

October 26, 2016

APPENDIX A Nocturnal Owl Survey Report

BEAR PAW PIPELINE PROJECT – ADDITIONAL INFORMATION REQUEST REPORT

October 26, 2016

To: Bear Paw Pipeline Corporation Inc
1969 Upper Water Street, Suite 1903
Halifax, NS B3J 1M5

From: Sara Wallace
Dartmouth NS Office

File: Bear Paw Pipeline Project

Date: May 9, 2016

RE: NOCTURNAL OWL SURVEYS

INTRODUCTION

As part of the field surveys undertaken in support of the environmental assessment of the Bear Paw Pipeline Project (the Project), Bear Paw Pipeline Corporation Inc. (Bear Paw Pipeline) commissioned Stantec to conduct nocturnal owl surveys. Surveys were undertaken to better understand the presence, relative abundance, distribution, and habitat use of nocturnal owl in and around the pipeline, with a focus on species of conservation interest. Information was collected through a literature review, historical database search and baseline field surveys.

The focus of this report is to outline the approach taken for the nocturnal owl surveys undertaken in early spring (April 19 to April 22) 2016, and to summarize the findings of those surveys.

STUDY AREA

There are six owl species with ranges that overlap the Study Area, including barred owl (*Strix varia*), boreal owl (*Aegolius funereus*), great horned owl (*Bubo virginianus*), long-eared owl (*Asio otus*), northern saw-whet owl (*Aegolius acadicus*) and short-eared owl (*Asio flammeus*) (Table 1.). This survey focuses attention on two of these: Barred Owl and Boreal Owl.

Table 1 Owl Species Recorded During Field Surveys and Identified by the AC CDC and MBBA as Occurring Within the Vicinity of the Bear Paw Pipeline, Including Information on their Population and Breeding Statuses

Common Name	Scientific Name	AC CDC S-Rank	General Status Rank	NS ESA	SARA	COSEWIC	MBBA Breeding Status	Field Survey Breeding Status
Barred owl	<i>Strix varia</i>	S5	Secure				Probable	
Boreal owl	<i>Aegolius funereus</i>	S1B	Undetermined			Not at Risk	Probable	
Great Horned Owl	<i>Bubo virginianus</i>	S5	Secure				Probable	
Long-eared Owl	<i>Asio otus</i>	S2	May Be At Risk				Possible	
Northern saw-whet owl	<i>Aegolius acadicus</i>	S4	Secure					No indication
Short-eared owl	<i>Asio flammeus</i>	S1S2	May Be At Risk		Special Concern	Special Concern	Possible	

RE: NOCTURNAL OWL SURVEYS

APPROACH AND METHODS

Standardized owl surveys typically consist of alternating periods of silent listening and broadcasts of owl calls. During the breeding season, many owls are quite vocal. Owl vocalizations are used to delineate territory and communicate with mates. Passive listening at the beginning of the owl survey allows the listener to determine more accurately the location of a calling owl.

Many of the owl species identified as potentially occurring in the Study Area are known to respond to the calls of their own species and to the calls of other owl species during the breeding season. Owing to the territorial behavior presented by these species, songs (owl species vocalizations) broadcast within an owl's territory may elicit a vocal or visual response by the resident owl(s) in an attempt to defend its territory against a potential intruder. This response makes nocturnal broadcast surveys an effective method for documenting owl species (Takats et al 2001). However, there are limitations to the effectiveness of playbacks for detecting owls. The playbacks used should be appropriate for the area where surveys are conducted and when calls from a variety of species are used, care must be taken in the order in which calls are presented since the perceived presence of a larger or more aggressive owl species could potentially dissuade an owl from calling rather than initiate calling. Limitations in the quality of broadcast calls or the ability of broadcast systems to produce sufficient volume can also limit the effectiveness of playbacks. Playbacks can draw owls away from their territories, providing a less accurate estimate of the location of their breeding territory. This emphasizes the need to use a combination of passive listening and playbacks when conducting owl surveys.

The Nova Scotia Nocturnal Owl Survey protocol follows the Guidelines for Nocturnal Owl Monitoring in North America (Takats et al. 2001), published by Beaverhill Bird Observatory and Bird Studies Canada, and available at <http://www.bsc-eoc.org/download/Owl.pdf>, as was used in this survey. This protocol incorporates the best available knowledge on owl ecology, activity patterns, and calling rates, and provides the best available option for surveying owl occurrence.

Surveys were conducted on April 18, 19, 20 and 21, 2016, starting 30 minutes after sunset and continuing until about 1200 hrs during suitable conditions (minimal precipitation and winds less than 20 km/h). Owl surveys were conducted at all potentially accessible locations and within appropriate breeding habitat. The 28 designated owl survey sites were identified on a map of the Study Area and confirmed in the field during daylight hours to ease locating each point during the night of the survey. Survey locations were spaced a minimum of 1 km apart with a listening radius of 500 m to maximize coverage of each identified broadcast station. Permission to enter private lands along the pipeline route had not been granted at the time the surveys were initiated. Consequently, all point count locations were situated on crown lands or on public roads that passed through private lands.

The Study Area was surveyed once in its entirety using call a combination of passive listening and playbacks for both barred owl and boreal owl. Playbacks were performed at each designated owl survey location once during the survey period. Digital recordings of owl calls were played on a portable stereo system. The playback period began with two minutes of passive listening during which spontaneous owl vocalizations were documented. The passive listening period was followed by a series alternating playbacks and silent listening periods, lasting approximately 11 minutes total. The calling sequence for nocturnal owl surveys was:

- 2:00 passive listening
- 0:20 boreal owl / 1:00 listening
- 0:20 barred owl / 2:00 listening
- 0:20 barred owl / 2:00 listening

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Each vocalization lasted 20 seconds and was followed by a one (Boreal Owl) or two (Barred Owl) minute silent listening period during which response vocalizations were recorded.

Observers recorded the following information for all owl survey sites: date, names of observers, time, and weather conditions (temperature, % cloud cover, Beaufort wind scale, visibility, and precipitation). Weather has a great influence on the ability to hear owls and wind and precipitation significantly reduce calling rates and detectability. Surveys should be conducted on nights with wind less than 19km/hr (i.e., 3 or less on the Beaufort Scale, which is enough to constantly move twigs and to extend a small flag.). For optimum response, surveys should be run on nights that are calm, clear and not too cold (warmer than -15°C).

Owl call responses or detections were noted by species, along with any other observations on their behavior at the time of observation. Where owls were detected, their locations were estimated, based on compass bearings and approximate distance from observer location, and plotted on a vegetation habitat map to determine the approximate calling location for that species. It was also noted at which point in the playback series the owl was observed. Other information including the general noise level, and presence of other nocturnal species (e.g., American woodcock (*Scolopax minor*)), was also recorded.

RESULTS AND DISCUSSION

Nocturnal owl surveys generally followed the suggested protocol (Takats et al. 2001), but were adjusted somewhat as a reflection of bird activity and seasonal conditions.

One species of owl, boreal owl, was observed during the surveys. A single boreal owl was detected as it engaged in territorial activity (calling) in response to call playbacks. Effects of playbacks were successful as the owl responded immediately and in the first minute of silent listening following broadcast of the playback.

The boreal owl is listed as *S1B* by the Atlantic Canada Conservation Data Centre (AC CDC), indicating that it is a very rare nesting species in Nova Scotia. The Nova Scotia Department of Natural Resources (NSDNR) lists this species as status Undetermined, indicating that its population status in Nova Scotia is poorly understood. The boreal owl has a circumboreal distribution across forests of North America. Boreal owls nest in tree cavities, typically in aspen or conifer snags located in stands of mature older forest. Cavities excavated by northern flicker (*Colaptes auratus*), a medium-sized member of the woodpecker family, are most commonly used. Nesting sometimes occurs in younger forest stands if suitable nest cavities or nest boxes are available, but only when mature forest habitat is lacking.

It was not possible to determine whether the territorial activity as observed at this location reflects the regular and continued use or occupancy (nesting) of this area as additional efforts to locate the animal, including a replay of the boreal owl playback in the minutes following the original call playback protocol failed to elicit further vocal or visual response. A return to the area during daytime hours also failed to turn up any owl nests.

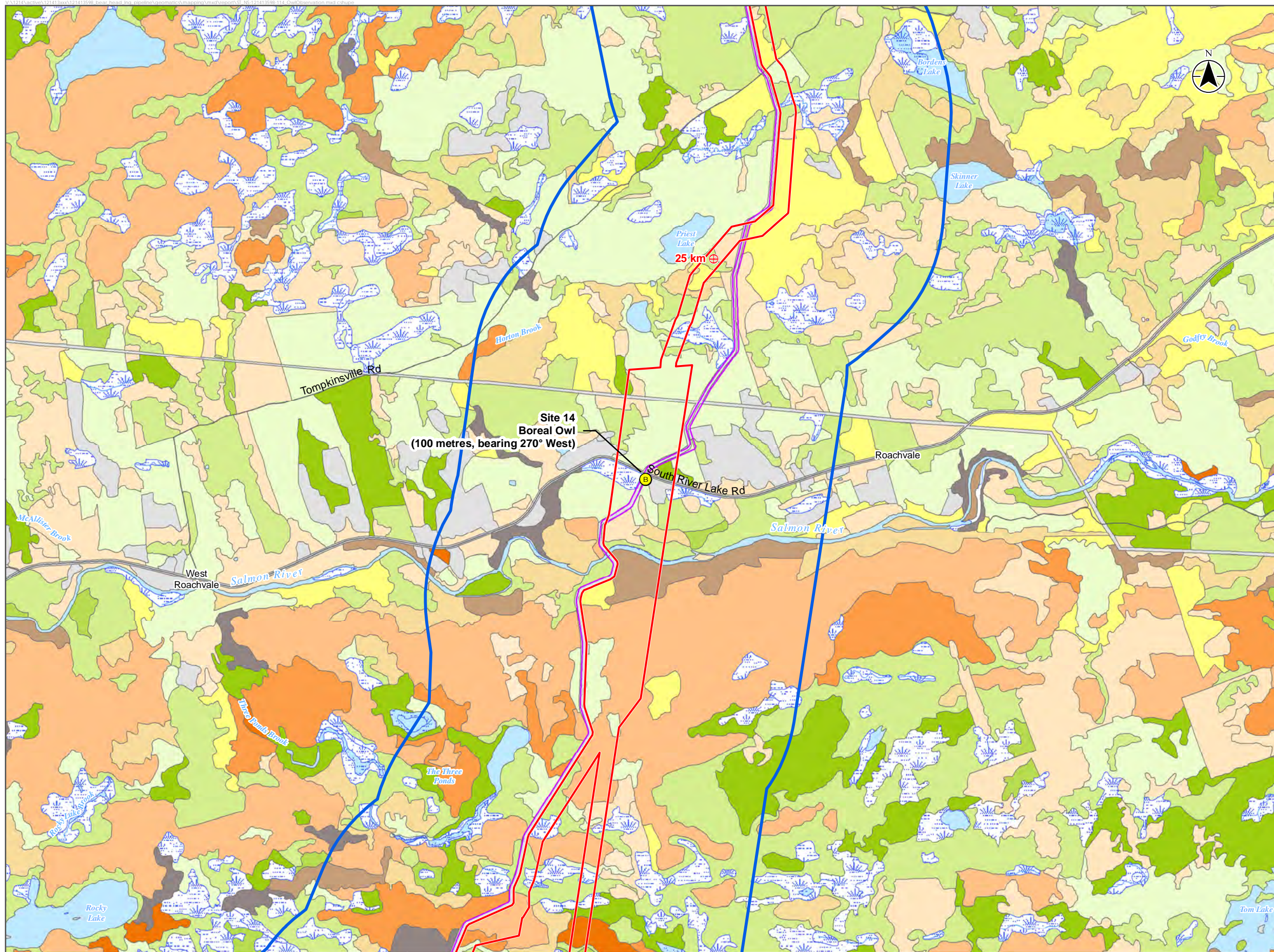
The results of nocturnal owl surveys for are summarized below, as well as in Table 2 and Figure 1.

RE: NOCTURNAL OWL SURVEYS

Table 2 Owls Detected During 2016 Nocturnal Owl Surveys

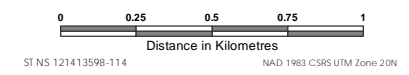
Site ID	Site Location / Coordinates		Date / Time / Duration of Playback			Species ¹	No. of Owls	Behaviour ²	Distance / Azimuth from Point
	X_UTM	Y_UTM							
Owl 1	608278.99	5003541.31	18/04	8:21	11	ND	-	-	-
Owl 2	606408.41	5005909.16	18/04	8:48	11	ND	-	-	-
Owl 3	605580.10	5007331.20	18/04	9:06	11	ND	-	-	-
Owl 4	605363.40	5008554.01	18/04	9:39	11	ND	-	-	-
Owl 5	-	-	-	-	-	-	-	-	-
Owl 6	605266.11	5010863.37	18/04	9:50	11	ND	-	-	-
Owl 7			-	-	-	-	-	-	-
Owl 8	605079.80	5011690.73	18/04	10:04	11	ND	-	-	-
Owl 9	606844.70	5014115.73	18/04	10:15	11	ND	-	-	-
Owl 10	608161.83	5016386.18	18/04	9:44	11	ND	-	-	-
Owl 11	609542.96	5018308.93	18/04	9:20	11	ND	-	-	-
Owl 12	610485.19	5019513.48	18/04	8:55	11	ND	-	-	-
Owl 13	611756.27	5021536.53	18/04	8:25	11	ND	-	-	-
Owl 14	612088.96	5023147.13	19/04	8:28	13	Boreal Owl	1	TE	100 m @ 270°
Owl 15	612847.47	5025777.94	19/04	8:56	11	ND	-	-	-
Owl 16	612901.25	5028639.95	19/04	9:45	11	ND	-	-	-
Owl 17	612677.18	5029910.20	19/04	9:26	11	ND	-	-	-
Owl 18	613441.70	5034208.09	19/04	10:28	11	ND	-	-	-
Owl 19	614549.96	5033762.73	21/04	10:18	11	ND	-	-	-
Owl 20	614706.74	5034315.88	19/04	11:03	11	ND	-	-	-
Owl 21	613905.11	5034950.31	19/04	10:46	11	ND	-	-	-
Owl 22	616109.60	5035923.07	21/04	9:52	11	ND	-	-	-
Owl 23	618302.95	5036926.43	21/04	9:24	11	ND	-	-	-
Owl 24	621664.42	5038600.67	21/04	9:56	11	ND	-	-	-
Owl 25	623638.22	5040153.70	21/04	9:30	11	ND	-	-	-
Owl 26	626698.23	5044137.89	19/04	8:21	11	ND	-	-	-
Owl 27	627720.01	5045489.20	19/04	8:46	11	ND	-	-	-
Owl 28	628853.26	5046675.36	19/04	10:47	11	ND	-	-	-
Owl 29	630156.42	5047383.63	19/04	10:02	11	ND	-	-	-
Owl 30	631076.45	5046848.58	19/04	9:48	11	ND	-	-	-

Note: ¹ ND – No detection; ² Behaviour: BU: building nest; DI: disturbed; FL: fleeing; IN: incubation; RR: rearing; TE: territoriality (calling); TF: travel / flying.



Occurrence of Boreal Owl within the Vicinity of the Project

- Study Features**
- B Boreal Owl Observation
- Land Cover Type**
- Regeneration-Young Hardwood
 - Immature-Pole Hardwood
 - Mature-Overmature Hardwood
 - Uneven Hardwood
 - Regeneration-Young Mixedwood
 - Immature-Pole Mixedwood
 - Mature-Overmature Mixedwood
 - Uneven Mixedwood
 - Regeneration-Young Softwood
 - Immature-Pole Softwood
 - Mature-Overmature Softwood
 - Uneven Softwood
 - Forestry Other
 - Non-Forest
 - Wetland
- Project Components**
- Kilometre Post (Approximate Distance from Origin)
 - Assessment Corridor for Environmental Assessment
 - Local Assessment Area
 - Existing Pipeline Right of Way



Disclaimer: This map is for illustrative purposes to support this project. Questions can be directed to the issuing agency.



Figure 2

Sources: Data provided by the Government of Canada and Nova Scotia.

RE: NOCTURNAL OWL SURVEYS

A cursory survey of the single detection site during daylight hours revealed a patchwork of habitat types, with the boreal owl activity having come from an area of willow (*Salix* spp.) and alder (*Alnus* spp.) thicket. Adjacent hillsides surrounding the area were covered largely by mature softwood and mixedwood stands interspersed with regenerating stands dominated by balsam fir (*Abies balsamea*), red spruce (*Picea rubens*), red maple (*Acer rubrum*) and white birch (*Betula papyrifera*). Rural homes in the area are surrounded by a patchy or fragmented agricultural (Christmas tree farming) landscape. These areas can thus prove productive habitat for boreal owl, albeit the occurrence did appear in association with or proximity to somewhat non-traditional habitat types for these birds. Of note, in 2005, active nesting was recorded near the community of New Harbour, Guysborough County, which is located approximately 20 km southeast of the location where we recorded the boreal owl (Lauff 2009), the Study Area is thought to be within the breeding range of boreal owl in Nova Scotia, although breeding occurrences are thought to be rare (Erskine 1992).

No other owl species were detected during any of the surveys, in spite of the presence of suitable habitat.

INCIDENTAL OBSERVATIONS

Other incidental wildlife observations (audible calls) recorded during the nocturnal owl surveys include Wilson's snipe (*Gallinago delicata*) and American woodcock

Wilson's snipe is listed as S3S4B by the AC CDC, indicating that they are an uncommon to fairly common breeding species in Nova Scotia. The NSDNR lists this species as Sensitive. A Wilson's snipe was heard calling approximately 100m north of Nocturnal Owl Survey Site # 25.

American woodcock is listed as S4S5B by the AC CDC, indicating that they are a fairly common to secure breeding species in Nova Scotia. NSDNR considers the Nova Scotia population of this species to be Secure. American woodcock was recorded in association with surveys performed at Nocturnal Owl Survey Site # 18.

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REFERENCES

- Erskine, A.J. 1992. Atlas of Breeding Birds of the Maritime Provinces. Nova Scotia Museum. Halifax, Nova Scotia. 270 pp.
- Lauff R.F. 2009. First nest records of the Boreal Owl *Aegolius funereus* in Nova Scotia, Canada. In: Johnson D.H., Van Nieuwenhuysse D. & Duncan J.R. (eds) Proc. Fourth World Owl Conf. Oct–Nov 2007, Groningen, The Netherlands. Ardea 97(4): 497–502.
- Takats D., D. L. Lisa, C. M. Francis, G. L. Holroyd, J. R. Duncan, K. M. Mazur, R. J. Cannings, W. Harris, D. Holt. 2001. Guidelines for Nocturnal Owl Monitoring in North America. Beaverhill Bird Observatory and Bird Studies Canada, Edmonton, Alberta. 32 pp.

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APPENDIX B

Standard Mitigation

BEAR PAW PIPELINE PROJECT – ADDITIONAL INFORMATION REQUEST REPORT

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2.5.3 Standard Mitigation Measures

The following sections summarize standard mitigation to be employed, as applicable to reduce or eliminate adverse effects associated with activities. Additional VC-specific mitigation will be identified in Chapter 5.

2.5.3.1 General Construction

- All components will be constructed according to all applicable regulations, safety codes, and standards.
- Safety exclusion zones will be required to manage access to construction sites.
- Existing infrastructure and previously developed areas (e.g., existing roads, rights-of-way, clear-cuts) will be used where feasible to reduce additional site clearing and the need for new materials.
- Construction activities will be restricted to the approved PDA including the surveyed RoW, approved temporary workspace, the compressor station boundaries and existing roads.
- Natural vegetation will be preserved where feasible.
- Whenever feasible, clearing activities will be scheduled outside the normal breeding season for most species of migratory birds in Nova Scotia (generally April 1 to August 31).
- Natural vegetation buffers will be maintained, where feasible, around wetlands and riparian zones. Watercourse and wetland buffers will be at approximately 30 m, wherever feasible.
- Material will be sourced from existing, approved pits or quarries, if required to establish grades along the RoW or compressor station site.
- All deliveries to the site and transportation of construction and waste materials will be managed within the legal loading requirements and according to spring weight restrictions.
- Roads frequently traveled will be upgraded and repaired as necessary.

2.5.3.2 Blasting and Noise Control

- If blasting is required, it will be limited to daytime hours, if feasible.
- Pre-blast surveys will be completed to evaluate the potential for ground vibration and identify potentially affected structures (e.g., wells and foundations).
- Blasting will be conducted according to provincial legislation, and will be subject to terms and conditions of applicable permits.
- Blasting near watercourses will follow the requirements of the *Fisheries Act* and the *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (Wright and Hopky 1998).
- All equipment will be maintained in good working order to maintain noise suppression.
- Idling of vehicles will be limited. Vehicles and equipment will be turned off when not in use, unless required for effective or safe operation.
- Nearby residents will be given a construction schedule for key noise-generating activities including blasting, and provided with contact information in case of complaints.

2.5.3.3 Dust and Air Emissions Control

- Idling of vehicles will be limited. Vehicles and equipment will be turned off when not in use, unless required for effective or safe operation.

Excerpt from Section 2.5 (Environmental and Safety Protection Systems) of the Bear Paw Pipeline Environmental Assessment Report (2015)

- The burning of brush or slash will only be permitted if the necessary permits and approvals are obtained.
- Cleared areas will be stabilized.
- Natural vegetation will be preserved where possible.
- When dust is a concern, dust suppressants (e.g., water) will be applied to exposed surfaces. Petroleum products will generally not be applied as a dust suppressant.

2.5.3.4 Traffic Management

- Project-related traffic will be managed in accordance with the Nova Scotia Temporary Traffic Control Manual (e.g., traffic control persons, signage, temporary markings) (NSDTIR 2009).
- During construction activities, advance public notice will be given for any necessary detours or road closures.
- Planning for required traffic delays will avoid peak traffic times when possible, and will consider other traffic disruptions in the area.
- Vehicles will yield to wildlife and will be operated at appropriate speeds.
- Flag persons, detours, safety barricades, fences, signs and/or flashers will be used as required.

2.5.3.5 Erosion and Sedimentation Control

- The area of exposed soil will be limited, and the length of time soil is exposed without mitigation (e.g., mulching, seeding, rock cover) will be reduced through scheduled work progression.
- Erosion and sedimentation control structures will be used and maintained throughout construction activities.
- Erosion and sedimentation control structures will be inspected regularly, especially before and after heavy rain events.
- Erosion and sedimentation control structures will remain in place until the disturbed area is stabilized or natural revegetation occurs.
- Dewatering of excavated areas will control the release of sediment-laden water (e.g., filtration through vegetation or engineered erosion control devices). For large sites, settling ponds may be required.
- Overburden storage piles and exposed topsoil will be covered, or seeded and revegetated, as soon as practicable.
- Engineered surface water drainage and diversion channels will be constructed to direct flow around the construction site and away from watercourses and wetlands.
- Construction material (e.g., gravel) placed in or next to watercourses will be free of debris, fine silt and sand, and chemical contaminants.
- All watercourse crossings will be conducted according to the terms of provincial water approvals including site-specific erosion and sediment control plans.

2.5.3.6 Clearing and Disposal

- During clearing, trees will be felled towards the RoW, wherever possible. Trees that inadvertently fall into adjacent undisturbed vegetation will be recovered.
- Environmentally sensitive features will be avoided during clearing as identified by appropriate signage and fencing.
- Salvageable timber will not be bulldozed.
- Subject to regulatory approval, wooden mats or equivalent in areas of wet soils will be installed to reduce terrain disturbance and soil structure damage. These materials will be removed during clean-up.
- In consultation with the landowner(s) or appropriate regulatory agency, potential rollback locations and the material to be used will be determined.
- Rollback will be placed in a manner that does not create or enhance a fire hazard along the RoW.
- All timber material not salvaged for merchantability will be disposed of through mechanical chipping.
- Applicable permits will be obtained prior to burning and all applicable regulations will be followed.
- Burning will not take place within 30 m of a waterbody.

2.5.3.7 Topsoil/Strippings Salvage and Grading

- Soil storage areas will be located in the approved right-of-way and temporary workspaces.
- Following the salvage of the topsoil, if warranted, topsoil windrows and stockpiles will be stabilized.

2.5.3.8 Watercourse Crossings

- The clearing of extra temporary workspace will be avoided within 10 m of a watercourse to protect riparian areas. This area shall be clearly marked prior to clearing operation. The RoW will be narrowed through the riparian area, if possible.
- Clearing at watercourse crossings will be limited to the removal of trees and shrubs to the ditch line and work side areas required for vehicle crossings.
- Trees will be felled away from watercourses.
- If the working surface is unstable, clearing equipment will not be permitted within the 10 m riparian buffer.
- Grading of the primary banks of watercourses will be delayed until immediately before construction of the crossing.
- Grading will be directed away from waterbodies. No fill material will be placed in a waterbody during grading.
- To reduce the length of time of instream activity, the contractor shall make every effort to ditch, lower-in, and backfill water crossings during the same working day.
- Earthen berms will not be used to isolate the crossing construction area.
- Downstream flow will be maintained at all times when constructing an isolated crossing.
- Water and pump intakes will be installed in a way that reduces or avoids the disturbance of the streambed. The screens will be maintained free of debris.

Excerpt from Section 2.5 (Environmental and Safety Protection Systems) of the Bear Paw Pipeline Environmental Assessment Report (2015)

- Clean coarse material (gravel or rock), or native material removed from the trench, will be used preferentially as the final 0.5 m of backfill.

2.5.3.9 Pipe Activities

- The amount of open trench at any one time will be minimized.
- Trenches will be backfilled as soon as practical, following lowering-in, to minimize hazards to wildlife.
- Topsoil and subsoil removed during trenching will be stored in separate spoil piles to avoid mixing. Spoil piles will be managed so that spoil does not spread off of the RoW.
- Where feasible, the RoW will be graded to divert surface water away from the open trench.
- Where the open trench has the potential to dewater a wetland, methods will be used to prevent the flow of water along the trench.
- If the trench requires dewatering, water will be filtered through vegetated areas or other appropriate sediment filtering devices.
- Dewatering will be completed in a manner that does not cause erosion or allow sediment to enter a watercourse.
- Trench water will not be allowed to flow directly into any watercourse.

2.5.3.10 Pressure Testing

- The rate of water withdrawal for hydrostatic testing will follow appropriate regulatory agency guidelines.
- Water hauling trucks used for test water will be clean.
- Water intakes will be screened in accordance with the Freshwater Intake End-of-Pipe Fish Screen Guideline published by DFO. Screens will be maintained so they are clear of debris.
- Shunt test water ahead from test section to test section to the extent possible to reduce water hauling, water usage and number of dewatering points.
- Prior to the discharge of hydrostatic test water, the appropriate testing and treatment measures will be implemented in accordance with local regulatory requirements.
- Hydrostatic test water will be discharged into the same drainage basin from which it was withdrawn, unless otherwise approved by the appropriate authority.
- Test water will be discharged into vegetated areas or other appropriate sediment filtering devices.

2.5.3.11 Dangerous Goods Management

- All fuels and lubricants used during construction will be stored in designated areas. Storage areas will be located at least 100 m from watercourses, wetlands and water supply areas (including known private wells), where possible, except where secondary containment is provided.
- Equipment used will be well-maintained and free of fluid leaks. Equipment to be used in or adjacent to a watercourse or waterbody will be clean or otherwise free of external grease, oil or other fluids, mud, soil and vegetation, prior to entering the waterbody.
- When practicable, refuelling of machinery will not occur within 30 m of watercourses and

Excerpt from Section 2.5 (Environmental and Safety Protection Systems) of the Bear Paw Pipeline Environmental Assessment Report (2015)

- water supply areas (including private wells). Where stationary equipment is situated near a wetland, special precautions will be implemented to prevent spills during refuelling (e.g., absorbent pads will be placed below nozzles, and spill response kits will be placed at the refuelling site).
- Storage of all dangerous goods will comply with the Workplace Hazardous Materials Information System (WHMIS) requirements.
- **Transportation of dangerous goods will comply with Transport Canada's *Transportation of Dangerous Goods Act*.**
- Emergency response procedures will be in place for spill response, with trained personnel present onsite at all times.

2.5.3.12 Waste Management

- All sites will be kept free of loose waste material and debris.
- Solid wastes, including waste construction material, will be disposed of in approved facilities.
- Temporary storage of waste materials onsite will be located at least 30 m from watercourses, wetlands and water supply areas (including known private wells).
- Temporary onsite sewage systems will be installed and operated according to relevant provincial legislation.
- Food and food waste will be stored and disposed of properly to avoid attracting wildlife.

2.5.3.13 Fire Prevention

- Proper disposal methods for welding rods, cigarette butts and other hot or burning material will be used.
- Smoking will only occur in designated areas.
- Appropriate fire-fighting equipment will be kept on site.
- The burning of slash will only occur if permission is granted from the regulating authorities and if conditions permit. If burning is delayed, slash will be stored along the RoW, in approved push-outs.

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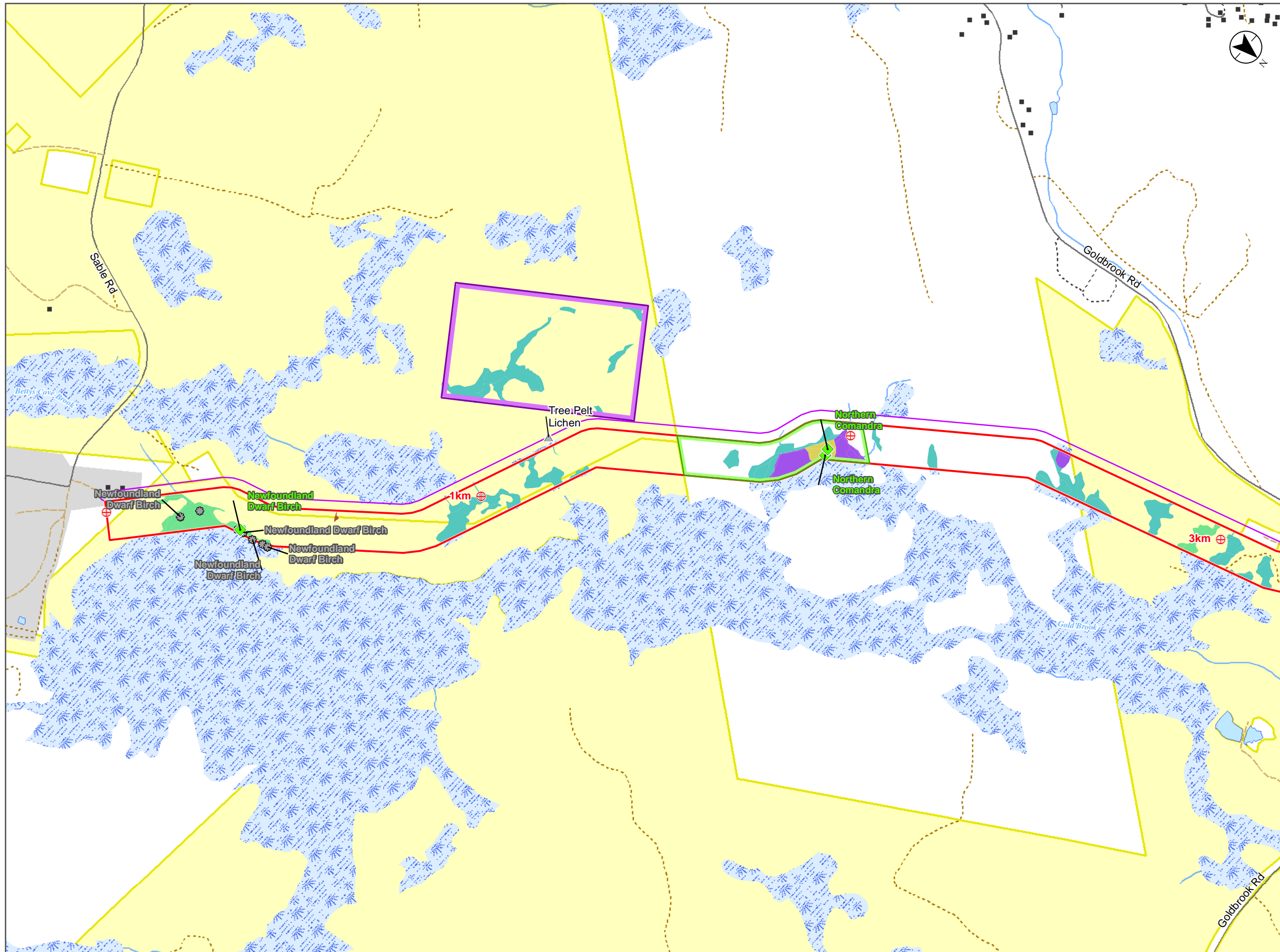
APPENDIX C

Vegetation and Wetlands

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Wetlands and Plant Species of Conservation Interest



Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

Wetland (Wetland Class)

■ Bog

■ Fen

■ Marsh

■ Treed Bog

■ Treed Swamp - Softwood

■ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

■ Assessment Corridor / Local Assessment Area (LAA)

■ Compressor Station / Local Assessment Area (LAA)

■ Existing Pipeline Right of Way

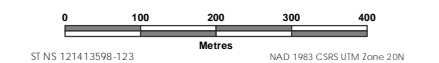
Map Features

■ Wetland

■ Industrial

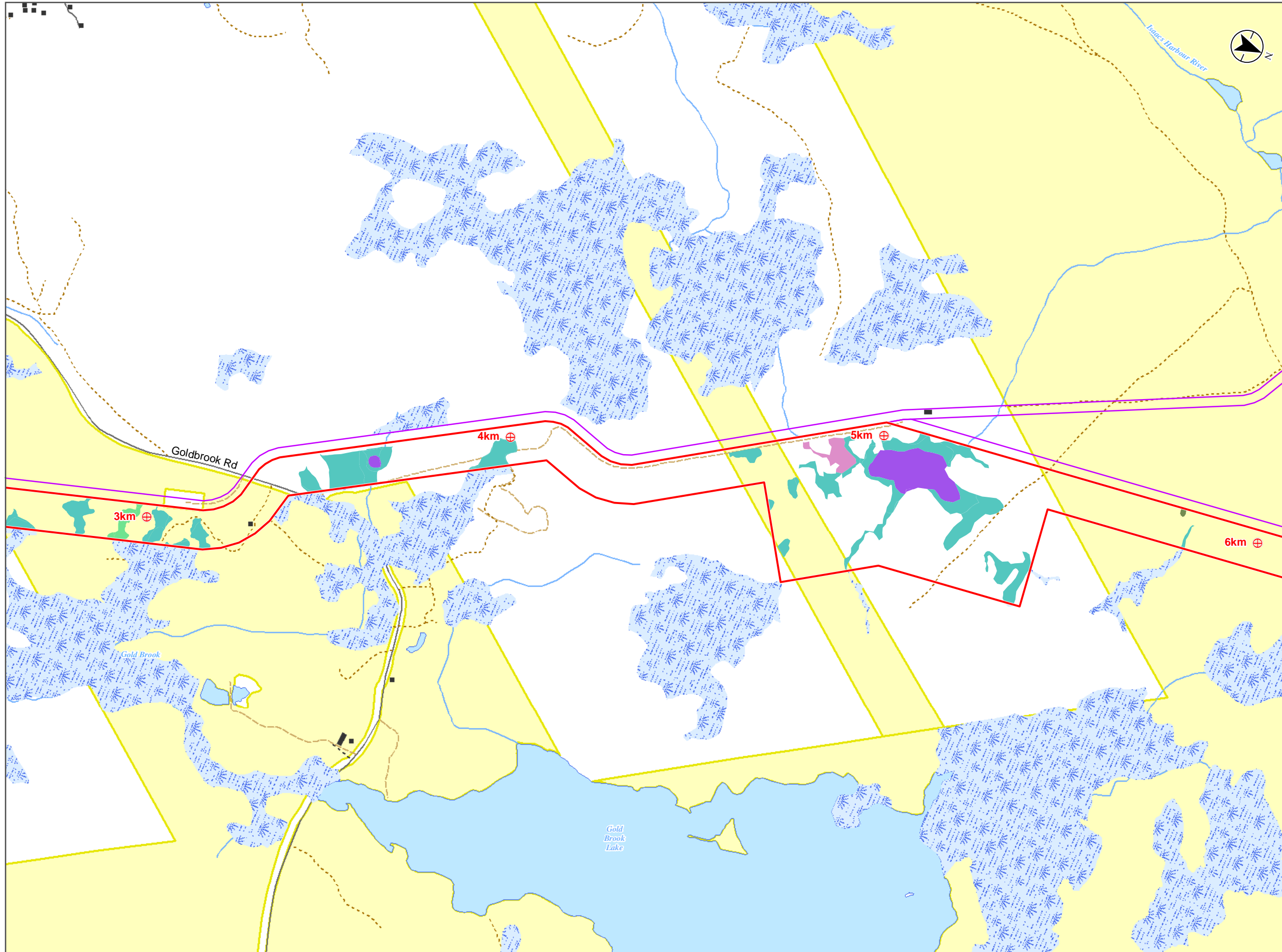
■ Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
*ACCDC observations with accuracy $\leq \pm 1$ km shown on mapping. Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.



Disclaimer: This map is for illustrative purposes to support this project; questions can be directed to the issuing agency.
BEAR PAW PIPELINE PROJECT





Wetlands and Plant Species of Conservation Interest

Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

Wetland (Wetland Class)

■ Bog

■ Fen

■ Shrub Swamp

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

■ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

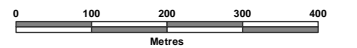
▭ Existing Pipeline Right of Way

Map Features

■ Wetland

■ Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
 *ACCDC observations with accuracy $\leq \pm 1$ km shown on mapping. Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.



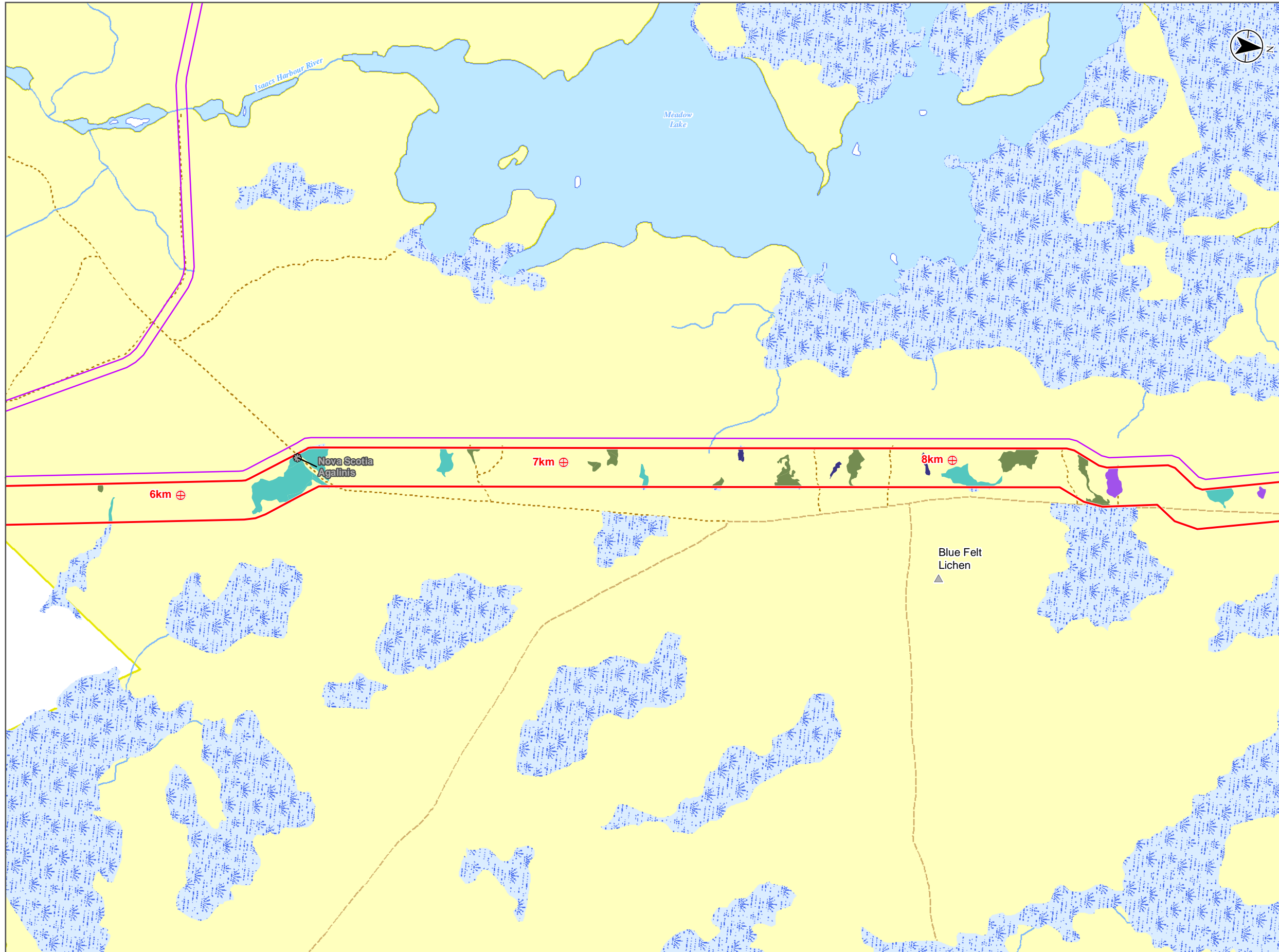
STNS 121413598-123 NAD 1983 CSRS UTM Zone 20N



Disclaimer: This map is for illustrative purposes to support this project; questions can be directed to the issuing agency.

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Wetlands and Plant Species of Conservation Interest

Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

Wetland (Wetland Class)

■ Bog

■ Treed Swamp - Hardwood

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

■ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

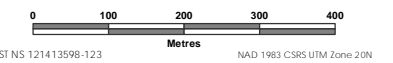
▭ Existing Pipeline Right of Way

Map Features

■ Wetland

■ Crown Land

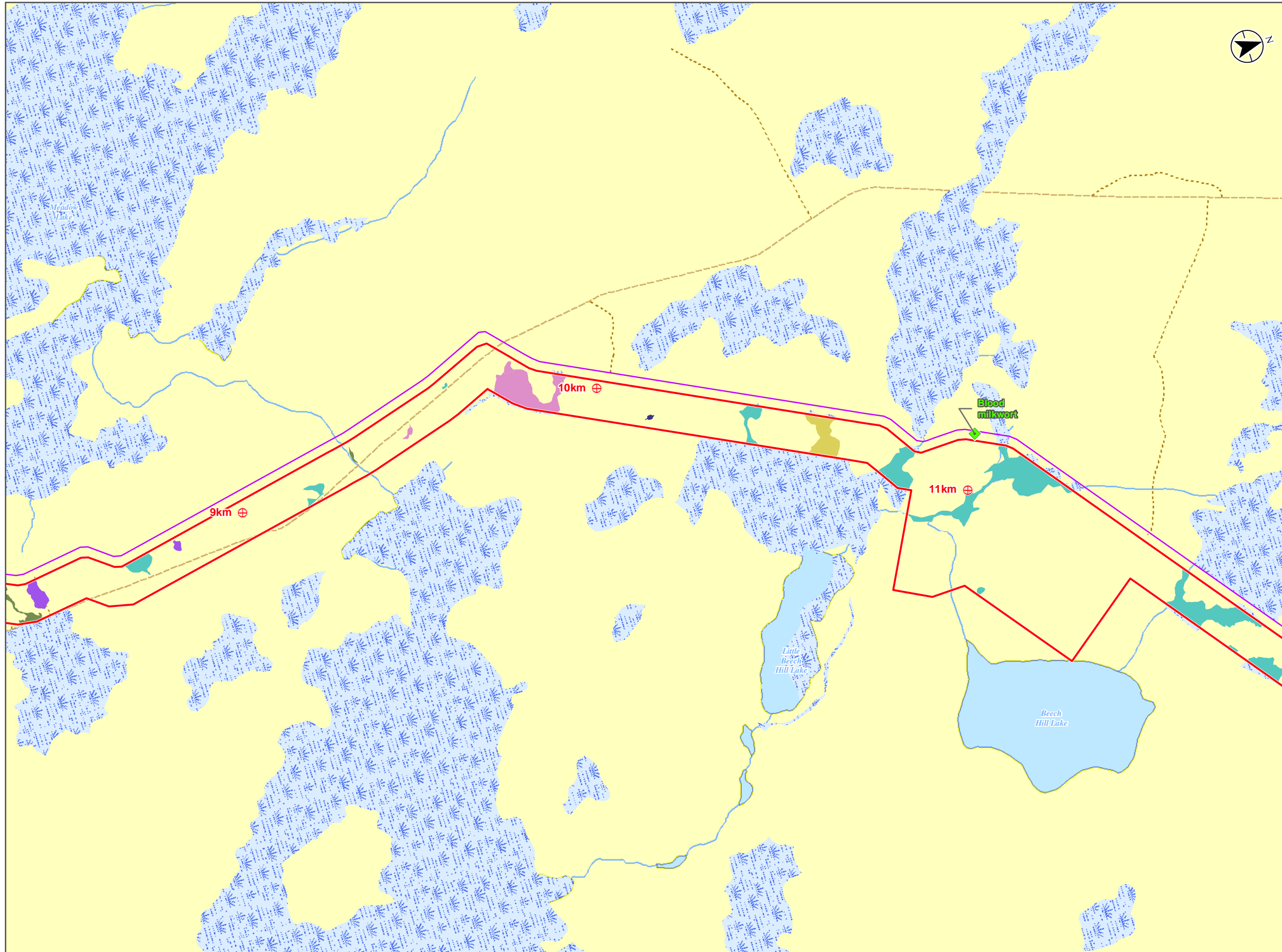
Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
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Wetlands and Plant Species of Conservation Interest



Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACDC)

● Field Observation

Wetland (Wetland Class)

■ Bog

■ Shrub Swamp

■ Treed Bog

■ Treed Swamp - Hardwood

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

□ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

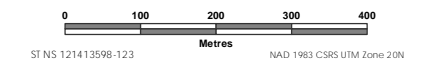
▭ Existing Pipeline Right of Way

Map Features

▨ Wetland

■ Crown Land

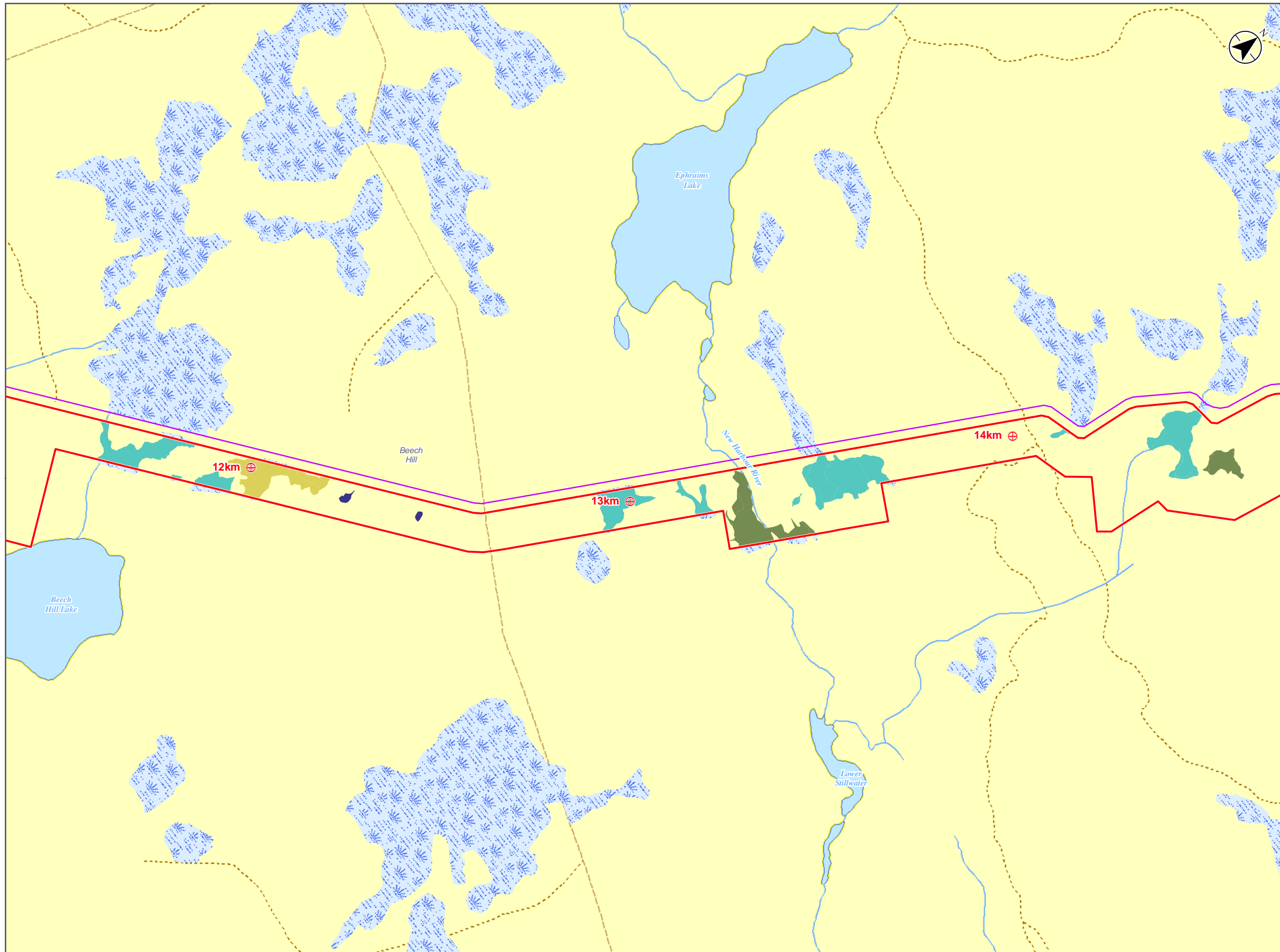
Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
*ACDC observations with accuracy ± 1 km shown on mapping. Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.



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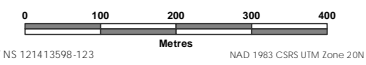


Wetlands and Plant Species of Conservation Interest

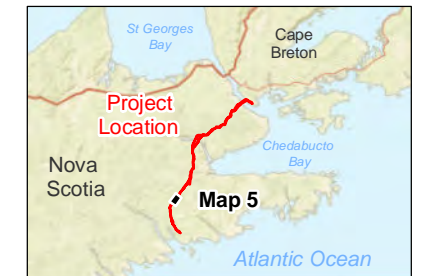


- Study Features**
- 2016 Reported Vascular Plant Observations**
- ◆ Field Observation
- 2015 Reported Plant Observation**
- ▲ Desktop Observation (ACCDC)
 - Field Observation
- Wetland (Wetland Class)**
- Treed Bog
 - Treed Swamp - Hardwood
 - Treed Swamp - Mixedwood
 - Treed Swamp - Softwood
- Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation
- Project Components**
- ⊕ Kilometre Post (Approximate Distance from Origin)
 - ▭ Assessment Corridor / Local Assessment Area (LAA)
 - ▭ Existing Pipeline Right of Way
- Map Features**
- ▨ Wetland
 - Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
 *ACCDC observations with accuracy $\leq \pm 1$ km shown on mapping. Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.

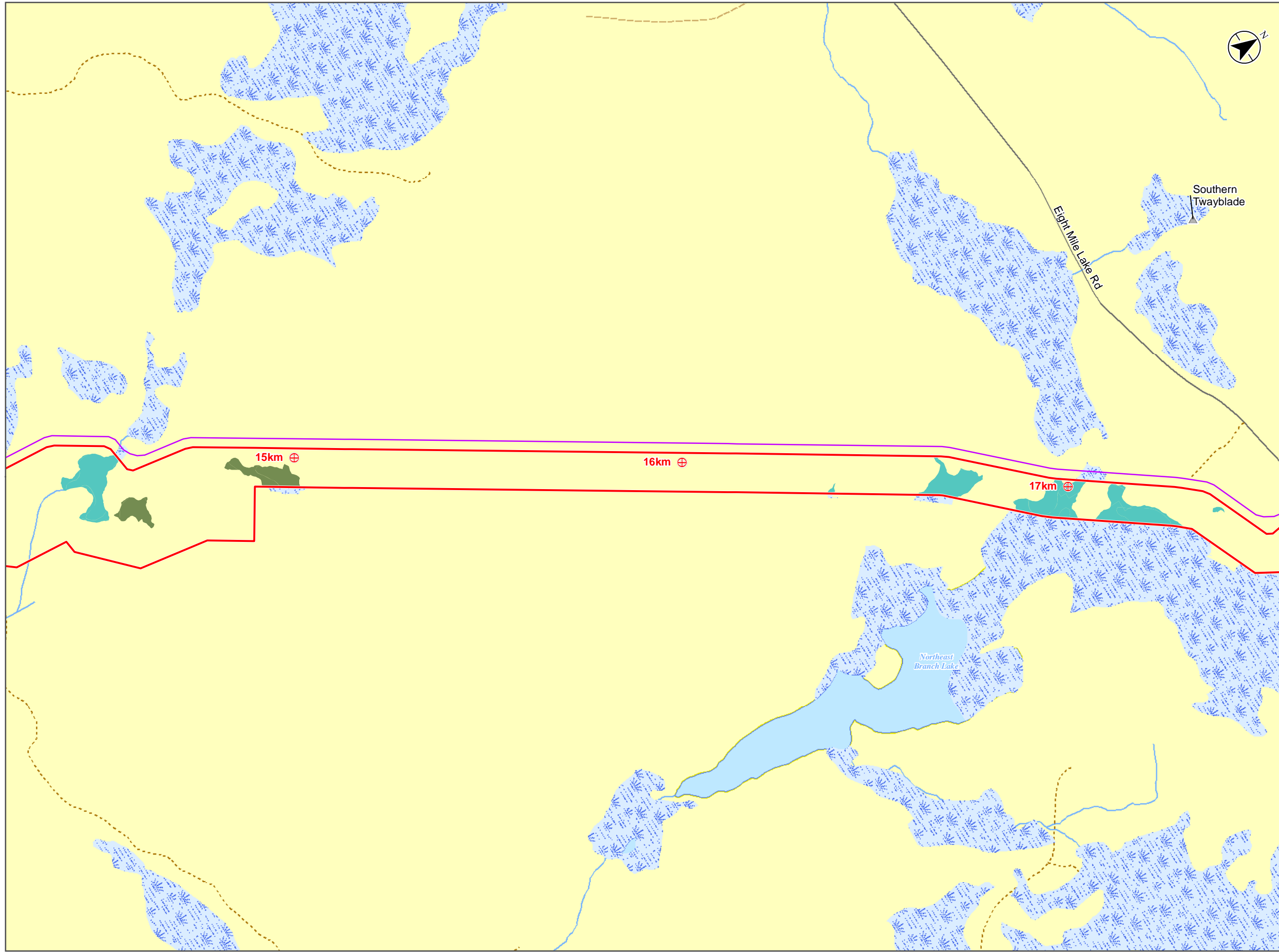


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Disclaimer: This map is for illustrative purposes to support this project; questions can be directed to the issuing agency.





Wetlands and Plant Species of Conservation Interest

Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACDC)

● Field Observation

Wetland (Wetland Class)

■ Treed Bog

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

□ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

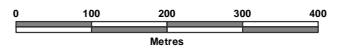
▭ Existing Pipeline Right of Way

Map Features

■ Wetland

■ Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
 *ACDC observations with accuracy $\leq \pm 1$ km shown on mapping. Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.



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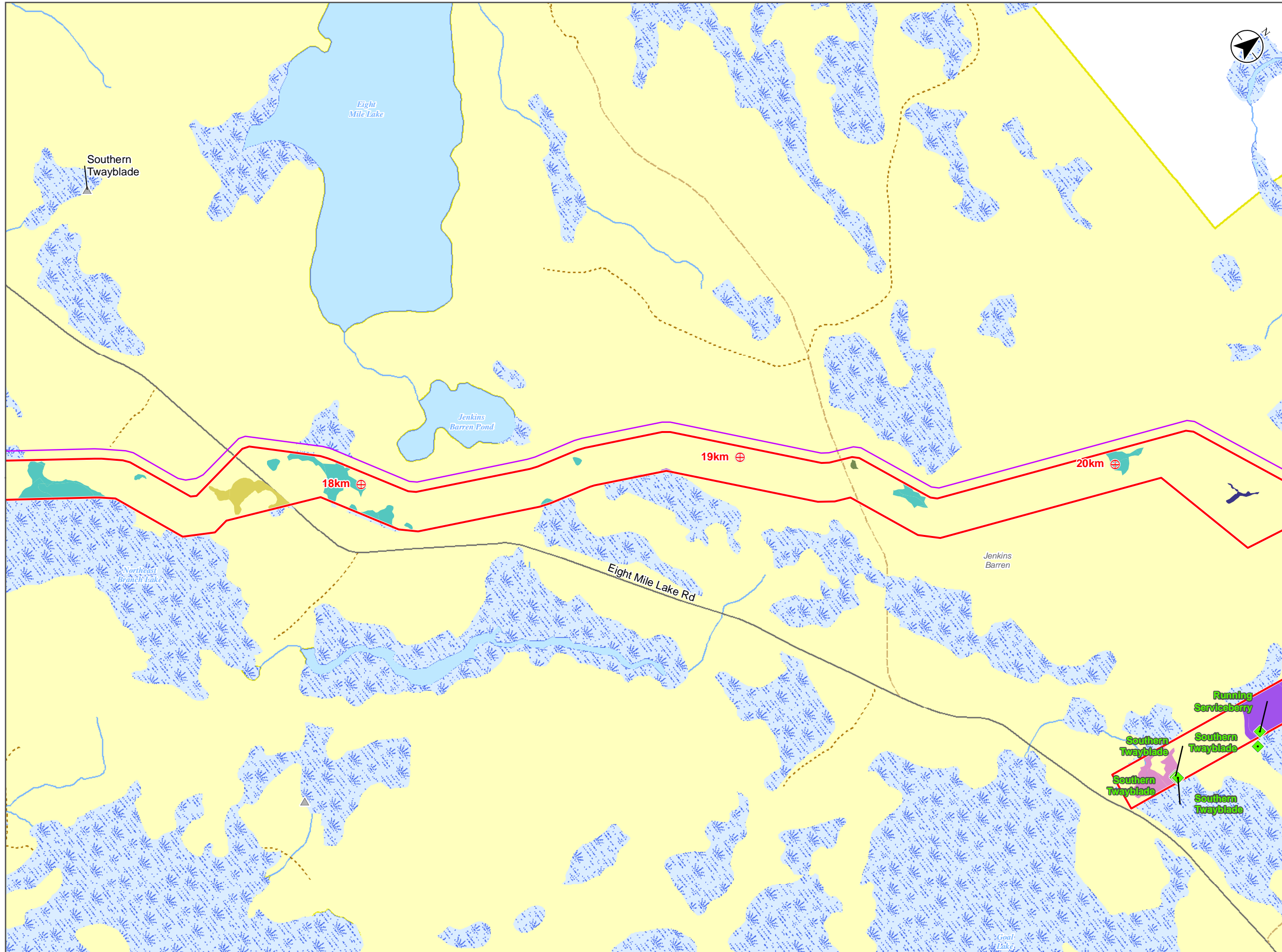


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Wetlands and Plant Species of Conservation Interest



Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

Wetland (Wetland Class)

■ Bog

■ Shrub Swamp

■ Treed Bog

■ Treed Swamp - Hardwood

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

□ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

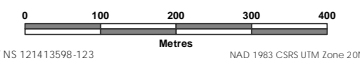
▭ Existing Pipeline Right of Way

Map Features

▨ Wetland

■ Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
 *ACCDC observations with accuracy ± 1 km shown on mapping. Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.



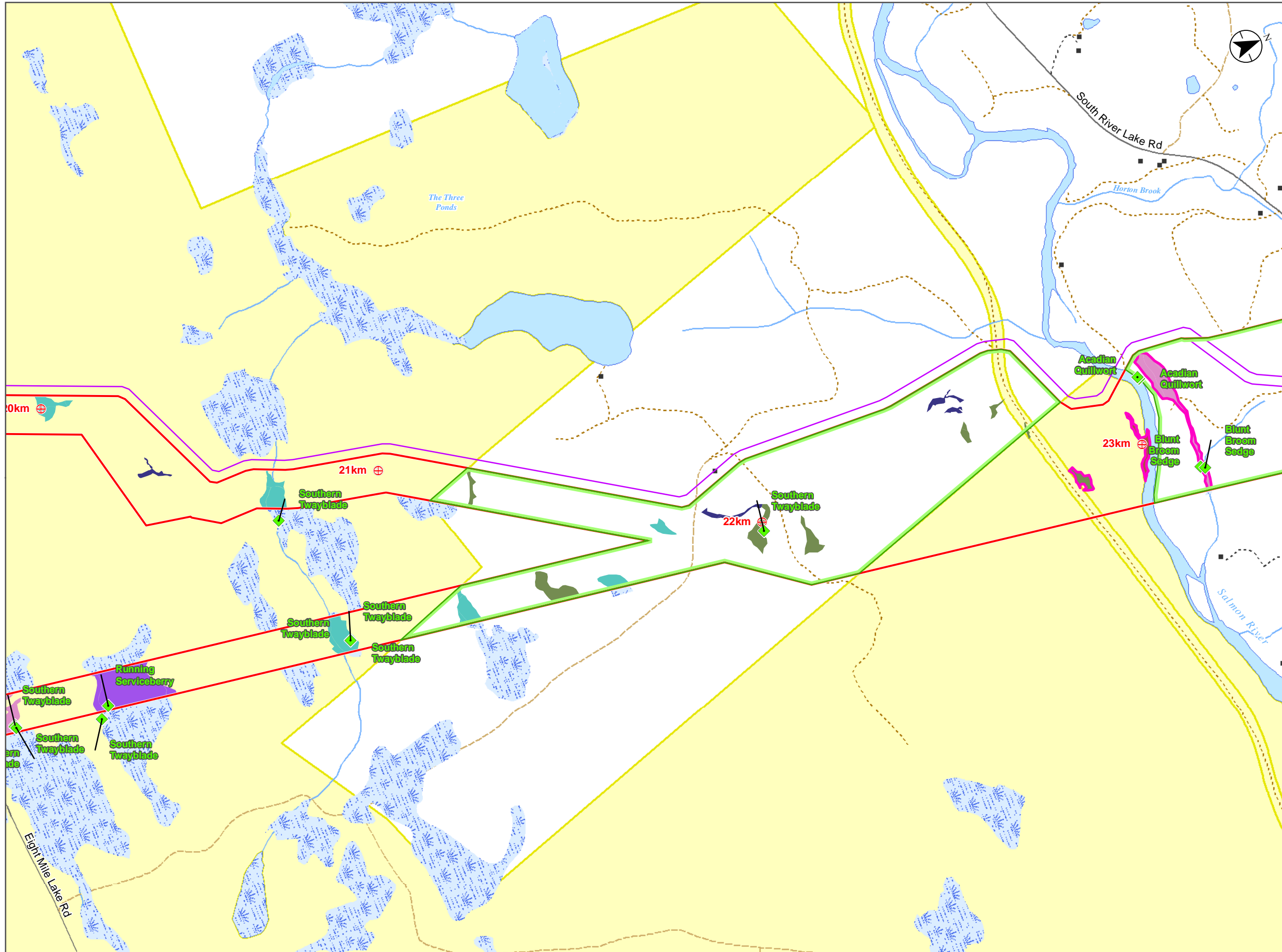
STNS 121413598-123 NAD 1983 CSRS UTM Zone 20N



Disclaimer: This map is for illustrative purposes to support this project; questions can be directed to the issuing agency.
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Wetlands and Plant Species of Conservation Interest



Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

Wetland (Wetland Class)

■ Bog

■ Marsh

■ Shrub Swamp

■ Treed Swamp - Hardwood

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

□ Wetland of Sepcial Significance

□ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

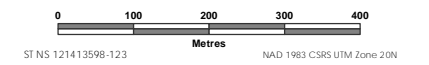
▭ Existing Pipeline Right of Way

Map Features

▭ Wetland

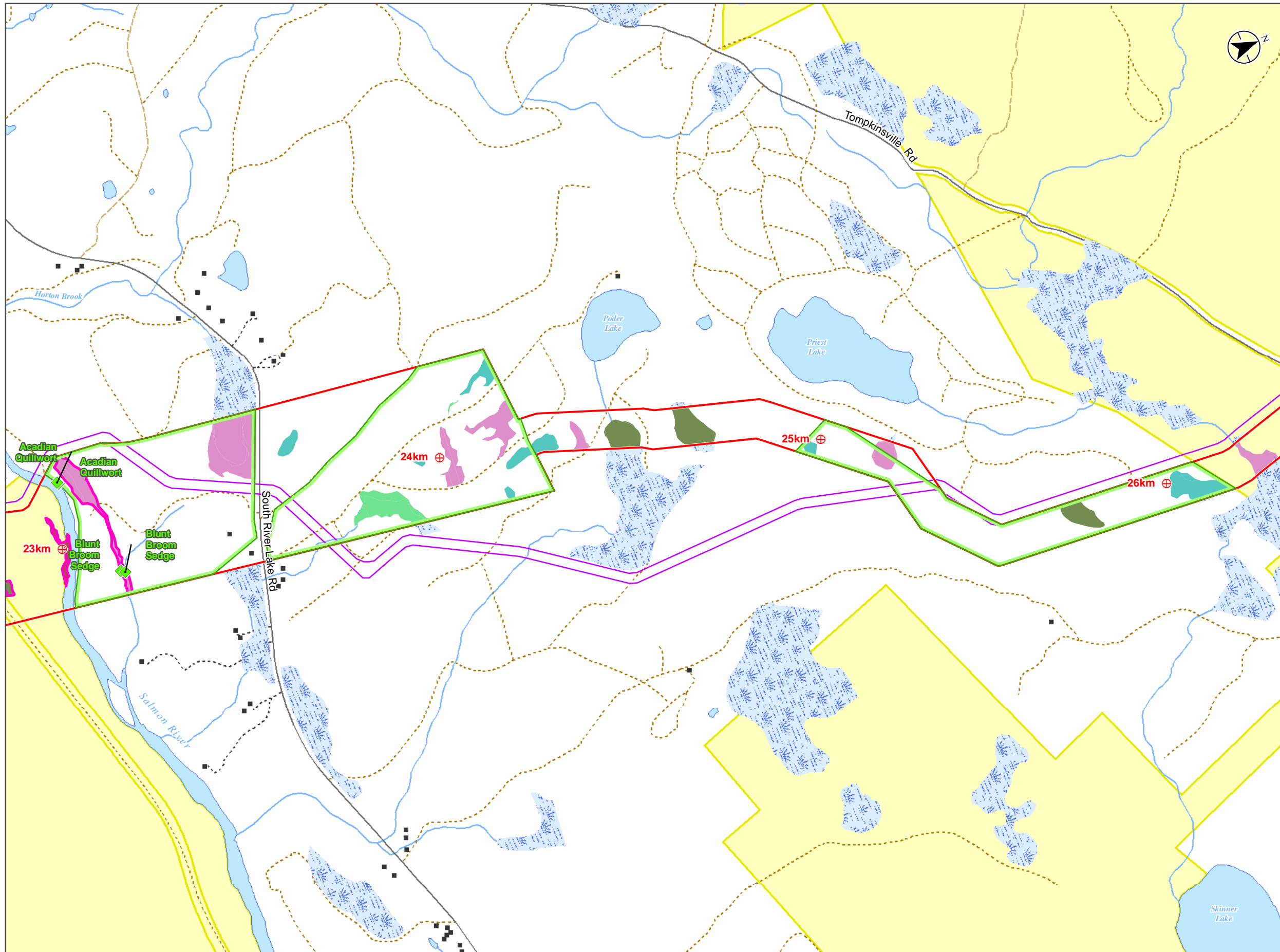
▭ Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
 *ACCDC observations with accuracy ± 1 km shown on mapping. Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.



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Wetlands and Plant Species of Conservation Interest

Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACDC)

● Field Observation

Wetland (Wetland Class)

■ Fen

■ Marsh

■ Shrub Swamp

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

□ Wetland of Special Significance

□ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

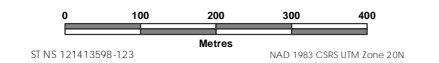
▭ Existing Pipeline Right of Way

Map Features

■ Wetland

■ Crown Land

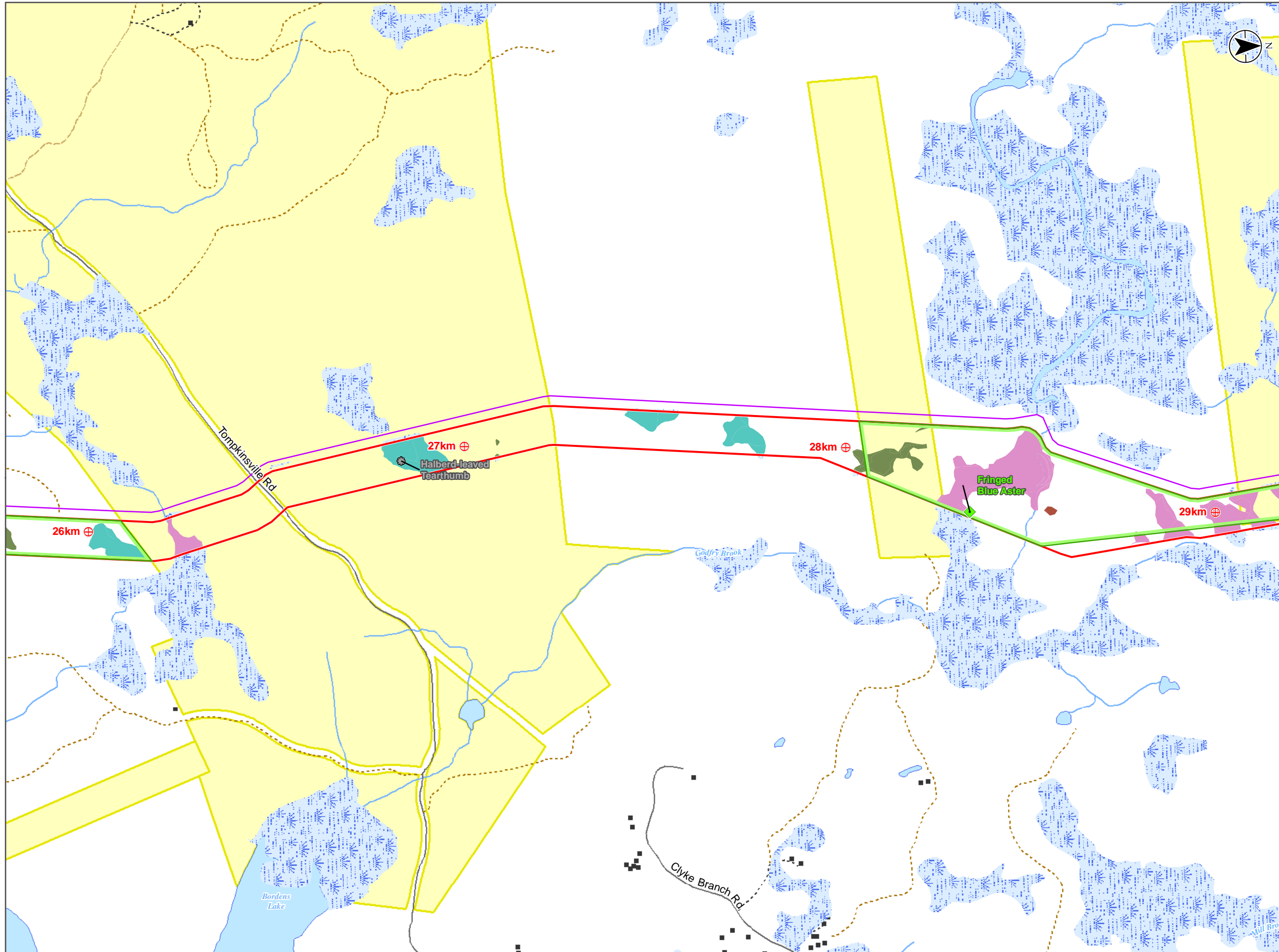
Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
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Wetlands and Plant Species of Conservation Interest

Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

Wetland (Wetland Class)

■ Marsh

■ Shrub Swamp

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

■ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

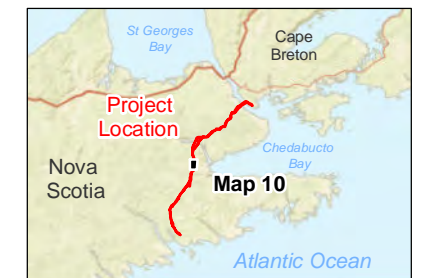
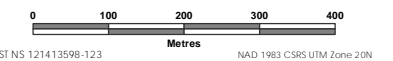
▭ Existing Pipeline Right of Way

Map Features

■ Wetland

■ Crown Land

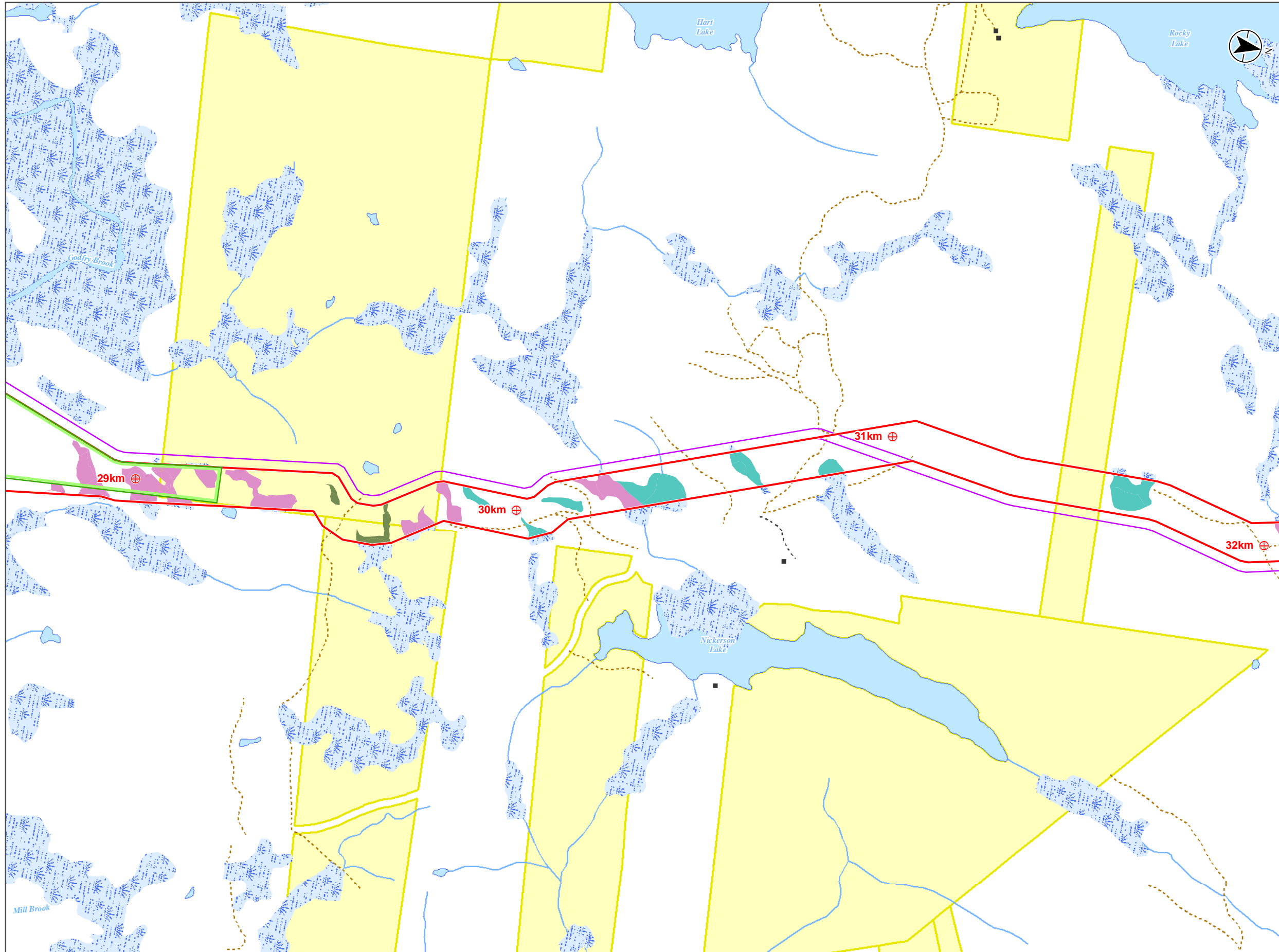
Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
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Wetlands and Plant Species of Conservation Interest



Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

Wetland (Wetland Class)

■ Shrub Swamp

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

■ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

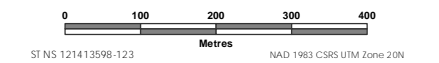
▭ Existing Pipeline Right of Way

Map Features

■ Wetland

■ Crown Land

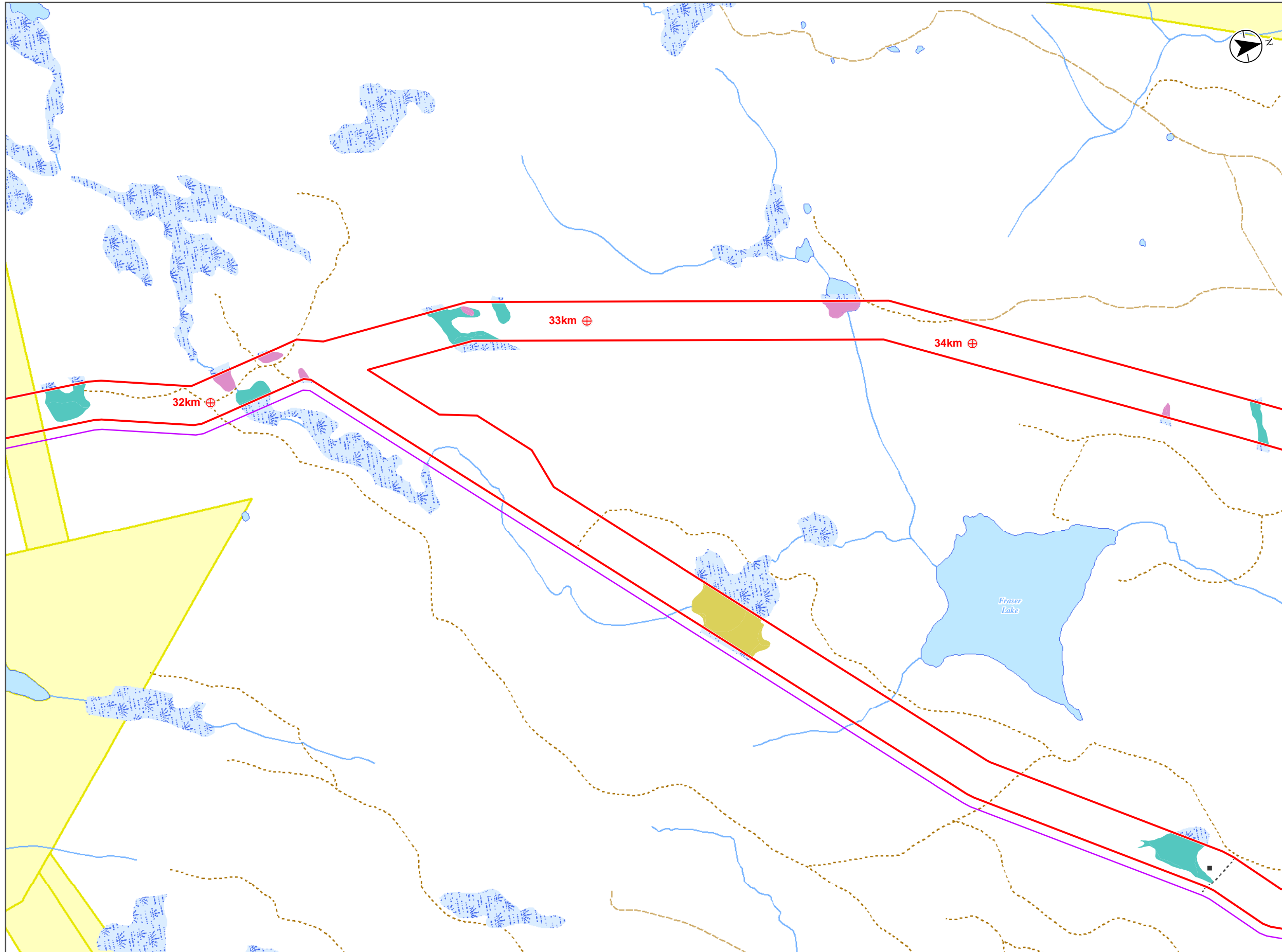
Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
 *ACCDC observations with accuracy ± 1 km shown on mapping.
 Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.



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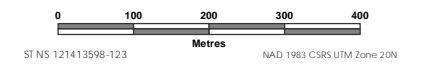


Wetlands and Plant Species of Conservation Interest



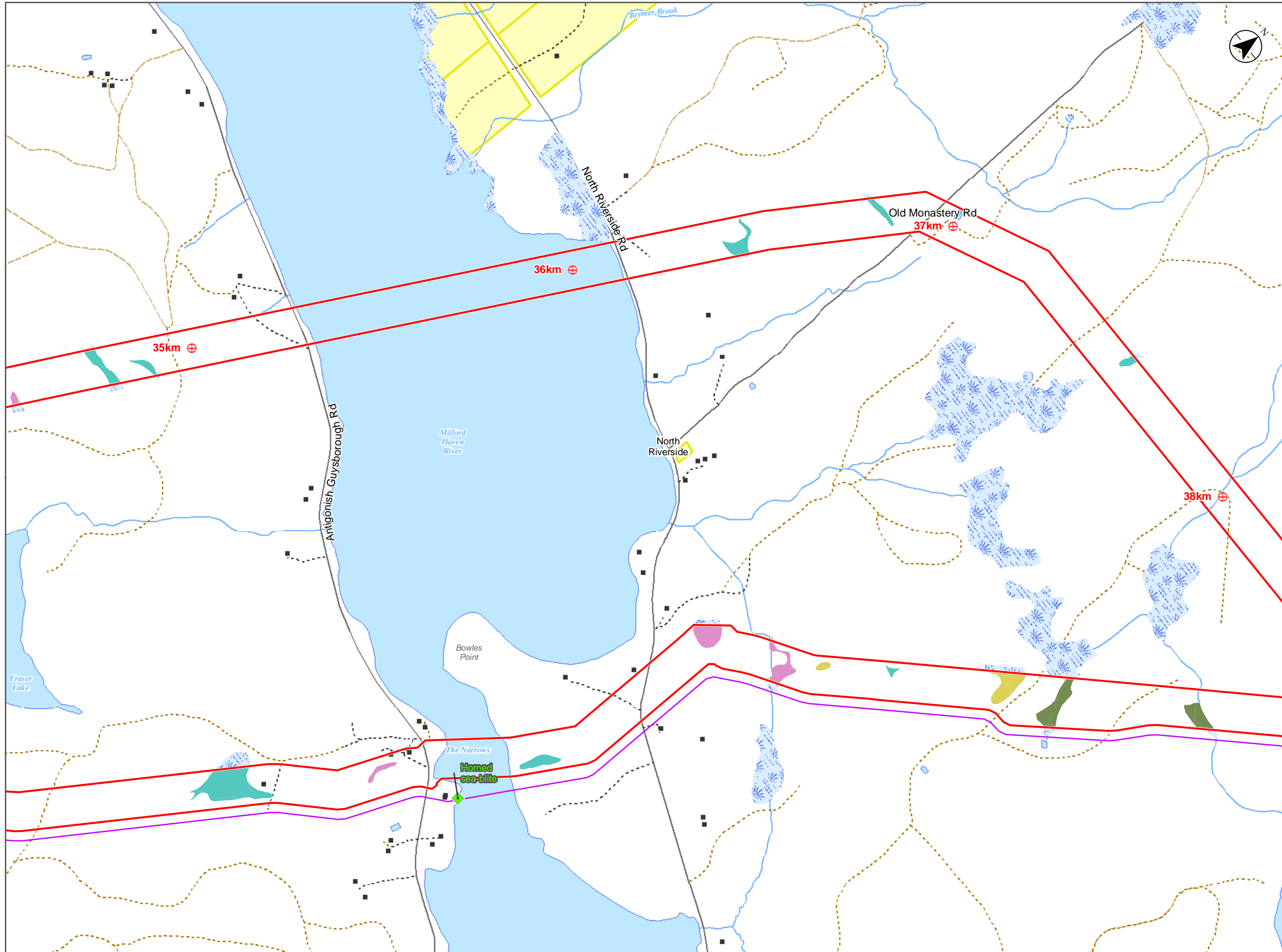
- Study Features**
- 2016 Reported Vascular Plant Observations**
- ◆ Field Observation
- 2015 Reported Plant Observation**
- ▲ Desktop Observation (ACCDC)
 - Field Observation
- Wetland (Wetland Class)**
- Shrub Swamp
 - Treed Bog
 - Treed Swamp - Softwood
- Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation
- Project Components**
- ⊕ Kilometre Post (Approximate Distance from Origin)
 - ▭ Assessment Corridor / Local Assessment Area (LAA)
 - ▭ Existing Pipeline Right of Way
- Map Features**
- Wetland
 - Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
 *ACCDC observations with accuracy $\leq \pm 1$ km shown on mapping. Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.



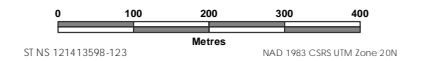
Disclaimer: This map is for illustrative purposes to support this project; questions can be directed to the issuing agency.
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Wetlands and Plant Species of Conservation Interest



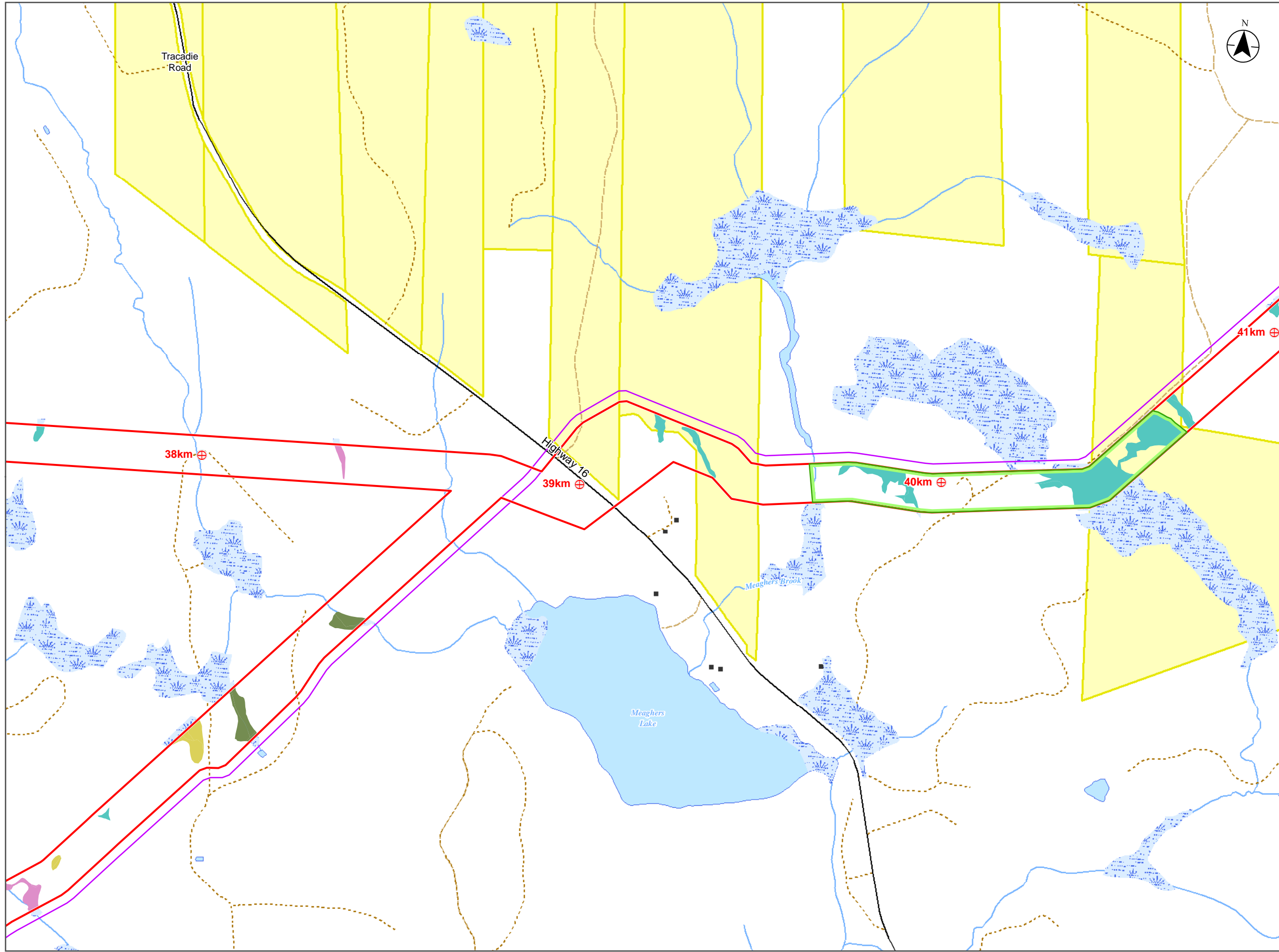
- Study Features**
- 2016 Reported Vascular Plant Observations**
- Field Observation
- 2015 Reported Plant Observation**
- Desktop Observation (ACCDC)
 - Field Observation
- Wetland (Wetland Class)**
- Shallow Water
 - Shrub Swamp
 - Treed Bog
 - Treed Swamp - Mixedwood
 - Treed Swamp - Softwood
- Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation**
- Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation
- Project Components**
- Kilometre Post (Approximate Distance from Origin)
 - Assessment Corridor / Local Assessment Area (LAA)
 - Existing Pipeline Right of Way
- Map Features**
- Wetland
 - Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
 *ACCDC observations with accuracy $\leq \pm 1$ km shown on mapping. Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.



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Wetlands and Plant Species of Conservation Interest

Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACDC)

● Field Observation

Wetland (Wetland Class)

■ Shrub Swamp

■ Treed Bog

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

■ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

■ Assessment Corridor / Local Assessment Area (LAA)

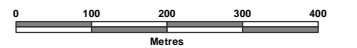
■ Existing Pipeline Right of Way

Map Features

■ Wetland

■ Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
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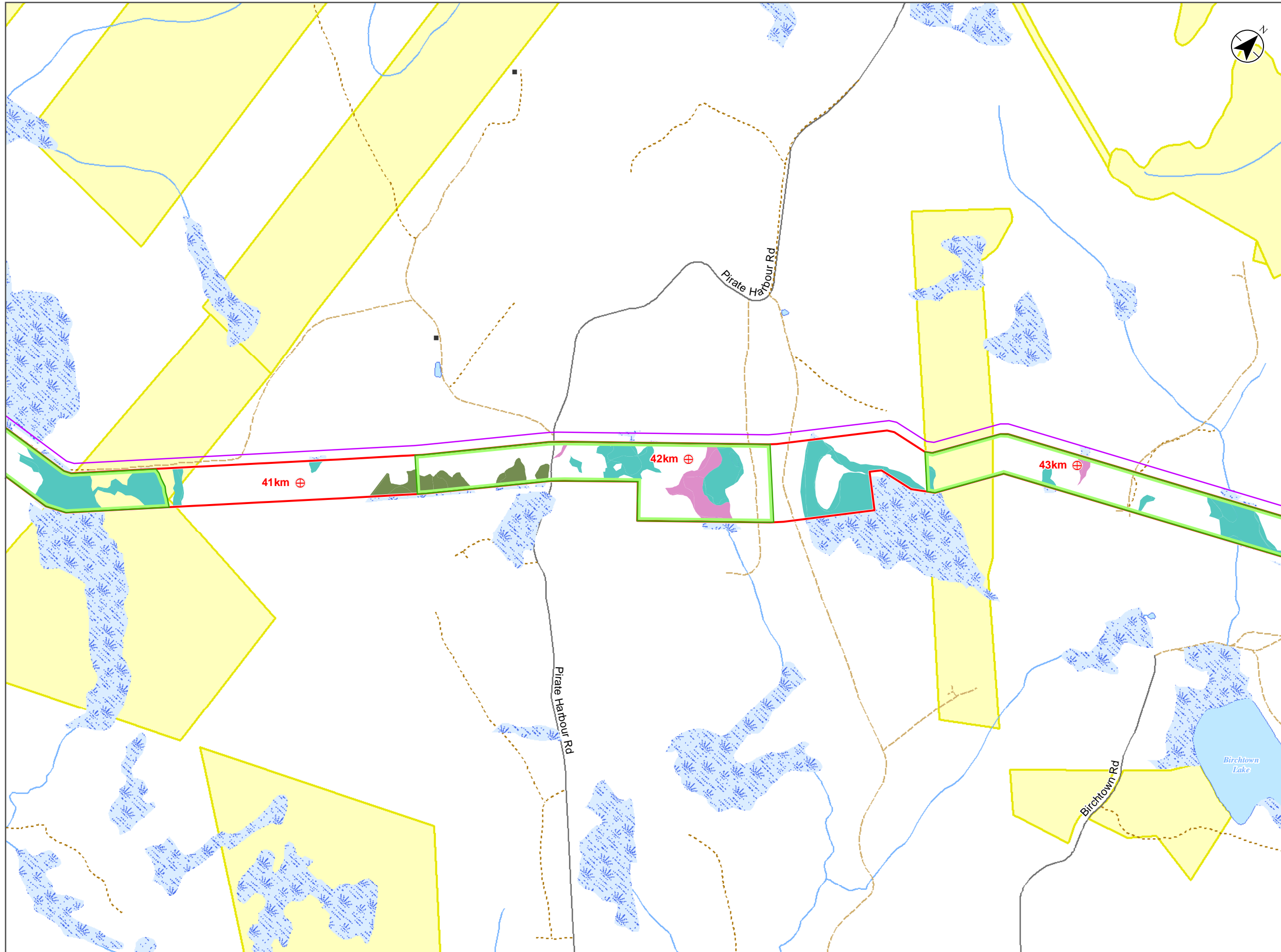
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Bear Paw PIPELINE

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Wetlands and Plant Species of Conservation Interest



Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

Wetland (Wetland Class)

■ Shrub Swamp

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

■ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

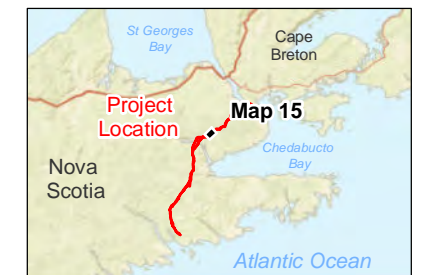
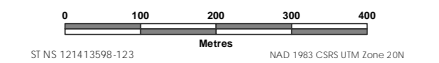
▭ Existing Pipeline Right of Way

Map Features

■ Wetland

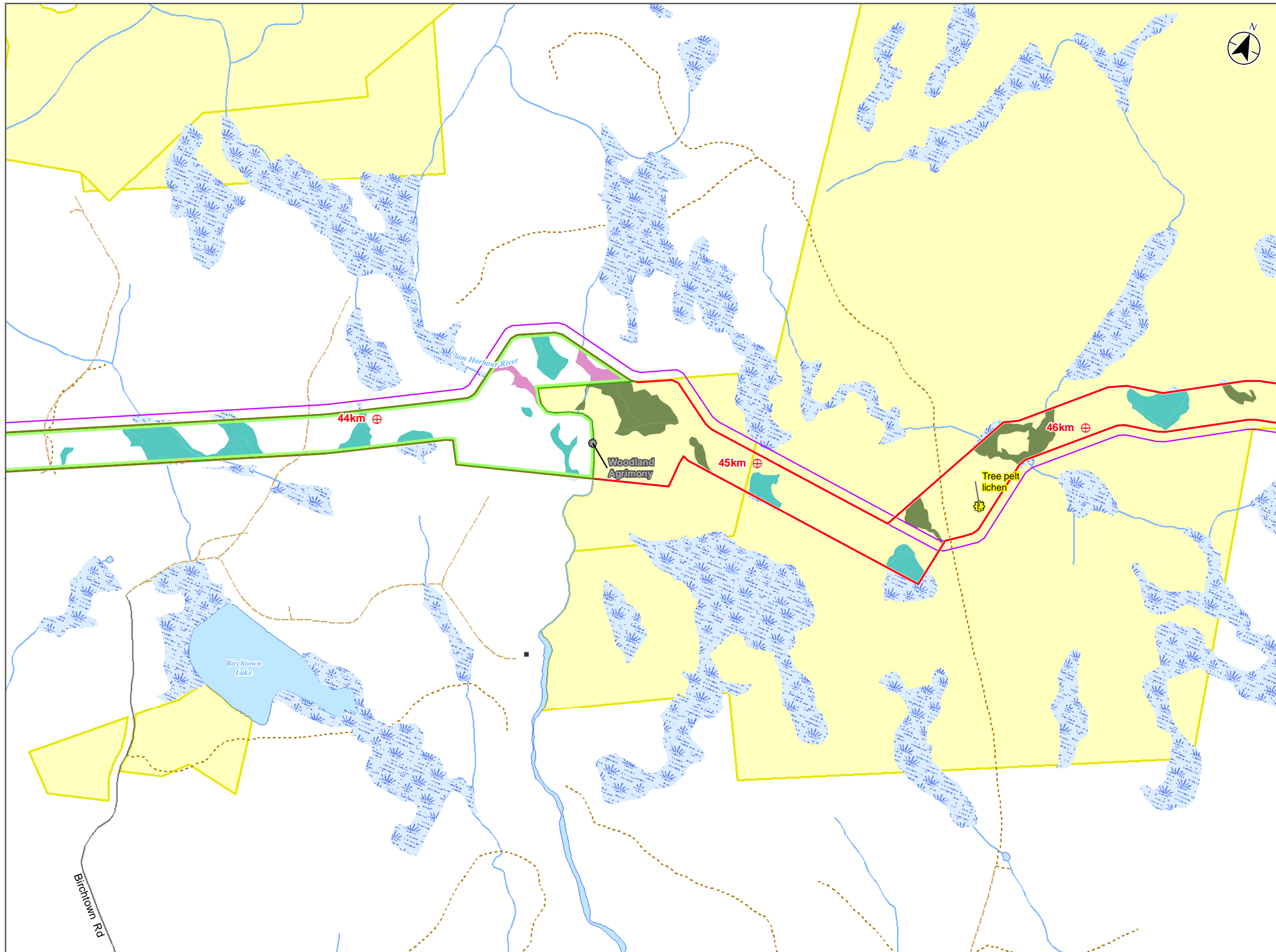
■ Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
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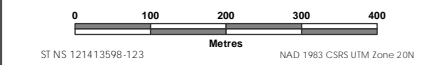




Wetlands and Plant Species of Conservation Interest

- Study Features**
- 2016 Reported Vascular Plant Observations**
- ◆ Field Observation
- 2015 Reported Plant Observation**
- ▲ Desktop Observation (ACCDC)
 - Field Observation
- 2016 Lichen Field Observations**
- 2016 Lichen Field Observations
- Wetland (Wetland Class)**
- Shrub Swamp
 - Treed Swamp - Mixedwood
 - Treed Swamp - Softwood
- Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation**
- Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation
- Project Components**
- ⊕ Kilometre Post (Approximate Distance from Origin)
 - ▭ Assessment Corridor / Local Assessment Area (LAA)
 - ▭ Existing Pipeline Right of Way
- Map Features**
- Wetland
 - Crown Land

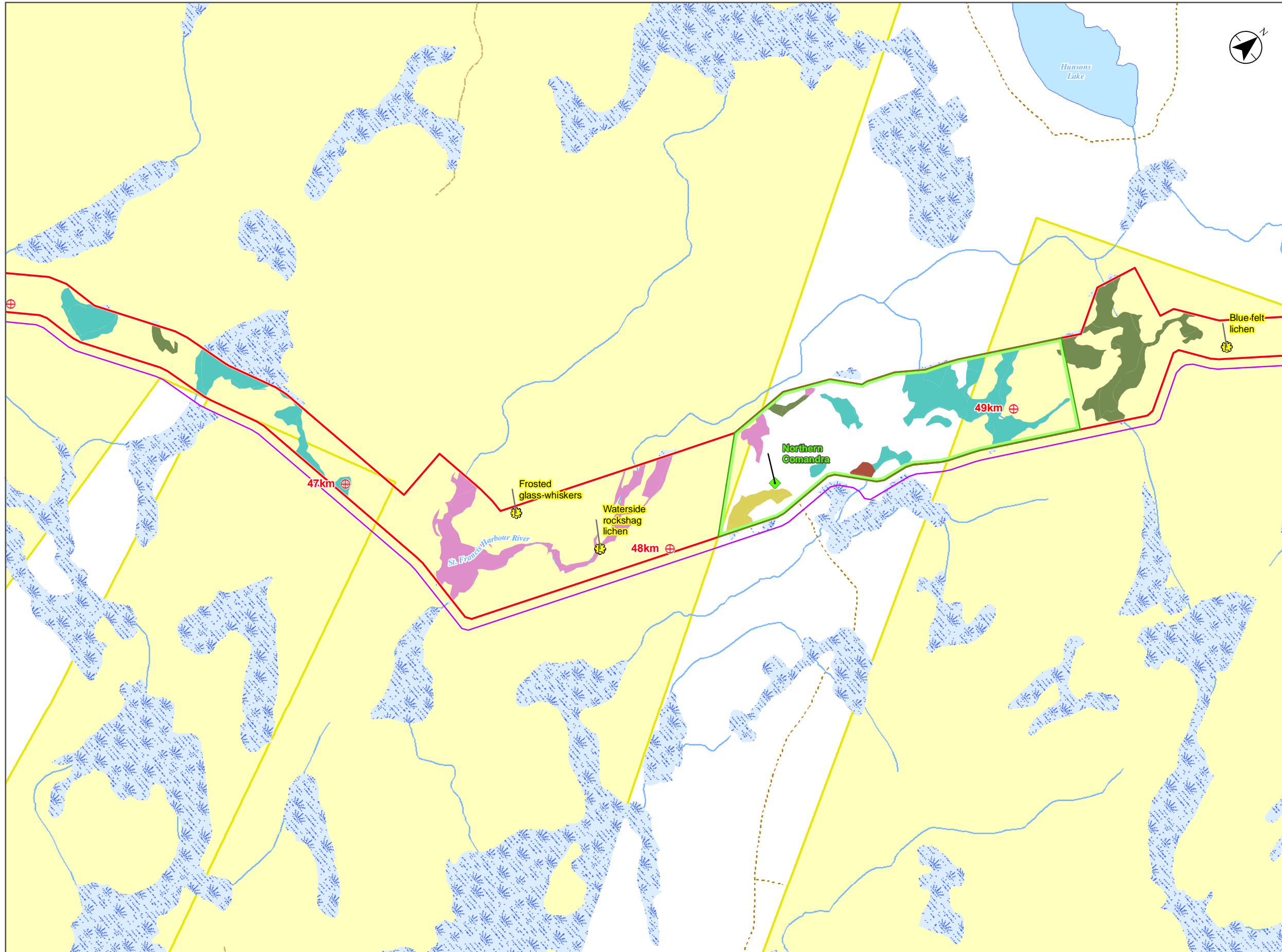
Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
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Wetlands and Plant Species of Conservation Interest



Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

⊕ 2016 Lichen Field Observations

Wetland (Wetland Class)

■ Marsh

■ Shrub Swamp

■ Treed Bog

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

□ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

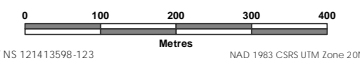
▭ Existing Pipeline Right of Way

Map Features

▨ Wetland

▭ Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
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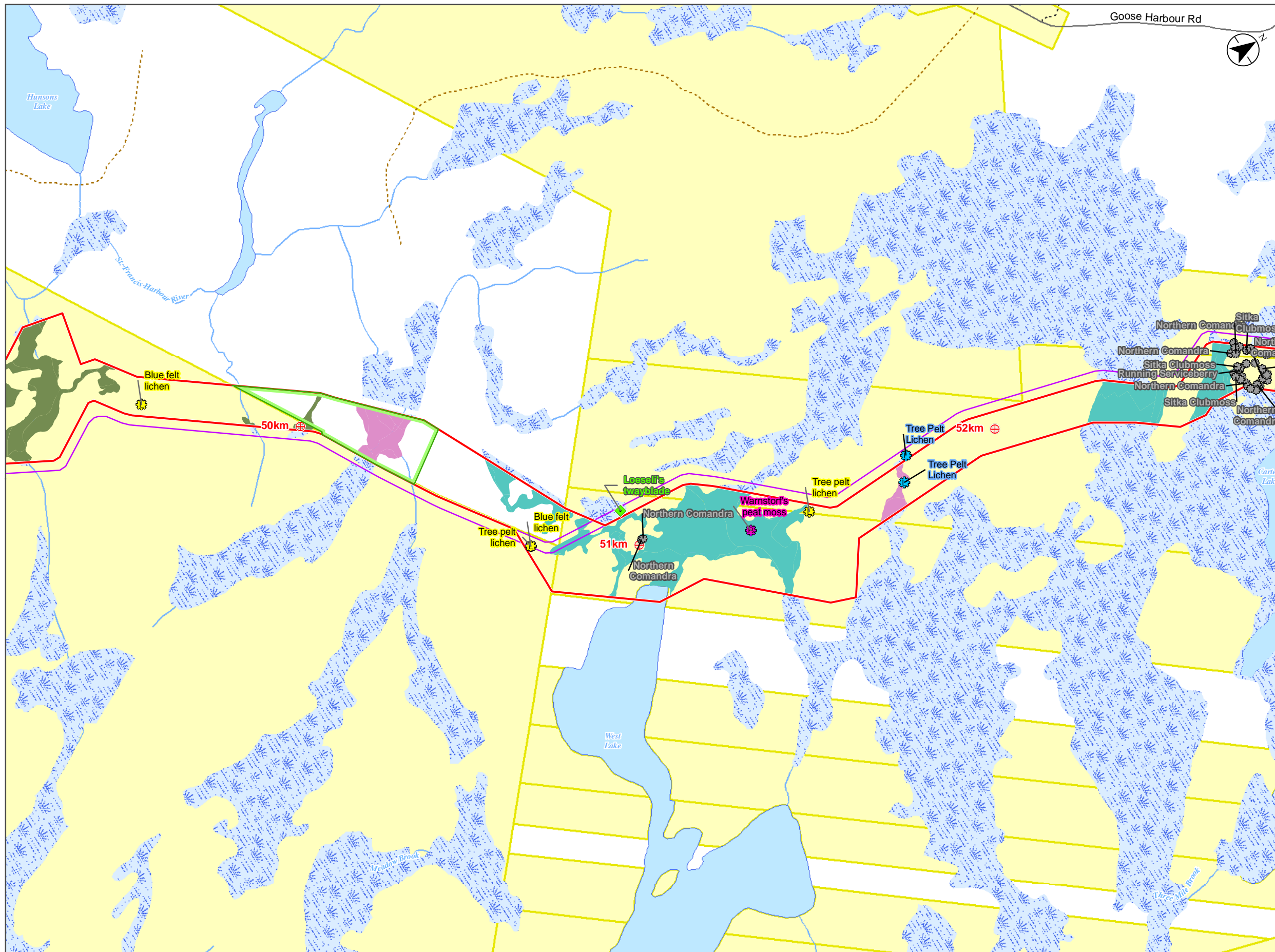


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Wetlands and Plant Species of Conservation Interest

Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

● 2015 Lichen Field Observations

● 2016 Lichen Field Observations

● 2016 Bryophyte Field Observations

Wetland (Wetland Class)

■ Shrub Swamp

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

■ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

■ Assessment Corridor / Local Assessment Area (LAA)

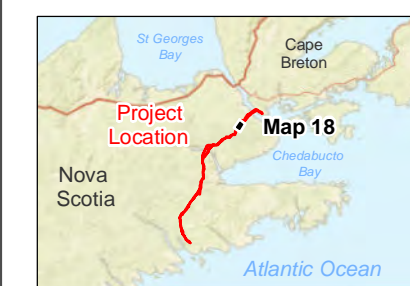
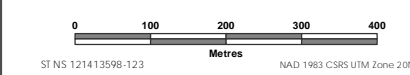
■ Existing Pipeline Right of Way

Map Features

■ Wetland

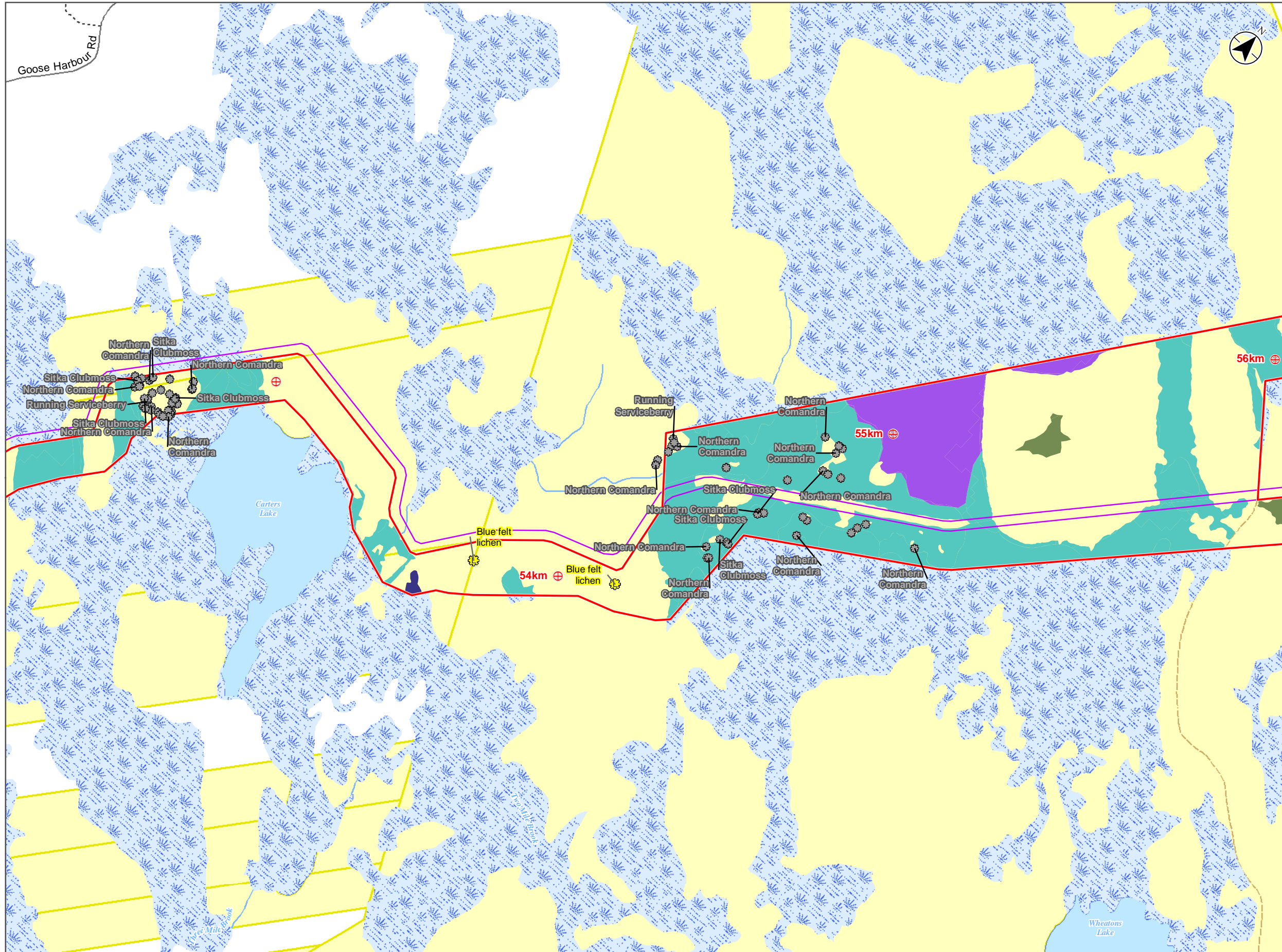
■ Crown Land

Sources: Data provided by Allantia; Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
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Wetlands and Plant Species of Conservation Interest

Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

★ 2016 Lichen Field Observations

Wetland (Wetland Class)

■ Bog

■ Shrub Swamp

■ Treed Swamp - Hardwood

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

□ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

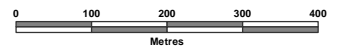
▭ Existing Pipeline Right of Way

Map Features

▨ Wetland

■ Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
 *ACCDC observations with accuracy ± 1 km shown on mapping. Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.



STNS 121413598-123 NAD 1983 CSRS UTM Zone 20N



Disclaimer: This map is for illustrative purposes to support this project; questions can be directed to the issuing agency.

BEAR PAW PIPELINE PROJECT



Wetlands and Plant Species of Conservation Interest



Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

Wetland (Wetland Class)

■ Bog

■ Shrub Swamp

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

■ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

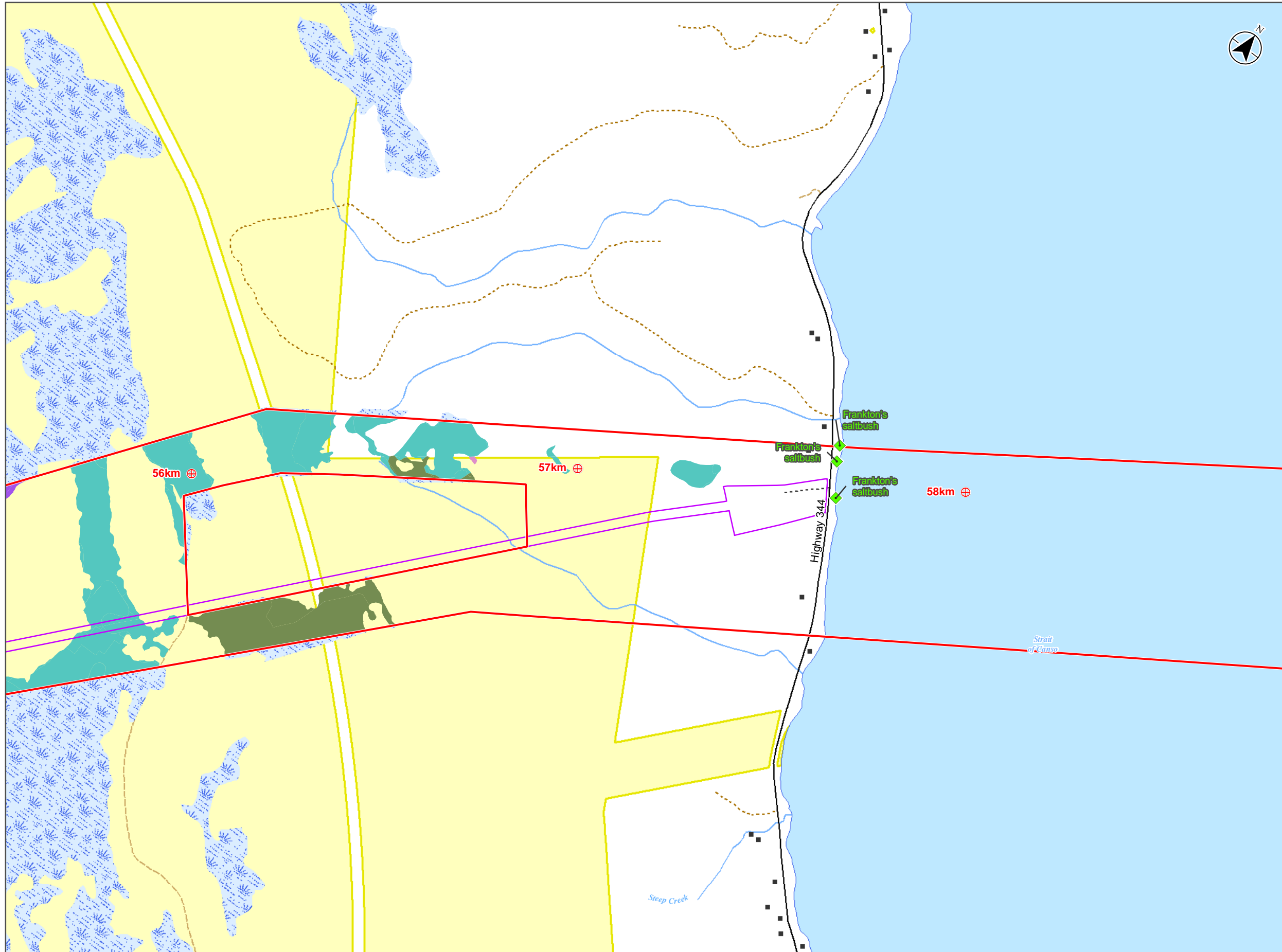
▭ Assessment Corridor / Local Assessment Area (LAA)

▭ Existing Pipeline Right of Way

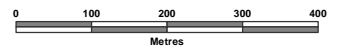
Map Features

■ Wetland

■ Crown Land



Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
 *ACCDC observations with accuracy ± 1 km shown on mapping. Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.



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BEAR PAW PIPELINE PROJECT





Wetlands and Plant Species of Conservation Interest

Study Features

2016 Reported Vascular Plant Observations

◆ Field Observation

2015 Reported Plant Observation

▲ Desktop Observation (ACCDC)

● Field Observation

Wetland (Wetland Class)

■ Marsh

■ Shrub Swamp

■ Treed Bog

■ Treed Swamp - Mixedwood

■ Treed Swamp - Softwood

■ Area of Private Land Surveyed in the Assessment Area in 2016 for Wetlands and Vegetation

Project Components

⊕ Kilometre Post (Approximate Distance from Origin)

▭ Assessment Corridor / Local Assessment Area (LAA)

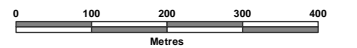
Map Features

■ Wetland

■ Industrial

■ Crown Land

Sources: Data provided by Atlantic Canada Conservation Data Centre, the Government of Canada and Nova Scotia.
 *ACCDC observations with accuracy $\leq \pm 1$ km shown on mapping. Results within the assessment corridor, on crown land, are derived from field surveys; all other results are based on desktop information.



STNS 121413598-123 NAD 1983 CSRS UTM Zone 20N



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BEAR PAW PIPELINE PROJECT



Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Abies balsamea</i>	balsam fir	S5	secure	x	x
<i>Acer pensylvanicum</i>	striped maple	S5	secure	x	x
<i>Acer rubrum</i>	red maple	S5	secure	x	x
<i>Acer saccharum</i>	sugar maple	S5	secure	x	x
<i>Acer spicatum</i>	mountain maple	S5	secure	x	x
<i>Actaea rubra</i>	red baneberry	S5	secure	x	x
<i>Agalinis neoscotica</i>	Nova Scotia agalinis	S3	secure	x	
<i>Agrimonia gryposepala</i>	woodland agrimony	S3	secure	x	
<i>Agrimonia striata</i>	woodland agrimony	S5	secure		x
<i>Agrostis capillaris</i>	colonial bent grass	SNA	exotic		x
<i>Agrostis gigantea</i>	redtop	SNA	exotic	x	x
<i>Agrostis perennans</i>	upland bent grass	S4S5	secure	x	x
<i>Agrostis stolonifera</i>	creeping bent grass	S5	secure	x	x
<i>Alnus incana</i>	speckled alder	S5	secure	x	x
<i>Alnus viridis</i>	green alder	S5	secure		x
<i>Amelanchier canadensis</i>	Canada serviceberry	S4?	secure		x
<i>Amelanchier sp.</i>	a serviceberry	na	na	x	x
<i>Amelanchier stolonifera</i>	running serviceberry	S3?	secure	x	x
<i>Amelanchier x intermedia</i>	running serviceberry	SNA	not assessed	x	
<i>Anaphalis margaritacea</i>	pearly everlasting	S5	secure	x	x
<i>Andromeda polifolia</i>	bog rosemary	S5	secure	x	x
<i>Angelica sylvestris</i>	woodland angelica	SNA	exotic		x
<i>Anthoxanthum odoratum</i>	large sweet vernal grass	SNA	exotic		x
<i>Apocynum androsaemifolium</i>	spreading dogbane	S5	secure	x	

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Apocynum cannabinum</i>	Indian hemp	S4	secure	x	x
<i>Aquilegia vulgaris</i>	European columbine	SNA	exotic	x	x
<i>Aralia hispida</i>	bristly sarsaparilla	S5	secure	x	x
<i>Aralia nudicaulis</i>	wild sarsaparilla	S5	secure	x	x
<i>Arethusa bulbosa</i>	arethusa	S4	secure	x	x
<i>Argentina anserina</i>	common silverweed	S5	secure		x
<i>Athyrium filix-femina</i>	common lady fern	S5	secure	x	x
<i>Atriplex franktonii</i>	Frankton's saltbush	S3S4	secure		x
<i>Atriplex glabriuscula</i>	glabrous orache	S4S5	secure		x
<i>Atriplex littoralis</i>	narrow-leaved orache	SNA	exotic		x
<i>Atriplex patula</i>	spreading orache	SNA	exotic		x
<i>Atriplex prostrata</i>	thin-leaved orache	S5	secure		x
<i>Atriplex subspicata</i>	thick-leaved orache	S5?	secure		x
<i>Bartonia paniculata</i>	branched bartonia	S4S5	secure	x	
<i>Betula alleghaniensis</i>	yellow birch	S5	secure	x	x
<i>Betula michauxii</i>	Newfoundland dwarf birch	S2	sensitive	x	x
<i>Betula papyrifera</i>	paper birch	S5	secure	x	x
<i>Betula papyrifera var. cordifolia</i>	heart-leaved birch	S5	secure	x	x
<i>Betula populifolia</i>	gray birch	S5	secure	x	x
<i>Bidens cernua</i>	nodding beggarticks	S5	secure	x	
<i>Bidens frondosa</i>	Devil's beggarticks	S5	secure		x
<i>Botrychium multifidum</i>	leathery moonwort	S4	secure	x	x
<i>Brachyelytrum septentrionale</i>	northern shorthusk	S5	secure	x	x
<i>Bromus ciliatus</i>	fringed brome	S5	secure	x	x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Bromus inermis</i>	smooth brome	SNA	exotic	x	
<i>Cakile edentula</i>	American searocket	S5	secure		x
<i>Calamagrostis canadensis</i>	bluejoint reed grass	S5	secure	x	x
<i>Calamagrostis pickeringii</i>	Pickering's reed grass	S4S5	secure	x	x
<i>Calla palustris</i>	wild calla	S4	secure	x	x
<i>Callitriche palustris</i>	marsh water-starwort	S5	secure	x	
<i>Calopogon tuberosus var. tuberosus</i>	tuberous grass pink	S4	secure		x
<i>Calystegia sepium</i>	hedge false bindweed	S5	secure		x
<i>Cardamine diphylla</i>	two-leaved toothwort	S4	secure		x
<i>Cardamine pensylvanica</i>	Pennsylvania bittercress	S5	secure	x	x
<i>Carex albicans var. emmonsii</i>	white-tinged sedge	S4	secure		x
<i>Carex aquatilis</i>	water sedge	S5	secure		x
<i>Carex arctata</i>	drooping woodland sedge	S5	secure	x	
<i>Carex atlantica</i>	Atlantic sedge	S4	secure	x	x
<i>Carex atlantica ssp. atlantica</i>	Atlantic sedge	S4	secure	x	x
<i>Carex bromoides</i>	bromelike sedge	S4	secure		x
<i>Carex brunnescens</i>	brownish sedge	S5	secure	x	x
<i>Carex canescens</i>	silvery sedge	S5	secure	x	x
<i>Carex communis</i>	fibrous-root sedge	S5	secure	x	x
<i>Carex crinita</i>	fringed sedge	S5	secure	x	
<i>Carex debilis</i>	white-edged sedge	S5	secure	x	x
<i>Carex deweyana</i>	Dewey's sedge	S5	secure	x	x
<i>Carex disperma</i>	two-seeded sedge	S5	secure		x
<i>Carex echinata</i>	star sedge	S5	secure	x	x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Carex exilis</i>	coastal sedge	S4	secure	x	x
<i>Carex flava</i>	yellow sedge	S5	secure	x	x
<i>Carex folliculata</i>	northern long sedge	S5	secure	x	x
<i>Carex gracillima</i>	graceful sedge	S4S5	secure	x	x
<i>Carex gynandra</i>	nodding sedge	S5	secure	x	x
<i>Carex intumescens</i>	bladder sedge	S5	secure	x	x
<i>Carex lasiocarpa</i>	slender sedge	S5	secure	x	x
<i>Carex lenticularis</i>	lenticular sedge	S4	secure	x	x
<i>Carex leptalea</i>	bristly-stalked sedge	S5	secure	x	x
<i>Carex leptoneuria</i>	finely-nerved sedge	S5	secure	x	x
<i>Carex lurida</i>	sallow sedge	S5	secure	x	x
<i>Carex magellanica</i>	boreal bog sedge	S5	secure	x	x
<i>Carex michauxiana</i>	Michaux's sedge	S4	secure	x	x
<i>Carex nigra</i>	smooth black sedge	S5	secure	x	x
<i>Carex novae-angliae</i>	New England sedge	S5	secure	x	x
<i>Carex oligosperma</i>	few-seeded sedge	S5	secure	x	x
<i>Carex paleacea</i>	chaffy sedge	S5	secure		x
<i>Carex pallescens</i>	pale sedge	S5	secure		x
<i>Carex panicea</i>	grasslike sedge	SNA	exotic		x
<i>Carex pauciflora</i>	few-flowered sedge	S4S5	secure	x	x
<i>Carex projecta</i>	necklace sedge	S5	secure	x	x
<i>Carex pseudocyperus</i>	cyperuslike sedge	S4S5	secure	x	
<i>Carex radiata</i>	eastern star sedge	S4	secure		x
<i>Carex scabrata</i>	rough sedge	S5	secure		x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Carex scoparia</i>	broom sedge	S5	secure	x	x
<i>Carex stipata</i>	awl-fruited sedge	S5	secure	x	x
<i>Carex stricta</i>	tussock sedge	S5	secure	x	x
<i>Carex torta</i>	twisted sedge	S5	secure	x	
<i>Carex tribuloides</i>	blunt broom sedge	S3?	secure		x
<i>Carex trisperma</i>	three-seeded sedge	S5	secure	x	x
<i>Carex utriculata</i>	Northern Beaked Sedge	S5	secure		x
<i>Carex vesicaria</i>	inflated sedge	S4S5	secure		x
<i>Carex vulpinoidea</i>	fox sedge	S4?	secure		x
<i>Carex wiegandii</i>	Wiegand's sedge	S3	sensitive		x
<i>Centaurea nigra</i>	black knapweed	SNA	exotic	x	x
<i>Chamaedaphne calyculata</i>	leatherleaf	S5	secure	x	x
<i>Chamerion angustifolium</i>	fireweed	S5	secure	x	x
<i>Chelone glabra</i>	white turtlehead	S5	secure	x	x
<i>Chrysosplenium americanum</i>	American golden saxifrage	S5	secure	x	x
<i>Cicuta bulbifera</i>	bulbous water-hemlock	S5	secure	x	
<i>Cinna latifolia</i>	drooping wood reed grass	S5	secure	x	x
<i>Circaea alpina</i>	small enchanter's nightshade	S5	secure	x	x
<i>Circaea x intermedia</i>	intermediate enchanter's nightshade	SNA	not assessed	x	
<i>Clematis virginiana</i>	Virginia clematis	S5	secure	x	x
<i>Clintonia borealis</i>	yellow bluebead lily	S5	secure	x	x
<i>Coptis trifolia</i>	goldthread	S5	secure	x	x
<i>Corallorhiza trifida</i>	early coralroot	S4	secure		x
<i>Cornus alternifolia</i>	alternate-leaved dogwood	S5	secure	x	x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Cornus canadensis</i>	bunchberry	S5	secure	x	x
<i>Cornus sericea</i>	red osier dogwood	S5	secure	x	x
<i>Corylus cornuta</i>	beaked hazel	S5	secure	x	x
<i>Crataegus sp.</i>	a hawthorn	na	na	x	x
<i>Cypripedium acaule</i>	pink lady's-slipper	S5	secure	x	x
<i>Cystopteris fragilis</i>	fragile fern	S4	secure		x
<i>Danthonia compressa</i>	flattened oat grass	S5	secure	x	x
<i>Danthonia spicata</i>	poverty oat grass	S5	secure	x	x
<i>Daucus carota</i>	Queen Anne's lace	SNA	exotic	x	x
<i>Dennstaedtia punctilobula</i>	eastern hay-scented fern	S5	secure	x	x
<i>Deparia acrostichoides</i>	silvery glade fern	S4	secure	x	x
<i>Deschampsia caespitosa</i>	tufted hair grass	S4	secure		x
<i>Deschampsia flexuosa</i>	wavy hair grass	S5	secure		x
<i>Dichanthelium acuminatum</i>	woolly panic grass	S5	secure	x	x
<i>Dichanthelium boreale</i>	northern panic grass	S5	secure	x	
<i>Diervilla lonicera</i>	northern bush honeysuckle	S5	secure	x	x
<i>Doellingeria umbellata</i>	hairy flat-top white aster	S5	secure	x	x
<i>Drosera intermedia</i>	spoon-leaved sundew	S5	secure	x	x
<i>Drosera rotundifolia</i>	round-leaved sundew	S5	secure	x	x
<i>Dryopteris campyloptera</i>	mountain wood fern	S5	secure	x	x
<i>Dryopteris carthusiana</i>	spinulose wood fern	S5	secure	x	x
<i>Dryopteris cristata</i>	crested wood fern	S5	secure	x	x
<i>Dryopteris intermedia</i>	evergreen wood fern	S5	secure	x	x
<i>Dryopteris x boottii</i>	a hybrid wood-fern	SNA	not assessed	x	

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Dryopteris x triploidea</i>	a hybrid wood-fern	SNA	not assessed	x	
<i>Dulichium arundinaceum</i>	three-way sedge	S5	secure	x	x
<i>Eleocharis acicularis</i>	Needle Spikerush	S5	secure		x
<i>Eleocharis obtusa</i>	blunt spikerush	S5	secure	x	
<i>Eleocharis palustris</i>	common spikerush	S5	secure	x	
<i>Eleocharis tenuis</i>	slender spikerush	S5	secure		x
<i>Elymus repens</i>	quack grass	SNA	exotic		x
<i>Elymus virginicus</i>	Virginia wild rye	S5	secure		x
<i>Empetrum nigrum</i>	black crowberry	S5	secure	x	x
<i>Epigaea repens</i>	trailing arbutus	S5	secure	x	x
<i>Epilobium ciliatum</i>	northern willowherb	S5	secure	x	x
<i>Epilobium leptophyllum</i>	bog willowherb	S5	secure	x	x
<i>Epilobium palustre</i>	marsh willowherb	S5	secure	x	x
<i>Epilobium sp.</i>	a willowherb	na	na		x
<i>Equisetum arvense</i>	field horsetail	S5	secure		x
<i>Equisetum fluviatile</i>	water horsetail	S5	secure	x	x
<i>Equisetum sylvaticum</i>	woodland horsetail	S5	secure	x	x
<i>Eriocaulon aquaticum</i>	white buttons	S5	secure	x	
<i>Eriophorum angustifolium ssp. subarcticum</i>	narrow-leaved cottongrass	S5	secure		x
<i>Eriophorum tenellum</i>	rough cottongrass	S4S5	secure	x	
<i>Eriophorum vaginatum</i>	tussock cottongrass	S5	secure	x	x
<i>Eriophorum virginicum</i>	tawny cottongrass	S5	secure	x	x
<i>Eriophorum viridicarinatum</i>	green-keeled cottongrass	S4	secure	x	
<i>Eupatorium maculatum</i>	spotted Joe-pye-weed	S5	secure	x	x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Eupatorium perfoliatum</i>	common boneset	S5	secure	x	x
<i>Euphrasia stricta</i>	stiff eyebright	SNA	exotic	x	
<i>Eurybia radula</i>	low rough aster	S5	secure	x	x
<i>Euthamia graminifolia</i>	grass-leaved goldenrod	S5	secure	x	x
<i>Fagus grandifolia</i>	American beech	S5	secure	x	x
<i>Festuca rubra</i>	red fescue	S5	secure	x	x
<i>Filipendula rubra</i>	queen-of-the-prairie	SNA	exotic		x
<i>Filipendula ulmaria</i>	queen-of-the-meadow	SNA	exotic	x	x
<i>Fragaria virginiana</i>	wild strawberry	S5	secure	x	x
<i>Fraxinus americana</i>	white ash	S5	secure	x	x
<i>Galeopsis tetrahit</i>	common hemp-nettle	SNA	exotic		x
<i>Galium asprellum</i>	rough bedstraw	S5	secure		x
<i>Galium palustre</i>	common marsh bedstraw	S5	secure	x	x
<i>Galium trifidum</i>	three-petaled bedstraw	S5	secure	x	
<i>Galium triflorum</i>	three-flowered bedstraw	S5	secure	x	x
<i>Gaultheria hispidula</i>	creeping snowberry	S5	secure	x	x
<i>Gaultheria procumbens</i>	eastern teaberry	S5	secure	x	x
<i>Gaylussacia baccata</i>	black huckleberry	S5	secure	x	x
<i>Gaylussacia bigeloviana</i>	Bigelow's huckleberry	S5	secure	x	x
<i>Geocaulon lividum</i>	northern comandra	S3	secure	x	x
<i>Geum macrophyllum</i>	large-leaved avens	S5	secure		x
<i>Geum rivale</i>	water avens	S5	secure	x	x
<i>Glyceria borealis</i>	northern manna grass	S5	secure	x	x
<i>Glyceria canadensis</i>	Canada manna grass	S5	secure	x	x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Glyceria grandis</i>	common tall manna grass	S4S5	secure	x	x
<i>Glyceria laxa</i>	northern mannagrass	S4?	secure	x	
<i>Glyceria maxima</i>	rough manna grass	na	na		x
<i>Glyceria obtusa</i>	Atlantic manna grass	S4	secure	x	
<i>Glyceria sp.</i>	a mannagrass	na	na		x
<i>Glyceria striata</i>	fowl manna grass	S5	secure	x	x
<i>Goodyera tessellata</i>	checkered rattlesnake-plantain	S4	secure	x	x
<i>Gymnocarpium dryopteris</i>	common oak fern	S5	secure	x	x
<i>Hamamelis virginiana</i>	american witch-hazel	S5	secure	x	
<i>Hieracium aurantiacum</i>	orange hawkweed	SNA	exotic		x
<i>Hieracium caespitosum</i>	field hawkweed	SNA	exotic	x	x
<i>Hieracium lachenalii</i>	common hawkweed	SNA	exotic	x	x
<i>Hieracium pilosella</i>	mouse-ear hawkweed	SNA	exotic	x	x
<i>Hieracium scabrum</i>	rough hawkweed	S5	secure	x	
<i>Hippuris vulgaris</i>	common mare's-tail	S4	secure	x	
<i>Hordeum jubatum</i>	foxtail barley	S5	secure		x
<i>Houstonia caerulea</i>	azure bluet	S5	secure		x
<i>Huperzia lucidula</i>	shining firmoss	S5	secure	x	x
<i>Hydrocotyle americana</i>	American marsh pennywort	S5	secure	x	x
<i>Hypericum boreale</i>	northern St. John's-wort	S5	secure	x	
<i>Hypericum canadense</i>	Canada St. John's-wort	S5	secure	x	
<i>Hypericum ellipticum</i>	pale St. John's-wort	S5	secure	x	
<i>Hypericum gentianoides</i>	false St. John's-wort	SNA	exotic	x	
<i>Hypericum perforatum</i>	common St. John's-wort	SNA	exotic		x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Ilex verticillata</i>	common winterberry	S5	secure	x	x
<i>Impatiens capensis</i>	spotted jewelweed	S5	secure	x	x
<i>Iris versicolor</i>	harlequin blue flag	S5	secure	x	x
<i>Isoetes acadensis</i>	Acadian quillwort	S3	sensitive		x
<i>Isoetes sp.</i>	a quillwort	na	na	x	x
<i>Juncus arcticus</i>	arctic rush	na	na		x
<i>Juncus articulatus</i>	jointed rush	S5	secure		x
<i>Juncus brevicaudatus</i>	short-tailed rush	S5	secure	x	x
<i>Juncus bufonius</i>	toad rush	S5	secure	x	
<i>Juncus canadensis</i>	Canada rush	S5	secure	x	
<i>Juncus effusus</i>	soft rush	S5	secure	x	x
<i>Juncus effusus var. conglomeratus</i>	soft rush	S4?	secure	x	
<i>Juncus filiformis</i>	thread rush	S5	secure		x
<i>Juncus militaris</i>	bayonet rush	S5	secure	x	x
<i>Juncus pelocarpus</i>	brown-fruited rush	S5	secure	x	x
<i>Juncus sp.</i>	a rush	na	na		x
<i>Juncus tenuis</i>	path rush	S5	secure	x	x
<i>Juniperus communis</i>	common juniper	S5	secure	x	x
<i>Juniperus communis var. depressa</i>	common juniper	S5	secure	x	
<i>Kalmia angustifolia</i>	sheep laurel	S5	secure	x	x
<i>Kalmia polifolia</i>	pale bog laurel	S5	secure	x	x
<i>Lactuca canadensis</i>	Canada lettuce	S5	secure	x	
<i>Lactuca serriola</i>	prickly lettuce	SNA	exotic		x
<i>Lactuca serriola</i>	prickly lettuce	SNA	exotic	x	

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Lactuca sp.</i>	a lettuce	na	na		x
<i>Larix laricina</i>	tamarack	S5	secure	x	x
<i>Lathyrus japonicus var. maritimus</i>	beach pea	S5	secure		x
<i>Ledum groenlandicum</i>	common Labrador tea	S5	secure	x	x
<i>Leersia oryzoides</i>	rice cut grass	S5	secure	x	x
<i>Lemna turionifera</i>	Turion duckweed	S5	secure	x	x
<i>Leontodon autumnalis</i>	fall dandelion	SNA	exotic	x	
<i>Leucanthemum vulgare</i>	oxeye daisy	SNA	exotic	x	x
<i>Leymus mollis</i>	sea lyme grass	S5	secure		x
<i>Ligusticum scoticum</i>	Scotch lovage	S5	secure		x
<i>Limonium carolinianum</i>	sea lavender	S5	secure		x
<i>Linnaea borealis</i>	twinflower	S5	secure	x	x
<i>Liparis loeselii</i>	Loesel's twayblade	S3S4	secure		x
<i>Listera australis</i>	southern twayblade	S3	secure		x
<i>Listera cordata</i>	heart-leaved twayblade	S4	secure		x
<i>Lobelia dortmanna</i>	water lobelia	S5	secure	x	
<i>Lobelia inflata</i>	Indian tobacco	S5	secure	x	
<i>Lolium pratense</i>	meadow fescue	SNA	exotic	x	x
<i>Lonicera canadensis</i>	Canada fly honeysuckle	S5	secure	x	x
<i>Lonicera villosa</i>	mountain fly honeysuckle	S4S5	secure	x	x
<i>Lotus corniculatus</i>	garden bird's-foot trefoil	SNA	exotic	x	x
<i>Ludwigia palustris</i>	marsh seedbox	S5	secure	x	x
<i>Luzula multiflora</i>	common woodrush	S5	secure	x	x
<i>Lycopodium annotinum</i>	stiff clubmoss	S5	secure	x	x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Lycopodium clavatum</i>	running clubmoss	S5	secure		x
<i>Lycopodium dendroideum</i>	round-branched tree-clubmoss	S5	secure	x	x
<i>Lycopodium digitatum</i>	southern clubmoss	S5	secure	x	
<i>Lycopodium hickeyi</i>	Hickey's tree-clubmoss	S4?	secure	x	
<i>Lycopodium obscurum</i>	flat-branched tree-clubmoss	S4S5	secure	x	x
<i>Lycopodium sitchense</i>	Sitka clubmoss	S3?	secure	x	
<i>Lycopodium tristachyum</i>	blue groundcedar	S4	secure	x	
<i>Lycopus americanus</i>	American water horehound	S5	secure	x	
<i>Lycopus uniflorus</i>	northern water horehound	S5	secure	x	x
<i>Lysimachia terrestris</i>	swamp yellow loosestrife	S5	secure	x	x
<i>Lythrum salicaria</i>	purple loosestrife	SNA	exotic	x	x
<i>Maianthemum canadense</i>	wild lily-of-the-valley	S5	secure	x	x
<i>Maianthemum racemosum</i>	large false solomon's seal	S4S5	secure	x	x
<i>Maianthemum trifolium</i>	three-leaved false soloman's seal	S5	secure	x	x
<i>Malaxis unifolia</i>	green adder's-mouth	S4S5	secure		x
<i>Malus sp.</i>	an apple	SNA	Exotic		x
<i>Matricaria discoidea</i>	pineapple weed	SNA	exotic	x	
<i>Matteuccia struthiopteris</i>	ostrich fern	S5	secure		x
<i>Medeola virginiana</i>	Indian cucumber root	S5	secure	x	x
<i>Melampyrum lineare</i>	american cow wheat	S5	secure		x
<i>Mentha arvensis</i>	wild mint	S5	secure	x	x
<i>Menyanthes trifoliata</i>	bog buckbean	S5	secure		x
<i>Mitchella repens</i>	partridgeberry	S5	secure	x	x
<i>Mitella nuda</i>	naked bishop's-cap	S5	secure	x	x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Moneses uniflora</i>	one-flowered wintergreen	S5	secure		x
<i>Monotropa hypopithys</i>	pinemap	S4	secure	x	x
<i>Monotropa uniflora</i>	Indian pipe	S5	secure	x	x
<i>Morella pensylvanica</i>	northern bayberry	S5	secure	x	x
<i>Muhlenbergia uniflora</i>	bog muhly	S5	secure	x	
<i>Myosotis laxa</i>	small forget-me-not	S5	secure	x	x
<i>Myrica gale</i>	sweet gale	S5	secure	x	x
<i>Nemopanthus mucronatus</i>	mountain holly	S5	secure	x	x
<i>Nuphar lutea</i>	variegated pond-lily	S5	secure	x	x
<i>Nymphaea odorata</i>	fragrant water-lily	S5	secure	x	x
<i>Nymphoides cordata</i>	little floatingheart	S5	secure	x	
<i>Oclemena acuminata</i>	whorled wood aster	S5	secure	x	x
<i>Oclemena nemoralis</i>	bog aster	S5	secure	x	x
<i>Oclemena x blakei</i>	a hybrid white paniced American-aster	S5	secure	x	x
<i>Odontites vernus</i>	red bartsia	SNA	exotic	x	
<i>Oenothera biennis</i>	common evening primrose	S5	secure	x	x
<i>Oenothera perennis</i>	perennial evening primrose	S5	secure		x
<i>Omalotheica sylvatica</i>	woodland cudweed	S4S5	secure	x	
<i>Onoclea sensibilis</i>	sensitive fern	S5	secure	x	x
<i>Orthilia secunda</i>	one-sided wintergreen	S5	secure	x	x
<i>Osmunda cinnamomea</i>	cinnamon fern	S5	secure	x	x
<i>Osmunda claytoniana</i>	interrupted fern	S5	secure	x	x
<i>Osmunda regalis</i>	royal fern	S5	secure	x	x
<i>Oxalis montana</i>	common wood sorrel	S5	secure	x	x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Oxalis stricta</i>	European wood sorrel	S5	secure	x	x
<i>Packera aurea</i>	golden groundsel	S4	secure	x	
<i>Packera schweinitziana</i>	Schweinitz's groundsel	S4	secure	x	x
<i>Panax trifolius</i>	dwarf ginseng	S4	secure		x
<i>Petasites frigidus var. palmatus</i>	northern sweet coltsfoot	S4	secure	x	
<i>Phalaris arundinacea</i>	reed canary grass	S5	secure	x	x
<i>Phegopteris connectilis</i>	northern beech fern	S5	secure	x	x
<i>Phleum pratense</i>	common timothy	SNA	exotic	x	x
<i>Photinia floribunda</i>	purple chokeberry	S5	secure	x	x
<i>Photinia melanocarpa</i>	black chokeberry	S5	secure	x	x
<i>Photinia pyrifolia</i>	red chokeberry	S4?	secure	x	
<i>Picea glauca</i>	white spruce	S5	secure	x	x
<i>Picea mariana</i>	black spruce	S5	secure	x	x
<i>Pinus strobus</i>	eastern white pine	S5	secure	x	x
<i>Pinus sylvestris</i>	scotch pine	SNA	exotic		x
<i>Plantago lanceolata</i>	english plantain	SNA	exotic		x
<i>Plantago major</i>	common plantain	SNA	exotic	x	x
<i>Plantago maritima</i>	seaside plantain	S5	secure		x
<i>Platanthera aquilonis</i>	tall northern green orchid	S4?	secure		x
<i>Platanthera blephariglottis</i>	white fringed orchid	S4	secure	x	x
<i>Platanthera clavellata</i>	club spur orchid	S5	secure	x	x
<i>Platanthera dilatata</i>	white bog orchid	S4S5	secure	x	x
<i>Platanthera hyperborea</i>	leafy northern green orchis	SNA	na		x
<i>Platanthera psycodes</i>	small purple fringed orchid	S4	secure	x	x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Poa alsodes</i>	grove blue grass	S4	secure		x
<i>Poa compressa</i>	Canada blue grass	SNA	exotic	x	x
<i>Poa palustris</i>	fowl blue grass	S5	secure		x
<i>Poa pratensis</i>	Kentucky blue grass	S5	secure	x	x
<i>Poa trivialis</i>	rough blue grass	SNA	exotic		x
<i>Pogonia ophioglossoides</i>	rose pogonia	S4	secure	x	x
<i>Polygala sanguinea</i>	Blood milkwort	S2S3	sensitive		x
<i>Polygonatum pubescens</i>	hairy soloman's seal	S4S5	secure		x
<i>Polygonum arifolium</i>	Halberd-leaved tearthumb	S2	sensitive	x	
<i>Polygonum cilinode</i>	fringed black bindweed	S5	secure	x	x
<i>Polygonum cuspidatum</i>	Japanese knotweed	SNA	exotic		x
<i>Polygonum hydropiper</i>	marshpepper smartweed	SNA	exotic	x	
<i>Polygonum punctatum</i>	dotted smartweed	S5	secure	x	
<i>Polygonum sagittatum</i>	arrow-leaved smartweed	S5	secure	x	x
<i>Polygonum sagittatum</i>	arrow-leaved smartweed	S5	secure		x
<i>Polypodium virginianum</i>	rock polypody	S5	secure	x	x
<i>Polystichum acrostichoides</i>	Christmas fern	S5	secure	x	x
<i>Polystichum braunii</i>	Braun's holly fern	S4	secure		x
<i>Pontederia cordata</i>	pickerelweed	S5	secure	x	x
<i>Populus grandidentata</i>	large-toothed aspen	S5	secure	x	x
<i>Populus tremuloides</i>	trembling aspen	S5	secure	x	x
<i>Potamogeton alpinus</i>	alpine pondweed	S4	secure		x
<i>Potamogeton confervoides</i>	alga pondweed	S5	secure	x	x
<i>Potamogeton epihydrus</i>	ribbon-leaved pondweed	S5	secure	x	x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Potamogeton oakesianus</i>	Oakes' pondweed	S4S5	secure	x	
<i>Potamogeton robbinsii</i>	Robbins' pondweed	S4	secure	x	
<i>Potentilla norvegica</i>	rough cinquefoil	S5	secure	x	
<i>Potentilla simplex</i>	old field cinquefoil	S5	secure	x	x
<i>Prenanthes altissima</i>	tall rattlesnakeroot	S5	secure	x	x
<i>Prenanthes trifoliolata</i>	three-leaved rattlesnakeroot	S5	secure		x
<i>Prunella vulgaris</i>	common self-heal	S5	secure	x	x
<i>Prunus pensylvanica</i>	pin cherry	S5	secure	x	x
<i>Prunus virginiana</i>	chokecherry	S5	secure		x
<i>Pteridium aquilinum</i>	bracken fern	S5	secure	x	x
<i>Puccinellia americana</i>	seaside alkali grass	S4S5	secure		x
<i>Pyrola elliptica</i>	shinleaf	S5	secure	x	x
<i>Radiola linoides</i>	tiny allseed	SNA	exotic	x	
<i>Ranunculus abortivus</i>	kidney-leaved buttercup	S4S5	secure		x
<i>Ranunculus acris</i>	common buttercup	SNA	exotic	x	x
<i>Ranunculus flammula var. filiformis</i>	lesser spearwort	S5	secure	x	
<i>Ranunculus recurvatus</i>	hooked buttercup	S4	secure		x
<i>Ranunculus repens</i>	creeping buttercup	SNA	exotic	x	x
<i>Rhododendron canadense</i>	rhodora	S5	secure	x	x
<i>Rhynchospora alba</i>	white beakrush	S5	secure	x	x
<i>Ribes glandulosum</i>	skunk currant	S5	secure	x	x
<i>Ribes lacustre</i>	bristly black currant	S5	secure	x	x
<i>Ribes triste</i>	swamp red currant	S4	secure		x
<i>Rorippa nasturtium-aquaticum</i>	watercress	SNA	exotic	x	x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Rosa nitida</i>	shining rose	S4	secure	x	x
<i>Rosa virginiana</i>	Virginia rose	S5	secure	x	x
<i>Rubus adenocaulis</i>	glandulose dewberry	SNR	undetermined	x	
<i>Rubus allegheniensis</i>	alleghaney blackberry	S5	secure		x
<i>Rubus canadensis</i>	smooth blackberry	S5	secure	x	x
<i>Rubus chamaemorus</i>	cloudberry	S4	secure	x	x
<i>Rubus elegantulus</i>	showy blackberry	SNR	undetermined	x	
<i>Rubus hispidus</i>	bristly dewberry	S5	secure	x	x
<i>Rubus idaeus</i>	red raspberry	S5	secure	x	x
<i>Rubus idaeus ssp. strigosus</i>	red raspberry	S5	secure	x	
<i>Rubus pensilvanicus</i>	Pennsylvania blackberry	S4	secure	x	
<i>Rubus pubescens</i>	dwarf red raspberry	S5	secure	x	x
<i>Rubus setosus</i>	bristly blackberry	S4?	secure	x	
<i>Rumex acetosella</i>	sheep sorrel	SNA	exotic	x	x
<i>Rumex crispus</i>	curled dock	SNA	exotic		x
<i>Rumex obtusifolius</i>	bitter dock	SNA	exotic		x
<i>Rumex orbiculatus</i>	greater water dock	S5	secure	x	x
<i>Rumex pallidus</i>	seabeach dock	S4?	secure		x
<i>Sagittaria latifolia</i>	broad-leaved arrowhead	S5	secure		x
<i>Salix alba</i>	white willow	SNA	exotic		x
<i>Salix bebbiana</i>	Bebb's willow	S5	secure		x
<i>Salix discolor</i>	pussy willow	S5	secure	x	x
<i>Salix humilis</i>	upland willow	S5	secure	x	x
<i>Salix pyrifolia</i>	balsam willow	S5	secure	x	x

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Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Sambucus nigra ssp. canadensis</i>	black elderberry	S5	secure		x
<i>Sambucus racemosa</i>	red elderberry	S5	secure	x	x
<i>Sanicula marilandica</i>	Maryland sanicle	S4	secure	x	
<i>Sarracenia purpurea</i>	northern pitcher plant	S5	secure	x	x
<i>Scheuchzeria palustris</i>	marsh scheuchzeria	S5	secure	x	
<i>Schizachne purpurascens</i>	purple oat grass	S4	secure		x
<i>Schoenoplectus maritimus</i>	saltmarsh bulrush	S4S5	secure		x
<i>Schoenoplectus subterminalis</i>	water bulrush	S5	secure	x	x
<i>Scirpus atrocinctus</i>	black-girdled bulrush	S5	secure	x	x
<i>Scirpus cyperinus</i>	common woolly bulrush	S5	secure	x	x
<i>Scirpus microcarpus</i>	small-fruited bulrush	S5	secure		x
<i>Scutellaria galericulata</i>	marsh skullcap	S5	secure	x	x
<i>Scutellaria lateriflora</i>	mad-dog skullcap	S5	secure	x	x
<i>Senecio jacobaea</i>	tansy ragwort	SNA	exotic		x
<i>Senecio sp.</i>	a ragwort	na	na		x
<i>Sisyrinchium montanum</i>	mountain blue-eyed-grass	S5	secure	x	x
<i>Slum suave</i>	common water parsnip	S5	secure	x	x
<i>Solanum dulcamara</i>	bittersweet nightshade	SNA	exotic	x	x
<i>Solidago bicolor</i>	white goldenrod	S5	secure		x
<i>Solidago canadensis</i>	Canada goldenrod	S5	secure	x	x
<i>Solidago flexicaulis</i>	zigzag goldenrod	S5	secure	x	x
<i>Solidago macrophylla</i>	large-leaved goldenrod	S4	secure	x	
<i>Solidago puberula</i>	downy goldenrod	S5	secure	x	x
<i>Solidago rugosa</i>	rough-stemmed goldenrod	S5	secure	x	x

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Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Solidago sempervirens</i>	seaside goldenrod	S5	secure		x
<i>Solidago sp.</i>	a goldenrod	na	na		x
<i>Solidago uliginosa</i>	northern bog goldenrod	S5	secure	x	x
<i>Sonchus arvensis</i>	field sow thistle	SNA	exotic		x
<i>Sorbus americana</i>	American mountain ash	S5	secure	x	x
<i>Sorbus decora</i>	showy mountain ash	S4	secure		x
<i>Sparganium americanum</i>	American burreed	S5	secure	x	x
<i>Sparganium angustifolium</i>	narrow-leaved burreed	S5	secure	x	x
<i>Spartina alterniflora</i>	smooth cord grass	S5	secure		x
<i>Spartina patens</i>	saltmeadow cord grass	S5	secure		x
<i>Spartina pectinata</i>	prairie cord grass	S5	secure		x
<i>Spiraea alba</i>	white meadowsweet	S5	secure	x	x
<i>Spiraea tomentosa</i>	steeplebush	S5	secure	x	
<i>Spiranthes cernua</i>	nodding ladies'-tresses	S5	secure	x	
<i>Spiranthes lacera</i>	slender ladies'-tresses	S5	secure	x	
<i>Spiranthes lacera var. lacera</i>	slender ladies'-tresses	S5	secure	x	
<i>Stellaria borealis</i>	boreal stitchwort	S4	secure		x
<i>Stellaria calycantha</i>	northern stitchwort	SNA	na		x
<i>Stellaria graminea</i>	little starwort	SNA	exotic		x
<i>Stellaria sp.</i>	a stitchwort	na	na		x
<i>Streptopus amplexifolius</i>	clasping-leaved twisted-stalk	S4S5	secure	x	x
<i>Streptopus lanceolatus</i>	rose twisted-stalk	S5	secure	x	x
<i>Streptopus lanceolatus var. lanceolatus</i>	rose twisted-stalk	S5	secure	x	
<i>Suaeda calceoliformis</i>	horned sea-blite	S3S4	secure		x

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Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Suaeda maritima ssp. maritima</i>	white sea-blite	S5	secure		x
<i>Symphyotrichum ciliolatum</i>	fringed blue aster	S2	sensitive		x
<i>Symphyotrichum cordifolium</i>	heart-leaved aster	S4S5	secure	x	
<i>Symphyotrichum lanceolatum</i>	lance-leaved aster	S4S5	secure	x	
<i>Symphyotrichum lateriflorum</i>	calico aster	S5	secure	x	x
<i>Symphyotrichum novi-belgii</i>	New York aster	S5	secure	x	x
<i>Symphyotrichum puniceum</i>	purple-stemmed aster	S5	secure	x	x
<i>Tanacetum vulgare</i>	common tansy	SNA	exotic	x	
<i>Taraxacum officinale</i>	common dandelion	SNA	exotic		x
<i>Taxus canadensis</i>	Canada yew	S5	secure	x	x
<i>Thalictrum pubescens</i>	tall meadow-rue	S5	secure	x	x
<i>Thelypteris noveboracensis</i>	New York Fern	S5	secure	x	x
<i>Thelypteris palustris</i>	eastern marsh fern	S5	secure		x
<i>Thelypteris simulata</i>	bog fern	S4	secure	x	
<i>Torreyochloa pallida</i>	pale false manna grass	S4S5	secure	x	
<i>Triadenum fraseri</i>	Fraser's marsh St. John's-wort	S5	secure	x	x
<i>Triadenum virginicum</i>	Virginia St John's-wort	S5	secure		x
<i>Trichophorum caespitosum</i>	tufted clubrush	S5	secure	x	x
<i>Trientalis borealis</i>	northern starflower	S5	secure	x	x
<i>Trifolium campestre</i>	low hop clover	SNA	exotic	x	
<i>Trifolium hybridum</i>	alsike clover	SNA	exotic	x	
<i>Trifolium pratense</i>	red clover	SNA	exotic	x	x
<i>Trifolium repens</i>	white clover	SNA	exotic	x	x
<i>Triglochin maritima</i>	seaside arrowgrass	S5	secure	x	x

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Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Trillium cernuum</i>	nodding trillium	S4	secure	x	x
<i>Trillium undulatum</i>	painted trillium	S5	secure	x	x
<i>Tsuga canadensis</i>	eastern hemlock	S4S5	secure	x	x
<i>Tussilago farfara</i>	coltsfoot	SNA	exotic	x	x
<i>Typha latifolia</i>	broad-leaved cattail	S5	secure	x	x
<i>Utricularia cornuta</i>	horned bladderwort	S5	secure	x	
<i>Utricularia geminiscapa</i>	twin-stemmed bladderwort	S4	secure	x	x
<i>Utricularia gibba</i>	humped bladderwort	S4	secure	x	
<i>Utricularia intermedia</i>	flat-leaved bladderwort	S5	secure	x	
<i>Utricularia macrorhiza</i>	greater bladderwort	S5	secure	x	
<i>Utricularia minor</i>	lesser bladderwort	S4	secure	x	
<i>Vaccinium angustifolium</i>	late lowbush blueberry	S5	secure	x	x
<i>Vaccinium macrocarpon</i>	large cranberry	S5	secure	x	x
<i>Vaccinium myrtilloides</i>	velvet-leaved blueberry	S5	secure	x	x
<i>Vaccinium oxycoccos</i>	small cranberry	S5	secure	x	x
<i>Vaccinium vitis-idaea</i>	mountain cranberry	S5	secure		x
<i>Veronica officinalis</i>	common speedwell	S5	exotic	x	x
<i>Veronica scutellata</i>	marsh speedwell	S5	secure	x	x
<i>Viburnum lantanoides</i>	hobblebush	S5	secure	x	x
<i>Viburnum nudum</i>	northern wild raisin	S5	secure	x	x
<i>Viburnum opulus</i>	highbush cranberry	S4	secure		x
<i>Vicia cracca</i>	tufted vetch	SNA	exotic	x	x
<i>Vicia sativa</i>	common vetch	SNA	exotic		x
<i>Viola cucullata</i>	marsh blue violet	S5	secure	x	x

Table C1 Vascular Plants Recorded During Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	Observed in 2015?	Observed in 2016?
<i>Viola lanceolata</i>	lance-leaved violet	S5	secure	x	x
<i>Viola macloskeyi</i>	small white violet	S5	secure	x	x
<i>Viola renifolia</i>	kidney-leaved white violet	S4	secure	x	
<i>Viola septentrionalis</i>	northern woodland violet	S5?	secure	x	
<i>Viola sororia</i>	woolly blue violet	S5	secure	x	
<i>Viola sp.</i>	a violet	na	na		x
<i>Zostera marina</i>	common eelgrass	S5	secure		x

Table C2 Non-Vascular Plants Recorded During 2016 Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	NS ESA	SARA
Lichen Species					
<i>Anaptychia palmulata</i>	Shaggy Fringed Lichen	S4S5	Secure		
<i>Cetrelia chicitae</i>	Frothing Seastorm Lichen	S4S5	Secure		
<i>Collema subflaccidum</i>	Tree Tarpaper Lichen	S4S5	Secure		
<i>Degelia plumbea</i>	Blue Felt Lichen	S3	Secure	Vulnerable	Special Concern
<i>Ephebe lanata</i>	Waterside Rockshag Lichen	S3	Sensitive		
<i>Fuscopannaria ahlneri</i>	Corrugated Shingles Lichen	S4S5	Secure		
<i>Heterodermia neglecta</i>	Fringe Lichen	S4S5	Secure		
<i>Hypogymnia physodes</i>	Monk's Hood Lichen	S4S5	Secure		
<i>Leptogium cyanescens</i>	Blue Jellyskin Lichen	S4S5	Secure		
<i>Leptogium laceroides</i>	Short-bearded Jellyskin Lichen	S4S5	Secure		
<i>Lobaria pulmonaria</i>	Lungwort Lichen	S4S5	Secure		
<i>Lobaria quercizans</i>	Smooth Lung Lichen	S4S5	Secure		
<i>Lobaria scrobiculata</i>	Textured Lungwort Lichen	S4S5	Secure		
<i>Melanelixia subaurifera</i>	Abrading Camouflage Lichen	S4S5	Secure		
<i>Menegazia subsimilis</i>	Tree Flute Lichen	S4S5	Secure		
<i>Nephroma laevigtum</i>	Mustard Kidney Lichen	S4S5	Secure		
<i>Pannaria conoplea</i>	Mealy-rimmed Shingle Lichen	S4S5	Secure		
<i>Pannaria rubiginosa</i>	Brown-eyed Shingle Lichen	S4S5	Secure		
<i>Parmelia squarrosa</i>	Bottlebrush Shield Lichen	S4S5	Secure		
<i>Parmeliella triptophylla</i>	Black-bordered Shingles Lichen	S4S5	Secure		
<i>Peltigera aphosa</i>	Common Freckle Pelt Lichen	S4S5	Secure		
<i>Peltigera collina</i>	Tree Pelt Lichen	S2?	Sensitive		

Table C2 Non-Vascular Plants Recorded During 2016 Field Surveys and Information on their Population Statuses

Scientific Name	Common Name	AC CDC S-Rank	NSDNR General Status Rank	NS ESA	SARA
<i>Phaeophyscia rubropulchra</i>	Orange-cored Shadow Lichen	S4S5	Secure		
<i>Platismatia glauca</i>	Varied Rag Lichen	S4S5	Secure		
<i>Protopannaria pezizoides</i>	Brown-gray Moss-shingle Lichen	S4S5	Secure		
<i>Pseudocyphelaria perpetua</i>	Gilded Specklebelly Lichen	S4S5	Secure		
<i>Punctelia rudecta</i>	Rough Speckleback Lichen	S4S5	Secure		
<i>Pyxine sorediata</i>	Mustard Lichen	S4S5	Secure		
<i>Sclerophora peronella</i>	Frosted Glass-whiskers Lichen - Nova Scotia pop.	S1?	No Rank		Special Concern
<i>Sphaerophorus globosus</i>	Northern Coral Lichen	S4S5	Secure		
Bryophyte Species					
<i>Sphagnum angustifolium</i>	Narrowleaf Peatmoss	SNR	Undetermined		
<i>Sphagnum cuspidatum</i>	Feathery Peat Moss	S5	Secure		
<i>Sphagnum flavicomans</i>	a Peatmoss	S4S5	Secure		
<i>Sphagnum fuscum</i>	Brown Peat Moss	S5	Secure		
<i>Sphagnum megellanicum</i>	Magellan's Peat Moss	S5	Secure		
<i>Sphagnum pulchrum</i>	Beautiful Peat Moss	S4S5	Secure		
<i>Sphagnum subsecundum</i>	Orange Peat Moss	S4S5	Secure		
<i>Sphagnum warnstorffii</i>	Warnstorff's peat moss	S2S3	Sensitive		

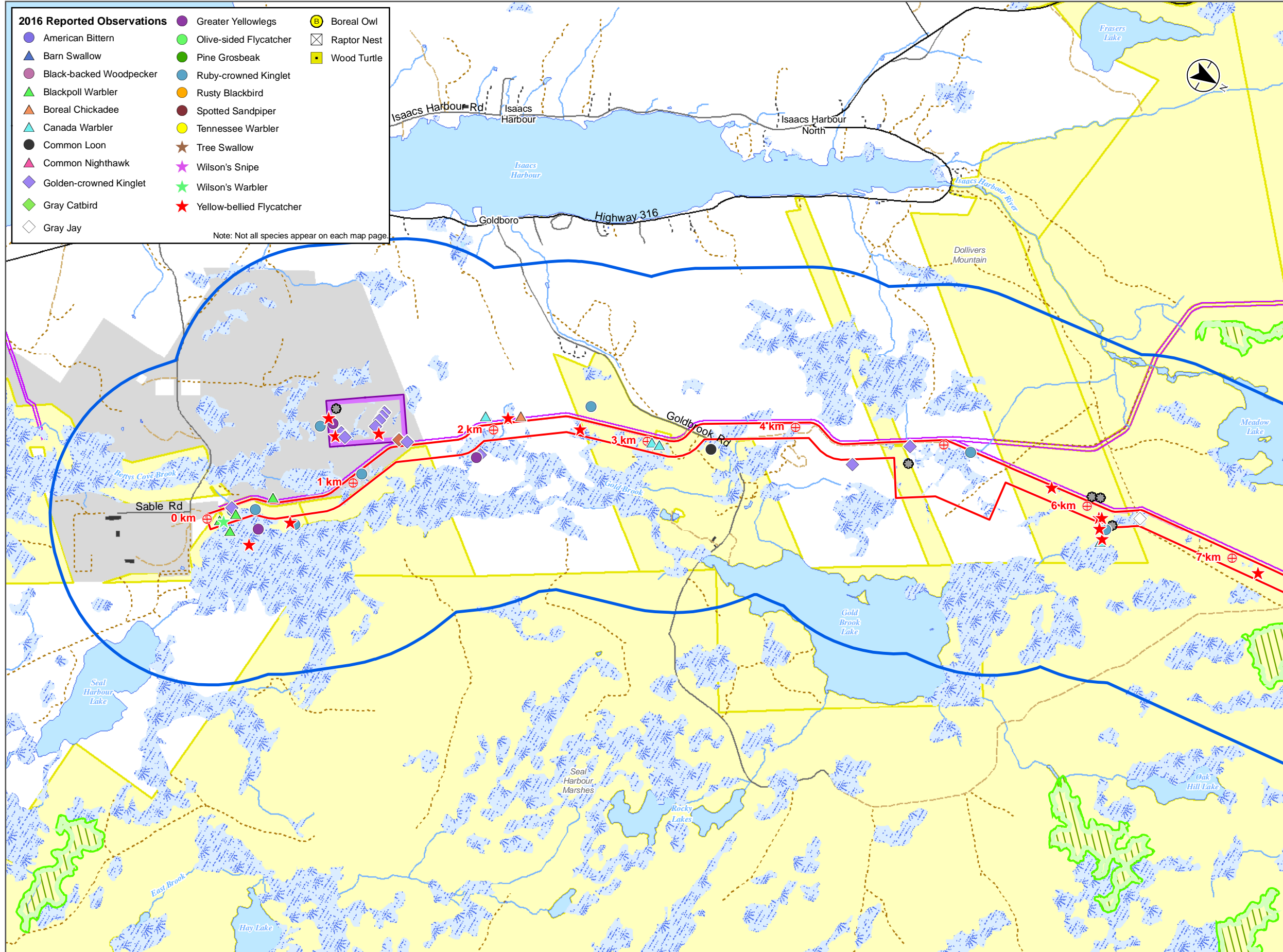
October 26, 2016

APPENDIX D

Birds and Bird Habitat

BEAR PAW PIPELINE PROJECT – ADDITIONAL INFORMATION REQUEST REPORT

October 26, 2016



Wildlife Species of Conservation Interest

- 2016 Reported Observations**
- Greater Yellowlegs
 - Boreal Owl
 - American Bittern
 - Olive-sided Flycatcher
 - ▲ Barn Swallow
 - Pine Grosbeak
 - Black-backed Woodpecker
 - Ruby-crowned Kinglet
 - ▲ Blackpoll Warbler
 - Rusty Blackbird
 - ▲ Boreal Chickadee
 - Spotted Sandpiper
 - ▲ Canada Warbler
 - Tennessee Warbler
 - Common Loon
 - ★ Tree Swallow
 - ▲ Common Nighthawk
 - ★ Wilson's Snipe
 - ◆ Golden-crowned Kinglet
 - ★ Wilson's Warbler
 - ◆ Gray Catbird
 - ★ Yellow-bellied Flycatcher
 - ◇ Gray Jay
- Note: Not all species appear on each map page.

Study Features

- 2015 Field Observation
- Interior Forest

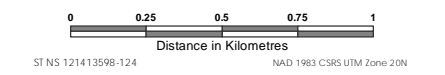
Project Components

- ⊕ Kilometre Post (Approximate Distance from Origin)
- ▭ Assessment Corridor/Project Development Area
- ▭ Compressor Station/ Project Development Area
- ▭ Local Assessment Area
- ▭ Existing Pipeline Right of Way

Map Features

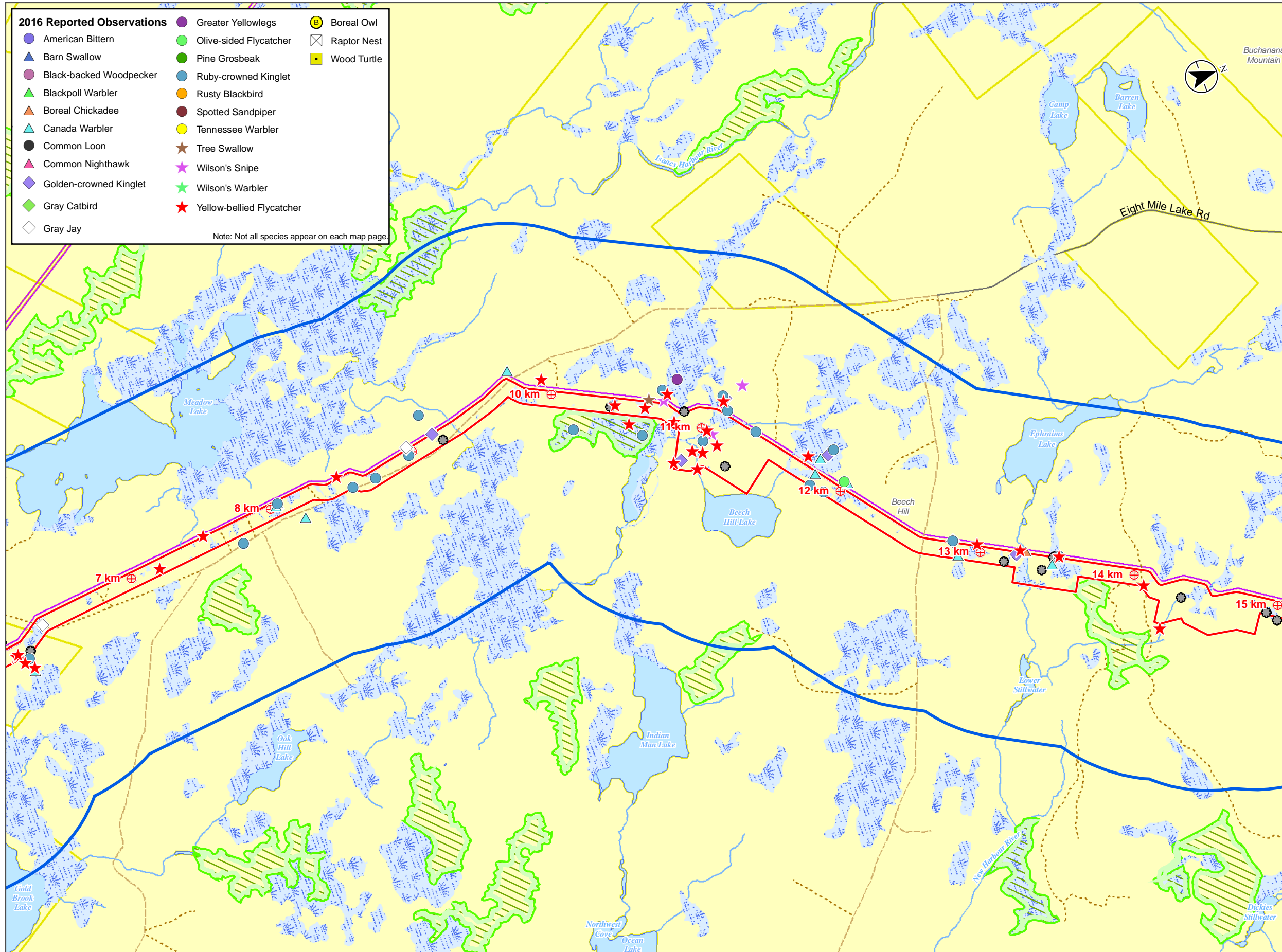
- Collector/Arterial Road
- Local Road
- Private/Restricted Road
- - - Seasonal Road
- - - Track/Trail
- Watercourse
- Waterbody
- Wetland
- Industrial
- Crown Land

Sources: Data provided by the Government of Canada and Nova Scotia.



Disclaimer: This map is for illustrative purposes to support this project. Questions can be directed to the issuing agency.
BEAR PAW PIPELINE PROJECT



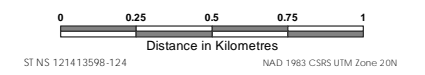


Wildlife Species of Conservation Interest

- 2016 Reported Observations**
- Greater Yellowlegs
 - Boreal Owl
 - American Bittern
 - Olive-sided Flycatcher
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 - Pine Grosbeak
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 - Wilson's Warbler
 - Gray Catbird
 - Yellow-bellied Flycatcher
 - ◇ Gray Jay
 - ⊠ Raptor Nest
 - Wood Turtle
- Note: Not all species appear on each map page.

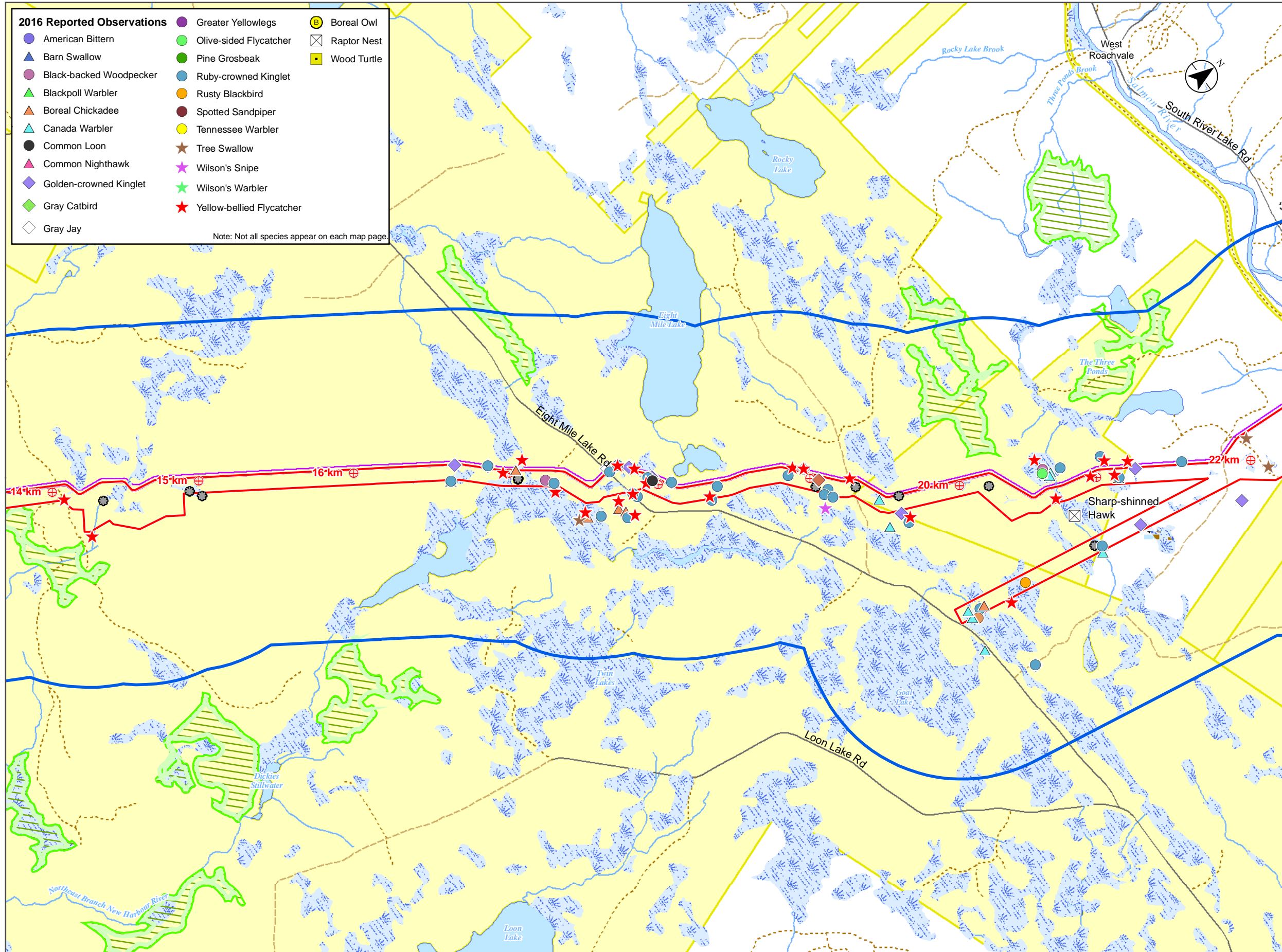
- Study Features**
- 2015 Field Observation
 - Interior Forest
- Project Components**
- ⊕ Kilometre Post (Approximate Distance from Origin)
 - ▭ Assessment Corridor/Project Development Area
 - ▭ Local Assessment Area
 - ▭ Existing Pipeline Right of Way
- Map Features**
- Local Road
 - Seasonal Road
 - Track/Trail
 - Watercourse
 - Waterbody
 - Wetland
 - Crown Land

Sources: Data provided by the Government of Canada and Nova Scotia.



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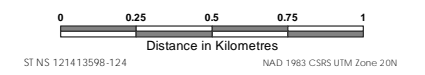


- 2016 Reported Observations**
- Greater Yellowlegs
 - ⊙ Boreal Owl
 - American Bittern
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 - ◇ Gray Jay
- Note: Not all species appear on each map page.

Wildlife Species of Conservation Interest

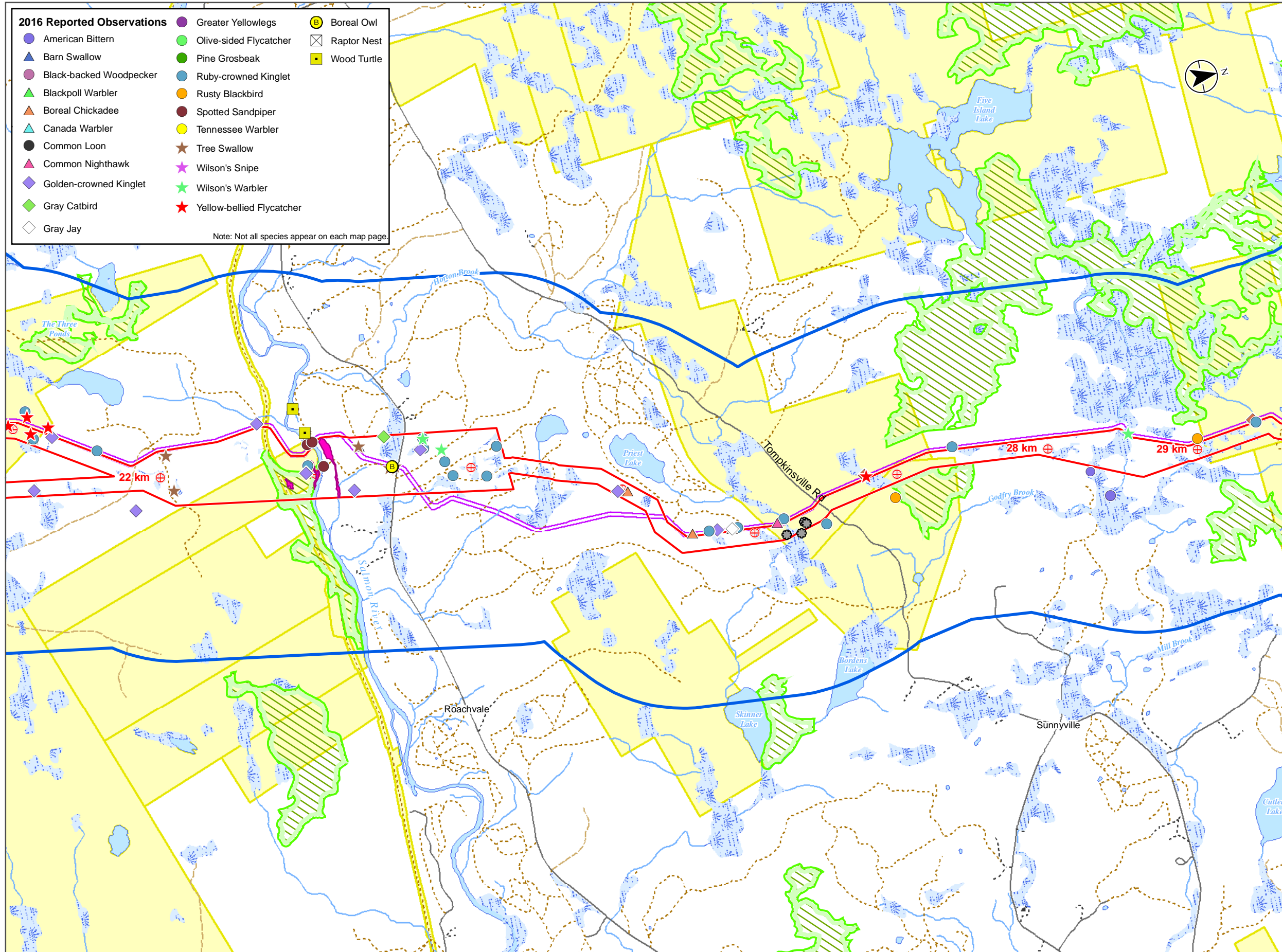
- Study Features**
- 2015 Field Observation
 - ▭ Interior Forest
- Project Components**
- ⊕ Kilometre Post (Approximate Distance from Origin)
 - ▭ Assessment Corridor/Project Development Area
 - ▭ Local Assessment Area
 - ▭ Existing Pipeline Right of Way
- Map Features**
- Local Road
 - - - Private/Restricted Road
 - - - Seasonal Road
 - - - Track/Trail
 - Watercourse
 - ▭ Waterbody
 - ▭ Wetland
 - ▭ Crown Land

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- 2016 Reported Observations**
- Greater Yellowlegs
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 - American Bittern
 - Olive-sided Flycatcher
 - ⓧ Raptor Nest
 - ▲ Barn Swallow
 - Pine Grosbeak
 - Wood Turtle
 - ▲ Black-backed Woodpecker
 - Ruby-crowned Kinglet
 - ▲ Blackpoll Warbler
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 - ★ Wilson's Warbler
 - ◆ Gray Catbird
 - ★ Yellow-bellied Flycatcher
 - ◇ Gray Jay
- Note: Not all species appear on each map page.

Wildlife Species of Conservation Interest

Study Features

- 2015 Field Observation
- Interior Forest
- Wetland of Special Significance

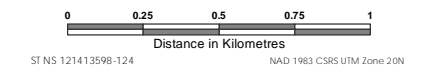
Project Components

- ⊕ Kilometre Post (Approximate Distance from Origin)
- Assessment Corridor/Project Development Area
- Local Assessment Area
- Existing Pipeline Right of Way

Map Features

- Local Road
- - - Private/Restricted Road
- - - Seasonal Road
- · - · - Track/Trail
- Watercourse
- Waterbody
- Wetland
- Crown Land

Sources: Data provided by the Government of Canada and Nova Scotia.



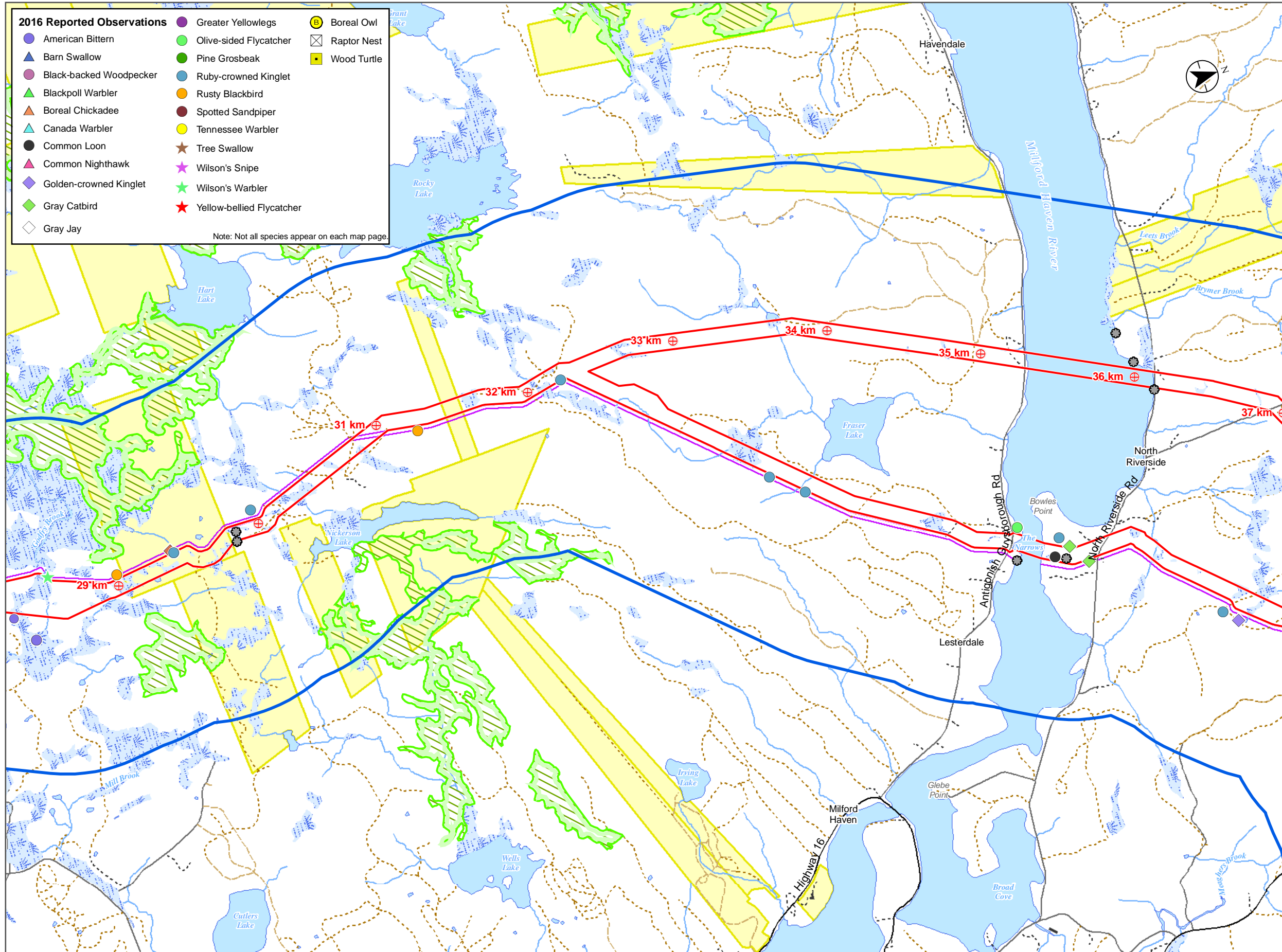
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Disclaimer: This map is for illustrative purposes to support this project; questions can be directed to the issuing agency.

BEAR PAW PIPELINE PROJECT



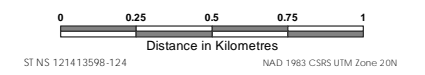


Wildlife Species of Conservation Interest

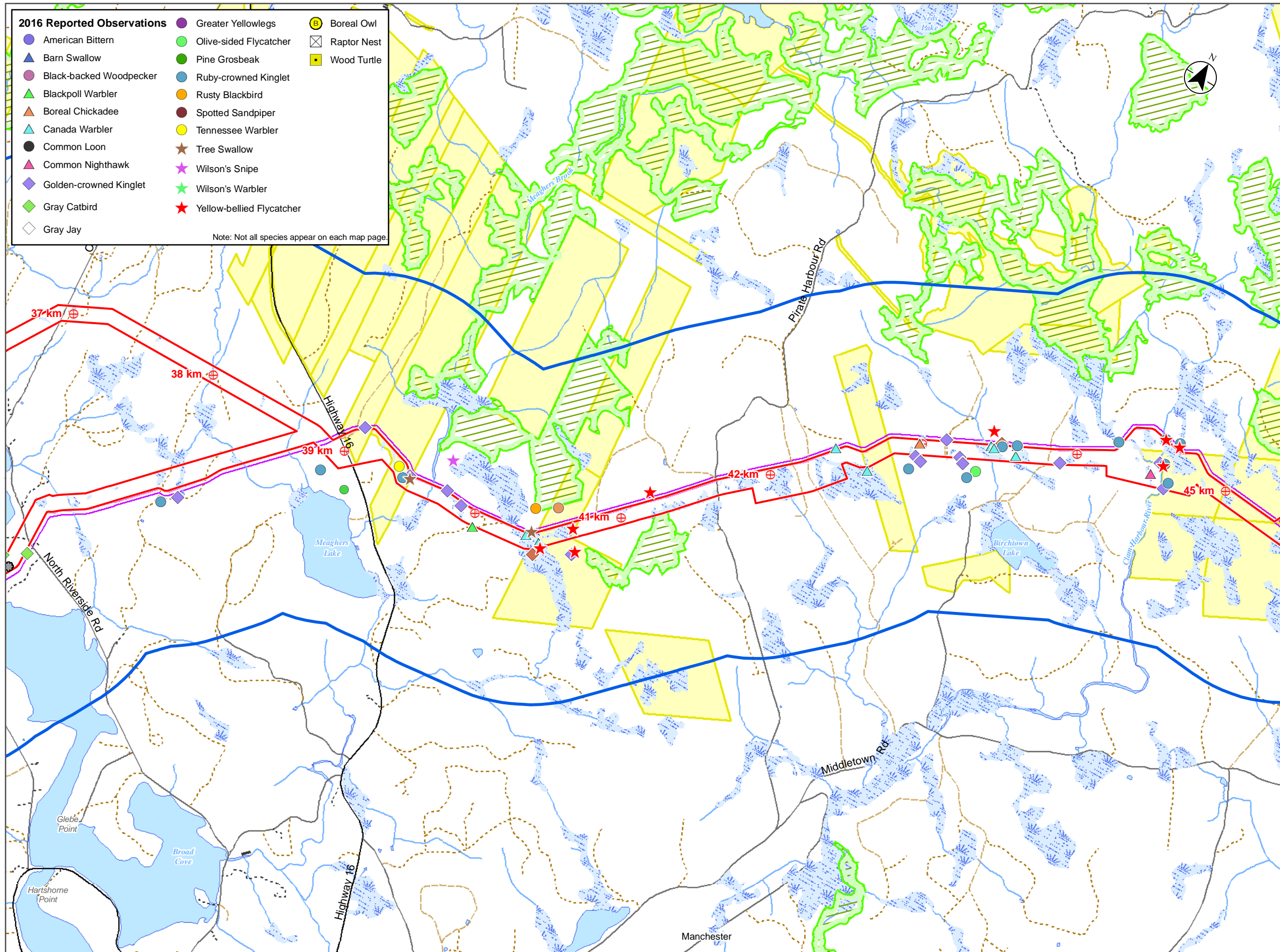
- 2016 Reported Observations**
- Greater Yellowlegs
 - Boreal Owl
 - American Bittern
 - Olive-sided Flycatcher
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 - Pine Grosbeak
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- Note: Not all species appear on each map page.

- Study Features**
- 2015 Field Observation
 - Interior Forest
- Project Components**
- ⊕ Kilometre Post (Approximate Distance from Origin)
 - ▭ Assessment Corridor/Project Development Area
 - ▭ Local Assessment Area
 - ▭ Existing Pipeline Right of Way
- Map Features**
- Collector/Arterial Road
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 - Wetland
 - Crown Land

Sources: Data provided by the Government of Canada and Nova Scotia.



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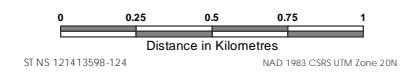


- 2016 Reported Observations**
- Greater Yellowlegs
 - Boreal Owl
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 - Olive-sided Flycatcher
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 - Pine Grosbeak
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 - ◇ Gray Jay
 - ⊠ Raptor Nest
 - Wood Turtle
- Note: Not all species appear on each map page.

Wildlife Species of Conservation Interest

- Study Features**
- 2015 Field Observation
 - Interior Forest
- Project Components**
- ⊕ Kilometre Post (Approximate Distance from Origin)
 - Assessment Corridor/Project Development Area
 - Local Assessment Area
 - Existing Pipeline Right of Way
- Map Features**
- Collector/Arterial Road
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 - Seasonal Road
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 - Watercourse
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 - Wetland
 - Crown Land

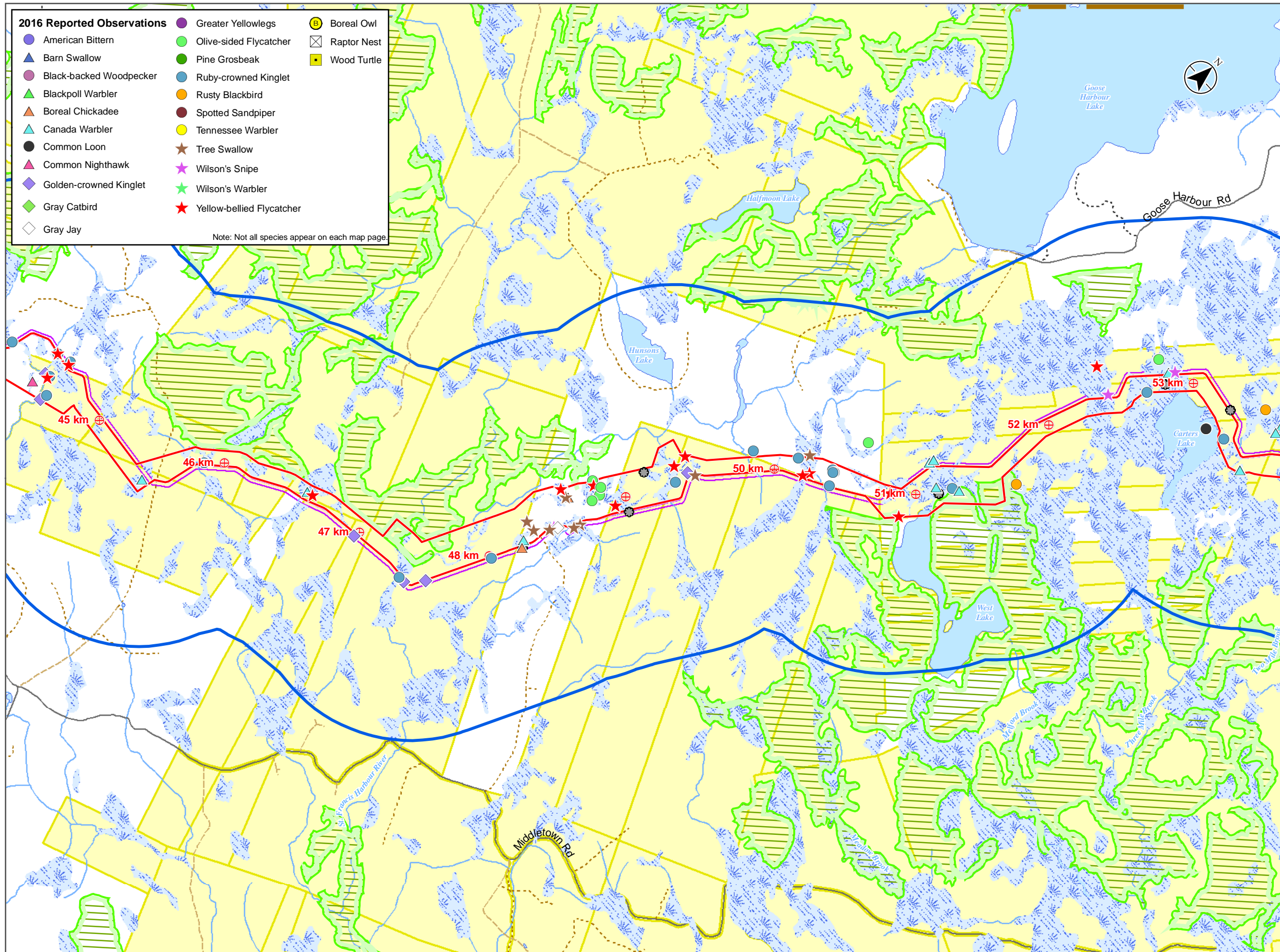
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BEAR PAW PIPELINE PROJECT



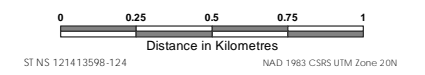


- 2016 Reported Observations**
- Greater Yellowlegs
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 - Gray Catbird
 - Gray Jay
 - Boreal Owl
 - Raptor Nest
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- Note: Not all species appear on each map page.

Wildlife Species of Conservation Interest

- Study Features**
- 2015 Field Observation
 - Interior Forest
- Project Components**
- ⊕ Kilometre Post (Approximate Distance from Origin)
 - ▭ Assessment Corridor/Project Development Area
 - ▭ Local Assessment Area
 - ▭ Existing Pipeline Right of Way
- Map Features**
- Local Road
 - Private/Restricted Road
 - - - Seasonal Road
 - - - Track/Trail
 - Watercourse
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 - Wetland
 - Crown Land

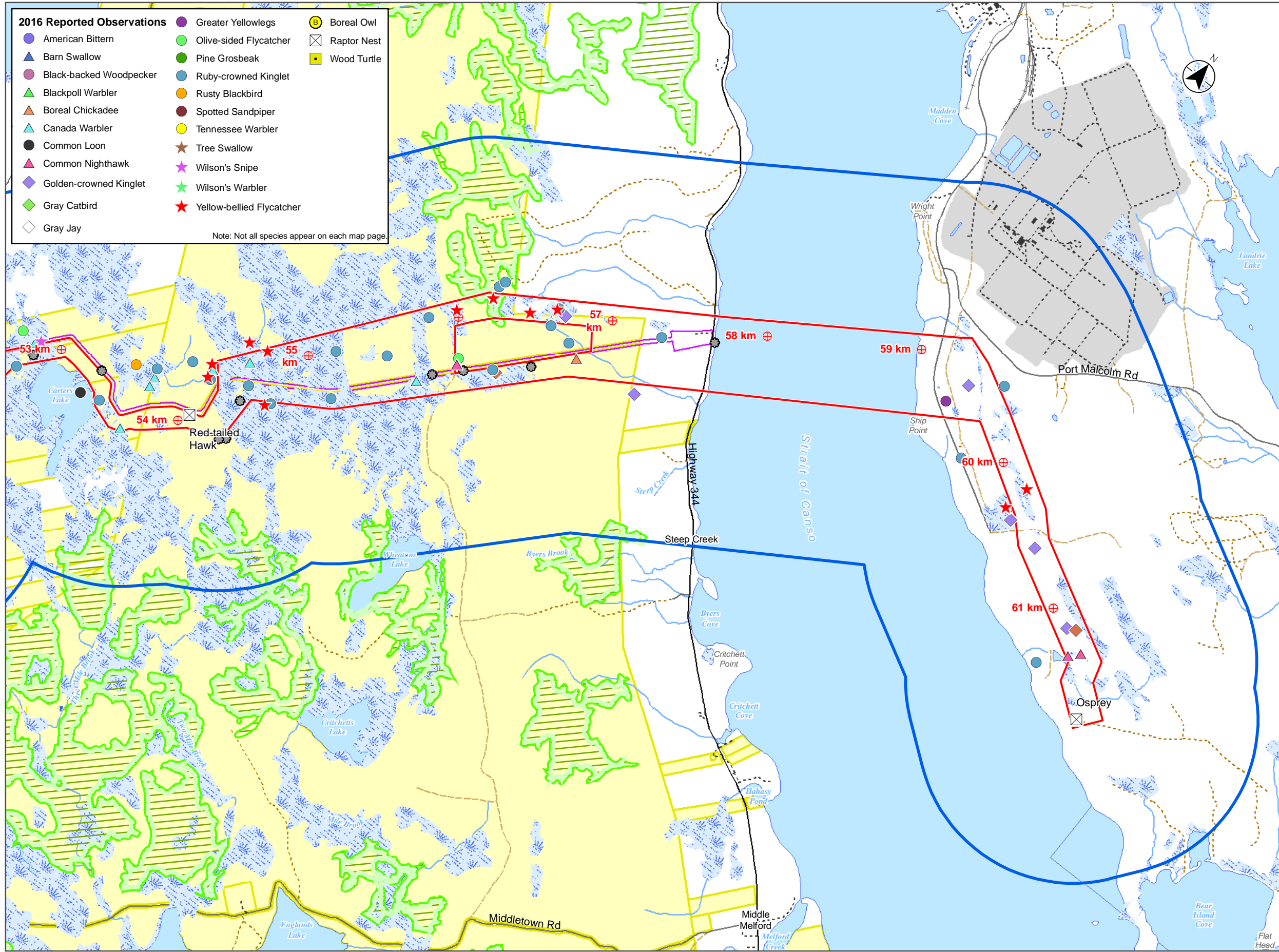
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BEAR PAW PIPELINE PROJECT



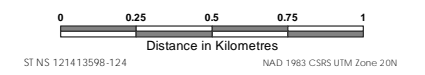


- 2016 Reported Observations**
- Greater Yellowlegs
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 - ▲ Gray Catbird
 - ▲ Gray Jay
- Note: Not all species appear on each map page.

Wildlife Species of Conservation Interest

- Study Features**
- 2015 Field Observation
 - Interior Forest
- Project Components**
- ⊕ Kilometre Post (Approximate Distance from Origin)
 - ▭ Assessment Corridor/Project Development Area
 - ▭ Local Assessment Area
 - ▭ Existing Pipeline Right of Way
- Map Features**
- Collector/Arterial Road
 - Local Road
 - - - Private/Restricted Road
 - + Railway
 - - - Seasonal Road
 - - - Track/Trail
 - Watercourse
 - Waterbody
 - Wetland
 - Crown Land

Sources: Data provided by the Government of Canada and Nova Scotia.



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Table D1 Birds recorded in 2016 and information on their population statuses

Species	Scientific Name	SARA	COSEWIC	NS ESA	AC CDC S-Rank	NSDNR General Status Rank
Alder Flycatcher	<i>Empidonax alnorum</i>				S5B	Secure
American Bittern	<i>Botaurus lentiginosus</i>				S3S4B	Sensitive
American Black Duck	<i>Anas rubripes</i>				S5	Secure
American Crow	<i>Corvus brachyrhynchos</i>				S5	Secure
American Goldfinch	<i>Carduelis tristis</i>				S5	Secure
American Kestrel	<i>Falco sparverius</i>				S5B	Secure
American Redstart	<i>Setophaga ruticilla</i>				S5B	Secure
American Robin	<i>Turdus migratorius</i>				S5B	Secure
American Woodcock	<i>Scolopax minor</i>				S4S5B	Secure
Bald Eagle	<i>Haliaeetus leucocephalus</i>		NAR		S4	Secure
Barn Swallow	<i>Hirundo rustica</i>		Threatened	Endangered	S3B	At Risk
Barred Owl	<i>Strix varia</i>				S5	Secure
Belted Kingfisher	<i>Megaceryle alcyon</i>				S5B	Secure
Black-and-white Warbler	<i>Mniotilta varia</i>				S4S5B	Secure
Black-backed Woodpecker	<i>Picoides arcticus</i>				S3S4	Sensitive
Blackburnian Warbler	<i>Dendroica fusca</i>				S4B	Secure
Black-capped Chickadee	<i>Poecile atricapilla</i>				S5	Secure
Blackpoll Warbler	<i>Dendroica striata</i>				S3S4B	Sensitive
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>				S5B	Secure
Black-throated Green Warbler	<i>Dendroica virens</i>				S4S5B	Secure
Blue Jay	<i>Cyanocitta cristata</i>				S5	Secure
Blue-headed Vireo	<i>Vireo solitarius</i>				S5B	Secure
Boreal Chickadee	<i>Poecile hudsonica</i>				S3	Sensitive
Boreal Owl	<i>Aegolius funereus</i>				S1B	Undetermined

Table D1 Birds recorded in 2016 and information on their population statuses

Species	Scientific Name	SARA	COSEWIC	NS ESA	AC CDC S-Rank	NSDNR General Status Rank
Broad-winged Hawk	<i>Buteo platypterus</i>				S4S5B	Secure
Brown Creeper	<i>Certhia americana</i>				S5	Secure
Canada Warbler	<i>Cardellina canadensis</i>	Threatened	Threatened	Endangered	S3B	At Risk
Cedar Waxwing	<i>Bombycilla cedrorum</i>				S5B	Secure
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>				S5B	Secure
Chipping Sparrow	<i>Spizella passerina</i>				S4S5B	Secure
Common Grackle	<i>Quiscalus quiscula</i>				S5B	Secure
Common Loon	<i>Gavia immer</i>		NAR		S3B,S4N	May
Common Merganser	<i>Mergus merganser</i>				S5	Secure
Common Nighthawk	<i>Chordeiles minor</i>	Threatened	Threatened	Threatened	S3B	At Risk
Common Raven	<i>Corvus corax</i>				S5	Secure
Common Yellowthroat	<i>Geothlypis trichas</i>				S5B	Secure
Dark-eyed Junco	<i>Junco hyemalis</i>				S4S5	Secure
Downy Woodpecker	<i>Picoides pubescens</i>				S5	Secure
Eastern Wood-Pewee	<i>Contopus virens</i>		Special Concern	Vulnerable	S3S4B	Sensitive
European Starling	<i>Sturnus vulgaris</i>				SNA	Exotic
Evening Grosbeak	<i>Coccothraustes vespertinus</i>				S4B,S5N	Secure
Golden-crowned Kinglet	<i>Regulus satrapa</i>				S4	Sensitive
Gray Catbird	<i>Dumetella carolinensis</i>				S3B	May Be At Risk
Gray Jay	<i>Perisoreus canadensis</i>				S3S4	Sensitive
Great Black-backed Gull	<i>Larus marinus</i>				S4	Secure
Greater Yellowlegs	<i>Tringa melanoleuca</i>				S3B,S5M	Sensitive
Hairy Woodpecker	<i>Picoides villosus</i>				S5	Secure
Hermit Thrush	<i>Catharus guttatus</i>				S5B	Secure

Table D1 Birds recorded in 2016 and information on their population statuses

Species	Scientific Name	SARA	COSEWIC	NS ESA	AC CDC S-Rank	NSDNR General Status Rank
Herring Gull	<i>Larus argentatus</i>				S4S5	Secure
Hooded Merganser	<i>Lophodytes cucullatus</i>				S4S5B	Secure
Least Flycatcher	<i>Empidonax minimus</i>				S4B	Secure
Lincoln's Sparrow	<i>Melospiza lincolni</i>				S4B	Secure
Magnolia Warbler	<i>Dendroica magnolia</i>				S5B	Secure
Mourning Warbler	<i>Oporornis philadelphia</i>				S4B	Secure
Nashville Warbler	<i>Vermivora ruficapilla</i>				S5B	Secure
Northern Flicker	<i>Colaptes auratus</i>				S5B	Secure
Northern Goshawk	<i>Accipiter gentilis</i>		NAR		S3S4	Secure
Northern Harrier	<i>Circus cyaneus</i>		NAR		S5B	Secure
Northern Parula	<i>Parula americana</i>				S5B	Secure
Northern Waterthrush	<i>Seiurus noveboracensis</i>				S4B	Secure
Olive-Sided Flycatcher	<i>Contopus cooperi</i>	Threatened	Threatened	Threatened	S3B	At Risk
Osprey	<i>Pandion haliaetus</i>				S5B	Secure
Ovenbird	<i>Seiurus aurocapilla</i>				S5B	Secure
Palm Warbler	<i>Dendroica palmarum</i>				S5B	Secure
Pileated Woodpecker	<i>Dryocopus pileatus</i>				S5	Secure
Pine Grosbeak	<i>Pinicola enucleator</i>				S3?B,S5N	May Be At Risk
Purple Finch	<i>Carpodacus purpureus</i>				S4S5	Secure
Red-breasted Nuthatch	<i>Sitta canadensis</i>				S4S5	Secure
Red-eyed Vireo	<i>Vireo olivaceus</i>				S5B	Secure
Red-tailed Hawk	<i>Buteo jamaicensis</i>		NAR		S5	Secure
Red-winged Blackbird	<i>Agelaius phoeniceus</i>				S4S5B	Secure
Ring-billed Gull	<i>Larus delawarensis</i>				S1?B,S5N	Secure

Table D1 Birds recorded in 2016 and information on their population statuses

Species	Scientific Name	SARA	COSEWIC	NS ESA	AC CDC S-Rank	NSDNR General Status Rank
Ring-necked Duck	<i>Aythya collaris</i>				S5B	Secure
Ruby-crowned Kinglet	<i>Regulus calendula</i>				S4B	Sensitive
Ruby-throated Hummingbird	<i>Archilochus colubris</i>				S5B	Secure
Ruffed Grouse	<i>Bonasa umbellus</i>				S4S5	Secure
Rusty Blackbird	<i>Euphagus carolinus</i>	Special Concern	Special Concern	Endangered	S2S3B	May Be At Risk
Savannah Sparrow	<i>Passerculus sandwichensis</i>				S4B	Secure
Sharp-shinned Hawk	<i>Accipiter striatus</i>		NAR		S4S5B	Secure
Song Sparrow	<i>Melospiza melodia</i>				S5B	Secure
Spotted Sandpiper	<i>Actitis macularius</i>				S3S4B	Sensitive
Spruce Grouse	<i>Falcapennis canadensis</i>				S5	Secure
Swainson's Thrush	<i>Catharus ustulatus</i>				S4S5B	Secure
Swamp Sparrow	<i>Melospiza georgiana</i>				S5B	Secure
Tennessee Warbler	<i>Vermivora peregrina</i>				S3S4B	Sensitive
Tree Swallow	<i>Tachycineta bicolor</i>				S4B	Sensitive
White-throated Sparrow	<i>Zonotrichia albicollis</i>				S5B	Secure
White-winged Crossbill	<i>Loxia leucoptera</i>				S4S5	Secure
Wilson's Snipe	<i>Gallinago delicata</i>				S3S4B	Sensitive
Wilson's Warbler	<i>Wilsonia pusilla</i>				S3S4B	Sensitive
Winter Wren	<i>Troglodytes troglodytes</i>				S5B	Secure
Wood Duck	<i>Aix sponsa</i>				S4S5B	Secure
Yellow Warbler	<i>Dendroica petechia</i>				S5B	Secure
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>				S3S4B	Sensitive
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>				S4S5B	Secure
Yellow-rumped Warbler	<i>Dendroica coronata</i>				S5B	Secure

BEAR PAW PIPELINE PROJECT – ADDITIONAL INFORMATION REQUEST REPORT

Table D2 Density (# territories/100 ha) for breeding bird species

Land Cover Class ¹ Species	BOG	COR	DEV	FO	MH	MM	MS	RH	RM	RS	SW
Alder Flycatcher	19.9	13.2	0.0	9.8	8.0	0.0	7.1	0.0	10.6	5.3	14.3
American Goldfinch	0.0	0.0	15.9	4.9	0.0	0.0	0.0	0.0	0.0	1.3	0.0
American Redstart	0.0	17.6	31.8	17.1	15.9	20.3	3.5	11.6	15.9	5.3	3.2
American Robin	0.0	2.2	0.0	14.7	0.0	5.8	0.0	5.8	5.3	2.7	3.2
Black-and-white Warbler	4.0	12.1	15.9	12.2	8.0	5.8	14.1	2.9	10.6	8.0	12.7
Blackburnian Warbler	0.0	2.2	0.0	0.0	0.0	2.9	3.5	2.9	0.0	1.3	1.6
Black-capped Chickadee	4.0	3.3	0.0	4.9	0.0	0.0	0.0	2.9	2.7	1.3	0.0
Blackpoll Warbler	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Black-throated Blue Warbler	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Black-throated Green Warbler	0.0	26.3	0.0	12.2	8.0	28.9	21.2	26.0	23.9	26.5	8.0
Blue-headed Vireo	0.0	6.6	0.0	2.4	0.0	2.9	7.1	0.0	8.0	9.3	4.8
Canada Warbler	0.0	2.2	0.0	2.4	0.0	0.0	7.1	0.0	0.0	1.3	9.5
Cedar Waxwing	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chestnut-sided Warbler	8.0	3.3	0.0	14.7	8.0	0.0	0.0	0.0	0.0	0.0	0.0
Chipping Sparrow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0
Common Grackle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6
Common Yellowthroat	39.8	32.9	15.9	22.0	31.8	11.6	31.8	2.9	10.6	15.9	35.0
Dark-eyed Junco	4.0	11.0	0.0	4.9	0.0	8.7	7.1	0.0	8.0	13.3	12.7
Eastern Wood-Pewee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0
Golden-crowned Kinglet	4.0	6.6	0.0	0.0	0.0	0.0	10.6	0.0	5.3	10.6	4.8
Hairy Woodpecker	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table D2 Density (# territories/100 ha) for breeding bird species

Land Cover Class ¹ Species	BOG	COR	DEV	FO	MH	MM	MS	RH	RM	RS	SW
Hermit Thrush	0.0	6.6	0.0	4.9	0.0	5.8	7.1	2.9	15.9	8.0	6.4
Least Flycatcher	4.0	5.5	0.0	7.3	31.8	5.8	3.5	14.5	15.9	0.0	1.6
Lincoln's Sparrow	4.0	4.4	0.0	7.3	0.0	5.8	7.1	2.9	0.0	4.0	4.8
Magnolia Warbler	4.0	29.6	15.9	17.1	8.0	2.9	17.7	2.9	31.8	26.5	22.3
Mourning Warbler	0.0	5.5	0.0	2.4	15.9	2.9	0.0	5.8	0.0	1.3	3.2
Nashville Warbler	4.0	6.6	0.0	12.2	0.0	0.0	0.0	0.0	5.3	8.0	19.1
Northern Flicker	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.6
Northern Parula	0.0	2.2	15.9	0.0	0.0	5.8	0.0	5.8	0.0	2.7	0.0
Northern Waterthrush	4.0	1.1	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0
Olive-Sided Flycatcher	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.6
Ovenbird	0.0	9.9	0.0	12.2	15.9	28.9	3.5	49.2	18.6	2.7	1.6
Palm Warbler	11.9	7.7	0.0	7.3	0.0	2.9	3.5	0.0	0.0	2.7	19.1
Pine Grosbeak	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0
Purple Finch	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	2.7	0.0
Red-breasted Nuthatch	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6
Red-eyed Vireo	4.0	16.5	15.9	14.7	31.8	14.5	7.1	31.8	29.2	6.6	4.8
Red-winged Blackbird	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.6
Ruby-crowned Kinglet	4.0	16.5	0.0	9.8	8.0	2.9	31.8	0.0	5.3	26.5	14.3
Savannah Sparrow	0.0	0.0	15.9	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0
Song Sparrow	0.0	4.4	0.0	2.4	0.0	0.0	0.0	0.0	0.0	2.7	0.0
Swainson's Thrush	4.0	11.0	0.0	9.8	0.0	11.6	28.3	2.9	13.3	13.3	6.4

Table D2 Density (# territories/100 ha) for breeding bird species

Land Cover Class ¹ Species	BOG	COR	DEV	FO	MH	MM	MS	RH	RM	RS	SW
Swamp Sparrow	8.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	6.4
White-throated Sparrow	8.0	25.2	15.9	31.8	31.8	8.7	14.1	5.8	15.9	25.2	15.9
Winter Wren	0.0	3.3	0.0	0.0	0.0	5.8	3.5	2.9	0.0	0.0	1.6
Yellow Warbler	0.0	2.2	15.9	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0
Yellow-bellied Flycatcher	4.0	11.0	0.0	0.0	8.0	0.0	24.8	8.7	0.0	10.6	22.3
Yellow-bellied Sapsucker	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow-rumped Warbler	0.0	7.7	0.0	0.0	8.0	0.0	17.7	2.9	2.7	15.9	11.1

Notes:
¹ BOG = open peatland, COR = corridor, DEV = developed, FO = forestry other, MH = mature - overmature and uneven hardwood, MM = mature - overmature and uneven mixedwood, MS = mature - overmature and uneven softwood, RH = regenerating - pole, RM = regenerating - pole mixedwood, RS = regenerating - pole softwood and SW = treed/tall shrub-dominated wetland (swamp).

October 26, 2016

APPENDIX E

Wood Turtle Photos

BEAR PAW PIPELINE PROJECT – ADDITIONAL INFORMATION REQUEST REPORT

October 26, 2016

Photos from June 13th 2016



Photos from June 21st 2016



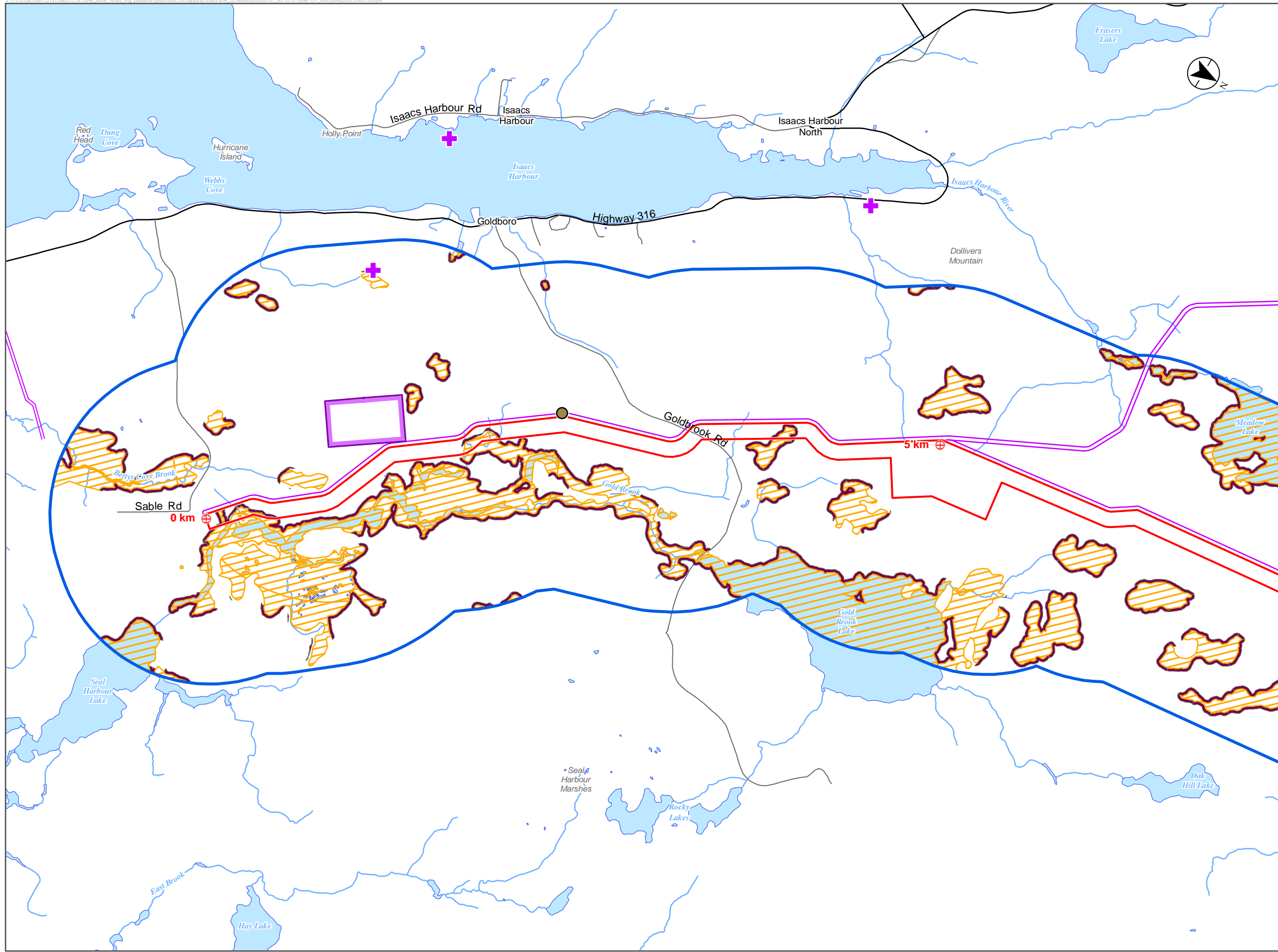
October 26, 2016

APPENDIX F
Wildlife Species of Conservation
Interest Mapbook

BEAR PAW PIPELINE PROJECT – ADDITIONAL INFORMATION REQUEST REPORT

October 26, 2016

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Moose and Moose Habitat

Study Features

Field Observations

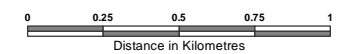
- + Moose Observation (Nova Scotia Department of Natural Resources)
- + Moose Observation (Jaques Whitford Observations, 1998)
- Moose Activity

Moose Shelter Habitat

- Upland Conifer Moose Shelter Habitat
- Upland Mixedwood Moose Shelter Habitat
- Potential Summer Foraging for Moose /Thermoregulation Habitat
- Moose Forested Buffer (<20m)

Project Components

- ⊕ Kilometre Post (Approximate Distance from Origin)
- Assessment Corridor/Project Development Area
- Compressor Station/ Project Development Area
- Local Assessment Area
- Existing Pipeline Right of Way



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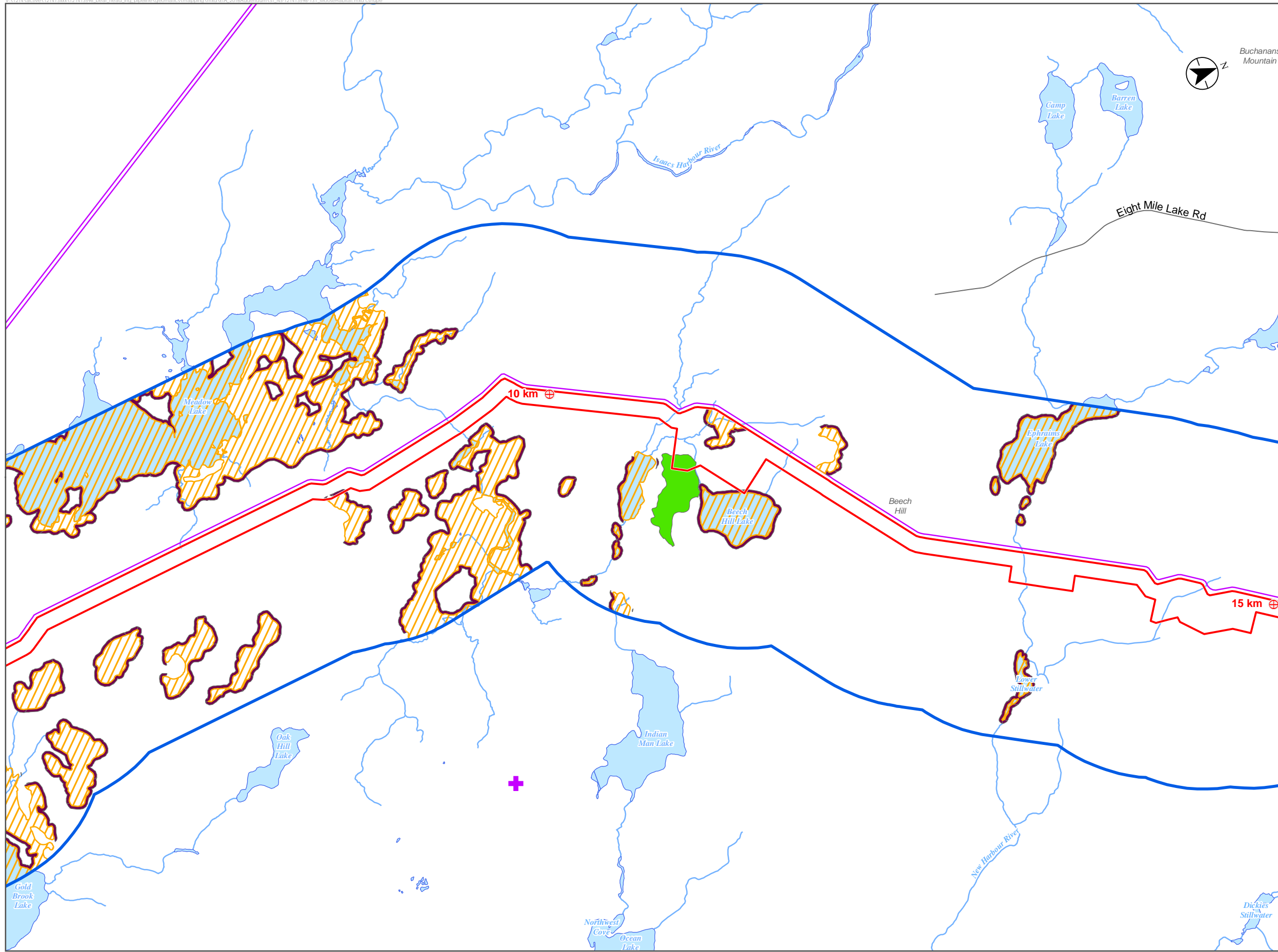


Disclaimer: This map is for illustrative purposes to support this project. Questions can be directed to the issuing agency.
BEAR PAW PIPELINE PROJECT



Sources: Data provided by the Government of Canada and Nova Scotia.

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Moose and Moose Habitat

Study Features

Field Observations

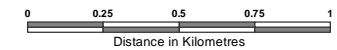
- Moose Observation (Nova Scotia Department of Natural Resources)
- Moose Observation (Jaques Whitford Observations, 1998)
- Moose Activity

Moose Shelter Habitat

- Upland Conifer Moose Shelter Habitat
- Upland Mixedwood Moose Shelter Habitat
- Potential Summer Foraging for Moose / Thermoregulation Habitat
- Moose Forested Buffer (<20m)

Project Components

- Kilometre Post (Approximate Distance from Origin)
- Assessment Corridor/Project Development Area
- Compressor Station/ Project Development Area
- Local Assessment Area
- Existing Pipeline Right of Way



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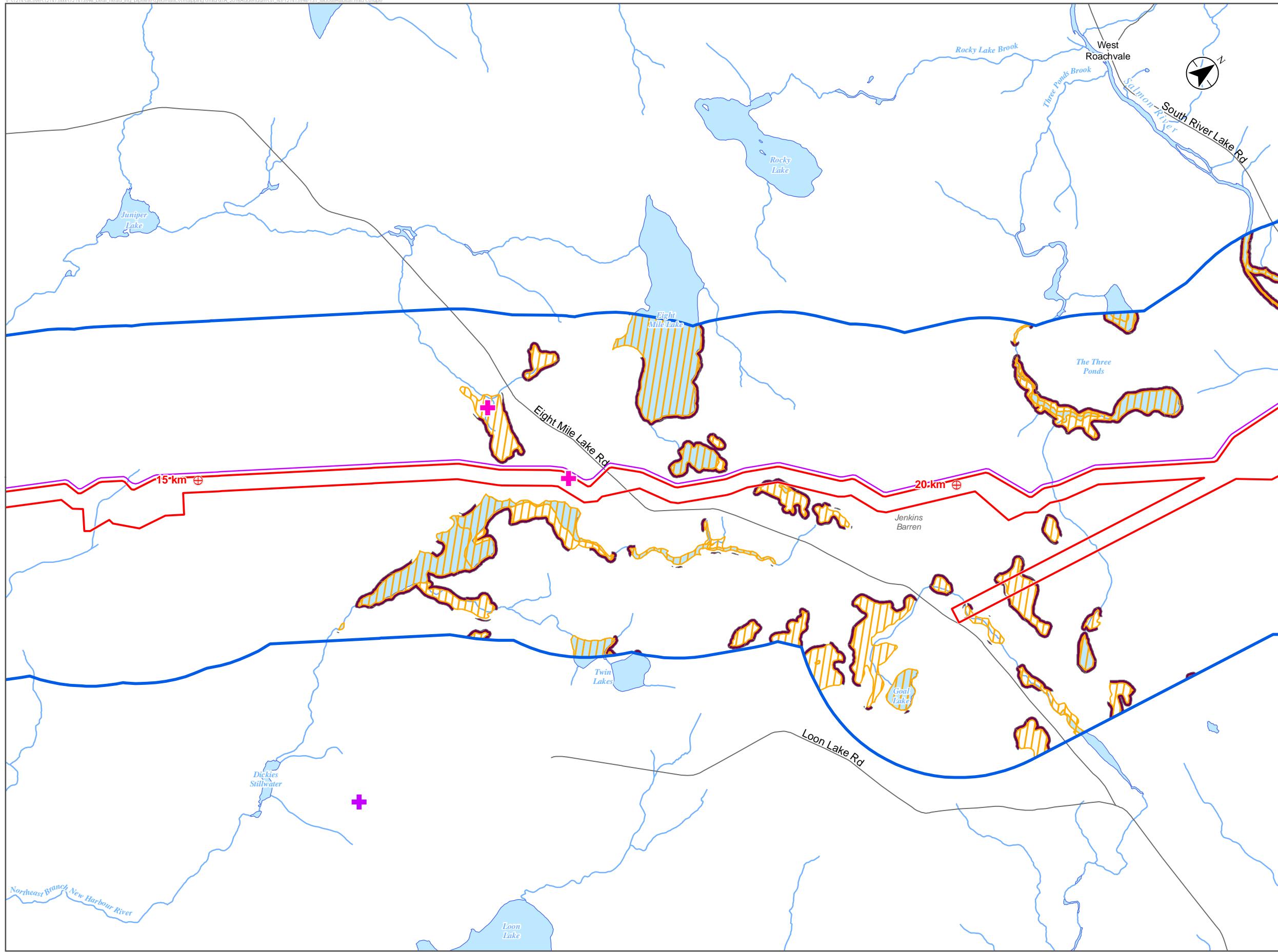


Disclaimer: This map is for illustrative purposes to support this project. Questions can be directed to the issuing agency.

BEAR PAW PIPELINE PROJECT



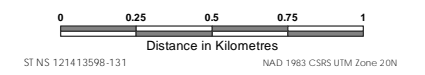
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Moose and Moose Habitat

Study Features

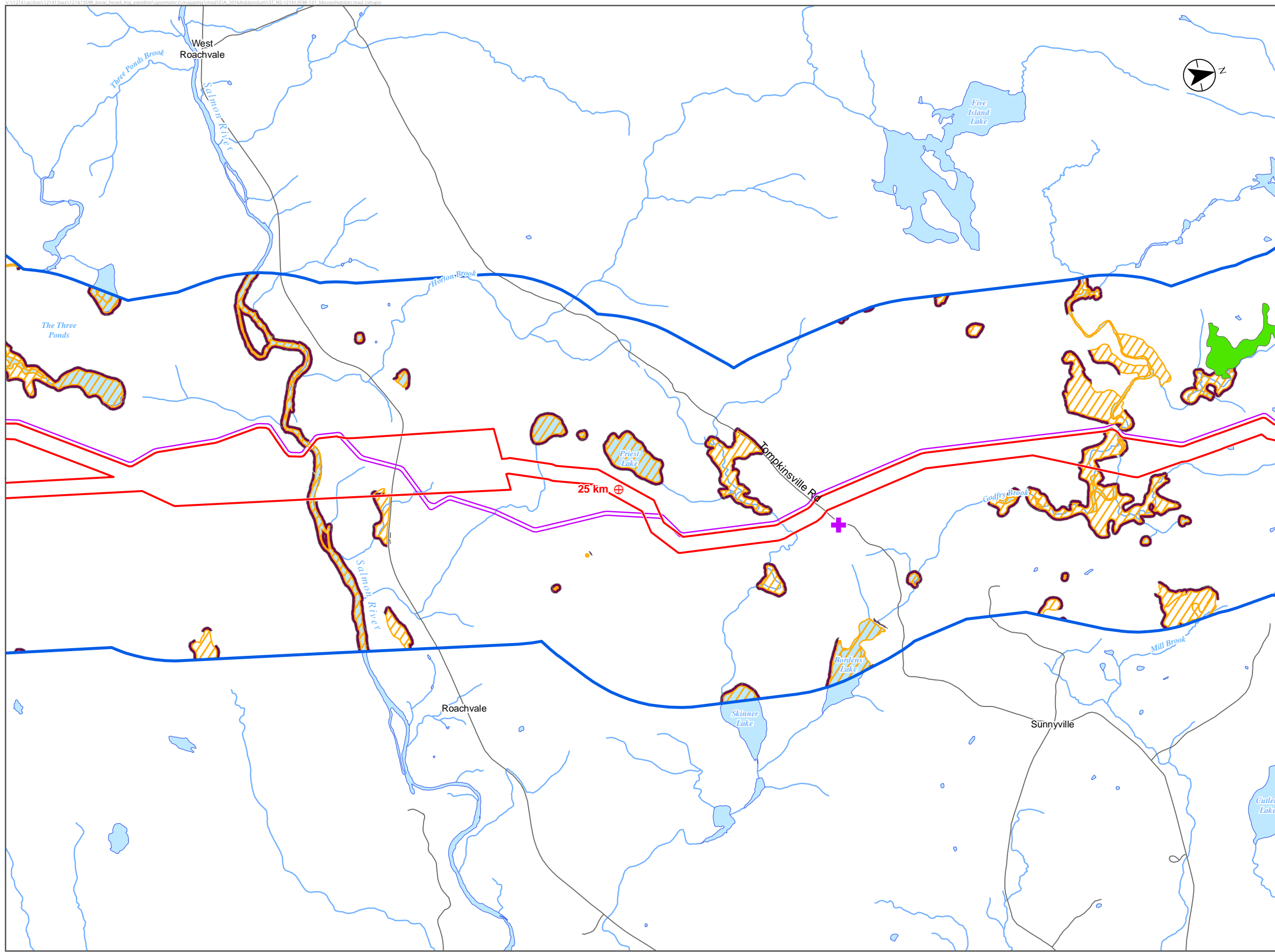
- Field Observations**
- + Moose Observation (Nova Scotia Department of Natural Resources)
 - + Moose Observation (Jaques Whitford Observations, 1998)
 - Moose Activity
- Moose Shelter Habitat**
- Upland Conifer Moose Shelter Habitat
 - Upland Mixedwood Moose Shelter Habitat
 - Potential Summer Foraging for Moose /Thermoregulation Habitat
 - Moose Forested Buffer (<20m)
- Project Components**
- ⊕ 15-km ⊕ 20-km ⊕ Kilometre Post (Approximate Distance from Origin)
 - Assessment Corridor/Project Development Area
 - Compressor Station/ Project Development Area
 - Local Assessment Area
 - Existing Pipeline Right of Way



Disclaimer: This map is for illustrative purposes to support this project. Questions can be directed to the issuing agency.



Sources: Data provided by the Government of Canada and Nova Scotia.



Moose and Moose Habitat

Study Features

Field Observations

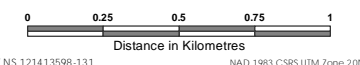
- + Moose Observation (Nova Scotia Department of Natural Resources)
- + Moose Observation (Jaques Whitford Observations, 1998)
- Moose Activity

Moose Shelter Habitat

- Upland Conifer Moose Shelter Habitat
- Upland Mixedwood Moose Shelter Habitat
- Potential Summer Foraging for Moose /Thermoregulation Habitat
- Moose Forested Buffer (<20m)

Project Components

- ⊕ Kilometre Post (Approximate Distance from Origin)
- Assessment Corridor/Project Development Area
- Compressor Station/ Project Development Area
- Local Assessment Area
- Existing Pipeline Right of Way



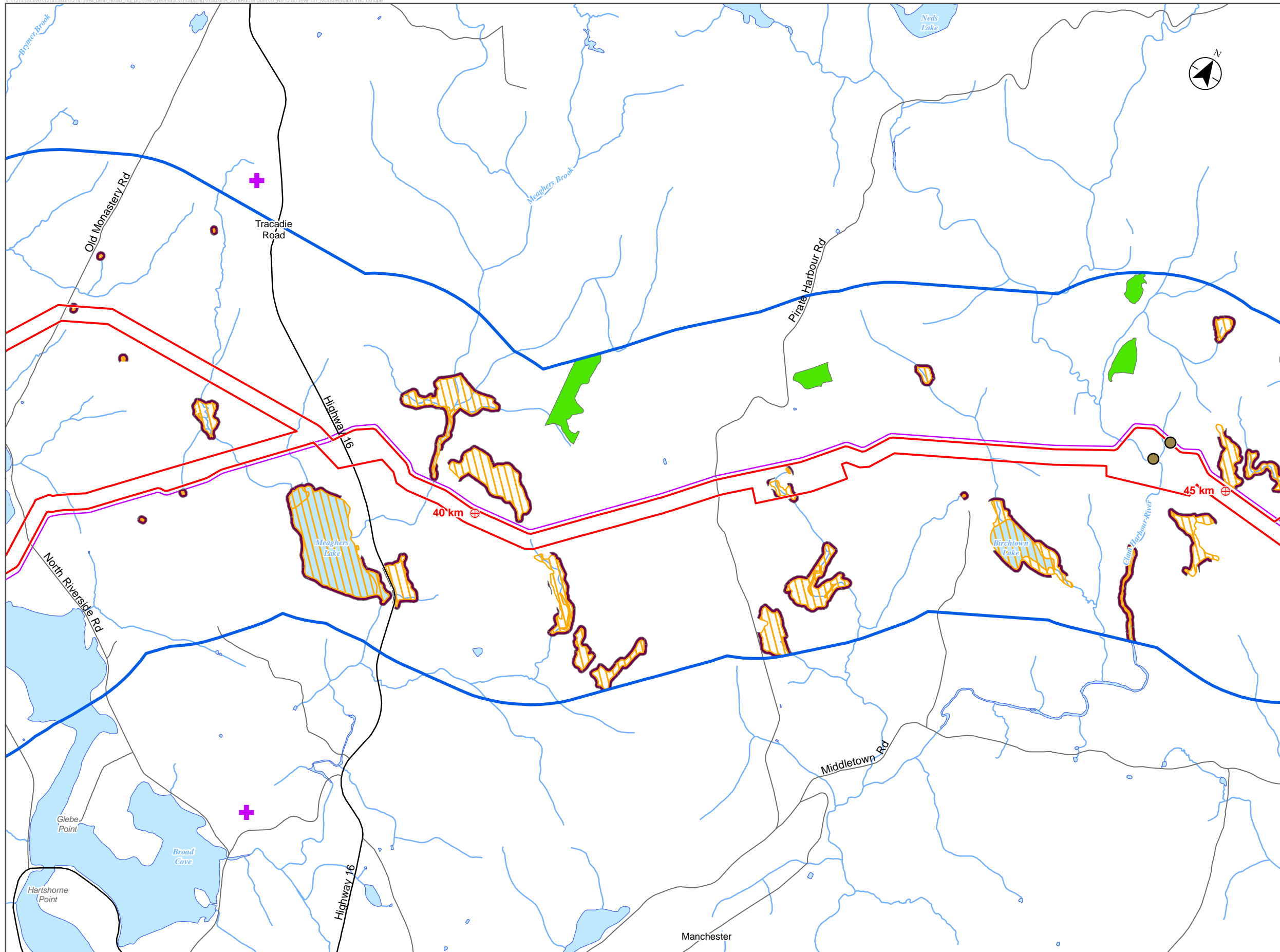
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BEAR PAW PIPELINE PROJECT



Sources: Data provided by the Government of Canada and Nova Scotia.

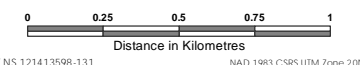
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Moose and Moose Habitat

Study Features

- Field Observations**
- + Moose Observation (Nova Scotia Department of Natural Resources)
 - + Moose Observation (Jaques Whitford Observations, 1998)
 - Moose Activity
- Moose Shelter Habitat**
- Upland Conifer Moose Shelter Habitat
 - Upland Mixedwood Moose Shelter Habitat
 - Potential Summer Foraging for Moose /Thermoregulation Habitat
 - Moose Forested Buffer (<20m)
- Project Components**
- ⊕ Kilometre Post (Approximate Distance from Origin)
 - Assessment Corridor/Project Development Area
 - Compressor Station/ Project Development Area
 - Local Assessment Area
 - Existing Pipeline Right of Way

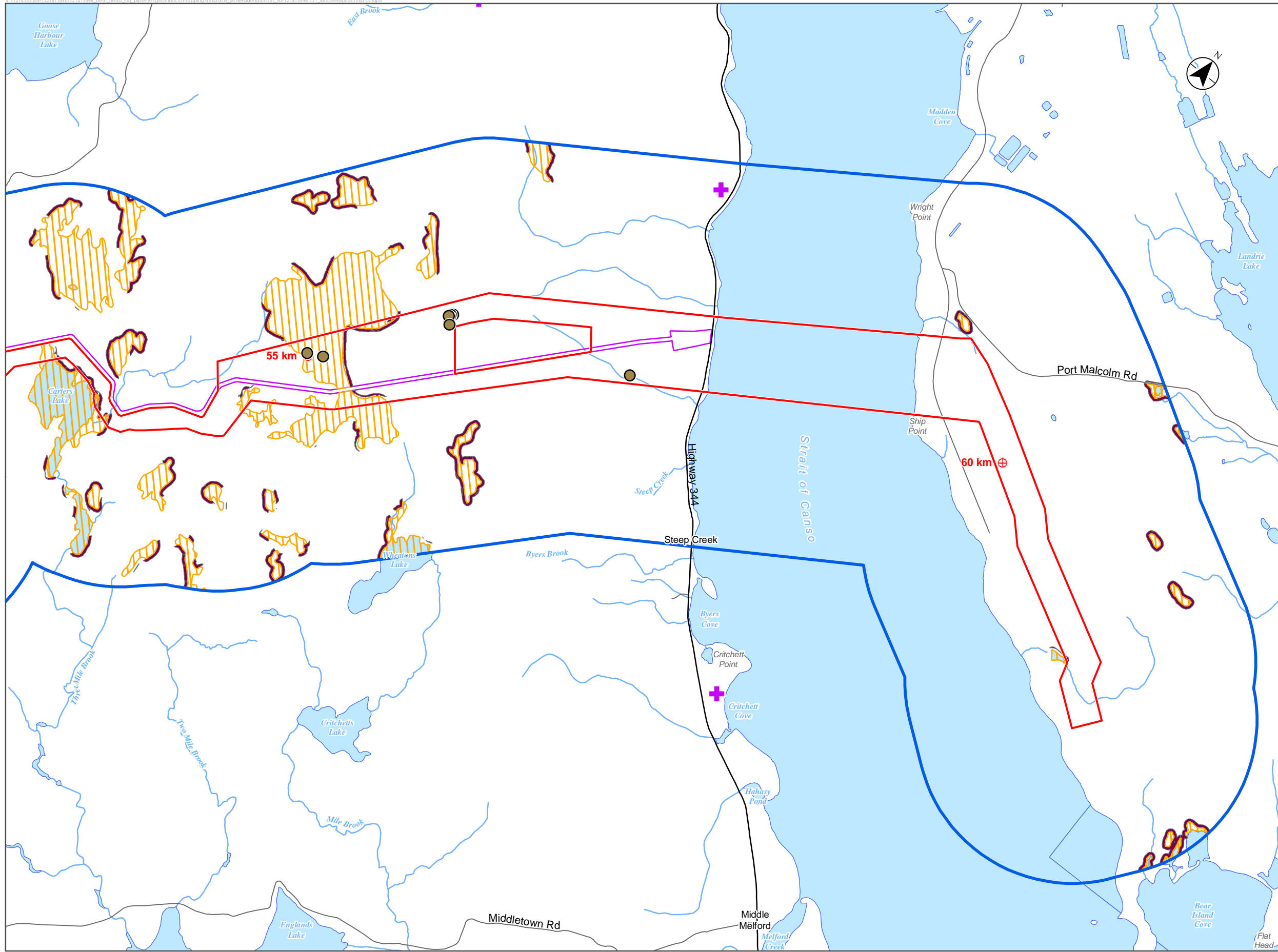


Disclaimer: This map is for illustrative purposes to support this project; questions can be directed to the issuing agency.
BEAR PAW PIPELINE PROJECT



Sources: Data provided by the Government of Canada and Nova Scotia.

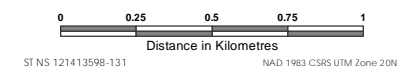
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Moose and Moose Habitat

Study Features

- Field Observations**
- + Moose Observation (Nova Scotia Department of Natural Resources)
 - + Moose Observation (Jaques Whitford Observations, 1998)
 - Moose Activity
- Moose Shelter Habitat**
- Upland Conifer Moose Shelter Habitat
 - Upland Mixedwood Moose Shelter Habitat
 - Potential Summer Foraging for Moose /Thermoregulation Habitat
 - Moose Forested Buffer (<20m)
- Project Components**
- ⊕ Kilometre Post (Approximate Distance from Origin)
 - Assessment Corridor/Project Development Area
 - Compressor Station/ Project Development Area
 - Local Assessment Area
 - Existing Pipeline Right of Way




Disclaimer: This map is for illustrative purposes to support this project. Questions can be directed to the issuing agency.

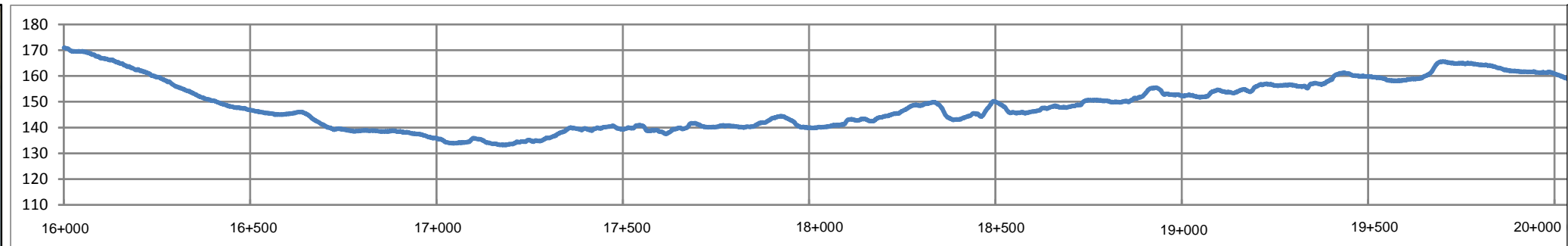
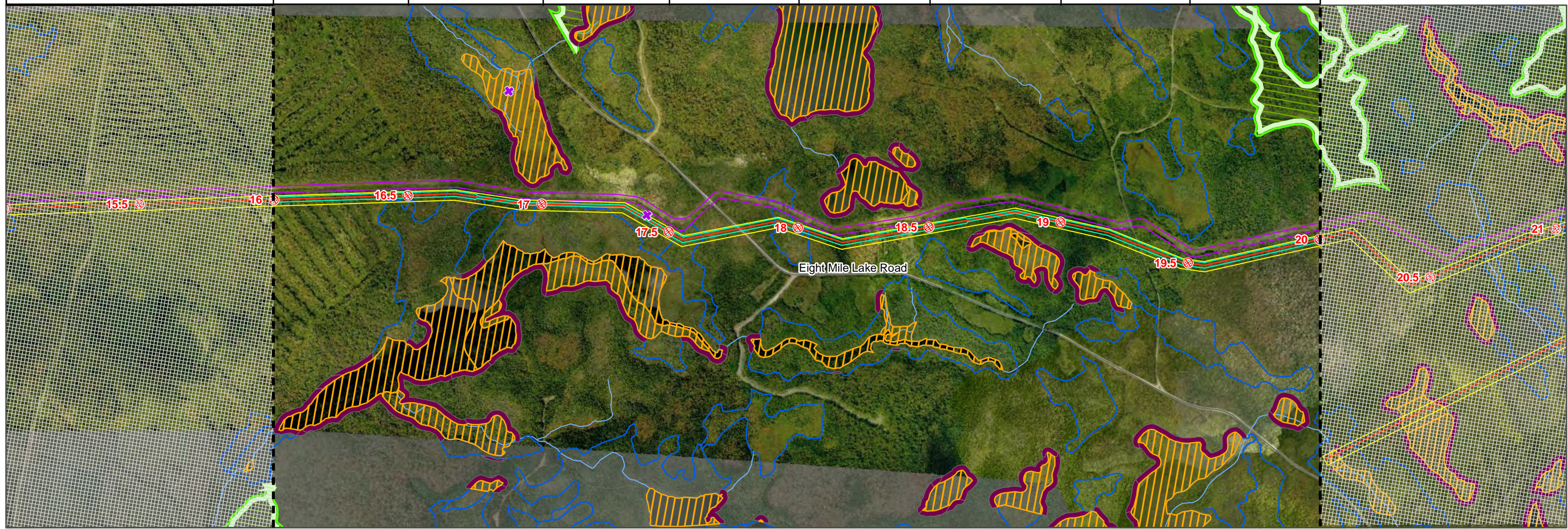


Sources: Data provided by the Government of Canada and Nova Scotia.

Operational Right of Way width narrowing	20 m	10 m	20 m	10 m	20 m		
Access control at road crossing (vegetation rollback; berm)							
Detailed routing to avoid moose potential summer foraging/thermoregulation habitat							
Regenerating to a 10 m operational RoW with species composition similar to adjacent habitat: a. Immature pole hardwood and softwood, b. Regenerating young softwood, c. Treed wetland							
Regenerating to a 10 m operational RoW with species composition similar to adjacent habitat: a. Regenerating young softwood							
Kilometre Post	16+500	17+000	17+500	18+000	18+500	19+000	19+500



- + Moose Observation (Jacques Whitford Observations, 1998)
- Interior Forest
- Potential Summer Foraging for Moose/Thermoregulation Habitat
- Moose Forested Buffer (<20m)
- Wetland



- ⊕ Kilometre Post (Approximate Distance from Origin)
- Conceptual Centreline
- Conceptual Right of Way
- Construction Right of Way
- Existing Pipeline Right of Way

0 100 200 300 400 500
Meters

ST NS_121413598-112 NAD 1983 CSRS UTM Zone 20N

Note: This figure is provided for illustration purposes only. Detailed engineering and final routing has not been completed at this time. Final routing and site-specific mitigation will be developed in the Moose Management Plan.
Sources: Base data provided by the Government of Canada and Nova Scotia. World Street Map from ESRI. Wetlands shown are a combination of data provided by Nova Scotia Dept. of Natural Resources, and wetlands interpreted/delineated by Stantec.

Disclaimer: This map is for illustrative purposes to support this project; questions can be directed to the issuing agency.



Conceptual Application of Moose Mitigation

Figure 1