



NORTHERN PULP NOVA SCOTIA

Plant Baseline Survey

Focus Report – Replacement Effluent Treatment Facility

Appendix Focus Report Item 8.1 Plant Baseline Survey along Re-aligned Pipeline Route

As required by item 8.1 of the Terms of Reference (ToR) (Nova Scotia Environment (NSE) 2019) for the Focus Report, plant baseline surveys were conducted to reflect the proposed re-aligned pipeline route as identified in the Focus Report Project Overview and Section 2.1, and the results of the surveys are presented in this section. The results of baseline plant surveys conducted at the Effluent Treatment Facility (ETF) site were reported in the Environmental Assessment Registration Document (EARD for Northern Pulp Nova Scotia, NPNS 2019), and remain unchanged.

8.1.1 Plant Survey Methodology

Plant surveys were conducted as an update to the existing environment as described in the EARD (NPNS 2019) and based on the revised project description. Plants were investigated along the proposed re-aligned pipeline route by a qualified botanist conducting a walkover of the proposed route. Prior to the field survey, the potential priority plant species as identified in the EARD based on Atlantic Canada Conservation Data Centre records (AC CDC 2018), were reviewed and the potential habitat and preferred timing for identification were used to plan field surveys. Field investigations within the proposed pipeline re-aligned route were conducted in June 2019 and July 2019. Identified plants were then reviewed in terms of their conservation status.

8.1.2 Update of Terrestrial Habitats within the Re-aligned Pipeline Route

Figure A8.1-1 illustrates land-cover within the local assessment area associated with the re-aligned pipeline route. Table A8.1-1 summarizes the existing terrestrial habitats. Plate A8.1-1 provides photos of typical habitats along the terrestrial portion of the re-aligned pipeline route.

Table A8.1-1: Summary of Habitat Types along the Terrestrial Portion of the Re-aligned Pipeline Route

Habitat Type	Description/Character	Approximate Linear Length along the Re-aligned Pipeline Route (m)
Forested	<p>Forested land generally falls into one of the three forest groups:</p> <ul style="list-style-type: none"> • Spruce Pine Forest group; • Mixedwood Forest group; and • Open Woodland Forest group. 	4,100
Developed	<p>Developed land includes areas that are typically urban or otherwise disturbed including: regularly mowed areas around the Pictou Roundabout, buildings, parking lots, developed land on the existing NPNS property and the Northumberland Ferries marine terminal.</p>	2,500
Marine waters	<p>Marine waters adjacent to the re-aligned pipeline route are restricted to the waters of the Pictou Harbour surrounding the Pictou Causeway and the coastal waters near the Northumberland Ferries marine terminal.</p>	5,500
Wetlands	<p>Wetlands are described in Appendix 5.1. Wetlands adjacent the re-aligned pipeline route are generally associated with watercourses and are comprised of the following wetland types:</p> <ul style="list-style-type: none"> • Shrub and treed swamps; • Bogs; • Marshes; and • Fens. 	1,100
Agriculture	<p>Agricultural land is represented by a few small areas of cleared land for either haying or crop production.</p>	500
Road Corridor	<p>Land classified as other road corridor would also represent disturbed habitat and include roads crossed (such as the Central Caribou and Three Brooks Roads) that overpass or otherwise intersect with Highway 106 route to the Northumberland Ferries marine terminal, as well as the Highway 106 roadway.</p>	800
Old Field/Pasture	<p>Old field habitat is scarcely represented and includes agricultural lands left fallow and allowed to undergo natural succession. This is typically occupied first by willow and birches, and second stands of white spruce.</p>	150
Cutovers	<p>Small cutovers areas exist along the route. Cutovers represent the cleared land following tree harvesting and are occupied by early regenerating conifer species with an abundance of coarse woody debris covering the ground surface.</p>	100



Northern Pulp Nova Scotia Corporation
 Replacement Effluent Treatment Facility
 Environmental Assessment - Focus Report

**Habitats Along the Proposed Pipeline
 Figure A 8.1-1**



- | | | | |
|-------------------------------------|---|------------|--------------|
| Approximate Project Footprint Area* | Cut Over (Varying Stages of Regeneration) | Wetland | Developed |
| Approximate Diffuser Location | Old Field/Pasture | Open Water | Dunes/Cliffs |
| Wooded | Agriculture | Beach | |



MAP DRAWING INFORMATION:
 DATA PROVIDED BY Northern Pulp Nova Scotia, GeoNova, NSDNR

MAP CREATED BY: SCM
 MAP CHECKED BY: SLD
 MAP PROJECTION: NAD 1983 UTM Zone 20N

*Precise Project Footprint to be determined following completion of detailed design

0 250 500 1,000 Meters



Plate A8.1-1: Typical Habitat Photos (Along the Re-aligned Pipeline Route)

Photos 1, 2 and 3: Typical Regenerating Hardwoods, Roadside Ditching, Adjacent Pictou Harbour Coast



Photos 4, 5 and 6: Roadside Ditch and Tree Copses, Immature Softwoods, Pictou Roundabout



Photos 7, 8 and 9: Agricultural Field, Section between Hwy 106 and Pine Tree Road, Northumberland Coast



8.1.3 Plant Species Observed along the Proposed Re-aligned Pipeline Route

Most of the plant species identified during field surveys are listed as having secure populations within the province of Nova Scotia, or are exotic species (i.e., not native to the province). Table A8.1-2 provides the list of vascular plant species observed, their provincial status, and the habitats in which they were observed. Table A8.1-3 provides a list of non-vascular plants (mosses and lichens) observed, their provincial status, and the habitats in which they were observed. The scientific and common names for each species observed are noted in the lists, and subsequent references to species in the text are to common names only.

Where a plant is identified as a species at risk (SAR) under the Nova Scotia Endangered Species Act (NSES) or the federal Species at Risk Act (SARA), or as a priority species (i.e., having S-ranks of S1 to S3; extremely rare to uncommon, by the Atlantic Canada Conservation Data Centre (AC CDC 2019)), additional discussion is provided.

Table A 8.1-2 Vascular Plant List for the Re-aligned Pipeline Route (Observed June 11-13 and July 30-31, 2019)

Species	Common Name	S Rank	Urban Disturbed (Ditches/Lawns)	Upland Woods	Abandoned Pasture	Wetland	Coastal
<i>Abies balsamea</i>	Balsam Fir	S5		x		x	
<i>Acer rubrum</i>	Red Maple	S5	x	x		x	
<i>Achillea millefolium</i>	Common Yarrow	SNA	x				
<i>Alisma triviale</i>	Northern Water Plantain	S5				x	
<i>Alnus incana</i>	Speckled Alder	S5		x	x	x	
<i>Ambrosia artemisiifolia</i>	Common Ragweed	S5	x				
<i>Amelanchier</i> sp.	Serviceberry	not a sp. at risk		x		x	
<i>Angelica sylvestris</i>	Woodland Angelica	SNA				x	x
<i>Anthemis</i> sp.	A Chamomile	not a sp. at risk	x				
<i>Aquilegia vulgaris</i>	European Columbine	SNA		x			
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	S5		x			
<i>Arctium minus</i>	Lesser Burdock	SNA		x			
<i>Athyrium filix-femina</i>	Lady-Fern	S5		x		x	
<i>Atriplex</i> sp.	Saltbush/orache	not a sp. at risk				x	x
<i>Berberis thunbergii</i> *	Japanese Barberry	SNA	x				
<i>Betula alleghaniensis</i>	Yellow Birch	S5		x			
<i>Betula papyrifera</i>	Paper Birch	S5	x				
<i>Betula populifolia</i>	Gray Birch	S5	x			x	
<i>Bidens frondosa</i>	Devil's Beggarticks	S5				x	
<i>Calamagrostis canadensis</i>	Blue-Joint Reedgrass	S5				x	
<i>Calla palustris</i>	Wild Calla	S5				x	
<i>Callitriche palustris</i>	Marsh Water-starwort	S5				x	
<i>Calystegia sepium</i>	Hedge False Bindweed	S5				x	x
<i>Carex arctata</i>	Black Sedge	S5				x	
<i>Carex brunnescens</i>	Brownish Sedge	S5				x	
<i>Carex folliculata</i>	Northern Long Sedge	S5				x	
<i>Carex gynandra</i>	Nodding Sedge	S5		x		x	
<i>Carex intumescens</i>	Bladder Sedge	S5			x	x	
<i>Carex leptalea</i>	Bristly-stalked Sedge	S5				x	
<i>Carex lurida</i>	Sallow Sedge	S5				x	
<i>Carex nigra</i>	Smooth Black Sedge	S5				x	
<i>Carex paleacea</i>	Chaffy Sedge	S5				x	x
<i>Carex projecta</i>	Necklace Sedge	S5				x	
<i>Carex scoparia</i>	Broom Sedge	S5				x	x
<i>Carex stipata</i>	Awl-fruited Sedge	S5				x	
<i>Carex stricta</i>	Tussock Sedge	S5				x	
<i>Carex trisperma</i>	Three-seeded Sedge	S5				x	
<i>Carex vulpinoidea</i>	Fox Sedge	S4				x	
<i>Centaurea nigra</i>	Black Starthistle	SNA			x		
<i>Chamaedaphne calyculata</i>	Leatherleaf	S5				x	
<i>Chenopodium</i> sp.		not a sp. at risk				x	
<i>Chrysosplenium americanum</i>	American Golden-Saxifrage	S5				x	
<i>Cicuta maculata</i>	Spotted Water-Hemlock	S5				x	
<i>Cirsium arvense</i>	Canada Thistle	SNA	x				
<i>Clintonia borealis</i>	Clinton Lily	S5		x			
<i>Comptonia peregrina</i>	Sweet Fern	S5		x			
<i>Cornus alternifolia</i>	Alternate-leaved Dogwood	S5				x	
<i>Cornus canadensis</i>	Dwarf Dogwood	S5		x			
<i>Cornus sericea</i>	Red Osier Dogwood	S5				x	
<i>Crataegus monogyna</i>	English Hawthorn	SNA	x			x	
<i>Crataegus</i> sp.	Hawthorne	not a sp. at risk	x		x		
<i>Danthonia spicata</i>	Poverty Oat-Grass	SNA	x				
<i>Daucus carota</i>	Wild Carrot	SNA	x		x	x	
<i>Dennstaedtia punctilobula</i>	Eastern Hay-Scented Fern	S5		x			
<i>Dianthus armeria</i>	Deptford Pink	SNA	x				
<i>Diervilla lonicera</i>	Northern Bush-Honeysuckle	S5	x				
<i>Doellingeria umbellata</i>	Hairy Flat-top White Aster	S5	x	x		x	
<i>Dryopteris carthusiana</i>	Spinulose Shield Fern	S5		x			

Species	Common Name	S Rank	Urban Disturbed (Ditches/Lawns)	Upland Woods	Abandoned Pasture	Wetland	Coastal
<i>Dryopteris cristata</i>	Crested Wood Fern	S5				x	
<i>Dryopteris intermedia</i>	Evergreen Wood Fern	S5				x	
<i>Echinocystis lobata</i>	Wild Mock-Cucumber	S5		x			
<i>Eleocharis acicularis</i>	Needle Spikerush	S5				x	
<i>Eleocharis obtusa</i>	Blunt Spike-Rush	S5				x	
<i>Epigaea repens</i>	Trailing Arbutus	S5		x			
<i>Epilobium palustre</i>	Marsh Willowherb	S5				x	x
<i>Equisetum arvense</i>	Field Horsetail	S5	x			x	
<i>Equisetum sylvaticum</i>	Woodland Horsetail	S5	x	x		x	
<i>Eupatorium perfoliatum</i>	Common Boneset	S5				x	
<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	S5		x		x	x
<i>Fragaria virginiana</i>	Virginia Strawberry	S5	x		x	x	
<i>Fraxinus americana</i>	White Ash	S5		x		x	
<i>Fraxinus excelsior</i>	European Ash	SNA				x	
<i>Galeopsis tetrahit</i>	Common Hemp-nettle	SNA				x	
<i>Galium asprellum</i>	Rough Bedstraw	S5	x				
<i>Galium boreale</i>	Northern Bedstraw	S5				x	
<i>Galium palustre</i>	Common Marsh Bedstraw	S5	x	x		x	x
<i>Geum aleppicum</i>	Yellow Avens	S5				x	
<i>Geum laciniatum</i>	Rough Avens	S5		x			
<i>Glyceria canadensis</i>	Canada Manna Grass	S5				x	
<i>Glyceria laxa</i>	Northern Mannagrass	S4?	x	x		x	
<i>Glyceria striata</i>	Fowl Manna Grass	S5				x	
<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S5		x			
<i>Hieracium pilosella</i>	Mouseear	SNA	x		x		
<i>Honckenya peploides</i>	Sea-Beach Sandwort	S5					x
<i>Hordeum jubatum</i>	Foxtail Barley	S5				x	
<i>Hypericum perforatum</i>	A St. John's-Wort	SNA			x		
<i>Ilex verticillata</i>	Black Holly	S5				x	
<i>Impatiens capensis</i>	Spotted Jewelweed	S5	x	x		x	x
<i>Iris versicolor</i>	Blueflag	S5				x	
<i>Juncus canadensis</i>	Canada Rush	S5				x	
<i>Juncus effusus</i>	Soft Rush	S5		x		x	
<i>Juncus filiformis</i>	Thread Rush	S5				x	
<i>Juncus gerardii</i>	Black-Grass Rush	S5				x	x
<i>Juncus tenuis</i>	Slender Rush	S5				x	
<i>Kalmia angustifolia</i>	Sheep-Laurel	S5				x	
<i>Larix laricina</i>	American Larch	S5	x			x	
<i>Lathyrus aphaca</i>	Yellow Vetchling	SNA				x	
<i>Lathyrus palustris</i>	Vetchling Peavine	S5	x				
<i>Lathyrus pratensis</i>	Meadow Vetchling	SNA				x	
<i>Ledum groenlandicum</i>	Common Labrador Tea	S5				x	
<i>Leersia oryzoides</i>	Rice Cut Grass	S5				x	x
<i>Lemna minor</i>	Lesser Duckweed	SNA				x	
<i>Leucanthemum vulgare</i>	Oxeye Daisy	SNA			x		
<i>Linnaea borealis</i>	Twinflower	S5		x			
<i>Lolium perenne</i>	Perennial Rye Grass	SNA				x	x
<i>Lonicera tatarica*</i>	Tartarian Honeysuckle	SNA					
<i>Lotus corniculatus</i>	Garden Bird's-foot Trefoil	SNA				x	
<i>Lupinus polyphyllus</i>	Large-Leaved Lupine	SNA	x		x		
<i>Luzula acuminata</i>	Hairy Woodrush	S5		x	x		
<i>Luzula multiflora</i>	Common Woodrush	S5				x	
<i>Lycopus americanus</i>	American Bugleweed	S5				x	
<i>Lysimachia ciliata</i>	Fringed Yellow Loosestrife	S4				x	
<i>Lysimachia terrestris</i>	Swamp Loosestrife	S5				x	
<i>Maianthemum canadense</i>	Wild Lily-of-The-Valley	S5		x			
<i>Maianthemum trifolium</i>	Three-Leaf Solomon's-Plume	S5				x	
<i>Malus pumila</i>	Common Apple	SNA				x	
<i>Melilotus altissimus</i>	Tall Yellow Sweetclover	SNA	x				

Species	Common Name	S Rank	Urban Disturbed (Ditches/Lawns)	Upland Woods	Abandoned Pasture	Wetland	Coastal
<i>Mentha arvensis</i>	Wild Mint	S5				x	
<i>Mentha</i> sp.	A Mint	not a sp. at risk				x	x
<i>Mitchella repens</i>	Partridge-Berry	S5		x			
<i>Moehringia lateriflora</i>	Grove Sandwort	S5		x			
<i>Morella pensylvanica</i>	Northern Bayberry	S5	x	x		x	
<i>Myosotis laxa</i>	Small Forget-Me-Not	S5	x	x		x	x
<i>Myrica gale</i>	Sweet Bayberry	S5				x	
<i>Myrica pensylvanica</i>	Northern Bayberry	S5				x	
<i>Nemopanthus mucronatus</i>	Mountain Holly	S5		x		x	
<i>Nuphar lutea</i> ssp. <i>Variegata</i>	Variegated Pond-lily	S5				x	
<i>Oclemena acuminata</i>	Whorled Aster	S5					
<i>Oclemena nemoralis</i>	Bog Aster	S5					
<i>Oenothera biennis</i>	Common Evening Primrose	S5				x	
<i>Onoclea sensibilis</i>	Sensitive Fern	S5	x	x		x	x
<i>Orthilia secunda</i>	One-Side Wintergreen	S5		x			
<i>Osmunda cinnamomea</i>	Cinnamon Fern	S5				x	
<i>Osmunda claytoniana</i>	Interrupted Fern	S5		x			
<i>Osmunda regalis</i>	Royal Fern	S5				x	
<i>Oxalis stricta</i>	European Wood Sorrel	S5				x	
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	SNA				x	
<i>Phalaris arundinacea</i>	Reed Canary Grass	S5		x		x	
<i>Pheum pratense</i>	Meadow Timothy	SNA			x		
<i>Picea glauca</i>	White Spruce	S5	x			x	
<i>Picea mariana</i>	Black Spruce	S5		x		x	
<i>Picea rubens</i>	Red Spruce	S5		x			
<i>Pinus resinosa</i>	Red Pine	S5		x			
<i>Pinus strobus</i>	Eastern White Pine	S5		x			
<i>Platanthera lacera</i>	Ragged Fringed Orchid	S4S5				x	
<i>Platanthera psycodes</i>	Small Purple Fringed Orchid	S4				x	
<i>Polygonum amphibium</i>	Water Smartweed	S4S5				x	
<i>Polygonum hydropiperoides</i>	False Waterpepper	S5				x	
<i>Polygonum sagittatum</i>	Arrow-leaved Smartweed	S5	x	x		x	x
<i>Pontederia cordata</i>	Pickernelweed	S5				x	
<i>Populus grandidentata</i>	Large-Tooth Aspen	S5		x			
<i>Populus tremuloides</i>	Quaking Aspen	S5	x	x			
<i>Potamogeton pusillus</i>	Small Pondweed	S5				x	
<i>Potentilla simplex</i>	Old Field Cinquefoil	S5				x	
<i>Prenanthes altissima</i>	Tall Rattlesnake-root	S5		x			
<i>Prunella vulgaris</i>	Common Self-heal	S5				x	
<i>Prunus pensylvanica</i>	Fire Cherry	S5	x				
<i>Prunus virginiana</i>	Choke Cherry	S5	x	x		x	
<i>Pteridium aquilinum</i>	Bracken Fern	S5		x			
<i>Quercus rubra</i>	Northern Red Oak	S5				x	
<i>Ranunculus acris</i>	Tall Butter-Cup	SNA	x		x	x	
<i>Ranunculus repens</i>	Creeping Butter-Cup	SNA				x	
<i>Rhamnum</i> sp.	Buckthorn	not a sp. at risk				x	
<i>Rhamnus cathartica</i> *	Buckthorn	SNA	x			x	
<i>Rhododendron groenlandicum</i>	Common Labrador Tea	S5				x	
<i>Rosa multiflora</i> *	Rambler Rose	SNA	x			x	
<i>Rosa rugosa</i> *	Rugosa Rose	SNA					
<i>Rosa</i> sp	Rose	not a sp. at risk		x		x	
<i>Rosa virginiana</i>	Virginia Rose	S5				x	
<i>Rubus allegheniensis</i>	Allegheny Blackberry	S5		x			
<i>Rubus hispidus</i>	Bristly Dewberry	S5					
<i>Rubus idaeus</i>	Red Raspberry	S5				x	
<i>Rubus pubescens</i>	Dwarf Red Raspberry	S5		x		x	
<i>Rubus</i> spp.		not a sp. at risk	x				
<i>Rumex acetosa</i>	Garden Sorrel	SNA			x		
<i>Rumex acetosella</i>	Sheep Sorrel	SNA			x		

Species	Common Name	S Rank	Urban Disturbed (Ditches/Lawns)	Upland Woods	Abandoned Pasture	Wetland	Coastal
<i>Rumex crispus</i>	Curly Dock	SNA				x	x
<i>Salix bebbiana</i>	Bebb's Willow	S5	x	x		x	
<i>Salix discolor</i>	Pussy Willow	S5		x		x	
<i>Salix</i> spp.	A willow	not a sp. at risk	x				
<i>Sambucus nigra</i> ssp. <i>canadensis</i>	Black Elderberry	S5				x	
<i>Sambucus racemosa</i>	Red Elderberry	S5				x	
<i>Sarracenia purpurea</i>	Northern Pitcher Plant	S5				x	
<i>Schoenoplectus acutus</i>	Hardstem Bulrush	S4				x	x
<i>Scirpus cyperinus</i>	Cottongrass Bulrush	S5				x	x
<i>Scirpus microcarpus</i>	Small-fruited Bulrush	S5				x	x
<i>Scutellaria galericulata</i>	Marsh Skullcap	S5				x	
<i>Scutellaria lateriflora</i>	Mad-dog Skullcap	S5				x	x
<i>Solanum dulcamara</i>	Bittersweet Nightshade	SNA	x	x		x	
<i>Solidago canadensis</i>	Canada Goldenrod	S4S5	x			x	
<i>Solidago rugosa</i>	Rough-stemmed Goldenrod	S5	x			x	x
<i>Solidago</i> sp	Goldenrod	not a sp. at risk	x		x		
<i>Sonchus arvensis</i>	Field Sow Thistle	SNA				x	x
<i>Sorbus americana</i>	American Mountain-Ash	S5		x		x	
<i>Spartina alterniflora</i>	Smooth Cord Grass	S5				x	x
<i>Spartina patens</i>	Saltmeadow Cord Grass	S5				x	x
<i>Spergularia rubra</i>	Ruby Sandspurrey	SNA	x				
<i>Spiraea alba</i>	Narrow-Leaved Meadow-	S5	x		x	x	
<i>Spiraea tomentosa</i>	Hardhack Spiraea	S5		x		x	
<i>Stachys palustris</i>	Marsh Hedge-Nettle	SNA				x	x
<i>Stellaria graminea</i>	Little Starwort	S5			x		
<i>Symphyotrichum cordifolium</i>	Heart-leaved Aster	S4S5	x				
<i>Symphyotrichum lateriflorum</i>	Calico Aster	S5	x			x	
<i>Symphyotrichum novi-belgii</i>	New York Aster	S5				x	
<i>Symphyotrichum puniceum</i>	Purple-stemmed Aster	S5				x	
<i>Taraxacum officinale</i>	Common Dandelion	SNA	x		x		
<i>Thelypteris noveboracensis</i>	New York Fern	S5		x			
<i>Triadenum fraseri</i>	Fraser's Marsh St John's-wort	S5				x	
<i>Trientalis borealis</i>	Northern Starflower	S5		x			
<i>Trifolium arvense</i>	Rabbit's-foot Clover	SNA	x				
<i>Trifolium campestre</i>	Low Hop Clover	SNA	x				
<i>Trifolium pratense</i>	Red Clover	SNA	x				
<i>Tsuga canadensis</i>	Eastern Hemlock	S5		x			
<i>Tussilago farfara</i>	Colt's Foot	SNA	x				
<i>Typha angustifolia</i>	Narrow-Leaved Cattail	S5				x	x
<i>Typha latifolia</i>	Broad-Leaf Cattail	S5				x	
<i>Vaccinium angustifolium</i>	Late Lowbush Blueberry	S5		x			
<i>Vaccinium macrocarpon</i>	Large Cranberry	S5	x			x	
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	S5		x			
<i>Veronica officinalis</i>	Gypsy-Weed	S5	x				
<i>Viburnum opulus</i>	Highbush Cranberry	S4	x			x	
<i>Viburnum nudum</i>	Poosum-Haw Viburnum	S5				x	
<i>Vicia cracca</i>	Tufted Vetch	SNA	x		x	x	x
<i>Viola blanda</i>	Smooth White Violet	S5				x	
<i>Viola cucullata</i>	Marsh Blue Violet	S5				x	
<i>Viola macloskeyi</i>	Smooth White Violet	S5		x			

* Invasive plant

Botanist: Tom Neily

S-rank - Ranking by the Conservation Data Centre and NatureServe. Status notes (as of August 2019): S1: Extremely rare in province; S2: Rare in the province; S3: Uncommon in province; S4: Widespread, common and apparently Secure in province; S5: SWidespread, abundant and demonstrably secure in province; SNA: Not applicable. (ACCDC 2019).

Table A 8.1-3 Non vascular (Lichens and Mosses) Plant List for the Re-aligned Pipeline Route (observed June 11-13, 2019).

Species	Common Name	S-Rank
<i>Amblystegium varium</i>	a bryophyte	S5
<i>Atrichum crispulum</i>	a bryophyte	S5
<i>Barbula unguiculata</i>	a bryophyte	S5
<i>Calliergonella cuspidata</i>	a bryophyte	S5
<i>Collema occultatum</i>	a lichen	S2?
<i>Dicranella subulata</i>	a bryophyte	S4S5
<i>Dicranella varia</i>	a bryophyte	S3S4
<i>Fissidens exilis</i>	a bryophyte	S1S2
<i>Hygroamblystegium tenax</i>	a bryophyte	S5
<i>Lempholemma chalazanum</i>	a lichen	n/a
<i>Leptogium imbricatum</i>	a lichen	S2?
<i>Leptogium tenuissimum</i>	a lichen	S2S3
<i>Phaeophyscia pusilloides</i>	a lichen	S5
<i>Weissia brachycarpa</i>	a bryophyte	SU
Botanist: Tom Neily S-rank - Ranking by the Conservation Data Centre and NatureServe. Status notes (as of August 2019): S1: Extremely rare in province; S2: Rare in the province; S3: Uncommon in province; S4: Widespread, common and apparently Secure in province; S5: SWidespread, abundant and demonstrably secure in province; SNA: Not applicable. (ACCDC 2019). Bold S# - Species is ranked as S1-S3 by the AC CDC.		

8.1.4 Invasive Plant Species

Over 20 percent of the plant species observed along the re-aligned pipeline route are not native to the province of Nova Scotia. The majority of these species were associated with disturbed ditches and lawns. Such species included common yarrow, wild carrot, mouseear, tall yellow sweetclover, dandelion, colt's-foot, and tufted vetch. Exotic pasture species included black star-thistle, oxeye daisy, and sheep sorrel. Exotic species within forested and coastal areas included lesser burdock, buckthorn, rugose rose, rambler rose, and European columbine.

Plants that are considered potentially problematic invasive species (Hill and Blaney 2010) include: buckthorn, Japanese barberry, Tartarian honeysuckle, rugosa rose, and rambler rose. These species have the ability to invade, outcompete, and shade out native plants.

8.1.5 Priority Plants Observed within the Re-aligned Pipeline Route

Priority plants (i.e., plants listed under SARA, the NS ESA, or having listings of S1 to S3 by the AC CDC) observed during the field surveys are shown on Figure A8.1-2 and summarized in Table A8.1-4.

During the 2019 plant surveys, no priority vascular plants were observed. Black ash (*Fraxinus nigra*), a provincially listed (NSESAs) vascular plant was preliminarily identified in wetland WL-13B during early vegetation survey conducted on June 13, 2019; however, following the later vegetation survey conducted on July 30, 2019, the tree in question was confirmed to be European ash, which is an exotic species and not listed as a priority species in Nova Scotia or federally.




Squashberry (*Viburnum edule*), a species listed by the AC CDC as S3 (uncommon in the province), was preliminarily identified in WL-5D and along the roadside during the late vegetation survey conducted on July 30, 2019; however, following further review, it was confirmed as highbush cranberry, which is not listed as a priority species in Nova Scotia.



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Priority Plants observed in 2019 Field Surveys
Figure A8.1-2



-  Approximate Project Footprint Area*
-  Priority Plant Location
-  Wetland



MAP DRAWING INFORMATION:
 DATA PROVIDED BY Northern Pulp Nova Scotia, GeoNova, NSDNR, CWS

MAP CREATED BY: SCM
 MAP CHECKED BY: SLD
 MAP PROJECTION: NAD 1983 UTM Zone 20N

*Precise Project Footprint to be determined following completion of detailed design

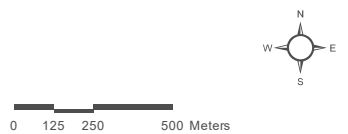


Table A8.1-4: Summary of SARA/NS ESA Listed Plant Species and S1 to S3 Ranked Plants Observed

Species	Status*	Habitat of Interest in Local Assessment Area	Observation
Crusted tarpaper lichen (<i>Collema occultatum</i>)	S2?	Forests and open woodlands, grows on bark and wood.	Along the east side of the highway right-of-way south of the Pictou Roundabout.
A lichen (<i>Leptogium imbricatum</i>)	S2?	Grows in soil, clay, humus, turf, detritus and dead leaves.	Along the coast of Pictou Harbour north of the causeway and in the vicinity of WL-3
A lichen (<i>Leptogium tenuissimum</i>)	S2S3	Grows among mosses on calcareous soil.	Along the coast in the vicinity of WL-3, and along the coast of Pictou Harbour south of the causeway east of WC03.
A moss (<i>Fissidens exilis</i>)	S1S2	Bare, damp soil of shaded banks and in wetlands and seepage areas.	Along the Pictou Harbour coastline to the north of the NPNS parking area.
Variable Forklet moss (<i>Dicranella varia</i>)	S3S4	Wet, calcareous soil, especially clay, in open, disturbed places, such as roadside ditches.	Along eroding eastern shoreline on the NPNS property on the surface of mineral soil.

* S-rank - Ranking by the Atlantic Canada Conservation Data Centre and NatureServe. Status notes (as of August 2019): S1: Extremely rare in province; S2: Rare in province; S3: Uncommon in province; S4: Widespread, common and apparently secure in province; S5: Widespread, abundant and demonstrably secure in province; SU: unrankable (lack of info); SNA: Not applicable. The use of '#S#' is to denote a range in rank used to indicate any uncertainty about the status of the species or community. Qualifiers: ? = Inexact/Uncertain. (AC CDC 2019).

Three priority non-vascular species were observed: the crusted tarpaper lichen (*Collema occultatum*), a lichen (*Leptogium imbricatum*), and a lichen (*Leptogium tenuissimum*). Two priority moss species were observed: variable forklet moss (*Dicranella varia*), and a moss species (*Fissidens exilis*). Further details on observed priority lichens and mosses are as follows:

Crusted tarpaper lichen – this lichen ranked as S2? (rare in province/uncertain) by the AC CDC, was observed on June 12 2019 along the east side of the highway right-of-way south of the Pictou Roundabout. Crusted tarpaper lichen typically grow in forests and open wooded areas on tree bark and wood.

***L. imbricatum*, a lichen** – this lichen ranked as S2? (rare in province/uncertain) by the AC CDC, was observed on June 12, 2019 along the coast of Pictou Harbour north of the causeway (**Photo 10**) and in the vicinity of wetland WL-3. These lichens grow in soil, clay, humus, turf, detritus and dead leaves.

L. tenuissimum, a lichen – this lichen ranked as S2S3 (rare/uncommon in province) by the AC CDC, was observed in two locations: along the coast in the vicinity of WL-3 on June 12, 2019, and along the coast of Pictou Harbour south of the causeway east of WC03 (Photo 11).

Photo 10: Eroding Coast North of the Causeway



Variable forklet moss – Variable forklet moss is ranked S3S4 (uncommon/widespread in province) by the AC CDC. This moss was observed in the fall of 2017 (October 5, 2017) and on June 13, 2019 along eroding eastern shoreline on the NPNS property outside of the proposed re-aligned pipeline route. The moss species was found on the surface of mineral soil in an unstable habitat (coastal bluff) that is subject to ongoing coastal erosion. This species can be expected anywhere suitable habitat exists, such as the similarly eroding, unstable habitat along the north and east shorelines of Abercrombie Point. Surveys in June 2019 found this plant along the Pictou Harbour coastline, north of the NPNS parking area.

***F. exilis*, a moss species** – this moss ranked S1S2 (extremely rare/rare in province) by the AC CDC was observed on June 13, 2019 along the Pictou Harbour coastline to the north of the NPNS parking area. This moss is typically found on bare, damp soils of shaded banks and in wetlands and seepage areas.

Photo 11: Eroding Coast North of NPNS Facility



8.1.6 Potential Priority Plants

Potential priority plants were reviewed in the EARD. In general, the potential priority plants remain the same for the re-aligned pipeline route as they were for the original pipeline route assessed in the EARD based on the habitat types observed in 2019.

The June 2019 and July 2019 plant surveys are now complete and no additional priority plants species (beyond those noted above) were observed. In general, due to the highly disturbed nature of the proposed re-aligned pipeline route (i.e., close proximity to the highway and agricultural fields), it is unlikely that additional priority plants are present beyond those found during the 2019 surveys.

8.1.7 References

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