A Preliminary Assessment for Mammals and Herpetofauna at a Proposed Quarry Expansion in Colpton, Lunenburg County, Nova Scotia

1.0 Introduction and Background

Edgewood Environmental Services (EES) was subcontracted by Envirosphere Consultants Ltd. to complete a preliminary assessment for mammals and herpetofauna as background for an application by Dexter Construction Company Limited for a quarry expansion. The assessment area was approximately 77 ha and consisted of a forest matrix with interspersed wetlands, and an existing quarry (Figure 1, UTM 20T 357055E 4922227N).

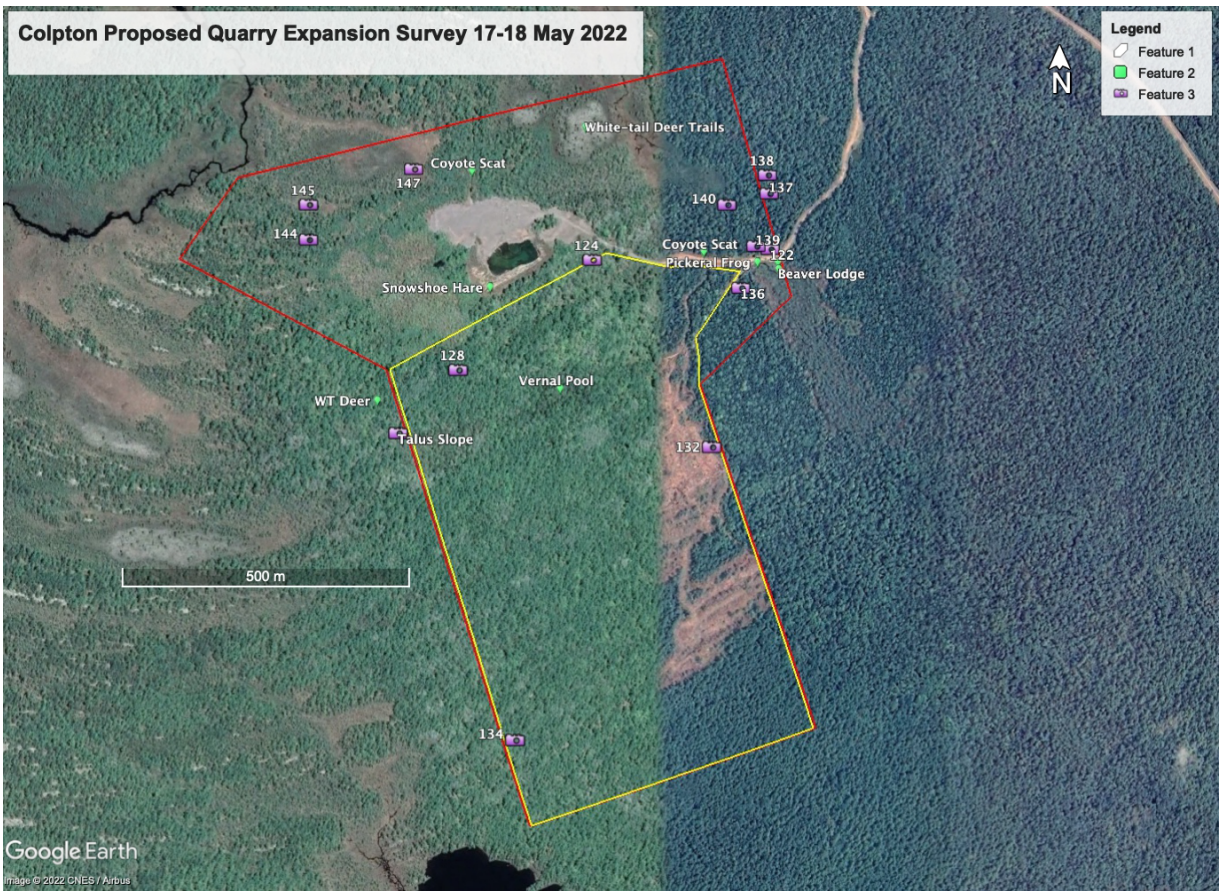

Figure 1. Colpton study area boundaries indicated in red. Approximate area recently clearcut is outlined in yellow. Features of interest and photo locations are also noted.

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

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

AC CDC records for the area surrounding the Colpton property show several mammal, or herpetofauna species at risk or conservation concern within a 5 km radius of the study site (Table 1), and up to 100 km away (Table 2).

Mammal and Herpetofauna Species at Risk With in a 5 km Radius of the Study Area			
Common Name	**Scientific Name**	**Provincial Conservation Status**	**Distance from Center (Km)**
Little brown myotis	*Myotis lucifugus*	Endangered	3.8
Long-eared myotis	*Myotis septentrionalis*	Endangered	3.8
Blanding's turtle	*Emydoidea blandingii*	Endangered	0.7
Eastern ribbonsnake	*Thamnophis saurita*	Threatened	1.0
Snapping turtle	*Chelydra serpentina*	Vulnerable	1.0

Table 1. Mammal and herpetofauna species at risk within a 5 km radius of the center of the study site based on AC CDC records (2022).

Rare or Uncommon Mammal and Herpetofauna Species Within a 100 km Radius of the Study Area (Not Identified in Table 1)			
Common Name	**Scientific Name**	**Provincial Conservation Status**	**Distance from Center (Km)**
Tri-colored bat	*Perimyotis subflavus*	Endangered	7
Canada lynx	*Lynx canadensis*	Endangered	39
Moose	*Alces alces americana*	Endangered	21
American marten	*Martes americana*	Endangered	26
Maritime shrew	*Sorex maritimensis*	No Status	62
Wood turtle	*Glyptemys insculpta*	Threatened	15
Eastern painted turtle	*Chrysemys picta*	No Status	1
Four-toed salamander	*Hemidactylum scutatum*	No Status	4

Table 2. Mammal and herpetofauna species at risk within a 100 km radius of the center of the study site based on AC CDC records (2022).

1.0 Critical and Core Habitat

Critical and core habitat is habitat that is considered to be essential for the continued persistence and recovery of a species or population. Both are considered synonymus; however, "critical habitat" is referenced in the federal Species at Risk Act (SARA), and the term "core habitat" is used in the Nova Scotia Endangered Species Act (NSESA). Identification of critical and core habitat is a requirement under these acts for species that are designated as either endangered or threatened. An understanding of critical or "core" habitats are required for those species in Tables 1 and 2.

1.1.1. Mammals

Critical habitat for the three endangered bat species in Nova Scotia is not fully understood or described, but is considered to be anywhere the species have been identified since 1995 (NSDNRR 2020 c). This includes hibernation sites, maternity roosts, and summer roosts. Although two of the three bat species have been recorded within 3.8 km of the center of the study site, and the remaining species within 7 km (AC DCC 2022, Table 1), the Colpton study area is not currently within mapped critical habitat identified within the recovery plan for bats (NSDNRR 2020 c; p 85).

The Colpton study area is also not found within either designated core moose habitat identified in the Recovery Plan for Moose (*Alces alces americana*) in Mainland Nova Scotia or a mainland moose concentration area (NSDRR 2021).

1.1.2. Herpetofauna

Recovery plans for Blanding's turtle and Eastern ribbonsnake include mapping for critical habitat for these species (NSDNRR 2020 a, b). Designated critical habitat for Blanding's turtle includes approximately 12 ha of the Colpton study area based on mapping found in the recovery plan (NSDNRR 2020 b; p 25). This portion of the study area is located at the northwest corner of the property and falls within the Pleasant River critical habitat parcel identified in the recovery plan.

Similarly, critical habitat has been identified for the Eastern ribbonsnake within the northern part of the study area identified in the recovery plan as the Barren Meadow – Keddy Brook parcel. It is difficult to estimate from the mapping how much critical habitat falls within the study area but it appears that a portion along the northern boundary is either in, or adjacent to this habitat. Additional critical habitat within 0.1 – 1.5 km of the study site has been identified at Fox Lake and 7 Mile Lake (NSDNRR 2020 a; p 35).

2.0. Methodology

Walk-over surveys for mammals and herpetofauna were conducted throughout the survey area identified in red in Figure 1 prior to full leaf-out. All surveys were conducted on-foot by a single

observer and were designed to intersect major wetland habitat or forest stand types, or follow existing roads and trails within the study area (Figure 1). Because this was a reconnaissance survey, effort was not standardized, and no species-specific targeted surveys were conducted at this time.

Observations within, or adjacent to forest habitat, wetlands, and streams were made along indeterminant survey routes to opportunistically search for wildlife sign. Forwarding trails and haul roads used to transport wood or aggregate were also searched for animal sign. Evidence of species occurrence was confirmed through direct visual observation of individuals, or indirect evidence such as calls, scat, tracks, potential dens, and foraging behaviours (i.e., grubbing, rock and log rolling, browse, seed middens). Waypoints for features of interest were recorded using a Garmin Oregon 750t® GPS, and all photos were taken using an Apple iPhone 11®. Nocturnal bat surveys were conducted with a Wildlife Acoustics Echo Meter Touch 2 Pro® for iOS fitted to an Apple iPhone 11. Incidental avian observations based on sightings or calls were recorded in Table 4. Nocturnal surveys for bats and amphibians commenced 30 minutes after official sundown and consisted of detecting calls (amphibians), or echolocation signals (bats) at a single survey point (Figure 1, waypoint Pickerel Frog) for one hour.

3.0 Results

3.1. General Habitats

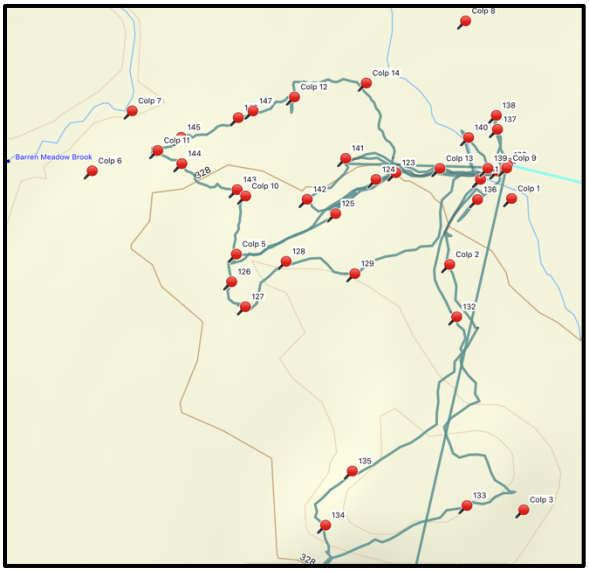

Figure 2. Garmin Base Camp image of survey track with waypoints at Colpton Quarry on 17-18 May 2022.

Surveys within the study area (Figure 1) were completed over a two-day period on 17–18 May 2022. Approximately 8 km of walk-over surveys were completed over two days (Figure 2). Issues with GPS signals on 17 May prevented recording a complete track log as evidenced by the obvious "gap" in coverage in the western portion of the study area. The majority of the site until recently had been a mixed-wood forest site with interspersed wetlands (treed swamps, marsh, vernal pool, and bogs). The most obvious finding was that approximately 44 ha of the ~77 ha study area (57%) had been recently clearcut (Figures 3 a, b, c) with remnant scattered trees. The quarry operator indicated that the cutover was undertaken by the previous landowner who had retained harvest rights (P. Stewart, Envirosphere Consultants, Pers. Comm.)

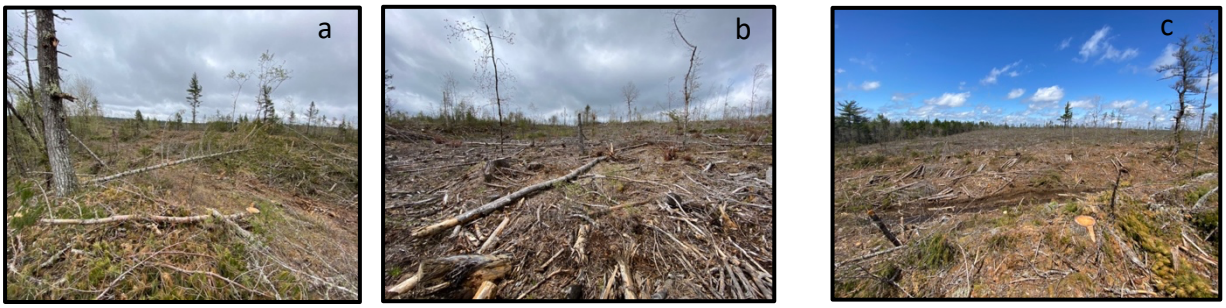

Figure 3 a, b, c. Photos taken at photo waypoint 128 (a), photo waypoint 132 (b), (c, no photo waypoint) illustrating clearcut harvest, remnant trees, and residual tops and branches contributing to on-site coarse woody material suitable for cover habitat for small mammals and some birds.

The immediate impact of the removal of forest cover is the loss of habitat for most resident biodiversity, and for those species that used portions of the harvest area to meet seasonal life history needs. Resident species that require mature forest cover will be displaced. With the change in forest cover successional processes will promote the re-establishment of early seral and generalist plant and animal species. Mammalian species such as white-tail deer (*Odocoileus virginianus*), moose, eastern coyote (*Canis latrans*), black bear (*Ursus americanus*), red fox (*Vulpes vulpes*), and snowshoe hare (*Lepus americanus)* will forage in regenerating cutovers as new vegetative growth is established. Smaller mammals such as snowshoe hare, short-tailed weasel (*Mustela erminea*), deer mice (*Peromyscus maniculatus*), white footed mice (*Peromyscus leucopus*), and shrews (*Blarina brevicauda*, *Sorex* spp.) will utilize residual cover (trees, slash) remaining in the clearcut, and near the "edge" where the clearcut abuts the adjacent forest cover. Mammal use will increase over time as newly established vegetation provides both cover and food. If the site is left to succeed to the climax community and develop structurally (> 60 – 100 years), red (*Tamiasciurus hudsonicus*), and flying squirrels (*Glaucomys* spp.) may become residents. Mustelids such as American marten and fisher (*Pekania pennanti*) may utilize the area as part of their larger home ranges if appropriate structural features develop within the protected areas that surround the study site. Both these species utilize mature late seral forests with abundant large diameter trees and coarse woody material, which, depending on future land use may not develop. Figure 4 (photo waypoint 134, Figure 1) is a photo of the forest stand structure found immediately adjacent to the clearcut along the western boundary of the study area, and provides some indication of what the clearcut may succeed to in time.

Figure 4. Photo of forest cover and development adjacent to study area taken at photo waypoint 134 (Figure 1).

Species that require water or are generally associated with aquatic habitats such as watercourses and wetlands (including vernal pools) will have a significantly reduced presence in the clearcut area. A single vernal pool was located in the clearcut area that could potentially provide some habitat for amphibians such as wood frogs (*Rana sylvatica*), or green frogs (*Rana clamitans*);

however, with the loss of all cover surrounding the pool and the concomitant increase in water temperature and solar exposure it is unlikely that amphibians will utilize this area in the future until there is sufficient re-establishment of ground cover to ameliorate these environmental effects. Wetlands and watercourses located on and adjacent to the study area which will provide suitable habitat for commonly occurring mammal species such as raccoons (*Procyon lotor)*, mink (*Mustela visons*), and otter (*Lontra canadensis*).

Outside the recent clearcut, residual patches of forest cover ≤ 20 years old were found near photo waypoint 124 (Figure 5 a, b) and photo waypoint 136 (Figure 5c). These remnant patches were

Figure 5 a, b, c. Photo waypoints 124 (a, b) and 136 (c) illustrating regenerating forest near or adjacent to the south side of the existing quarry (a, b), and near the eastern boundary of the study site west of the beaver flowage.

evidence of a previous harvest, and were principally composed of early and late seral species such as white pine (*Pinus strobus*), red maple (*Acer rubrum*), and balsam fir (*Abies balsamea*). Scattered older red oak (*Quercus rubrum*), and eastern hemlock (*Tsuga canadensis*) were also present.

Mature forest stands were also present in the study area at or near the boundaries of the property. Species found include white pine, black spruce, red oak, large-tooth aspen (*Populus grandidentata*), and red maple. Balsam fir regen is also present where there is understory development (Figures 1, 6 a, b, c). Generally speaking, canopy closure is open enough to promote understory structural diversity through vegetative regeneration which is beneficial to a wide variety of biodiversity.

Figure 6 a, b, c. Examples of mature forest stands located within the study area at photo waypoints 137 (a), 138 (b), and 144 (c).

A variety of aquatic habitats were also present within the study area. Figure 7 a (Figure 1 photo waypoint "Beaver Lodge") shows a beaver flowage that has been drained in the recent past. The