

4.1.4 Wetlands

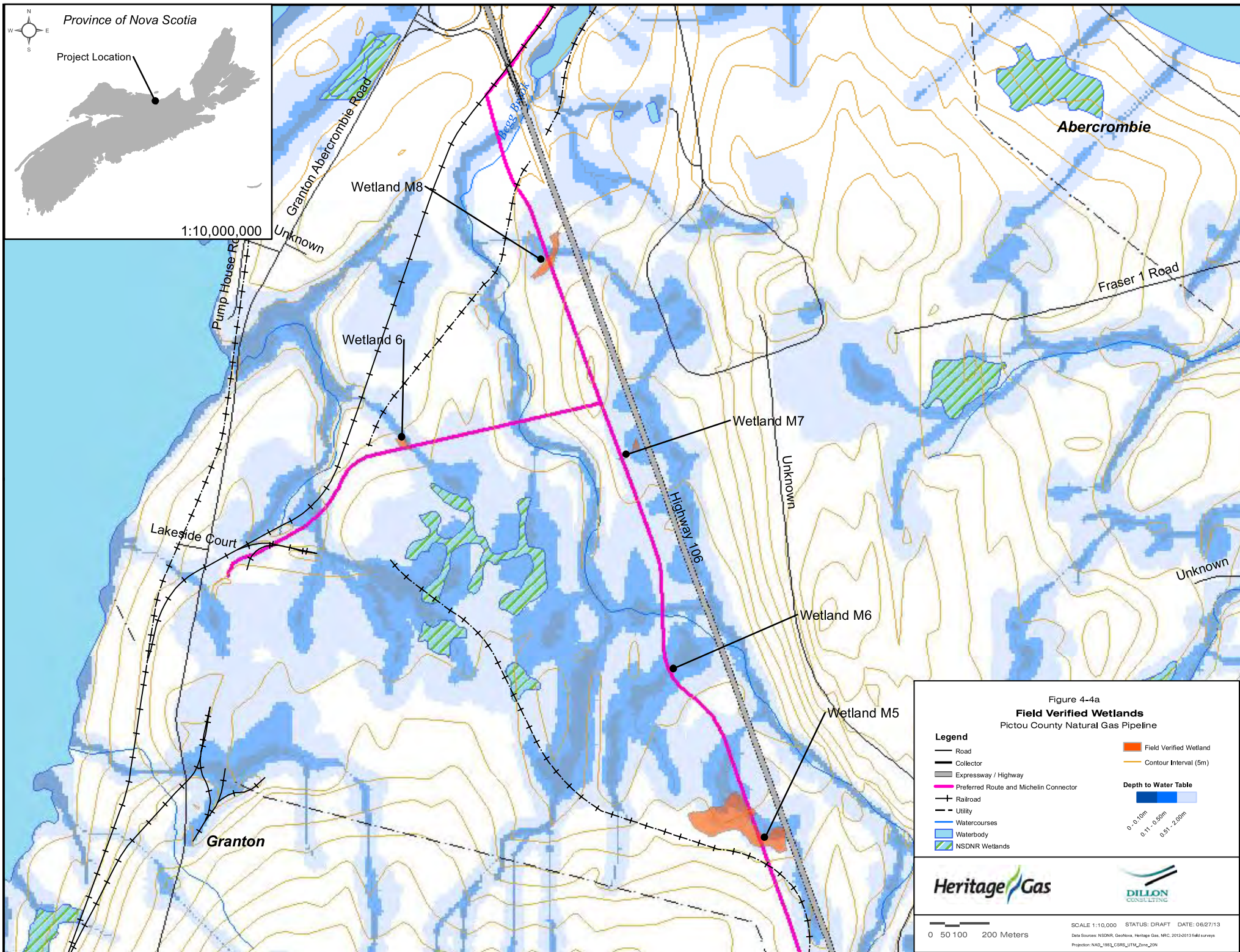
Wetlands are defined under the Environment Act as

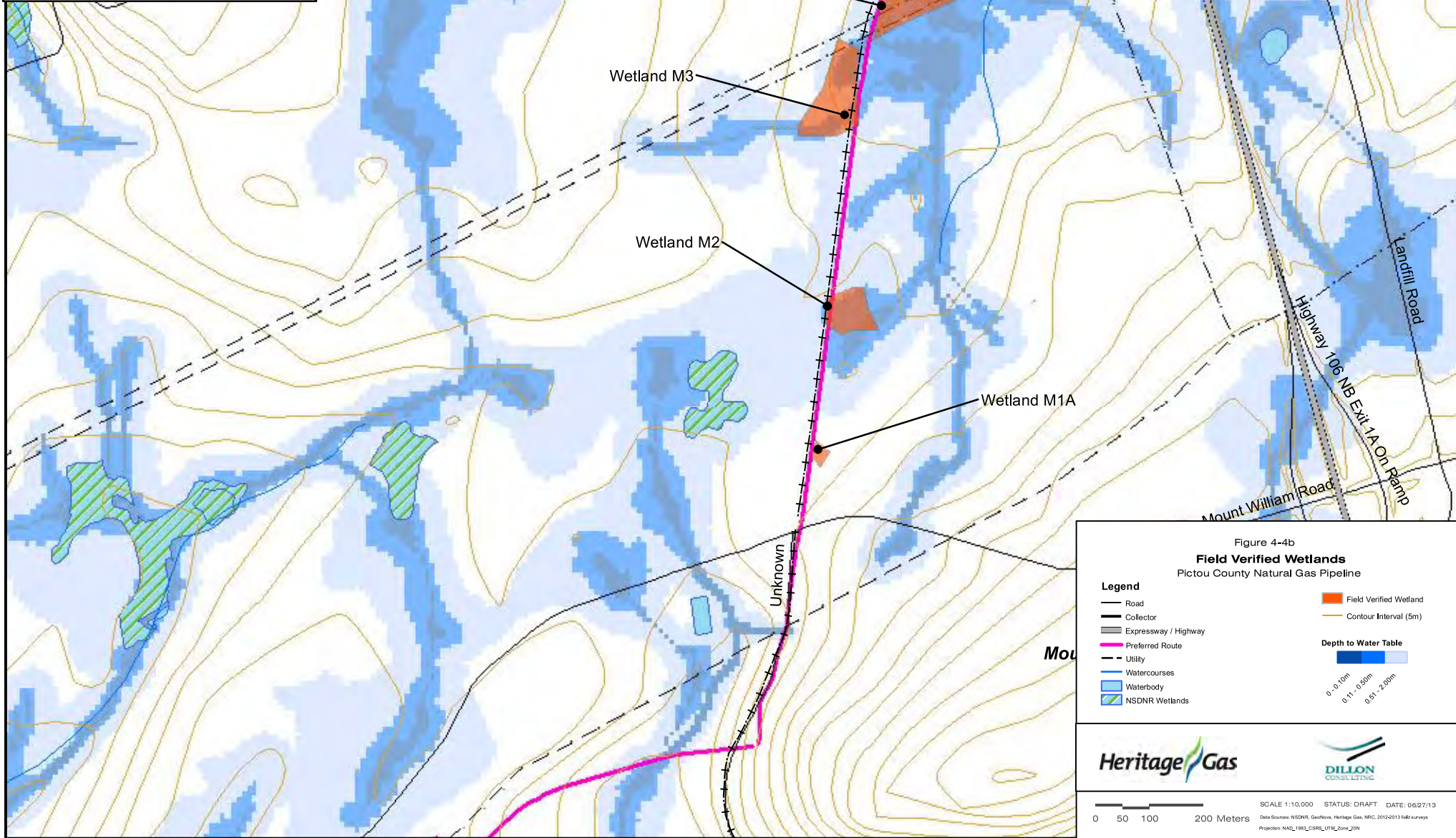
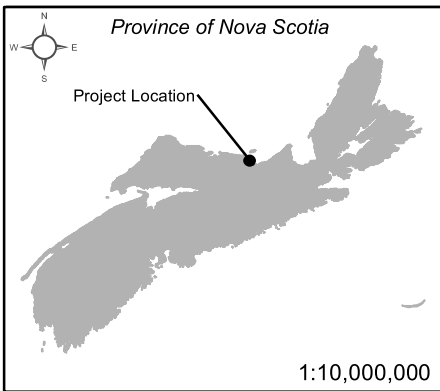
“land commonly referred to as a marsh, swamp, fen or bog that either periodically or permanently has a water table at, near or above the land's surface or that is saturated with water, and sustains aquatic processes as indicated by the presence of poorly drained soils, hydrophytic vegetation and biological activities adapted to wet conditions”

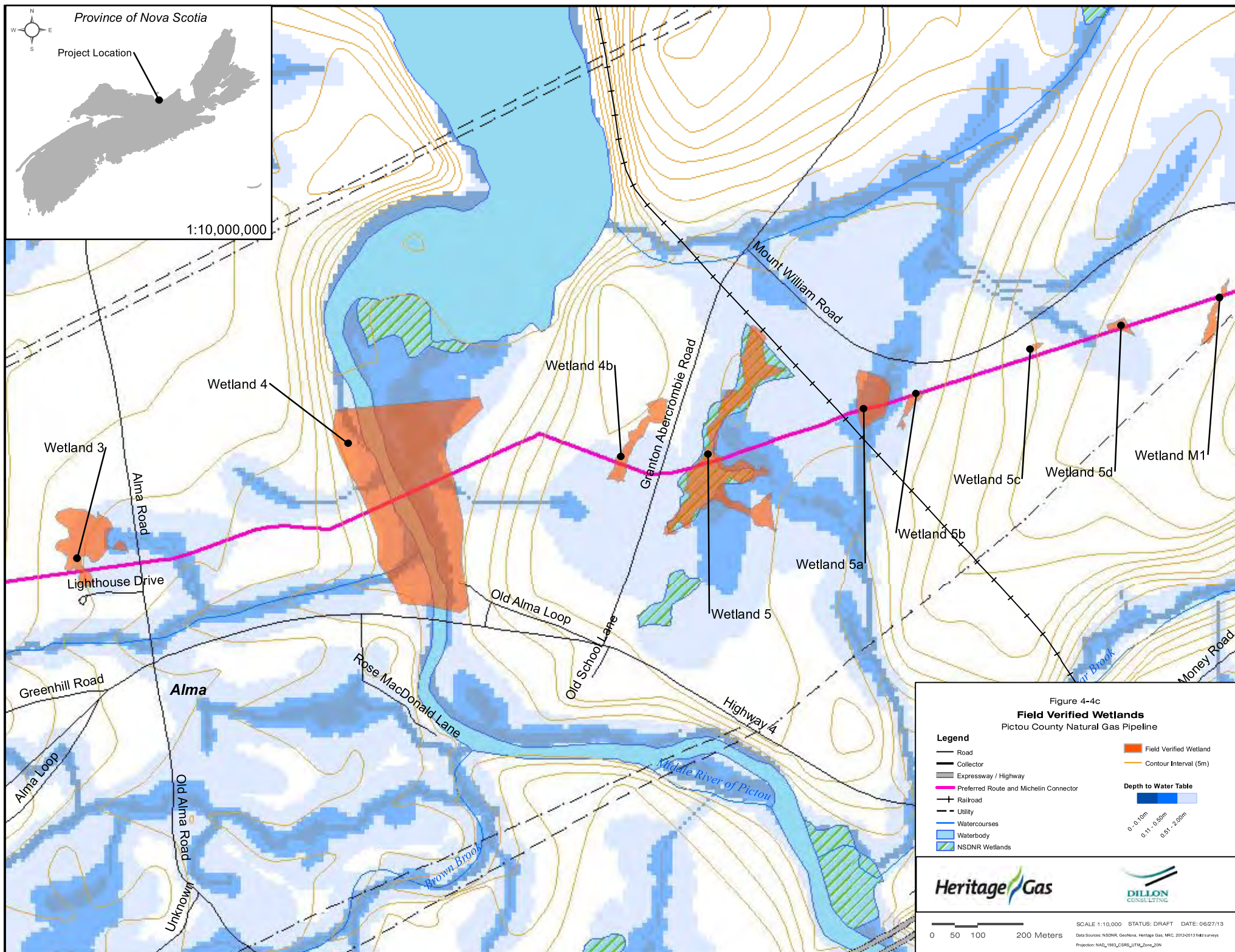
(<http://nslegislature.ca/legc/statutes/envromnt.htm>). Alteration of wetlands is governed by the Nova Scotia Wetland Conservation Policy (NSE 2011) and requires an approval by the NSE. Disturbance of wetlands over 2 ha are subject to provincial environmental assessment.

Wetlands were identified initially based on 1:10000 topographic mapping and NSDNR wetland database. Further investigations were undertaken to identify wetlands along the route by Dillon Consulting wetland analysts walking the route. Initial surveys were undertaken in April 2013 and primarily based on observations of wetland vegetation and hydrology. Follow-up surveys were undertaken in June 2013 to delineate any new wetland areas encountered. Where encountered as potentially within the proposed easement, wetlands were delineated following US Army Corp. of Engineers (ACOE) protocols to identify wetland soils, hydrology and vegetation and flagged within the easement. Where wetlands were identified within the proposed easement in follow-up surveys, additional assessment was made of wetland class (based on Canadian Wetland Classification System) and key wetland functions, including potential for at risk species.

A summary of field verified wetlands encountered along the proposed easement is provided in **Table 4-6** below and the locations are illustrated in **Figures 4-4a, 4-4b, 4-4c, and 4-4d**. It is noted that wetlands requiring alteration approvals will be avoided by use of HDD techniques or for the abandoned railway alignment, construction within the railbed itself. Upon confirmation that priority species are not present, small wetlands less than 100 m², wetlands that developed as unintended result of urban, commercial, industrial or agricultural construction projects completed in the past 20 years and shrub swamp areas may be affected by the proposed pipeline construction.







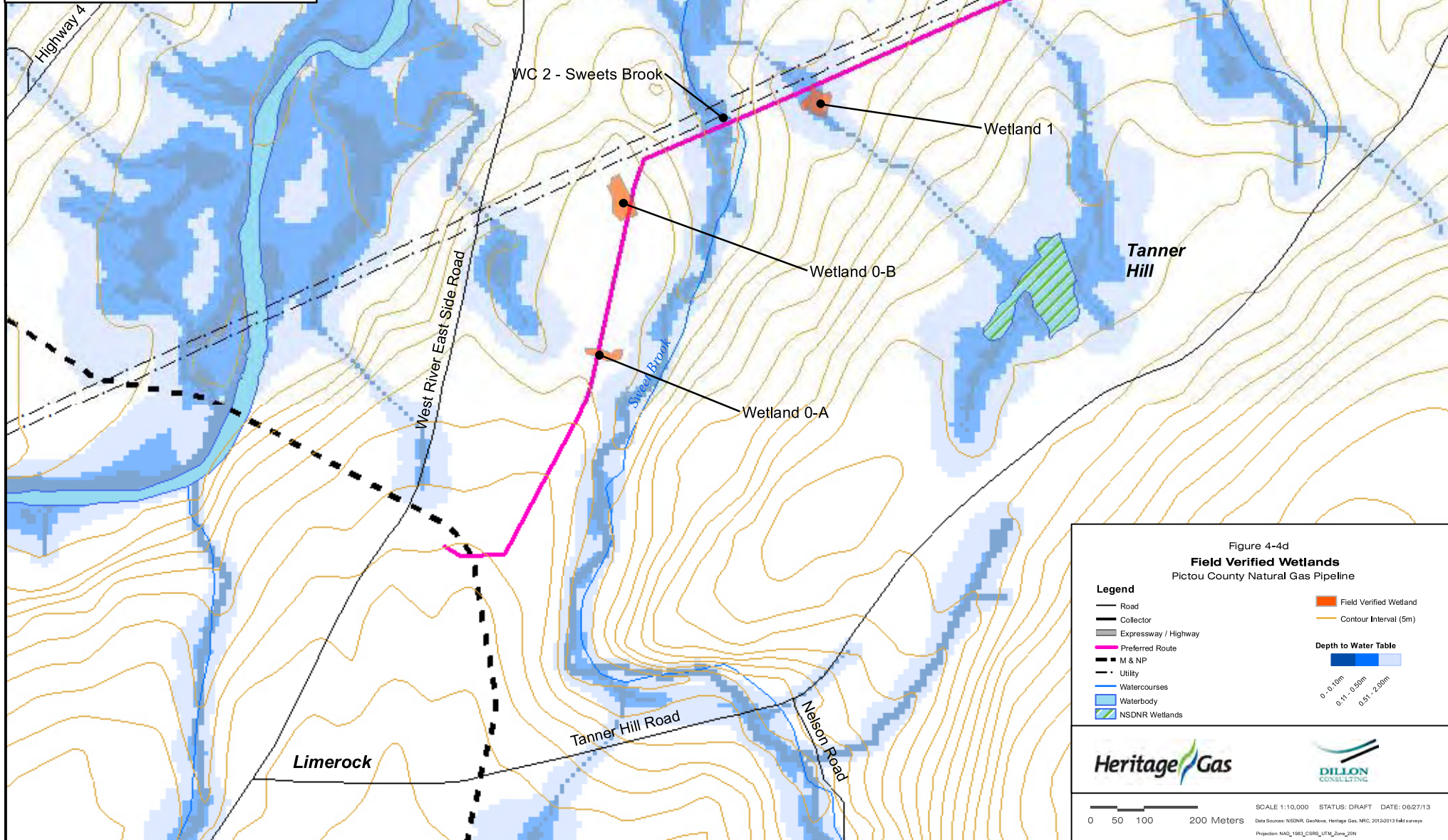
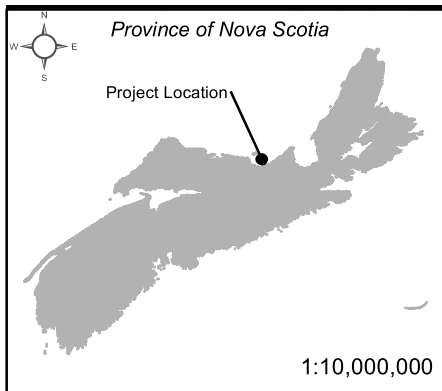
















Table 4-6 Wetlands Crossed by the Proposed Alignment




Wetland No.	Wetland Classification	Wetland Features	Wetland Size (ha)	Key Functions	Photo
WT-0-A	Treed swamp	Terrene basin, isolated flow path, seasonally saturated, natural but may have historic disturbance. In depression, receiving drainage from Tanner Hill slope. No standing water. Logging road runs along north edge of wetland. No priority species or wildlife observed June 2013. Low potential for SAR.	Small <0.1	Within context of small size reducing overall significance of functions - Surface water detention: moderate Nutrient transformation: high Carbon sequestration: moderate Wildlife habitat: moderate	
WT-0-B	Treed Bog	Terrene basin, isolated flow path, seasonally saturated, natural but may have historic disturbance. Slopes to east. Trees - young red maple, larch, old fence to north. No priority species or wildlife observed June 2013. Low potential for SAR.	Small ~0.26	Within context of small size reducing overall significance of functions - Surface water detention: moderate Nutrient transformation: moderate Carbon sequestration: moderate Wildlife habitat: moderate Contribution to bog bird habitat	
Water-course 1 Sweet Brook	Shrub swamp	Lotic river – unconfined, floodplain, throughflow, seasonally flooded, natural. No priority species or wildlife observed June 2013. Moderate potential for SAR.	Moderate Extends up and down river	Surface water detention: high Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Sediment retention: high Shoreline stabilization: high Fish habitat: stream shading Wildlife habitat: high	




Wetland No.	Wetland Classification	Wetland Features	Wetland Size (ha)	Key Functions	Photo
WT-1	Herbaceous swamp	Terrene basin, isolated, seasonally flooded, origin may have been influenced by powerline corridor road construction Draining to Sweet Brook	Small ~0.2	Within context of small size reducing overall significance of functions - Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area	
WT-3	Shrub swamp	Terrene slope, outflow, seasonally flooded and seasonally saturated, natural Alder thicket wetland - part of a larger wetland complex and forms a connection between two larger portions on the north and south sides of the alignment; the portion of the wetland to be crossed is less than 10 m wide. Northern portion is an alder (shrub) swamp, with a smaller grass dominated meadow to the south.	Moderate ~1.2	Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate to high; contributes to diversity in area	
WT-4	Treed swamp	West side of Middle River north of alignment	Not on alignment	na	No photo
Middle River Wetland	Treed swamp and graminoid fen / swamp	Lotic river, floodplain, throughflow, seasonally flooded, natural High potential priority plant species habitat	Large Extends up and down river	Surface water detention: high Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Sediment retention: high Shoreline stabilization: high Fish habitat: stream shading Wildlife habitat: high	



Wetland No.	Wetland Classification	Wetland Features	Wetland Size (ha)	Key Functions	Photo
WT-4B	Shrub swamp	Terrene, flat, isolated, seasonally flooded, natural Weigand sedge habitat	Small ~0.5	Within context of small size reducing overall significance of functions - Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate to high; contributes to diversity in area; priority plant species	
WT-5	Open Bog	Terrene, basin, isolated, permanently saturated	Moderate ~2.7	Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: moderate Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area	
WT-5a	Treed swamp	Terrene, flat, isolated, seasonally flooded, natural No water on surface, very wet in spring. No priority species observed June 2013. Wildlife observed included frogs. Low potential for SAR.	Small ~0.7	Within context of small size reducing overall significance of functions - Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area	

Wetland No.	Wetland Classification	Wetland Features	Wetland Size (ha)	Key Functions	Photo
WT-5b	Shrub swamp	<p>Lotic stream/terrene, slope, throughflow, seasonally flooded, natural</p> <p>Disturbance noted (may be road fill) No priority species or wildlife observed June 2013. Low potential for SAR.</p>	Small ~1.0	<p>Within context of small size reducing overall significance of functions -</p> <p>Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area</p>	
WT-5c	Shrub swamp	<p>Lotic stream/terrene, slope, through flow, seasonally flooded, natural</p> <p>Headwater area, stream flows north to south. No priority species or wildlife observed June 2013. Low potential for SAR.</p>	Small ~0.2	<p>Within context of small size reducing overall significance of functions -</p> <p>Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area</p>	

Wetland No.	Wetland Classification	Wetland Features	Wetland Size (ha)	Key Functions	Photo
WT-5d	Treed swamp	<p>Terrene basin, isolated, seasonally flooded, natural</p> <p>Depression. No priority species or wildlife observed June 2013. Low potential for SAR.</p>	Small ~0.1	<p>Within context of small size reducing overall significance of functions -</p> <p>Surface water detention: moderate</p> <p>Streamflow maintenance: moderate</p> <p>Nutrient transformation: high</p> <p>Carbon sequestration: high</p> <p>Wildlife habitat: moderate; contributes to diversity in area</p>	
WT-6	Swamp	Adjacent railbed	Not in alignment	na	na
WT-M1	Shrub swamp at edge; cattail at powerline	Terrene basin, isolated, seasonally flooded, natural at edge but likely enlarged by receiving powerline drainage	Small ~0.2	<p>Within context of small size reducing overall significance of functions -</p> <p>Surface water detention: moderate</p> <p>Streamflow maintenance: moderate</p> <p>Nutrient transformation: high</p> <p>Carbon sequestration: high</p> <p>Wildlife habitat: moderate; contributes to diversity in area</p>	
WT-M1A	Marsh - manmade	<p>Terrene basin, isolated, permanently flooded, manmade where gravel removed.</p> <p>No priority species or wildlife observed June 2013. Low potential for SAR.</p> <p>Pipeline will avoid as in railway bed in this area.</p>	Small ~0.1	<p>Within context of small size reducing overall significance of functions -</p> <p>Surface water detention: moderate</p> <p>Nutrient transformation: high</p> <p>Carbon sequestration: high</p> <p>Wildlife habitat: moderate; contributes to diversity in area</p>	

Wetland No.	Wetland Classification	Wetland Features	Wetland Size (ha)	Key Functions	Photo
WT-M2	Treed swamp	Terrene basin, isolated, seasonally flooded and saturated, natural To east of railbed area No priority species or wildlife observed June 2013. Low potential for SAR. Pipeline will avoid as in railway bed in this area.	Small ~0.6	Within context of small size reducing overall significance of functions - Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area	
WT-M3	Marsh	Lotic stream basin, outflow, permanently flooded, manmade / beaver enhanced – connected to M4. Ponded area with marginal wetland (railway bed area). No priority species or wildlife observed June 2013. Low potential for SAR. Pipeline will avoid as in railway bed in this area, subject to NSE request may culvert to improve drainage.	Moderate ~1.2	Within context of small size reducing overall significance of functions - Surface water detention: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area	
WT-M4	Treed swamp	Lotic stream basin, outflow, seasonally flooded and permanently saturated, beaver enhanced – connected to M3 Iron staining noted in stream. Harvest to south to north powerline. No priority species or wildlife observed June 2013. Low potential for SAR. Extensive beaver ponding in area. Pipeline will avoid as in railway bed in this area.	moderate partial delineation to powerline only >2.5	Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area, beaver use	

Wetland No.	Wetland Classification	Wetland Features	Wetland Size (ha)	Key Functions	Photo
WT-M4a	Swamp	Terrene basin, isolated, permanently flooded, maybe manmade (ruts identified) Depression in woods No priority species or wildlife observed June 2013. Low potential for SAR. Pipeline will avoid as in railway bed in this area.	Small <0.1	Within context of small size reducing overall significance of functions - Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area	
WT-M5	Treed swamp	Terrene basin, isolated, seasonally flooded, natural. Drainage treed swamp two parts irregular shape crossed.	Moderate ~2.6	Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area	
WT-M6	Not on alignment	Ponded area (avoided)	na	Component of wildlife habitat	No picture
WT-M7	Swamp	Terrene slope, outflow, seasonally flooded, maybe partially manmade, may be drainage for road ditch – cattail near road and treed swamp away from road. Flooded area associated with river treed swamp that back floods towards the west (i.e. away from Highway 106) during wet times of the year	small Less than 100 m in row <0.1	Within context of small size reducing overall significance of functions - Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area	

Wetland No.	Wetland Classification	Wetland Features	Wetland Size (ha)	Key Functions	Photo
WT-6	Marginal swamp	Terrene basin, isolated, seasonally flooded, may be manmade from historic logging depression which collects water – wetland hydrology suspect No priority species or wildlife observed June 2013. Low potential for SAR.	Small ~0.1	Within context of small size reducing overall significance of functions - Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area	
WT-M8	Treed swamp	Lotic stream/terrene, slope, through flow, seasonally flooded, natural A black duck nest containing 4 eggs was found at Approx. 20 m north of the alignment in April 2013.	Small ~0.1	Within context of small size reducing overall significance of functions - Surface water detention: moderate Streamflow maintenance: moderate Nutrient transformation: high Carbon sequestration: high Wildlife habitat: moderate; contributes to diversity in area	
WT-7	Shrub swamp	West of access road	Not on alignment	na	No Photo

4.1.5 Flora and Fauna

The methodology for addressing flora and fauna species and their habitat follows the direction in the NSE Guide to Addressing Wildlife Species and Habitats in an EA Registration Document (2009). As noted in this guidance, the focus for EA documents is on priority species and habitats. Priority species are characterized as those listed by legislation/authorities noted below. Additionally, species listed by the Atlantic Canada Data Centre (ACCDC) as rare were also considered in the assessment.

Table 4-7 Priority Species and Habitats Considered

Priority Species and Habitats Considered	
Lists	Designation
Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Federal Species-at Risk Act (SARA)	Endangered, Threatened or Special Concern Species
Nova Scotia Endangered Species Act (NSES)	Endangered, Threatened or Vulnerable Species
Nova Scotia General Status of Wild Species	Red (at risk) or Yellow (sensitive)

Regulatory protection to Species at Risk (SAR) is extended to those listed under SARA (Schedule 1) and the NSES. Priority / at risk species are considered for terrestrial habitats as well as wetlands and aquatic habitat.

Available background information on potential priority / at risk species for the study area was compiled from the previous NSDNR's Significant Wildlife Habitat Database, contact with NSDNR staff and the Atlantic Canada Conservation Data Center (ACCDC), Nova Scotia Department of Communities, Culture and Heritage (CCH) as well as consideration of habitat types present in the study area. Habitat types were based on the NSDNR data in **Figure 4-1** and field observations. The ACCDC data correspondence is included in **Appendix E**. A radius of 100 km was considered for review of known occurrences of priority species. Based on the review of potential priority species and potential available habitat in the study area, a "short-list" was generated.

Field inventories were designed to target peak periods of optimal detection of the "short-list" priority species within the time frame of the study. The short-lists of potential at-risk species for the study area, their likely habitat, flowering period or observation period, at risk / priority status and a summary of the field assessment is provided in **Table 4-8a** for plant, lichen and moss species and **Table 4-8b** for animal species.

Table 4-8a Potential Priority Plant / Lichen / Moss Species for Pictou 2013 Study Area based on 2012 ACCDC (100 km) data and 2013 SARA/NSESA/COSEWIC Listings and Potential Habitat Present; Summary of Field Findings

Species	Name	SARA (or COSEWIC*) Status and Sched. and NSESA Status or General NSDNR Status ¹	Habitat ² (nearby reference locations)	Flowers ²	Summary of Potential Based on Field Survey Findings
<i>Allium tricoccum</i>	Wild Leek	NSDNR Red	Deciduous forest, intervalles, rich woods	Late July	Potential habitat present, primarily Middle River floodplain area
<i>Alopecurus aequalis</i>	Short-awned Foxtail	NSDNR Yellow	Muddy edge of river, shallow pond, gravel edge	summer	Not observed in field survey – not expected
<i>Anemone quinquefolia</i>	Wood Anemone	NSDNR Yellow	Wooded riverbank, shaded intervalle	Late May-early June	Not observed in field survey – not expected
<i>Anemone virginiana</i> var. <i>alba</i>	Virginia Anemone	NSDNR Yellow	Streamside, intervalle; calcareous	Early July	Not observed in field survey – not expected
<i>Antennaria parlinii</i>	Parlins Pussytoes	NSDNR Red	Dry to moderate moisture; open woods	Apr.-Jun.	Not observed in field survey – not expected
<i>Botrychium lanceolatum</i> var.	Triangle Moonwort	NSDNR Yellow	Rich wooded hill side	July – Aug.	Potential habitat present Granton area to HWY 106 – low potential
<i>Botrychium simplex</i>	Least grape-fern	NSDNR Yellow	Lake/ mossy stream edge and variety	Late May-Jun.	Not observed in field survey – not expected
<i>Bromus latiglumis</i>	Broad-glumed Brome	NSDNR Red	Forest understory species	July - Oct.	Low potential for habitat
<i>Caltha palustris</i>	Yellow Marsh Marigold	NSDNR Yellow	Swamp, wet meadow, wet wood	Early Jun.	Not observed in field survey – not expected
<i>Cardamine pratensis</i>	Cuckoo Flower	NSDNR Red	Close to water; meadows, fields and low areas	Late May - early June	Not observed in field survey – not expected
<i>Carex haydenii</i>	Haydens Sedge	NSDNR Red	Seasonally saturated soils in open habitats	June–Aug.	Not observed in field survey – not expected
<i>Carex hirtifolia</i>	Pubescent Sedge	NSDNR Yellow	Calcareous meadows, thicket, forest slope	May, June	Not observed in field survey – not expected
<i>Carex hystericina</i>	Porcupine Sedge	NSDNR Red	Swamps, swales and along brook	summer	Not observed in field survey – not expected
<i>Carex pellita</i>	Woolly Sedge	NSDNR Red	Wet to dry meadows, marshes, stream banks, lakeshores, open scars and woodlands, low dunes, ditches, and other usually moist, successional habitats, especially in regions of calcareous soils; common plant of roadside ditches and other early successional or disturbed habitats	May – Aug.	Not observed in field survey – not expected
<i>Carex pensylvanica</i>	Pennsylvania Sedge	NSDNR Undetermined	Dry, rocky or gravelly soil, dry open woods	To mid May	Not observed in field survey – not expected
<i>Carex plantaginea</i>	Plantain-leaved Sedge	NSDNR Red	Rich deciduous woodlands, wooded slopes and ravines, and canyon-like gorges in wooded mountainous areas	Visible summer	Not observed in field survey – not expected
<i>Carex tenera</i>	Slender sedge	NSDNR Yellow	Meadow, woodland, opening	late May-Aug.	Not observed in field survey – not expected
<i>Carex tuckermanii</i>	Tuckermans Sedge	NSDNR Red	Meadow, swale	June – Aug.	Not observed in field survey – not expected
<i>Carex wiegandii</i>	Wiegands Sedge	NSDNR Red	Fruiting late spring–early summer. Bogs, openings in acidic conifer, mixed, or alder swamps, wet acidic sandy or peaty meadows	summer	Observed in Wetland 4b
<i>Caulophyllum thalictroides</i>	Blue Cohosh	NSDNR Red	Deciduous/interval forest	Apr.-early Jun.	Potential habitat along Middle River floodplain
<i>Cinna arundinacea</i>	Sweet Wood Reed Grass	NSDNR Red	Floodplain woodlands, swamps, thickets, small woodland openings,	Late summer	Potential habitat along Middle River floodplain

Species	Name	SARA (or COSEWIC*) Status and Sched. and NSESA Status or General NSDNR Status ¹	Habitat ² (nearby reference locations)	Flowers ²	Summary of Potential Based on Field Survey Findings
			seeps in wooded areas, and damp savannas. Less often, this species can be found in open areas, including fallow fields and strip-mined areas		
<i>Conioselinum chinense</i>	Hemlock Parsley	NSDNR yellow	Swamp, mossy coniferous woods/swale, seepy slope near coast	Aug.-Oct.	Low potential for preferred habitat
<i>Cuscuta cephalanthi</i>	Buttonbush Dodder	NSDNR Red	Low-lying near seashore, on aster	Aug. – Sept.	Potential for habitat along Middle River
<i>Cypripedium reginae</i>	Showy Lady's-slipper	NSDNR Red	Alkaline swamp, bog	June – Aug.	Not observed in field survey – not expected
<i>Degelia plumbea</i>	Blue Felt Lichen	NSDNR Yellow	Old-growth red maple, rarely yellow birch	Na – visible year round	Low potential based on habitat observed
<i>Desmodium canadensis</i>	Canada Tick-trefoil	NSDNR Red	Rich moist woods, sandy beach	Late July	Potential for habitat along Middle River
<i>Elymus wiegandii</i>	Wiegands Wild Rye	NSDNR Red	Streambank and meadow	July – Aug.	Potential for habitat along Middle River
<i>Epilobium coloratum</i>	Purple-leaf willow herb	NSDNR Yellow	Low-lying ground, springy slope	Jul-Oct.	Potential for habitat along rivers, wetlands
<i>Equisetum pratense</i>	Meadow Horsetail	NSDNR Yellow	Rich wooded bank, mossy slope, typically alkaline soil	Na	Not observed in field survey – not expected
<i>Floerkea proserpinacoides</i>	False Mermaidweed	NSDNR Yellow	Deciduous ravine, river edge, intervalles	Late May-late Jun.	Not observed in field survey – not expected
<i>Fraxinus nigra</i>	Black ash	NSDNR Yellow	Low ground, damp wood, swamp	May-Jun.	Not observed in field survey – not expected
<i>Fraxinus pennsylvanica</i>	Ash	NSDNR Red	Near lake or pond, low-lying area	May (visible year-round)	Not observed in field survey – not expected
<i>Galium labradoricum</i>	Labrador Bedstraw	NSDNR Yellow	Wet; cold bogs, swamps, thickets	Late May - Aug.	Not observed in field survey – not expected
<i>Hedeoma pulegioides</i>	American False Pennyroyal	NSDNR Yellow	Stony soil, upland pasture	Aug.	Low potential based on habitat observed
<i>Hepatica nobilis</i> var. <i>obtus</i>	Round-lobed Hepatica	NSDNR Red	Woody/grassy meadow, river terrace, steep exposed slope, dry pasture, dry pine/oak along river	Early May	Not observed in field survey – not expected
<i>Humulus lupulus</i> var. <i>lupuloides</i>	Common Hop	NSDNR Undetermined	Rich wooded, streamside	Visible summer	Hop species found along Middle River floodplain unconfirmed if SAR variety
<i>Leptogium corticola</i>	Blister Jellyskin Lichen	NSDNR Yellow	Usually on bark of various deciduous trees, rarely on rocks	Na	Low potential habitat in hardwoods along HWY 106
<i>Lillium canadense</i>	Canada Lily	NSDNR Yellow	Meadows and stream banks	July	Potential habitat streamside particularly Middle River
<i>Listera australis</i>	Southern Twayblade	NSDNR Red	Red maple swale, wetland	Late Jun.-Jul.	Not observed in field survey – not expected
<i>Osmorhiza longistylis</i>	Smooth Sweet Cicely	NSDNR Yellow	Rich deciduous forest, intervalle	Late June – July	Not observed in field survey – not expected
<i>Ophioglossum pusillum</i>	Adder's tongue	NSDNR Yellow	Acid soil, ditch, old field	Late May-Aug.	Not observed in field survey – not expected
<i>Pilea pumila</i>	Dwarf Clearweed	NSDNR Red	Cool, moist shade	July - Oct.	Potential habitat in riparian area along Middle River
<i>Platanthera flava</i> (var. <i>herbiola</i>)	Tuberclad Orchid	NSDNR Yellow	Hardwoods along stream	July - Aug.	Low potential habitat in riparian areas throughout

Species	Name	SARA (or COSEWIC*) Status and Sched. and NSESA Status or General NSDNR Status ¹	Habitat ² (nearby reference locations)	Flowers ²	Summary of Potential Based on Field Survey Findings
<i>Platanthera macrophylla</i>	Large Round-leaved Orchid	NSDNR Yellow	Damp woods in deep shade	Aug.	Low potential habitat in upland hardwoods
<i>Polygala sanguinea</i>	Field milkwort	NSDNR Yellow	Poor acidic field, damp slope, open woods/bush	Late Jun.-Oct.	Low potential based on habitat observed
<i>Rudbeckia laciniata</i>	Cut-leaved coneflower	NSDNR Yellow	Swale, swamp	Aug.	Potential habitat in wetland, streamside areas
<i>Salix sericea</i>	Silky willow	NSDNR Yellow	Wet thicket, stream edge, marsh	Early summer	Not observed in field survey – not expected
<i>Sanicula odorata</i>	Clustered Sanicle	NSDNR Red	Rich alluvial wood, intervals	July – Aug.	Potential habitat in Middle River area
<i>Scrophularia lanceolata</i>	Lance-leaved Figwort	NSDNR Undetermined	Streamside	summer	Figwort found on Middle River floodplain not at risk species
<i>Solidago hispida</i>	Hairy Goldenrod	NSDNR Red	Woods and forest edges, run-out fields	Aug.	Low potential based on habitat observed
<i>Symphyotrichum ciliolatum</i>	Fringed Blue Aster	NSDNR Yellow	open field, lawn, wood edge	Aug.-Sept.	Low potential based on habitat observed
<i>Thuja occidentalis</i>	Eastern White Cedar	NSESA Vulnerable	Cedar swamps, ornamental cedar not considered at risk.	Year-round	Not observed in field survey – not expected
<i>Tiarella cordifolia</i>	Heart-leaved Foamflower	NSDNR Yellow	Deciduous forest, intervals	Mid May-mid June	Not observed in field survey – not expected
<i>Triosteum aurantiacum</i>	Orange-fruited Tinkers Weed	NSDNR Yellow	Intervale soil, rich soil along river	July	Low potential habitat in Middle River area
<i>Viola nephrophylla</i>	Northern Bog Violet	NSDNR Yellow	Dampwood, streams	May - July	Not observed in field survey – not expected
<i>Zizia aurea</i>	Golden Alexanders	NSDNR Yellow	Edge stream, meadow, field	May-June	Not observed in field survey – not expected

1. NSDNR Status of Nova Scotia Wildlife - Red at risk, Yellow sensitive, Green stable

2. Zinck 1998

Table 4-8 b Potential Priority Animal Species for Pictou Study Area based on 2012 ACCDC (100 km) data and 2013 SARA/NSESA/COSEWIC Listings and Potential Habitat Present

Common Name	SARA (or COSEWIC*) Status and Sched. and NSESA Status	NSDNR Status	Habitat Preference	Timing for Investigation	Summary of Potential Based on Field Survey Findings
INVERTEBRATES					
Bog Elfin (<i>Callophrys (Incisalia) lanoraensis</i>)	na	NSDNR Red	Tamarack and black spruce bogs	Summer	Low potential based on habitat observed
Brook Floater (<i>Alasmodonta varicose</i>)	na	NSDNR Yellow	Riffles, rocky, gravel, sand bottom	Summer	Low potential in watercourses
Hoary Comma (<i>Polygonia gracilis</i>)	na	NSDNR Yellow	Boreal forest	Late Aug.	Low potential based on habitat observed
Monarch Butterfly (<i>Danaus plexippus</i>)	Special Concern Sched. 1	NSDNR Yellow	Migrates through area, feeds on milkweed or similar wildflower; Canadian habitat not vulnerable.	Late summer	Likely migrates through area
Northern Cloudywing (<i>Thorybes pylades</i>)	na	NSDNR Yellow	Wooded places, this species rarely occurs in built-up areas	Early July	Low potential based on habitat observed
BIRDS					
Barn Swallow (<i>Hirundo rustica</i>)	Threatened	NSDNR Yellow	Nest on structures	Nest May-July	Potential habitat in area
Bobolink (<i>Dolichonyx oryzivorus</i>)	Threatened	NSDNR Yellow	Nest in openings, lush grass	Nest Jun.- Jul.	Low potential habitat in area hayfields
Boreal Chickadee (<i>Parus hudsonicus</i>)	Na	NSDNR Yellow	Nest cavities in rotted tree stumps	Nest Mid May – mid Aug.	High potential for habitat in area
Canada Warbler (<i>Wilsonia Canadensis</i>)	Threatened Sched. 1	NSDNR Yellow	Nest in dense understory mature to mid age forest	Nest - June	Observed multiple times nesting near ROW from Middle River to Abercrombie
Chimney Swift (<i>Chaetura pelagica</i>)	Threatened Sched. 1; Endangered	NSDNR Yellow	Nest chimneys and large hollow trees nest / roost near	Nest summer	Low potential habitat in area
Common Loon (<i>Gavia immer</i>)	na	NSDNR Yellow	May nest in around adjacent lakes	Nest summer	Low potential habitat in area
Common Nighthawk (<i>Chordeiles minor</i>)	Threatened Sched. 1 Threatened	NSDNR Yellow	Nest -sparsely vegetated or bare ground (cutover/burns, building roof)	Nest - June-July	Low potential habitat in area
Common Tern (<i>Sterna hirundo</i>)	na	NSDNR Yellow	Nest offshore but may feed inland along lake shores	Nest summer	Not expected to nest in area
Eastern Bluebird (<i>Sialia sialis</i>)	na	NSDNR Yellow	Woodpecker holes forage low vegetation with scattered trees clear-cut near forest, favour broad-leaf	Nest- May-July	Low potential habitat in area
Gray Jay (<i>Perisoreus canadensis</i>)	Na	NSDNR Yellow	Forest	Nest Late Mar.-early Jul.	Moderate potential habitat in area
Northern Goshawk (<i>Accipiter gentilis</i>)	na	NSDNR Yellow	Woodland species	Nest –Apr.-May	Expected to forage and potentially nest in area
Olive-sided Flycatcher (<i>Contopus cooperi</i>)	Threatened Sched. 1	NSDNR Yellow	Open forest – conifers or mixed.	Nest – June-mid Aug.	Observed west of ROW in Mount William area
Rusty Blackbird (<i>Euphagus carolinus</i>)	Special Concern Sched. 1	NSDNR Yellow	Nests in swamps and bogs along sluggish streams	Nest - May-July	Potential habitat in wetlands in area
Short-eared Owl (<i>Asio flammeus</i>)	Special Concern Sched. 1	NSDNR Yellow	Open marshlands, fields	Nest – Apr.-June	Low potential to forage in area
FISH					
Atlantic salmon (<i>Salmo salar</i>) – Southern Gulf	Special Concern	NSDNR Red	Gravel bottomed streams, rivers	Late summer/fall	Low potential in watercourses in area
American eel (<i>Anguilla rostrata</i>)	Threatened	NSDNR Green	Fresh water streams for adults. Migrate to sea to spawn.	Non-winter	Expected in watercourses in area
Brook trout (<i>Salvelinus fontinalis</i>)	na	NSDNR Yellow	Streams, brooks	Late summer/fall	Expected in watercourses in area
Gaspereau (<i>Alosa</i>)	na	NSDNR Yellow	Spawn above head of tide in rivers,	Spring-summer	Expected in watercourses in

Common Name	SARA (or COSEWIC*) Status and Sched. and NSESA Status	NSDNR Status	Habitat Preference	Timing for Investigation	Summary of Potential Based on Field Survey Findings
<i>pseudoharengus</i>)			stillwater, lake		area
HERPTILES					
Snapping turtle (<i>Chelydra serpentina</i>)	Special Concern Sched. 1	NSDNR Green	Vegetated lakes and streams, nest on sand / gravel nEAR	Non-winter	Potential habitat in or near riparian areas
Wood turtle (<i>Glyptemys insculpta</i>)	Threatened – Sched. 1, Vulnerable	NSDNR Yellow	Nest on gravel bank near river, overwinter in pools, clear streams - near	Late spring	Potential habitat in or near riparian areas
MAMMALS					
Tri-colored Bat (<i>Pipistrellus subflavus</i>)	Endangered	NSDNR Yellow	Hibernate in caves, may feed in area	Summer - fall	Low potential
Little Brown Myotis (<i>Myotis lucifugus</i>)	Endangered	NSDNR Yellow	Hibernate in caves, trees near water - near	Summer - fall	Likely summer resident; low potential for winter hibernacula
Mainland Moose** (<i>Alces alces american</i>)	n/a Endangered	NSDNR Red	Forest – occasionally enter city area. near	Year round	Mass occasionally pass through area but not expected to be important habitat
Northern Myotis (<i>Myotis spetentrionalis</i>)	Endangered	NSDNR Yellow	Hibernate dense forest and caves, may feed in area	Summer - fall	Likely summer resident; low potential for winter hibernacula

4.1.5.1 Fish and Fish Habitat

Fish habitat is protected under the Fisheries Act (2012) which defines habitat as “spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes”. Permanent alteration to, or destruction of, fish habitat is subject to federal approval.

As the proposed pipeline watercourse crossings will be installed using a general baseline assessment of potential fish species and habitat in the vicinity of the proposed route was undertaken through field investigations within the proposed easement and background data for the area. Fish habitat was examined visually by Dillon Consulting Limited within the proposed easement based on standard DFO descriptors of stream character. Streams were initially examined in fall of 2012 and revisited in June 2013. Background data for watercourses in area includes studies undertaken in the general area for distribution pipeline investigations in the fall of 2000 (Sempra) which included electrofishing in various tributaries of the Middle River and West River; and 2004 (Preliminary studies for Heritage Gas by Dillon Consulting).

The general study area supports both recreationally fished species and fish species of conservation concern.

Table 4-9 provides a summary of fish habitat in the watercourses crossing the proposed pipeline route. It is noted that all defined watercourses will be drilled under using HDD techniques.

Table 4-9 Summary of Fish Habitat in Watercourses along the Proposed Alignment

No	Name/Label	Fish Habitat Features	Fish Species Expected*
WC-1	Sweet Brook	Stream character: riffle, run, pool Dominant substrate: gravel, cobble Cover: 70% alder side channels; 15% main channel Habitat type at alignment: good to excellent salmonid rearing, adult, potential spawning Habitat within 100 m downstream: good habitat throughout	Brook trout (NSDNR sensitive) American eel (COSEWIC Special Concern) Variety of forage fish – White sucker, threespine stickleback, dace sp. Chub sp.
WC-2	Trib. to Miller Brook	Stream character: 45% Riffle, 55% run Dominant substrate: cobble, sand Cover: 50% - mixed wood forest, with alders and low shrubs approaching bank Habitat type at alignment: salmonid rearing, adult Habitat within 100 m downstream: good habitat throughout	Brook trout (NSDNR sensitive) American eel (COSEWIC Special Concern) Variety of forage fish
WC-3	Trib. to Miller Brook	Stream character: flat Dominant substrate: gravel/cobble Cover: 80% mixed wood forest, with alder and shrubs on approaching banks on east bank.; abandoned field on west bank Habitat type at alignment: fair rearing, adult Habitat within 100 m downstream: fair to good	Brook trout (NSDNR sensitive) American eel (COSEWIC Special Concern) Variety of forage fish
WC-4	Trib. to West River	Not fish habitat Potential habitat over 1 km downstream	na
WC-5	Trib. to Miller Brook	Not fish habitat Potential habitat 300 m downstream	na
WC-6	Trib. to Middle River	Not likely fish habitat Sand and cobble substrate. Steep approaching slopes. Mixed wood forest. Former agricultural field. Potential seasonal fish habitat within 100 m downstream	na
WC-6b	Trib. to Middle River	Not fish habitat Potential habitat 300 m downstream	na
WC-7	Middle River	Stream character: run, pool Dominant substrate: clay, sand Cover: 10% floodplain trees and shrubs; mixed wood forest on west side and tall grasses and sedges on east. Habitat type at alignment: good adult, passage Habitat within 100 m downstream: similar to alignment	Brook trout (NSDNR sensitive) American eel (COSEWIC Special Concern) Gaspereau (NSDNR sensitive) Variety of forage fish
WC-8	Trib. to Bear Brook	Stream character: shallow flat, riffle Dominant substrate: sand, gravel Cover: 75% mixed wood forest and wetland Habitat type at alignment: seasonal forage Habitat within 100 m downstream: potential salmonid; Bear Brook records of Atlantic salmon (COSEWIC endangered)	Potential forage fish
WC-8b	Trib. to Bear Brook	Not fish habitat Potential forage fish habitat within 100 m downstream	na

No	Name/Label	Fish Habitat Features	Fish Species Expected*
WC-M1	Trib. to Bear Brook	Stream character: flat, shallow run Dominant substrate: sand, gravel Cover: 20% trees and bank Habitat type at alignment: fair adult Habitat within 100 m downstream: fair to good	Brook trout (NSDNR sensitive) American eel (COSEWIC Special Concern) Variety of forage fish
WC-M2	Trib. to Begg Brook	Pond may have fish, but obstructions make access marginal	Not expected within ROW
WC-M3	Begg Brook	Stream character: riffle Dominant substrate: cobble, gravel, sand Cover: 30% mixed wood Habitat type at alignment: good adult, fair rearing Habitat within 100 m downstream: similar; historic high suspended sediment load, some potential for brook trout spawning; beaver dam obstructions throughout limit access particularly at low flow	Brook trout (NSDNR sensitive) American eel (COSEWIC Special Concern) Variety of forage fish
WC-M5	Begg Brook	Stream character: run and ponded area downstream; flat, riffle upstream Dominant substrate: sand, silt, cobble Cover: 15% mixed wood, steep east bank Habitat type at alignment: adult salmonid Habitat within 100 m downstream: similar to alignment, significant beaver activity in the area	Brook trout (NSDNR sensitive) American eel (COSEWIC Special Concern) Gaspereau (NSDNR sensitive) Variety of forage fish
WC-10	Begg Brook	Stream character: ponded area at culvert outlet Dominant substrate: sand, silt, cobble Cover: 15% mixed wood, steep east bank Habitat type at alignment: adult salmonid Habitat within 100 m downstream: similar to alignment, significant beaver activity in the area, wetland to north	Brook trout (NSDNR sensitive) American eel (COSEWIC Special Concern) Gaspereau (NSDNR sensitive) Variety of forage fish
WC-11	Trib. to Begg Brook	Not expected Potential habitat within 100 m downstream	na
WC-M4	Trib. to Begg Brook	Stream character: riffle Dominant substrate: cobble, gravel Cover: 20% mixed wood Habitat type at alignment: good salmonid rearing, adult Habitat within 100 m downstream: similar to alignment	Brook trout (NSDNR sensitive) American eel (COSEWIC Special Concern) Gaspereau (NSDNR sensitive) Variety of forage fish
WC-9	Trib. to Middle River	Not likely fish habitat Potential habitat within 100 m downstream; receives drainage from Michelin culvert	na

Access Watercourse Crossing

See below for photographs showing the proposed Sweet Brook temporary access bridge location crossing and excellent quality salmonid habitat downstream. This is the only potential temporary crossing identified outside of the pipeline easement. Historically there are records of Atlantic salmon (COSEWIC endangered) for Sweet Brook.



4.1.5.2 Migratory and breeding birds

Information on migratory and breeding birds is based on background data supplemented by a field survey. Background data includes the Maritime Breeding Bird Atlas surveys for the area (<http://www.mba-aom.ca>). Bird species were recorded within the three, 10 km by 10 km breeding bird atlas squares encompassing the study area. **Appendix F** provides the atlas data including breeding status. The NSDNR Significant Habitat database identified Bald Eagle (*Haliaeetus leucocephalus*; NSDNR stable population) habitat in the Middle River shore area and Abercrombie Point area.

Bird surveys were conducted along the alignment by an experienced local birder, Ken McKenna in late May 2013. Mr. McKenna is an experienced birder with over 20 years birding in Pictou County. The survey period is representative of the early summer nesting period. Surveys were conducted as transects along the proposed pipeline easement and included most of the alignment and all key habitat types. Sections that were not surveyed were: the area from Alma Road to MacLean Road as much of the area is under active agriculture; and, the section from the Granton turnoff from Highway 106 to Northern Pulp in Abercrombie, and the proposed route to Michelin. All birds observed were documented and key nesting species highlighted. The bird observation list is included in **Appendix F**. Approximately 70 species of birds were observed. All the habitats identified within the proposed easement represent potential nesting habitat. Three species listed under SARA, NSESA, COSEWIC or considered NSDNR sensitive or at risk were observed during this survey.

Priority Bird Species Observed

- Canada Warbler (SARA Schedule 1 Threatened) – The populations of this warbler have declined over the past thirty years and the species is considered at risk by NSDNR. Loss

of winter habitat in South America is likely a key factor, but breeding habitat loss in Canada also likely contribute to the population decline. Nesting habitats include both upland and wetland habitats particularly forested areas with open tree canopy and complex forest floor. Treed swamps are frequent habitats in Nova Scotia. Canada Warblers were observed in May 2013 along the area of the alignment paralleling Highway 106 and likely were associated with wetland or wet wood habitat.

- Olive-sided Flycatcher (SARA Schedule 1 Threatened) – Threats to the population are primarily due to loss of wintering habitat, but forest harvesting in nesting areas may contribute to lowered breeding success. Preferred habitat for this bird is associated with openings in coniferous forest and mixed forest habitat and it prefers areas near tall trees or snags for perching. Open areas can include natural forest openings, openings near watercourses or wetlands, or manmade openings such as cutover areas. Less preferential habitat may be associated with hardwoods and young second-growth forest following disturbance. Olive-sided Flycatchers were heard in May 2013 approximately 200 m west of the proposed alignment in the section adjacent to Highway 106 (between Wetland M7 and M5).

- Eastern Wood Pewee (COSEWIC Special Concern) – One of the many songbird species with population declines in the last 40 years. This species typically nests in remote hardwood forest areas, but may also be found in ornamental trees particularly elms near developed areas. One observation occurred in the Granton area outside of the proposed pipeline easement.

Potential Priority Bird Species Habitat

Several priority bird species have potential to nest in the proposed pipeline study area:

- Barn Swallow (Threatened) – nesting is expected to occur in the general area. The highest potential for habitat is within built structures which are avoided by the proposed pipeline alignment.
- Bobolink (Threatened) – there is a low potential for nesting in the general area. Potential habitat is hayfields that have not been mowed for over a year or more. The agriculture along the proposed pipeline alignment is active.
- Boreal Chickadee (NSDNR sensitive) – nesting is expected in the general area. Nests may occur within proposed pipeline easement, with the highest potential for habitat associated with wetlands and damp well shaded coniferous forest.
- Chimney Swift (NSES Endangered) – nesting along the proposed pipeline easement is unlikely. The highest potential for nesting habitat is chimneys or large hollow trees within old growth forest, neither occur along the proposed pipeline alignment.
- Common Loon (NSDNR sensitive) – Common Loon are expected to occur in the area, but no nesting habitat was identified along the proposed pipeline route.

- Common Nighthawk (Threatened) – nesting along the proposed pipeline route is unlikely. Nesting habitat preference is for open rocky, gravelly clearings near forested habitats. Good areas were not observed along the proposed pipeline route, but small rocky areas occur along the powerline in the Limerock to Green Hill area and west of the Middle River.
- Eastern Bluebird (NSDNR sensitive) – it is unlikely bluebirds nest in the study area. Nesting habitat is tree cavities but man-made nest boxes are also used.
- Gray Jay (NSDNR sensitive) – nesting is expected within the general area. Preferred nesting habitat is open mature coniferous forest. Coniferous forest along the proposed pipeline route has some potential for jay nesting habitat.
- Northern Goshawk (NSDNR sensitive) – it is likely that goshawk nest in the general study area. Preferred nesting areas are old growth hardwoods which are not present along the proposed pipeline route. Mixed woods are less frequently used and occur along the proposed pipeline route.
- Rusty Blackbird (Special Concern) – there is low potential for Rusty Blackbirds to nest along the proposed pipeline route, primarily associated with wetland habitat. Preferred nesting habitat is forested wetlands often associated with slow moving streams, bogs, sedge meadows, marshes, swamps, beaver ponds or pasture edges.
- Short-eared Owl (Special Concern) – these owls are not expected to nest within the proposed pipeline easement, however there is a low potential for foraging in the general area.

4.1.5.3 Flora

Vegetation surveys were conducted in the study area targeting priority plant species habitat (and included development of a list of plants) during fall 2012 and early season 2013 periods. The alignment was surveyed on foot by a qualified plant specialist, Tom Neily visually searching for significant plant habitats and species of interest. Mr. Neily is an experienced botanist with over 30 years studying Nova Scotia plants, focusing on rare species. Mr. Neily is also recognized as a plant and lichen species at risk specialist and is experienced with moss identification. Priority species locations observed in the field were provided using a handheld GPS.

Priority plants typically occur at places where the local habitat is suitable for their establishment and growth. Similarly, rare or sensitive habitats develop in areas having unique combinations of soil, geologic, topographic, and climatic conditions. These areas were most intensively investigated during the field surveys; however, all habitats with the exceptions of residential areas, actively cultivated fields and developed urban or industrial (Northern Pulp and Michelin developed areas) lands were also surveyed. The plant survey also included visual searches based on habitat potential for uncommon (cyanolichens) lichens, and incidental moss identification.

Plants identified were generally typical of the habitats identified. Much of the upland habitat surveyed showed signs of previous agricultural activity (barbed wire fences, even age white spruce stands, etc.). Forest harvesting, both recent and in the past was also commonly encountered in upland areas. In Green Hill, approximately 2 kilometres of the route is through hay field. Another commonly encountered area with low potential is the secondary regeneration woodland along abandoned railway bed and power corridors which a large portion of the proposed pipeline route is adjacent to.

The areas identified with higher potential for plant species of interest are primarily within locations with limited potential for pipeline construction impact as the proposed method for installation is horizontal directionally drilling under watercourses and wetlands, as well as under the steep forested bluff at Greenhill associated with a watercourse crossing.

Figure 4-5 provides the areas identified as having higher potential for priority plant species.

Based on the habitats and species identified and potential priority species for the area, it is expected that follow-up late season plant surveys will target the same high potential areas as identified for the early season. Exotic (non-native) plant species were prevalent throughout many areas due to encroachment of disturbed habitats.

Appendix G provides the plant and moss species observed during botany field surveys.

Priority Plant Species

No plants (or lichens/mosses) listed under SARA, NSESA or COSEWIC were observed or expected in the alignment.

One plant listed as a NSDNR at risk species was observed in 2013:

- Wiegands sedge (*Carex wiegandii*) – found in wetland 4B. Five tufts of this sedge were found in sphagnum habitat within this wetland.

One plant species listed as undetermined by NSDNR and S1? by ACCDC was identified:

- Common Hops (*Humulus lupulus* var. *lupuloides*) – found along Middle River floodplain. The variety of the hops found was not confirmed but may be the S1? variety.

Several rare to uncommon (S2S3) moss species were observed within wetland habitat.

This sedge is primarily a maritime species of northeastern North America and is considered globally vulnerable. It is a perennial graminoid whose habitats are typically boggy or peaty soils and may include acidic sandy soils (Nichols 2002). Flowering is in June to August and fruiting in the fall. Pollination and seed dispersal is primarily by wind. Threats relate to loss and degradation of wetland habitat. Factors that may contribute to habitat degradation include wetland infilling, nutrient runoff and alteration of hydrological and disturbance regimes and invasives. Storm water quality is important as plants are susceptible to nutrient loading as is maintaining wetland hydrology. Off road vehicle activity can also threaten populations. The plant is most likely to persist in larger habitats. Habitats may include both stable wetland areas and dynamic successional areas. Where populations are in areas of disturbances, habitat size and dynamic processes are most important drivers.

Micro habitats which have the potential for interesting bryophyte and lichen species were limited to brook banks and a single bluff with exposed rock. The only cyanolichens observed were *Lobaria spp.*, *Collema subflaccidum*, *Leptogium cyanescens* and *L. lichenoides* (S2). There was no habitat potential for *Erioderma* sp.

Potential Priority Plant Habitat

Habitats with a relatively high likelihood of supporting rare species in the study area are floodplains (particularly the Middle River), wetlands (treed swamps in the Mount William area) and riparian habitats. As well, micro habitats which have high potential for interesting moss and lichen species included stream banks and an area of steep forested bluff (**Figure 4-5**). **Table 4-8a** indicated potential priority plant species for these areas.

4.1.5.4 Terrestrial Animal Species

Animal species present were investigated incidental to other surveys, with attention paid to potential habitat for priority species. Animal species encountered during 2012 and 2013 field surveys were typical of the habitats. Larger mammals expected in the area include coyote, black bear and white-tailed deer. Other common animals include beaver, raccoon, red fox and a variety of small mammals.

No priority animal species (excluding birds) were observed during field surveys. Potential priority animal species that may occur in the area based on habitat present are discussed below.

Potential Priority Animal Species

- Bog elfin (NSDNR at risk) – this butterfly species has only a few Nova Scotian records and is unlikely to occur along the proposed pipeline alignment. The black spruce / tamarack bog habitats area not present along ROW. One small bog is located in the Limerick area, but open habitat is generally not preferred.
- Hoary comma (NSDNR sensitive) – this butterfly species is very rare in Nova Scotia and unlikely to occur along the proposed pipeline alignment. The boreal forest type habitat is not generally present.
- Monarch butterfly (Special Concern Schedule 1) – this butterfly likely migrates through the area. Preferred breeding habitat is areas of milkweed which were not identified on the proposed pipeline route.
- Northern cloudywing – this butterfly has very few records in Nova Scotia and unclear habitat preferences that may include forested and built up areas. It is unlikely to occur along the proposed pipeline route.
- Snapping turtle (Special Concern) – these turtles prefer shallow lakes and streams or slow moving watercourses with mud bottom and dense aquatic vegetation and will occur in adjacent habitat as well. Snapping turtles may occur in the study area. Nesting occurs in the last two weeks in June to first week in July in sand or gravel areas typically

within a few metres of water, but will use soil on woods roads, gravel roadways, sawmill piles or tilled soil up to 100 m from water. Potential nesting areas may be present along the proposed pipeline route. No turtles were observed in late June 2013 field surveys.

- Wood turtle (Threatened Schedule 1) - wood turtles habitat is identified for the study area by NSDNR (Figure 4-1) and have been found in the East, West and Middle River systems. Wood turtles occur in habitats associated with streams and rivers but travel widely in adjacent habitat, particularly in floodplain intervals, riparian shrub areas, meadows and nearby farmland. Areas of up to 6 ha surrounding suitable stream habitat may be used. Streams with sand/gravel substrate are preferred but rocky streams may also be used. Nesting occurs in late June to early July. Nesting sites are usually along non-vegetated or sparsely vegetated sandy beaches and banks or sand and gravel bars along river banks, or in exposed sediments in the flood plain. However, disturbed areas such as roads or railbed may be used as well. No turtles or evidence of nesting habitat or nest attempts/egg remains were observed in late June 2013 field surveys.

- Bats - Tri-colored bat, Little Brown Myotis and Northern Myotis (Endangered) - Tri-colored bats are unlikely in Northern Nova Scotia but both of the myotis bats may have summer habitat in the study area, including potentially along the proposed pipeline route. Summer roost sites are cavity trees or buildings and may occur along the proposed pipeline route. Maternal colonies are typically larger cavity trees near a good food supply (watercourse or wetland) and are most likely near these features. The primary threat to bat populations is the infectious fungus – White Nose Syndrome which affects bats during the winter hibernation. Bat wintering hibernacula are not expected within the study area.

- Mainland moose (NSES Endangered) – although moose may travel widely throughout the area, habitat along the ROW is unlikely to provide significant microhabitat features.