

ACCDC Short List of Species of Conservation

ACCDC Short List of Species Conservation Concern (25 km)

| No. | Scientific Name | Common Name | NPROT | SRANK | SPROT | NSDNR General Status | MinDist (km) | Habitat (*LFP = Larval foodplant) | Freq w/i 25 | Most Recent |
|---------------|-------------------------------|---------------------------|-------|-------|-------|----------------------|--------------|--|-------------|-------------|
| Plants | | | | | | | | | | |
| 1 | <i>Polygala sanguinea</i> | Blood Milkwort | | S2S3 | | YELLOW | -5 | meadows, fields and glades | 4 | 1995 |
| 2 | <i>Carex tenera</i> | Tender Sedge | | S1S2 | | YELLOW | -2 | meadows, woodlands, and moist, dry openings | 2 | 2002 |
| 3 | <i>Lobelia spicata</i> | Pale-Spiked Lobelia | | S1 | | RED | 0 | dry fields | 3 | 1954 |
| 4 | <i>Fraxinus nigra</i> | Black Ash | | S2S3 | | YELLOW | 1 | Low ground, damp woods and swamps. | 11 | 2008 |
| 5 | <i>Polygonum arifolium</i> | Halberd-leaved Tearthumb | | S2 | | YELLOW | 1 | thickets, marshy borders, usually near/under alders. Flourishes in rich, alluvial soil. | 3 | 2006 |
| 6 | <i>Carex lupulina</i> | Hop Sedge | | S3 | | GREEN | 2 | mucky meadows along intervalles, swales, and wet, <u>deciduous or treed swamps</u> | 1 | 2006 |
| 7 | <i>Hedeoma pulegioides</i> | American False Pennyroyal | | S2S3 | | YELLOW | 2 | stony soils and upland pastures, occasionally near seashores | 3 | 1997 |
| 8 | <i>Carex tuckermanii</i> | Tuckerman's Sedge | | S1 | | RED | 4 | swales | 4 | 1993 |
| 9 | <i>Polygonum scandens</i> | Climbing False Buckwheat | | S3 | | YELLOW | 8 | Low alluvial thickets along river intervalles. | 7 | 2007 |
| 10 | <i>Campanula aparinoides</i> | Marsh Bellflower | | S3 | | YELLOW | 10 | Meadows, ditches and river banks. | 3 | 2007 |
| 11 | <i>Carex pellita</i> | Woolly Sedge | | S1 | | RED | 10 | wet meadows and fields, swales and seeps | 1 | 2007 |
| 12 | <i>Lilium canadense</i> | Canada Lily | | S2S3 | | YELLOW | 10 | In meadows and stream banks | 3 | 2007 |
| 13 | <i>Liparis loeselii</i> | Loesel's Twayblade | | S3S4 | | GREEN | 12 | rich coniferous forests, swamp edge, bogs, wet pastures, moist forest, swales, fields, boggy roadside ditches. | 1 | 1954 |
| 14 | <i>Myriophyllum farwellii</i> | Farwell's Water Milfoil | | S2 | | YELLOW | 12 | Ponds and slow-moving streams. | 1 | 1989 |
| 15 | <i>Sparganium natans</i> | Small Burreed | | S3 | | GREEN | 14 | bays, pools ditches, peat bogs | 2 | 2003 |

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| 16 | <i>Cypripedium arietinum</i> | Ram's-Head Lady's-Slipper | | S1 | Endangered | RED | 15 | gypsum sinkholes, areas with gypsum | 1 | 2002 |
| 17 | <i>Proserpinaca palustris</i> var. <i>crebra</i> | Marsh Mermaidweed | | S3 | | GREEN | 15 | boggy swales, wet marshes, and the edges of streams | 1 | 2001 |
| 18 | <i>Potamogeton obtusifolius</i> | Blunt-leaved Pondweed | | S2S3 | | YELLOW | 16 | ponds, lakes, slow-moving streams, often on substrate of deep muck | 3 | 2007 |
| 19 | <i>Potamogeton praelongus</i> | White-stemmed Pondweed | | S3? | | UNDETERMINED | 16 | usually in deep water | 1 | 2003 |
| 20 | <i>Agrimonia gryposepala</i> | Hooked Agrimony | | S3 | | GREEN | 17 | mesic to moist edges of forests and woods, deciduous or mixed woodlands, tickets, clearings in forests, streams, marshes, bogs, low meadows, roadsides and pastures | 3 | 2003 |
| 21 | <i>Asclepias incarnata</i> | Swamp Milkweed | | S3 | | GREEN | 18 | wet or rocky thickets, usually near a stream or lakeshore | 1 | 2003 |
| 22 | <i>Equisetum scirpoides</i> | Dwarf Scouring-Rush | | S3S4 | | GREEN | 18 | moist thickets, mossy knolls, spring banks, coniferous forests. | 1 | 1954 |
| 23 | <i>Polygonum pennsylvanicum</i> | Pennsylvania Smartweed | | S3 | | GREEN | 20 | wet to moist, disturbed sites, rich soil | 2 | 2003 |
| 24 | <i>Rudbeckia laciniata</i> var. <i>gaspereauensis</i> | Cut-Leaved Coneflower | | S2 | | YELLOW | 20 | Swales, the edges of swamps, or in gullies - in small colonies. | 1 | 2002 |
| 25 | <i>Carex bebbii</i> | Bebb's Sedge | | S1S2 | | RED | 20 | northern alkaline regions in poorly drained soils | 1 | 2003 |
| 26 | <i>Rhamnus alnifolia</i> | Alder-leaved Buckthorn | | S3 | | YELLOW | 20 | swampy woods and boggy meadows | 2 | 2003 |
| 27 | <i>Elymus wiegandii</i> | Wiegand's Wild Rye | | S1 | | RED | 21 | streambanks and meadows | 2 | 2006 |
| 28 | <i>Sisyrinchium angustifolium</i> | Narrow-leaved Blue-eyed-grass | | S3S4 | | GREEN | 21 | fields, meadows, open woods and roadsides | 1 | 2002 |

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| 29 | <i>Anemone quinquefolia</i> | Wood Anemone | | S2 | | YELLOW | 21 | wooded riverbanks and shaded intervals | 1 | 2003 |
| 30 | <i>Megalodonta beckii</i> | Water Beggarticks | | S3 | | YELLOW | 21 | still or slow-moving water or lakes, streams, rivers and brooks | 1 | 1954 |
| 31 | <i>Carex adusta</i> | Lesser Brown Sedge | | S2S3 | | YELLOW | 22 | dry, open woods, gravels, rocks, and clearings. Often in acidic soils | 1 | 2003 |
| 32 | <i>Ranunculus pensylvanicus</i> | Pennsylvania Buttercup | | S1 | | RED | 22 | wet meadows, moist clearings, ditches, bogs, depressions in woodlands | 2 | 2003 |
| 33 | <i>Amelanchier fernaldii</i> | Fernald's Serviceberry | | S2? | | UNDETERMINED | 23 | riparian, scrub-shrub wetlands, barrens, shrubland/chaparral, shores, ravines. | 1 | 1956 |
| 34 | <i>Carex atlantica ssp. capillacea</i> | Atlantic Sedge | | S2 | | GREEN | 24 | swamps, bogs and peaty barrens | 1 | 1992 |
| 35 | <i>Hypericum dissimulatum</i> | Disguised St John's-wort | | S2S3 | | YELLOW | 24 | On shores and damp open areas. | 2 | 2001 |
| 36 | <i>Salix petiolaris</i> | Meadow Willow | | S3 | | GREEN | 25 | bog margin, roadsides, wet meadow, dry field, riverside in tall meadow, marshy ground. | 1 | 2001 |
| Birds | | | | | | | | | | |
| 1 | <i>Bucephala clangula</i> | Common Goldeneye | | S2B, S5N | | GREEN | -3 | Breeds along wooded rivers and lakes, Winters in marine waters | 8 | 2007 |
| 2 | <i>Mergus serrator</i> | Red-breasted Merganser | | S3B, S5N | | GREEN | -3 | Breeds near water's edge, prefers marine waters | 8 | 2008 |
| 3 | <i>Anas acuta</i> | Northern Pintail | | S2B | | GREEN | 0 | Breeds in shallow, seasonal wetlands, marshes. Winters in shallow water, tidal waters | 3 | 1989 |

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| 4 | <i>Dolichonyx oryzivorus</i> | Bobolink | T | S3S4B | | YELLOW | 0 | Breeds in open grasslands. In migration uses marshes, grasslands | 30 | 2008 |
| 5 | <i>Rallus limicola</i> | Virginia Rail | | S2B | | GREEN | 0 | Breeds mainly in freshwater marshes w/ abundant emergent vegetation | 7 | 2008 |
| 6 | <i>Charadrius semipalmatus</i> | Semipalmated Plover | | S1S2B, S5M | | GREEN | 1 | Breeds along shorelines | 7 | 2006 |
| 7 | <i>Icterus galbula</i> | Baltimore Oriole | | S2S3B | | GREEN | 3 | Breeds in open, deciduous woodland | 3 | 2007 |
| 8 | <i>Sterna hirundo</i> | Common Tern | NAR | S3B | | YELLOW | 3 | Breeds on islands and in marshes | 8 | 2008 |
| 9 | <i>Asio flammeus</i> | Short-eared Owl | SC | S1S2 | | YELLOW | 4 | Open country, including prairie, meadows, tundra, moorlands, marshes, savanna, and open woodland. Ground nester | 2 | 2001 |
| 10 | <i>Bucephala islandica</i> (Eastern pop.) | Barrow's Goldeneye (Eastern pop.) | SC | S1N | | YELLOW | 5 | Breeds along wooded rivers and lakes, Winters in marine waters | 1 | 1996 |
| 11 | <i>Coccyzus erythrophthalmus</i> | Black-billed Cuckoo | | S3?B | | GREEN | 9 | deciduous woodlands, and thickets, including aspen, poplar, birch, sugar maple, hickory, hawthorn, and willow | 6 | 2008 |
| 12 | <i>Accipiter gentilis</i> | Northern Goshawk | NAR | S3S4 | | YELLOW | 9 | Breeds in mature forests | 4 | 2008 |
| 13 | <i>Anas clypeata</i> | Northern Shoveler | | S2B | | GREEN | 9 | Breeds in open, shallow wetlands. In winter, inhabits both freshwater and saline marshes | 2 | 2008 |
| 14 | <i>Mimus polyglottos</i> | Northern Mockingbird | | S3B | | GREEN | 9 | open ground and with shrubby vegetation like hedges, fruiting bushes, and thickets. | 2 | 1996 |

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| 15 | <i>Myiarchus crinitus</i> | Great Crested Flycatcher | | S2B | | GREEN | 9 | Breeds in open deciduous woodlands, riparian corridors, wooded swamps, and urban areas with large shade trees. Cavity nester | 1 | 1988 |
| 16 | <i>Poocetes gramineus</i> | Vesper Sparrow | | S2S3B | | YELLOW | 9 | open habitats with grass, including meadows, pastures, and roadsides. | 4 | 2007 |
| 17 | <i>Sayornis phoebe</i> | Eastern Phoebe | | S3S4B | | GREEN | 9 | woodlands and along forest edges, often near water | 8 | 2008 |
| 18 | <i>Sialia sialis</i> | Eastern Bluebird | NAR | S3B | | YELLOW | 9 | open country around trees, but with little understory and sparse ground cover. Original habitats probably included open, frequently burned pine savannas, beaver ponds, mature but open woods, and forest openings. Today, they're most common along pastures, agricultural fields, suburban parks, backyards, and golf courses. | 1 | ? |
| 19 | <i>Euphagus carolinus</i> | Rusty Blackbird | SC | S2S3B | | YELLOW | 10 | Breeds in wet forests, including areas with fens, bogs, muskeg, and beaver ponds. Winters in swamps, wet woodlands, and pond edges. | 5 | 2008 |
| 20 | <i>Toxostoma rufum</i> | Brown Thrasher | | S1?B | | GREEN | 11 | Breeds in brushy open country, thickets, shelter belts, riparian areas, and suburbs. Scrubland | 1 | 2006 |
| 21 | <i>Anas strepera</i> | Gadwall | | S2B | | GREEN | 13 | Marshes | 1 | 2008 |

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| 22 | <i>Catharus bicknelli</i> | Bicknell's Thrush | T | S1S2B | Vulnerable | YELLOW | 13 | montane fir and spruce forests, usually associated with recently disturbed areas. | 1 | 1986 |
| 23 | <i>Tringa melanoleuca</i> | Greater Yellowlegs | | S3B, S5M | | GREEN | 13 | Breeds in muskeg, wet bogs with small wooded islands, and forests (usually coniferous) with abundant clearings. Winters in wide variety of shallow fresh and saltwater habitats. | 1 | 1986 |
| 24 | <i>Tringa solitaria</i> | Solitary Sandpiper | | S1?B, S4S5M | | GREEN | 16 | Breeds in taiga, nesting in trees in deserted songbird nests. In migration and winter found along freshwater ponds, stream edges, temporary pools, flooded ditches and fields, more commonly in wooded regions, less frequently on mudflats and open marshes. | 1 | 2001 |
| 25 | <i>Progne subis</i> | Purple Martin | | S1B | | RED | 17 | Breeds near water and large open areas, cavity nester | 1 | 1987 |
| 26 | <i>Caprimulgus vociferus</i> | Whip-Poor-Will | T | S1?B | | GREEN | 17 | Breeds in deciduous or mixed forests with little or no underbrush. Winters in mixed woods near open areas. | 1 | 1990 |
| 27 | <i>Gallinula chloropus</i> | Common Moorhen | | S1B | | GREEN | 18 | Freshwater or brackish marshes with tall emergent vegetation, ponds | 4 | 1988 |
| 28 | <i>Branta bernicla</i> | Atlantic Brant | | S2S3M, S2S3N | | YELLOW | 19 | marshes | 1 | 1967 |

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| 29 | <i>Asio otus</i> | Long-eared Owl | | S2 | | GREEN | 22 | Dense vegetation adjacent to open grassland or shrubland, and open forests. | 1 | 2006 |
| Fish | | | | | | | | | | |
| 1 | <i>Salmo salar</i> | Atlantic Salmon | | S2 | | RED | -5 | | 5 | ? |
| Invertebrates | | | | | | | | | | |
| 1 | <i>Nymphalis milberti</i> | Milbert's Tortoiseshell | | S2 | | GREEN | 0 | Wet areas near woods. LFP: Stinging Nettle, <i>Urtica spp.</i> | 3 | 2006 |
| 2 | <i>Lycaena dospassosi</i> | Salt Marsh Copper | | S2 | | UNDETERMINED | 5 | Salt marshes. LFP: Silverweed <i>Potentilla egedii</i> . | 6 | 2008 |
| 3 | <i>Danaus plexippus</i> | Monarch | SC | S2B | | YELLOW | 9 | Anywhere during the spring (northward) migration; near the larval foodplants during the breeding season; in the fall commonly near the coast, often in large numbers, all heading south. LFP: Common Milkweed (<i>Asclepias syriaca</i>) and Swamp Milkweed (<i>A. incarnata</i>) | 1 | 2006 |
| 4 | <i>Lampsilis radiata</i> | Eastern Lampmussel | | S2 | | GREEN | 13 | inhabits streams, rivers, ponds, and lakes, where it is usually quite common. It can be found in a variety of substrates but prefers sand and gravel. | 7 | 2002 |
| 5 | <i>Alasmodonta varicosa</i> | Brook Floater | SC | S1S2 | | YELLOW | 14 | clean water in gravel or sand substrates in riffles of creeks and small rivers | 2 | 2002 |
| 6 | <i>Epitheca princeps</i> | Prince Baskettail | | S2 | | YELLOW | 16 | along ponds lakes and rivers | 2 | 2002 |
| 7 | <i>Williamsonia fletcheri</i> | Ebony Boghaunter | | S1 | | RED | 16 | sphagnum bog and swamps, often with open water, adjacent coniferous or mixed woodlands | 1 | 2002 |

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| 8 | <i>Somatochlora franklini</i> | Delicate Emerald | | S1 | | UNDETERMINED | 17 | found in sedge- and moss-filled fens, at the foot of hillsides below seepage or in wide-open meadows. It is not usually encountered near open water. Adult males fly through stretches of tall grasses, sedges, and shrubs | 1 | 1997 |
| 9 | <i>Gomphus descriptus</i> | Harpoon Clubtail | | S2 | | YELLOW | 18 | inhabits clean rivers and streams, often near gravel bars. | 2 | 1993 |
| 10 | <i>Aeshna constricta</i> | Lance-Tipped Darner | | S3 | | UNDETERMINED | 21 | marshy ponds and streams and often among the vegetation of seasonal ponds. | 1 | 1993 |
| 11 | <i>Boyeria grafiana</i> | Ocellated Darner | | S3 | | UNDETERMINED | 21 | found along rocky, small to medium, fast moving streams, but also found patrolling ponds and lakes | 1 | 1994 |
| 12 | <i>Lanthus parvulus</i> | Northern Pygmy Clubtail | | S3 | | YELLOW | 21 | along rocky streams adjacent forest | 1 | 1993 |
| 13 | <i>Ophiogomphus carolus</i> | Riffle Snaketail | | S3 | | GREEN | 21 | clear, cold, and rocky streams that are fast flowing with relatively few pools. Substrate must be fine gravel or sand in which nymphs of the species can burrow | 2 | 1997 |
| 14 | <i>Enodia anthedon</i> | Northern Pearly-Eye | | S3 | | GREEN | 23 | Moist, grassy places in woods. LFP: Woodland grasses, including Bearded Shortgrass (<i>Brachyelytrum erectum</i>), and False Melic Grass (<i>Schizachne purpurascens</i>) (Layberry) | 2 | 1994 |

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| 15 | <i>Hesperia comma laurentina</i> | Laurentian Skipper | | S3 | | GREEN | 23 | Grassy meadows, fields, roadsides. LFP: Perennial grasses and sedges (Opler) | 1 | 1984 |
| 16 | <i>Ophiogomphus aspersus</i> | Brook Snaketail | | S1 | | RED | 25 | clear, sand-bottomed streams with intermittent rapids, often through dense woodlands | 1 | 1996 |
| 17 | <i>Strophitus undulatus</i> | Creeper | | S1 | | RED | 25 | shallow water in both small streams and large rivers. It inhabits a variety of substrates, from silt to boulder fields | 1 | 2001 |
| Herpetofauna | | | | | | | | | | |
| 1 | <i>Glyptemys insculpta</i> | Wood Turtle | T | S3 | Vulnerable | YELLOW | 8 | Clear, moderately moving rivers, tributaries and streams in forests or floodplains | 6 | 2004 |
| 2 | <i>Hemidactylium scutatum</i> | Four-toed Salamander | NAR | S3 | | GREEN | 18 | moist mossy woods, particularly in peat moss. Peat bogs or mossy areas bordering streams | 1 | 1993 |

Source: Based on ACCDC Report 4613 Pugwash, Nova Scotia, October 20, 2011.

Species of Conservation Concern: Rankings Explained

Definitions of Rarity Rankings

| <i>Species at Risk Act</i> - COSEWIC Ranks | |
|--|--|
| Endangered | A species facing imminent extirpation or extinction |
| Threatened | A species likely to become endangered if limited factors are not reversed |
| Special Concern | A species of concern because of characteristics that make it particularly sensitive to human activities or natural events. |
| <i>NS Endangered Species Act</i> | |
| Endangered | A species that faces imminent extinction or extirpation and it listed as an endangered species pursuant to Section 12 |
| Threatened | A species that is likely to become endangered if the factors affecting its vulnerability are not reversed and is listed as a threatened species pursuant to section 12 |
| Vulnerable | A species of special concern due to characteristics that make it particularly sensitive to human activities or natural events and that is listed as a vulnerable species pursuant to section 12 |
| ACCDC Definitions (http://www.accdc.com/glossary.html) | |
| GRANK | Global rarity rank of species, using CDC/NatureServe methods |
| NPROT | National conservation status of species, as designated by COSEWIC |
| SRANK | Sub-national rarity rank of species, using CDC/NatureServe methods |
| SPROT | Sub-national conservation status of species, as designated by given provincial jurisdiction |
| T or Threatened | Used by COSEWIC to refer to a species that is likely to become endangered if limiting factors are not reversed |
| SC or Special Concern | A term used by COSEWIC to identify species that are particularly sensitive to human activities or natural events but are not endangered or threatened. |
| NAR or Not At Risk | A term used by COSEWIC for a species that is unlikely to become extinct or extirpated. |
| Endangered | A term used generally and by COSEWIC to refer to a species facing imminent extinction. |
| Extinct | A species that no longer exists. |
| Extirpated | A species that no longer exists, where it existed previously, in the wild. |
| ACCDC SRANK Definitions | |
| S1 | Extremely rare throughout its range in the province (typically five or fewer occurrences or very few remaining individuals). May be especially vulnerable to extirpation. |
| S2 | Rare throughout its range in the province (six 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 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 species is of long-term concern, e.g., watch list (100+ occurrences). |
| SU | Unrankable: Possibly in peril throughout its range in the province, but status uncertain: need more information. Used for new species not previously identified. |
| SX | Extinct/Extirpated: Believed to be extirpated within the province. |
| S#S# | Numeric range rank: A range between two consecutive numeric ranks. Denotes uncertainty about the exact rarity of the species, e.g., S1S2. |
| ? | In exact or uncertain: For numeric ranks, denotes uncertainty, e.g., SE? denotes uncertainty of exotic status. |

| NSDNR General Status Ranks | |
|----------------------------|--|
| Undetermined | Species for which insufficient data, information or knowledge is available or reliably evaluate their status. |
| Blue | No longer in Nova Scotia or extinct in the wild. |
| Red | Known to be or is thought to be at risk. |
| Yellow | Sensitive. Species that are not believed to be at risk of immediate extirpation or extinction but which may require special attention or protection to prevent them from becoming at risk. |
| Green | Secure. Species that are not believed to be at risk or sensitive. This category includes some species that have declined in numbers but remain relatively widespread or abundant. |

Interpreting USDA Wetland Indicator Status: Sourced directly from USDA Natural Resource Conservation Service at <http://plants.usda.gov/wetinfo.html>

Indicator Categories

| Indicator Code | Wetland Type | Comment |
|----------------|---------------------|--|
| OBL | Obligate Wetland | Occurs almost always (estimated probability 99%) under natural conditions in wetlands. |
| FACW | Facultative Wetland | Usually occurs in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands. |
| FAC | Facultative | Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%). |
| FACU | Facultative Upland | Usually occurs in non-wetlands (estimated probability 67%-99%), but occasionally found on wetlands (estimated probability 1%-33%). |
| UPL | Obligate Upland | Occurs in wetlands in another region, but occurs almost always (estimated probability 99%) under natural conditions in non-wetlands in the regions specified. If a species does not occur in wetlands in any region, it is not on the National List. |
| NA | No agreement | The regional panel was not able to reach a unanimous decision on this species. |
| NI | No indicator | Insufficient information was available to determine an indicator status. |
| NO | No occurrence | The species does not occur in that region. |

National Indicators reflect the range of estimated probabilities (expressed as a frequency of occurrence) of a species occurring in wetlands versus non-wetland across the entire distribution of the species. A frequency, for example, of 67%-99% (Facultative Wetland) means that 67%-99% of sample plots containing the species randomly selected across the range of the species would be wetland. When two indicators are given, they reflect the range from the lowest to the highest frequency of occurrence in wetlands across the regions in which the species is found. A positive (+) or negative (-) sign was used with the Facultative Indicator categories to more specifically define the regional frequency of occurrence in wetlands. The positive sign indicates a frequency toward the higher end of the category (more frequently found in wetlands), and a negative sign indicates a frequency toward the lower end of the category (less frequently found in wetlands). A question mark (?) following a National Indicator denotes a tentative assignment based on the botanical literature and not confirmed by regional review.

Regional Indicators express the estimated probability (likelihood) of a species occurring in wetlands versus non-wetlands in the region. Regional Indicators reflect the unanimous agreement of the Regional Interagency Review Panel. An asterisk (*) following a regional Indicator identifies tentative assignments based on limited information from which to determine the indicator status.

The wetland indicator categories should not be equated to degrees of wetness. Many obligate wetland species occur in permanently or semi-permanently flooded wetlands, but a number of obligates also occur in and some are restricted to wetlands which are only temporarily or seasonally flooded. The facultative upland species include a diverse collection of plants, which range from weedy species adapted to exist in a number of environmentally stressful or disturbed sites (including wetlands), to species in which a portion of the gene pool (an ecotype) always occurs in wetlands. Both the weedy and ecotype representatives of the facultative upland category occur in seasonally and semi-permanently flooded wetlands.

Archaeological Resource Impact Assessment

PUGWASH WIND FARM: ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT

Heritage Research Permit A2011NS108



January 2012

Submitted to:
CBCL Ltd.

1489 Hollis Street
PO Box 606
Halifax, Nova Scotia
B3J 2R7

**PUGWASH WIND FARM:
ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT**

**Heritage Research Permit A2011NS108
Category C**

Davis MacIntyre & Associates Limited
Project No.: 11-035.1CBH

Principal Investigator: Stephen A. Davis
Report Compiled by: Laura A. de Boer,
April D. MacIntyre & Stephen A. Davis

Cover: The largest of the stone mounds between turbine sites WTG-3 and WTG-4.

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EXECUTIVE SUMMARY

In November 2011, Davis MacIntyre & Associates was contracted by CBCL Ltd. to conduct an archaeological resource impact assessment of the proposed Pugwash Wind Farm in Cumberland County. The project will include the construction of a wind farm including wind turbines, access roads, and additional associated infrastructure. Twelve turbines are proposed as well as a cable connection system and a substation.

In December 2011, the turbine and access road layout was revised, prompting an amendment to the existing Heritage Research Permit and a second reconnaissance of the study area.

An archaeological desktop study of the development area was conducted by Davis Archaeological Consultants Limited in June 2007 under Heritage Research Permit A2007NS36. The locations of some of the turbines have been adjusted since the 2007 study, although they are located within the same general area.

The results of this impact assessment have indicated that only one area is of archaeological concern: the originally access road between originally proposed turbine sites WTG-3 and WTG-4 (Fall 2011 Layout), or west of revised site WT-2 (December Layout). It is recommended that clearing and grubbing activity on this road be monitored by a professional archaeologist to ensure that any archaeological resources that may be encountered will be suitably mitigated.

1.0 INTRODUCTION

In November 2011, Davis MacIntyre & Associates was contracted by CBCL Ltd. on behalf of Atlantic Wind Power Corporation Inc. to conduct an archaeological resource impact assessment of the proposed Pugwash Wind Farm in Cumberland County. The project will include the construction of a wind farm consisting of turbines, access roads, and additional associated infrastructure. Twelve turbines are proposed as well as a cable connection system and a substation.

An archaeological desktop study of the development area was conducted by Davis Archaeological Consultants Limited in June 2007 under Heritage Research Permit A2007NS36 and included consultation of historic maps, manuscripts and published sources as well as the Maritime Archaeological Resource Inventory. An exercise in predictive modeling was also conducted to help determine the potential for First Nations archaeological resources. The locations of some of the turbines have been adjusted since the 2007 study, although they are located within the same general area.

Because archaeological resources may have been recorded in the study area since the 2007 assessment, the Maritime Archaeological Resource Inventory was consulted again as part of this assessment. The predictive model was also updated to reflect the potential of archaeological resources within proposed impact areas and the previous background study was also considered in light of these adjustments in impact zones.

A field reconnaissance of the impact area including all twelve turbines, access roads, cable connection system and substation was conducted to determine the potential for archaeological resources.

This assessment was conducted under Category C Heritage Research Permit A2011NS108 issued by the Nova Scotia Heritage Division. This report conforms to the standards required by the Heritage Division under the Special Places Protection Act.

2.0 STUDY AREA

The development area is located on the east side of Pugwash Basin and spans the north and south sides of the Irishtown Road. Twelve wind turbines were originally proposed for the development area in the fall of 2011 (Figure 2.0-1), later revised to a new plan of twelve proposed sites and a thirteenth alternative site (Figure 2.0-2). The area is part of the Nova Scotia Theme Region known as the Northumberland Plain and is part of the Northumberland Strait sub-Unit (#521a).

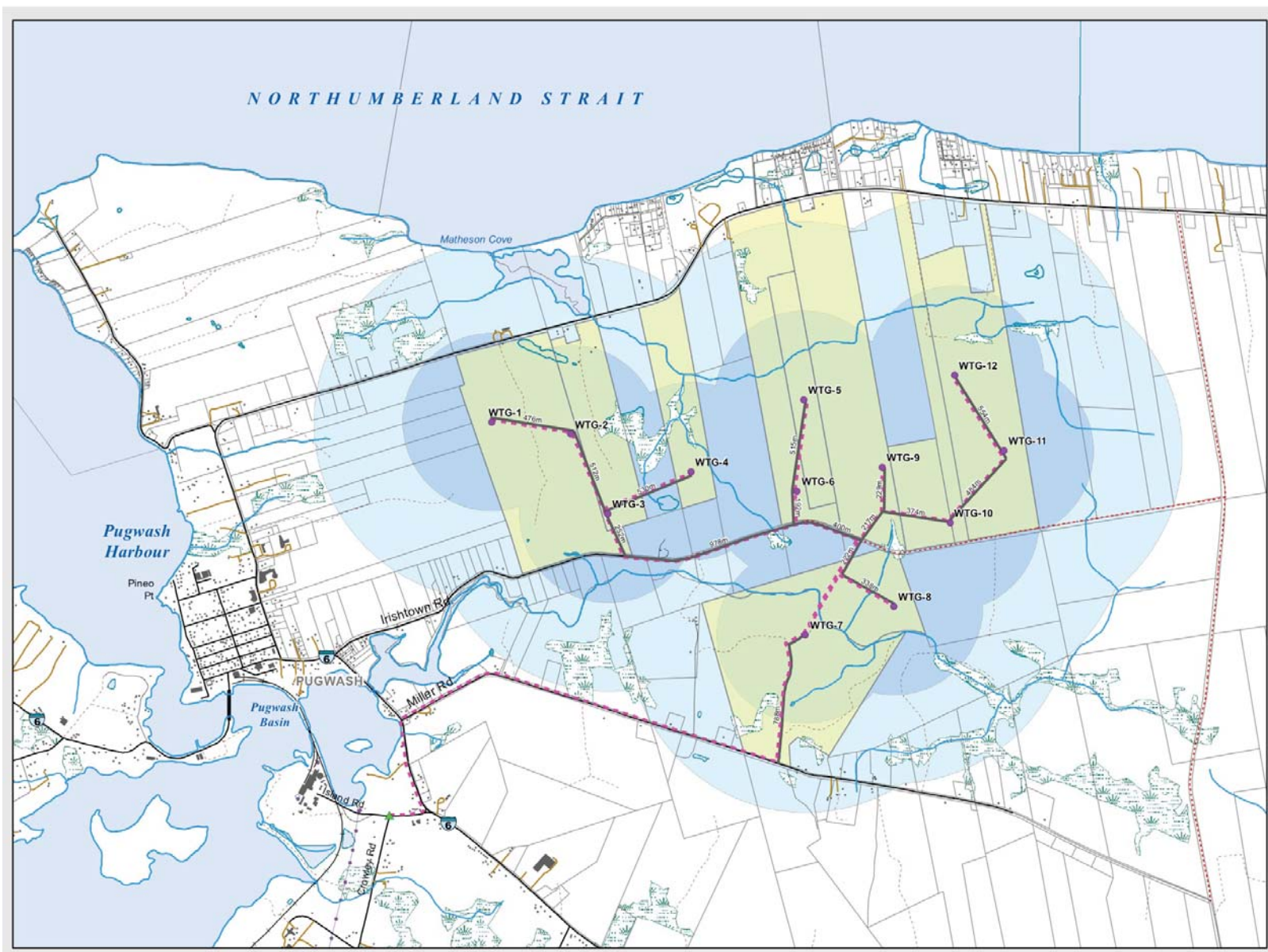


Figure 2.0-1: The 2011 original turbine and access road layout. Courtesy CBCL Ltd.



Figure 2.0-2: The 2011 revised (December) turbine and access road layout. Courtesy CBCL Ltd.

The Northumberland Strait region is characterized by low ridges and valleys along the coast. The ridges jut out to sea as headlands such as at Pugwash. The valleys form harbours and inlets along the coast. Much of the region lies north of the primary watershed boundary that dissects the Cobequid Hills region. Secondary and tertiary watersheds drain north through alternating weak and resistant strata so that the stream courses have adjusted to drain through the weaker rock to form trellised drainage patterns. There are very few lakes in the region and pH levels are generally alkaline. The coastline is characterized by intertidal marshes and subtidal Eel grass beds. The harbours and inlets are characterized by barachois ponds and tidal marshes. The soils in the Pugwash area are well-drained sandy loam to sandy clay loam. The forests are predominantly hardwood with Black Spruce, Jack Pine, White Spruce, Red Spruce, and Red Maple being the most common.

This region has a significant amount of abandoned farmland. Coyote, muskrat, mink, and raccoon are species commonly seen and the coastal areas are abundant in breeding populations of ducks and marsh birds, Osprey, Bald Eagle, Plover, Common Tern, Merganser, Willet, Herring Gull, Great Black-backed Gull, and Sharp-tailed Sparrow. The Broad-winged Hawk, Brown Creeper, Rough-legged Hawk, Snowy Owl, and Snow Bunting occur in the forested and upland areas. Warm-water species such as oysters and quahogs are found as well.

This region was traditionally used by the Mi'kmaq as summer camps and by Acadians in the eighteenth century who took advantage of the marsh lands for farming and the coastal region for engagement in the fishery. In the nineteenth century, English and Scottish settlers were engaged in farming, fishing, and forestry.¹

3.0 METHODOLOGY

This impact assessment includes both an updated background study and a field reconnaissance. The 2007 historical background study, predictive modeling, and MARI database results have all been revisited and the findings are presented below. A field reconnaissance of the proposed impact areas was also conducted to determine the potential for archaeological resources.

3.1 Predictive Modeling

The Pugwash Basin and the associated rivers and tributaries are believed to be suitable locations for First Nations exploitation. Although it is now spanned by modern road and railway bridges, the head of Tidemill Brook and the tidal pool into

¹ Davis and Browne, 1996:108-110.

which it flows before reaching the basin was likely seen as a sheltered location to the Mi'kmaq and their ancestors long before Europeans made their mark on the landscape. The abundance of small game and avian species, along with the proximity to inland waterways and the Northumberland Strait are convincing aspects as well. Historic documents have shown that at least one lot of land on the east side of the basin was claimed by a small group of Mi'kmaq from Pictou. Since the late 1960s, several precontact sites dating as far back at 5,000 years ago have been recorded in the Wallace and surrounding area.

The presence of First Nations archaeological resources is predicted in proximity to the tidal reaches of Tidemill Brook and other waterways along the Pugwash Basin. However, the only permanent watercourse in proximity to the proposed impact zones is Tidemill Brook, approximately three kilometers upstream from the head of tide. The brook is small and at the time of reconnaissance (see section 3.4) did not contain a sufficient amount of water to navigate via canoe, although recent rainfall had occurred in the area. As such, the predicted potential for this portion of the watercourse is considered to be low.

3.2 Maritime Archaeological Resource Inventory

No reported sites exist in close proximity to the study area. The nearest reported sites are located along River Phillip and the Wallace River.

In the 1960s, an amateur archaeologist reported a First Nations archaeological site “at the head of tide” on the Wallace River. Artifacts including three adze blades, a gouge with a long deep groove, a fully grooved axe, and a fully grooved hammer were recovered from a ploughed field along the same river in the late 1980s. A biface was also recovered from a field near Middleboro in the 1980s.

A historic homestead foundation has been reported on the shores of Wallace Bay, and another southeast of Wallace Bridge. Two nineteenth century farm sites were identified in the late 1990s near Wentworth Centre, the first a house foundation and barn and the second a filled foundation leaving behind only an artifact scatter.

An adze blade and a large biface were recovered from an eroding bank of River Phillip by a local resident. A second site was identified nearby, also on the riverbank, when testing for the Maritimes and Northeast Pipeline project yielded lithics and traces of red ochre. A late nineteenth or early twentieth century farm site was identified along River Phillip.

Finally, the post-World War II camp of Pugwash Landing man Louis Thom was identified in 2008 from oral records and field survey near Pugwash Junction.

3.3 Historical Background

The first documented settlers of the Pugwash and surrounding areas were the Mi'kmaq. A *Mu Awsami Sagiwe'k* (late Archaic – 5,000 to 2,500 BP) period site on the Wallace River and two sites of the same period on the River Philip have been recorded, as outlined in the previous section. At least one of these sites on the River Philip is believed to be associated with human burial and was identified and tested by Davis Archaeological Consultants Limited in 1998 during the Maritimes and Northeast Pipeline archaeological assessment.

The name Pugwash is taken from the Mi'kmaq word *Pagwecht* meaning “shallow water.”² Pugwash Harbour was part of a seigneurial grant called Tilly that was awarded in 1697 to Pierre-Noel Legardeur de Tilly. It is not known if the area was occupied at that time but there were several Acadian settlements along the north shore in the first half of the eighteenth century.³ Historians have suggested that there was a French settlement at Pugwash around 1750.⁴

At the end of the eighteenth century, Pugwash was settled by United Empire Loyalists who had fled the American colonies at the end of the Revolution in 1783. The Seaman family was among those Loyalist immigrants. Abraham, one of the most prominent historical members of the family, was known to be a master carver of gravestones. Stones which he carved are known in Nova Scotia dating to between 1864 and 1871.⁵

The Seamans received several grants of land between Fort Cumberland and North Wallace. In 1802, Stephen and Abraham Seaman entered into an agreement with three Mi'kmaq from Pictou. For the price of £5, Samuel Ocherem, Peter Markentwain, and Peter Victor “Indians of Picto”, sold their claim to 500 acres at Pugwash on the east side of the basin.⁶

Bartlet Brundige, also a United Empire Loyalist that arrived in 1783, settled on the west side of Pugwash River but he failed to apply for an official grant and on January 17, 1804 his 400 acres were awarded to Stephen Seaman in exchange for Seaman's grant on the east side of the river. An 1805 map by Deputy Surveyor Thomas Roach still indicates that lands were surveyed for the Mi'kmaq on the north side of Brundige's grant. However, the accompanying notation states that the land was “formerly laid out for the Indians by Mr. Tuttle but as most of them are dead, or left the province, I think it would be an eligible situation for Mr. Williams & associates to have the remainder of their land laid out in it...” (Figure 3.3-1).

² Nova Scotia Archives and Records Management, 1967:565.

³ Smith, 1978:1.

⁴ Clark, 1968; Brown 1922:120.

⁵ Trask 1978:89.

⁶ Smith, 1978:2-8.



Figure 3.3-1: Detail of an 1805 map by Deputy Surveyor Thomas Roach showing lots laid out around Pugwash Basin. The land on the northeast side of the basin was formerly reserved for the Mi'kmaq.⁷

Stephen Seaman is believed to be the first person to build a house on the east side of Pugwash Basin in 1807.⁸ An 1809 petition for an official grant of the land purchased by Seaman from the Mi'kmaq in 1802 states that Seaman had built a "dwelling House [and] settled with his Family on the same [and] has had the same in his Possession and under his improvement about two years."⁹

Stephen Seaman's mortgagors foreclosed on the lands he purchased from the Mi'kmaq in 1802. The land was sold at auction to Thomas Roach and James Shannon Morse. They never built at Pugwash, however. Roach and Morse sold a portion of the land, including the part on which Seaman's house was built, to David Sampson Pineo who occupied the house. The remainder of the land was sold to Oliver King. Pineo later sold a portion of his share to Joseph Black around 1839. Stephen Seaman contested the sale of his lands from the beginning, however, claiming that he had lost a great deal of the investment and "improvement" he had made in the land. After several petitions by Seaman, the Government ordered that

⁷ Roach, 1805.

⁸ Smith, 1978:9-11.

⁹ RG 20 Series A: Crane, James Noble & Crane, William.

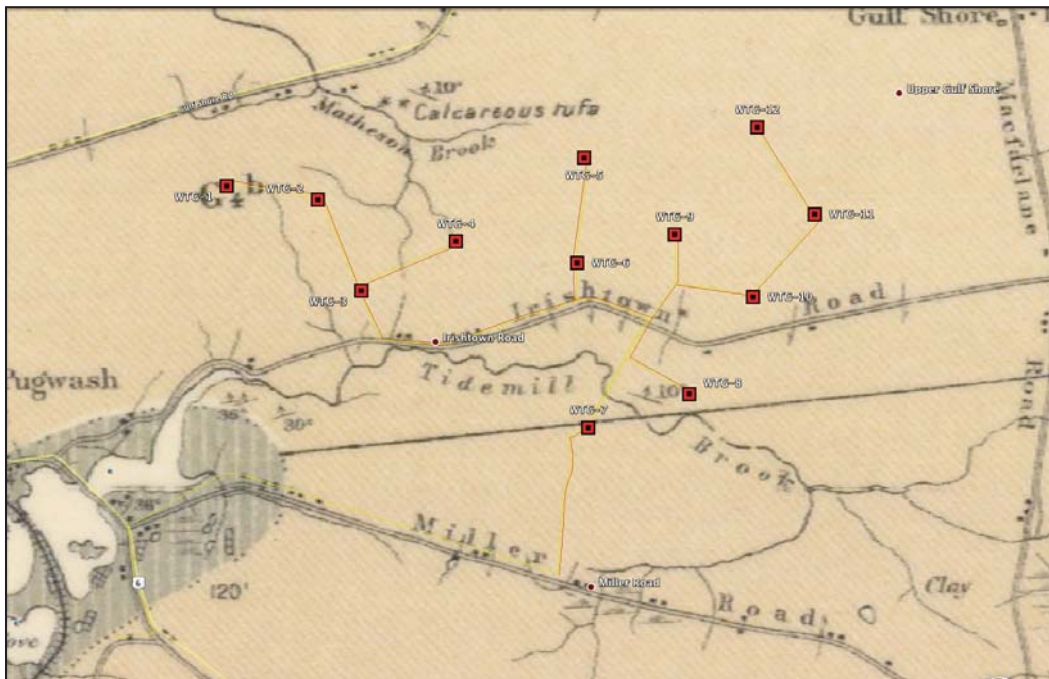


Figure 3.3-3: A 1905 geological survey map with the original turbine sites, access roads, and cable pathways overlaid.¹³

3.4 Field Reconnaissance – Original (Fall 2011) Layout

A field reconnaissance of the proposed access roads and turbine sites was conducted by Stephen Davis and Laura de Boer on November 8th and 9th, 2011. Although residential areas surround the study area on all sides, the proposed impact zones were found to contain surprisingly little evidence of cultural activity.

Table 1: Coordinates of the original 12 proposed wind turbines as provided by CBCL Ltd.

| Turbine Number | UTM_NAD83_E | UTM_NAD83_N | LONG | LAT |
|----------------|-------------|-------------|-----------------|----------------|
| WTG-1 | 450133 | 5078987 | -63.64241829660 | 45.86264291660 |
| WTG-2 | 450577 | 5078919 | -63.63668774600 | 45.86206056830 |
| WTG-3 | 450787 | 5078470 | -63.63394227250 | 45.85803820560 |
| WTG-4 | 451254 | 5078709 | -63.62794830010 | 45.86021703650 |

¹³ Barlow, Ells and Fletcher, 1905 (Base map only; GIS data courtesy CBCL Ltd).

| | | | | |
|---|--------|---------|-----------------|----------------|
| WTG-5 | 451888 | 5079113 | -63.61982262270 | 45.86390207140 |
| WTG-6 | 451850 | 5078597 | -63.62025897530 | 45.85925728620 |
| WTG-7 | 451898 | 5077789 | -63.61956940980 | 45.85198986730 |
| WTG-8 | 452395 | 5077950 | -63.61318290450 | 45.85347012720 |
| WTG-9 | 452329 | 5078732 | -63.61410803400 | 45.86050429990 |
| WTG-10 | 452710 | 5078422 | -63.60916304710 | 45.85773733330 |
| WTG-11 | 453015 | 5078824 | -63.60527713230 | 45.86138270750 |
| WTG-12 | 452737 | 5079252 | -63.60890435520 | 45.86521340160 |
| UTM Coordinates are for NAD83 CSRS UTM Zone 20N | | | | |

Turbine site WTG-1 is located in a mixed forest of young spruce and hardwoods. The ground undulates heavily, and a great deal of large stones are present on the surface. The road between turbines sites 1 and 2 is notable, as at the time of the survey it was observed that a large animal den is located along the proposed road centerline (approximately 20 T 450361 5078974). The den has been dug into a “push-out” or mound of earth created by a bulldozer near a grassy woods road that transects the study area. Given its size it is likely that the den is used by a bear or coyote. Coyote scat was noted on the grassy road to the west of the den, and a large humerus was noted under dense tree cover less than 40m from the den (Plate 1).

The second turbine site (WTG-2) is positioned in a mixed forest consisting of hardwood saplings and spruce that has matured to diameters of up to 40cm. The ground undulates heavily, and an alder swamp is located in close proximity to the proposed turbine’s central coordinates (Plate 2).

Turbine site WTG-3 is centred in a mixed forest of mature spruce pine, and birch, with an understorey of thorns and spruce saplings as well as a great deal of debris from blown-down trees (Plate 3). An active cow pasture is located in close proximity to the provided coordinates, occupied at the time of the reconnaissance with half a dozen Holstein heifers.

The proposed access road between turbine sites WTG-3 and WTG-4 contains the most significant findings encountered during this field reconnaissance. Three stone mounds were encountered on a large knoll in a mature spruce forest (20 T 451105 5078645; 20 T 451082 5078636; 20 T 451074 5078707). The knoll is very smooth and level, indicating it was once ploughed and used for pasture or agriculture.

The stone mounds appear to be the result of field clearing, and contain some very large stones, which would have taken several people some effort to move. One of the largest stones was found to measure approximately 1m x 70cm x 40cm. All the stones visible in each mound were of local sandstone in the common red and honey colours.

The largest mound measured approximately 9.4m x 4.4m, rising over 1m from the forest floor (Plate 4). The smallest was approximately 4.3m x 3.7m in area, and included a spruce tree 25cm in diameter growing out of it. The mounds are moss-covered but contain large voids below and around the stones, allowing small animals such as squirrels to live inside them.

The old pastureland surrounding the mounds was thoroughly examined in an effort to locate the remains of a homestead associated with the farming activity. No visible evidence of a homestead could be located. However, a possible roadbed running north-south was noted immediately west of the largest stone mound. Additionally, a cluster of stones lying across a nearby brook suggests that a bridge once existed there (20 T 451022 5078564; Plate 5). An old oil jug hanging in a tree above it suggests modern ATV or snowmobile users have marked the crossing for modern use. It is unclear whether the stones were placed by these modern visitors or by historical inhabitants.

Turbine candidate site WTG-4 is positioned significantly outside of the area identified as pasturelands. The coordinates are positioned in a mature spruce forest with a large number of blown-down tree trunks and a thick mossy floor (Plate 6).

Access to turbine site WTG-5 passed through a section of forest that appeared to be rough 20th century pasture, likely for cattle. A barbed wire fence was encountered less than 70m south of the turbine site, running along the southern bank of a small stream (Plate 7). The wire appears to have replaced an earlier wooden fence, and several of the surrounding trees have grown around the wire strands.

The fifth turbine site (WTG-5) is located in a mature forest predominantly comprised of spruce. A rarely used ATV trail runs through the site.

A mature spruce forest surrounds turbine candidate site WTG-6. A few pines at least a century old have also grown around the site. There are no rotted stumps indicating historic logging, as was typical elsewhere in the study area. A discarded machine oil jug was the only sign of cultural activity in proximity to the site.

Turbine candidate site WTG-7 is centred on an existing roadway that has become overgrown with alder and other scrubby vegetation (Plate 8). On the south side of the road there has been extensive silvaculture activities, forming a moderately mature pine forest. On the north side the land is somewhat lower and the forest is mixed spruce and hardwood, with no pine trees whatsoever.

A transmission line has been proposed between turbine candidate sites WTG-8 and WTG-9. The line crosses Tidemill Brook, a small but regularly flowing watercourse that drains into Pugwash Harbour. The watercourse and its banks were examined to determine whether or not the area had any elevated potential for First Nations archaeological resources.

The brook itself is less than two metres in width, though a slight widening and stillwater has been created by several tree trunks and other forest debris forming a dam immediately downstream (Plate 9). A low floodplain has formed on either side, leaving evidence of strong seasonal flooding in the scattered tree trunks and branches found throughout.

Observed from the south, the north side of the brook appeared to feature a small terrace that may have been suitable for encampment (Plate 10). However upon crossing the river it was found that the terrace was very rough and was elevated approximately 2 metres from the flood plain bordering the river. The terrain extending northwards had been clear-cut, resulting in dense regrowth of spruce saplings. A tree throw was observed on the terrace and was examined for archaeological material. No cultural material was observed.

The south side of the river is elevated approximately 4 metres above the floodplain. The ground slopes very gently but consistently towards the river both upstream and downstream of the crossing point.

Candidate site WTG-8 is located in an area of densely growing spruce trees less than twenty years old. There is some evidence of trimming, suggesting silvaculture activity, and the ground that is not covered by spruce is grassy, wet, and undulating. There was no evidence of cultural activity beyond the sporadic trimming activities and a few rough access roads or skidder trails.

An open area of recently clear-cut pine forest surrounds the proposed turbine site WTG-9 (Plate 11). The few pines that remain standing, as well as the scattered stumps, indicate that the forest was at least 100 years old when it was cut. The ground undulates heavily but the overall landscape is relatively level.

Turbine candidate site WTG-10 is located in a very young birch and poplar forest with an understorey of spruce saplings. The forest appears to have grown up on land that was clear-cut a few decades prior to the survey.

The eleventh proposed turbine site has been placed in a spruce forest with a dense mossy forest floor. A few hardwoods have also grown up, most of which are birch. An ATV trail less than 90m from the provided coordinates was the only visible evidence of cultural activity in the vicinity.

Turbine site WTG-12 was located in a spruce forest almost identical in description to site WTG-11. A recent clear-cut could be found to the east of the site, and there were scattered downed trees resulting from strong winds in the area (Plate 12).

4.4 Field Reconnaissance – Revised (December 2011) Layout

When the revised turbine and access road layout was assembled in December 2011, it was found to differ significantly from the original layout. Although several turbines were placed very close to their original positions, others were entirely new or significantly relocated and all access roads deviated significantly from the corridors surveyed in early November. As a result, a second reconnaissance of this new layout was conducted in December 2011 by Stephen Davis and Laura de Boer.

Table 2: Coordinates of the revised 12 proposed wind turbines as provided by CBCL Ltd., as well as a proposed alternative site 4.

| Turbine Numer | UTM_NAD83_E | UTM_NAD83_N |
|----------------------|--------------------|--------------------|
| WT-1 | 450666.21 | 5078715.41 |
| WT-2 | 451194.60 | 5078735.92 |
| WT-3 | 451812.81 | 5079183.76 |
| WT-4 | 452063.60 | 5078963.00 |
| WT-5 | 452271.12 | 5078667.69 |
| WT-6 | 452490.00 | 5078461.00 |
| WT-7 | 452782.76 | 5079257.84 |
| WT-8 | 452967.68 | 5078753.02 |
| WT-9 | 451669.98 | 5077884.64 |
| WT-10 | 452196.69 | 5077806.60 |
| WT-11 | 453127.60 | 5078004.00 |
| WT-12 | 452706.00 | 5077961.00 |
| ALT 4 | 452187.00 | 5078863.00 |

Turbine site WT-1 is located on a mixed wood knoll southeast of the original WTG-2 (Plate 13). The most prominent species were spruce and birch. A low, wet area borders the knoll on the north and east sides.

WT-2 is located less than 100 metres northwest of the former WTG-4, on the western slope of a low spruce knoll with a great deal of tree trunks felled by strong winds. The access road to this candidate site curves northwards around a low hill identified in the previous survey as an area of cultural activity. The current access road now runs within 10 to 20 metres of one of the stone mounds as well as the probable bridge structure marked with an oil can.

Site WT-3 has been placed in a mixed wood forest and is closely bordered by a stream (Plate 14). An old barbed wire fence intersects the site, where many of the mature spruce trees have grown around the strands of wire. The proposed access road leading to this candidate site runs very close to, if not on top of, the nearby stream.

An extremely wet spruce forest surrounds candidate site WT-4. Drainage is very slow and waterlogged moss forms the forest floor (Plate 15). Alternative site 4 (ALT 4), positioned approximately 150 metres southeast of WT-4, is only slightly less waterlogged.

The forest surrounding WT-5 has been recently clear cut, though it appears to have originally been a mature spruce or pine forest. The exposed ground has been cut with skidder trails during tree harvesting, resulting in long puddles in the low and wet ground.

Like the nearby original WTG-10, site WT-6 has been placed in a very young birch and poplar forest with an understorey of spruce saplings, all of which appears to be regrowth after clear cutting at least a decade ago. An existing road is located immediately east of the site.

WT-7 is located in a relatively dry spruce forest, less than 50 metres from the original WTG-12. WT-8 is similarly located in close proximity to the former WTG-11, in a mixed forest of maple, birch, and spruce.

Flagging tape was noted at the site of WT-9, where clumps of young birch have sprung up in a forest of spruce (Plate 16). The land appears to have been cleared by loggers sometime in the past 35 to 40 years.

Turbine site WT-10 is positioned in the same area of rough silvaculture as the former WTG-8. Some trimming of other species has encouraged the growth of spruce trees, though the ground undulates a great deal. A portion of the access road follows an existing road or skidder trail south from Irishtown Road, though it has overgrown heavily with alders.

The cable crossing of Tidemill Brook has been modified for the new layout, passing over the brook approximately 200 metres upstream from the formerly proposed location. The crossing point was found to be much the same as that described above, with a much higher bank on the south side and a low, rough floodplain on the north side (Plate 17). One area of the north side, approximately 20 metres downstream from the crossing, was noted to be more level and suitable for encampment. However, the potential for archaeological resources was determined to be low given the significant distance from the head of tide and the insignificant depth of the stream (varying from 10 centimeters to 1 metre dependent upon the position of tree trunks forming natural dams).

WT-11 is located in a forest of birch and alder that is 20 to 30 years old (Plate 18). The land is marked by skidder trails, and evidence of porcupines eating young birch bark is found throughout. To the west, WT-12 is found in a similar forest, though it is somewhat more low and wet. The ground broadly surrounding WT-12 is notably

flat, suggesting the land may have been pasture or ploughed field at some point in the nineteenth or early twentieth century.

4.0 RESULTS AND DISCUSSION

Only one of the areas surveyed is of particular note regarding archaeological significance: the location of the probable stone bridge and the three stone mounds likely resulting from field clearing on formerly agricultural lands between turbine sites WTG-3 and WTG-4 on the original turbine layout, or just west of the current WT-2. Although these mounds are not of significance on their own, large mounds such as these would have involved a great deal of effort on the part of the farmers or settlers. With this in consideration, it is probable that a homestead is located in close proximity to the stones, very likely on or near the crest of the low hill around which the mounds are centred. Although no such homestead remains were identified during either of the two surveys, it is possible that either the foundation was just outside the area surveyed or that the homestead was a log cabin-style structure with no discernable cellar and no stone foundation. If this is the case, construction of the access road has the potential to disturb a more significant archaeological resource.

It is also worth discussing the cable crossing of Tidemill Brook. First Nations encampment sites are usually found on the shore or banks of navigable rivers, which allowed for ease of transport into Nova Scotia's interior. However, Tidemill Brook does not appear to be of sufficient size to provide navigable waters. Additionally, the smooth and terraced landscape that is most suited to encampment is not present at the location where the brook crossing is proposed. Predictive modeling and field reconnaissance therefore suggest that this location is of low archaeological potential.

5.0 RECOMMENDATIONS AND CONCLUSIONS

The results of this impact assessment have indicated that only one area is of archaeological concern: the access road between the originally proposed turbine sites WTG-3 and WTG-4, or west of WT-2. The original road layout passed over the low hill on which the mounds were located, which is the most likely location for a homestead. Should the original layout be utilized in this region, archaeological testing is recommended. The testing would be conducted at 5-metre intervals throughout the section of road that passes through the area of elevated potential. Dependent upon road width, this may result in two or three rows of test units. Testing should be completed after the centerline of the road has been staked or otherwise marked and the proposed width has been determined to ensure that testing is conducted throughout the relevant impact area. If any significant

archaeological resources are encountered during the testing, the Heritage Division should be contacted to determine suitable mitigation procedures.

The revised or December road layout, in contrast to the original, skirts the hill in question by passing along its western and northern edges. If this road layout is used as planned, and if no other disturbance is to occur on the hill, it is recommended that archaeological monitoring be conducted on this portion of road as a precaution in the event that archaeological resources are encountered or disturbed during road construction.

Avoidance is the preferred method of mitigation in all instances where archaeological resources are present. Should any archaeological resources be encountered during ground disturbance activities, it is recommended that all activity cease and the Coordinator of Special Places, Laura Bennett (902-424-6475) be contacted immediately to determine a suitable method of mitigation.

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PLATES



Plate 1: Archaeologist Stephen Davis displays the large humerus encountered on the proposed access between turbines WTG-1 and WTG-2.



Plate 2: A relatively open area at turbine site WTG-2. Looking south.



Plate 3: Spruce saplings and trees downed by wind at turbine site WTG-3.



Plate 4: The largest stone mound along the access road between turbines WTG-3 and WTG-4, looking east.



Plate 5: A possible low bridge (yellow) crossing a small brook (blue) near the access road between turbines WTG-3 and WTG-4. Looking east. Note the oil can hanging nearby (red).



Plate 6: Turbine site WTG-4, looking northeast.



Plate 7: A barbed wire fence (blue) runs against several large trees bordering a small brook. Looking east.



Plate 8: Dense alder growth covers the existing roadway that passes through turbine site WTG-7. Looking east.



Plate 9: A still-water formed by logs jammed downstream on Tidemill Brook. Note the low floodplain on either bank. Looking east.



Plate 10: Looking north across Tidemill Brook at a rough terrace. Note the logs and other debris forming a dam in the brook on the left (west).



Plate 11: An open clear-cut area at turbine site WTG-9. Looking west.



Plate 12: A spruce forest at turbine site WTG-12, looking northeast.



Plate 13: The site of WT-1, showing wind-felled spruce on a knoll. Looking North.



Plate 14: Turbine site WT-3, looking east from near the small brook which borders the site.



Plate 15: Site WT-4, showing the very wet and mossy nature of the land throughout. Looking northeast.



Plate 16: Site WT-9, showing spruce with some clumps of birch in the distance. Flagging tape was noted to the left (east) of frame. Looking south.



Plate 17: The updated crossing of Tidemill Brook, looking upstream or southeast at the high south side (right) and the low and rough north side (left). Note that fallen logs like those visible in the frame have jammed downstream to create another stillwater in the foreground.



Plate 18: Turbine site WT-11. Looking west.

**APPENDIX A: HERITAGE RESEARCH PERMIT
AND AMENDMENT LETTER**



Tourism, Culture and Heritage

Heritage Division

Special Places Protection Act, R.S.N.S. 1989

Heritage Research Permit (Archaeology)

(Original becomes Permit when approved by
the Executive Director of the Heritage Division)

Office Use Only

Permit Number:
A2011NS108

| | |
|---|----------------------------------|
| <i>Greyed out fields will be made publically available. Please choose your project name accordingly</i> | |
| Surname Davis | First Name Stephen |
| Project Name Pugwash Wind Farm | |
| Name of Organization Davis MacIntyre & Associates Limited | |
| Representing (if applicable) | |
| Permit Start Date 7 November 2011 | Permit End Date 31 December 2011 |
| General Location: Irishtown Road, Pugwash, Cumberland County | |
| Specific Location: <i>(cite Borden numbers and UTM designations where appropriate and as described separately in accordance with the attached Project Description. Please refer to the appropriate Archaeological Heritage Research Permit Guidelines for the appropriate Project Description format)</i> | |
| Permit Category: Please choose one: <input type="checkbox"/> Category A - Archaeological Reconnaissance <input type="checkbox"/> Category B - Archaeological Research <input checked="" type="checkbox"/> Category C - Archaeological Resource Impact Assessment <input checked="" type="checkbox"/> I certify that I am familiar with the provisions of the <i>Special Places Protection Act</i> of Nova Scotia and that I have read, understand and will abide by the terms and conditions listed in the Heritage Research Permit Guidelines for the above noted category. <input type="checkbox"/> I currently hold a treasure trove license or pending application for a licence related to this Heritage Research Permit. | |
| Signature of applicant <i>for</i> <i>MacIntyre Stephen Davis</i> | Date 25 October 2011 |
| Approved by Executive Director <i>Bill Hecker</i> | Date <i>Oct 31 11</i> |



Communities, Culture
& Heritage
Heritage Division

1747 Summer Street Tel: (902) 424-6475
Halifax, Nova Scotia Fax: (902) 424-0560
B3H 3A6

December 12th, 2011

Laura de Boer
Davis MacIntyre & Associates
109 John Parr Dr.
Dartmouth NS B2W 4J7

Dear Ms. de Boer:

**RE: Heritage Research Permit Amendment Request
A2011NS108 - Pugwash Wind Farm**

This letter is written in response to your December 7th, 2011 request for amendment to heritage research permit A2011NS108.

The amendment request is to conduct a second field reconnaissance in the coming weeks, due to the new turbine layout and modification of access road locations. A map of the revised turbine layout has been submitted. All other aspects of the original permit application remain unchanged.

Staff find this request acceptable. If you have any questions as you proceed please let me know.

Sincerely,

Laura Bennett
Coordinator, Special Places