CRM = certified reference material.

Sample Comments: BDL = Below Detection limit; QR = Qualified result; NR = No result, damaged or insufficient sample; MAC = Maximum Allowable Concentration.