

# APPENDIX

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WOOD TURTLE  
HABITAT  
ASSESSMENT

NOVA SCOTIA DEPARTMENT OF PUBLIC WORKS

# HIGHWAY 101 CAMBRIDGE INTERCHANGE AND CONNECTOR ROADS EA WOOD TURTLE HABITAT SUITABILITY SURVEY

DECEMBER 14, 2022





# HIGHWAY 101 CAMBRIDGE INTERCHANGE AND CONNECTOR ROADS EA

## WOOD TURTLE HABITAT SUITABILITY SURVEY

NOVA SCOTIA DEPARTMENT OF PUBLIC WORKS

PROJECT NO.: 211-04152-00  
DATE: DECEMBER 14, 2022

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# 1. INTRODUCTION

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## 1.1. PROJECT OVERVIEW AND LOCATION

Nova Scotia Department of Public Works (NSDPW) is proposing a new interchange and connector roads from Highway 101 to Trunk 1 ('the Project'). The proposed interchange is located in Kings County, between Coldbrook and Berwick (Exits 14 and 15, respectively) in Cambridge, Nova Scotia, just west of the Annapolis Valley First Nation (AVFN). The proposed Project Development Area (PDA) and alignment are illustrated in Figure 1.

The Project will feature a 2-kilometre (km) connector road extending south to Trunk 1, as well as a 1.6 km connector road extending north to connect with Brooklyn Street. The north connector road to Trunk 1 will be a controlled access minor arterial roadway with two main travel lanes owned by NSDPW. The road will have a limited number of access points to adjacent lands, crossing agricultural and wooded fields, as well as the Cornwallis River and the surrounding flood plain.

At Trunk 1, the new intersection will be constructed as a roundabout just east of County Home Road, with a new 600 metres (m) southerly connection to Waterville Mountain Road, which will encroach on the wetland habitat associated with Rochford Brook. The north connection to Brooklyn Street will cross agricultural and wooded fields, including Coleman Brook.

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## 1.2. SCOPE OF WORK

WSP has been retained by NSDPW to complete Wood Turtle (*Glyptemys insculpta*) surveys for the Cornwallis River, Coleman Brook, and Rochford Brook. Due to seasonal timing constraints, the surveys include an inventory of suitable habitat completed in the fall of 2022, and five rounds of visual encounter surveys to be conducted in May and June of 2023. The surveys will coincide with seasonal periods when Wood Turtles are most likely to be observed.

The objective of the Wood Turtle surveys is to determine and evaluate the presence of Wood Turtle and its habitat within the Project Local Assessment Area (LAA). The findings will be used to assess potential adverse effects to Wood Turtles and develop appropriate mitigation measures during the Project environmental assessment (EA) process.

This report describes the findings from the suitable habitat inventory which was completed October 24<sup>th</sup> and 25<sup>th</sup>, 2022 for all three watercourses.

# 2. WOOD TURTLES AND THEIR HABITAT

The Wood Turtle is a Species at Risk (SAR) and is designated as 'Threatened' by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), the federal *Species at Risk Act* (SARA), and the Nova Scotia *Endangered Species Act* (ESA).

The species is a medium-sized semi-aquatic turtle which can range between 16 and 25 centimetres (cm) in length as adults. Wood Turtles have a brown to grayish brown, heavily sculpted, carapace with raised edges running down the center of the shell giving it a "woody" appearance, caused by the growth rings. The plastron of the Wood Turtle is yellow with black or dark coloured blotches with a V-shaped notch at the base of the tail, lacking a hinge. The skin on the head and upper body are often dark brown, while skin on the throat, tail, and undersides of the legs often are yellow/orange/red in colour (ECCC 2020).

Wood Turtles are commonly found in, or around, riparian areas and flood plains. This semi-aquatic turtle needs three key habitat components (ECCC 2020):

- **Watercourses:** Wood Turtles need to access water for thermoregulation, movement, hibernation and mating. When temperatures are cool in the spring, turtles are often found in clear, moderately flowing, streams or rivers. Wood Turtles usually spend their nights in the water and their days on land basking on the shore, rocks or logs. These turtles prefer hard bottomed streams/rivers composed of sand and/or gravel. They avoid clay and muck bottomed streams.
- **Nesting Substrate:** Wood Turtles nest in sand and sandy gravel areas such as sand bars and cutbanks along associated with rivers. They are also known to use sand and gravel areas associated with anthropogenic activities such as logging roads, road shoulders, bridge crossings, and residential areas.
- **Forest:** Wood Turtles are the most terrestrial to the freshwater turtles. During the summer months, these turtles spend much of their time on land. They will use dense mixtures of low growing vegetation for foraging.

Consultation with the Nova Scotia Department of Natural Resources and Renewables (NSDNR) identified the presence of critical habitat for Wood Turtle approximately 1.8 km from the Project boundaries (Lisa Doucette, personal communication, August 10, 2022).

## 2.1. HABITAT SUITABILITY FOR ECOLOGICAL PROCESSES

Wood Turtles have four crucial ecological processes: nesting, foraging, thermoregulation, and hibernation. These processes relate to their interactions with their environment. Each ecological process has its own specific habitat characteristics. **Table 1** identifies each process and its required habitat characteristics.

**Table 1 Summary of Wood Turtle ecological processes and associated habitat characteristics**

ECOLOGICAL PROCESS	HABITAT CHARACTERISTICS
Nesting	<ul style="list-style-type: none"> <li>• Sand/gravel bars</li> <li>• Sand/gravel substrate; fairly moist but well-drained</li> <li>• Bare ground with sparse vegetation</li> <li>• Full to partial sunlight/thermal radiation</li> </ul>
Thermoregulation	<ul style="list-style-type: none"> <li>• Vegetation near watercourse <ul style="list-style-type: none"> <li>○ Open (bare or sparse)</li> <li>○ Herbaceous (especially sedges)</li> <li>○ Short shrubland</li> </ul> </li> <li>• Cool water</li> </ul>
Foraging	<ul style="list-style-type: none"> <li>• Tall Shrubs</li> <li>• Deciduous/mixedwood forest</li> <li>• Oxbow ponds/lentic systems near watercourse</li> <li>• Wetlands</li> </ul>
Hibernation	<ul style="list-style-type: none"> <li>• Deep Pools <ul style="list-style-type: none"> <li>○ Does not freeze to bottom of pool</li> </ul> </li> <li>• Undercut Banks</li> <li>• Log jams</li> <li>• Beaver lodges</li> </ul>



# 3. METHODOLOGY

## 3.1. SUITABLE HABITAT INVENTORY

The suitable habitat inventory was completed by two qualified WSP field staff with experience conducting Wood Turtle surveys and evaluating Wood Turtle habitat. Field staff surveyed the Cornwallis River, Coleman Brook, and Rochford Brook within the Project’s LAA for the presence of Wood Turtle habitat with a focus on the watercourses and their riparian areas and noting any suitable foraging habitat within 200 m of the watercourses. The habitat survey included the following components:

- The watercourse edge and riparian areas were searched for evidence of Wood Turtle habitat (e.g., accessible water for thermoregulation, movement, hibernation, and mating; potential nest sites comprised of sand or sandy gravel areas such as sand bars, cutbanks along or in river; as well as for suitable foraging habitat comprised of dense mixtures of low growing vegetation).
- When Wood Turtle habitat was found, field staff recorded the location using a handheld GPS unit, photographed habitat features, and noted the type and quality of the habitat (**Table 2**).
- This process is repeated for both sides of each watercourse within the Project LAA.

The inventory of suitable habitat areas and features will be used to inform the visual encounter surveys planned for 2023 and to evaluate preliminary adverse effects to Wood Turtles during the EA process.

## 3.2. SUITABLE HABITAT RANKINGS

The watercourse edge and riparian areas were ranked as low, moderate, or high quality habitat based on the ecological processes of Wood Turtles. Suitable Snapping Turtle (*Chelydra serpentina*) habitat was incidentally recorded and ranked as well.

Areas ranked as low quality are not favourable to Wood Turtles due to the lack of nesting habitat, foraging habitat, and thermoregulation features (e.g., deep pools and basking sites). Moderate quality sites meet some of the ecological requirements of these turtles, e.g., areas that have meanders with sand/gravel bars which were submerged at the time of the survey, the presence of foraging habitat in the form of shrubland and hardwood stands, with an absence of grasslands and/or thermoregulation habitat (e.g., deep pools and basking sites). High quality sites have sand/gravel bars barren of vegetation which have formed within a meander or oxbow on the watercourse, and an abundance of grassland, shrubland, and hardwood habitat within 200 m of the watercourse, as well as suitable thermoregulation habitat.

**Table 2 Summary of habitat suitability ranks**

RANKS	NESTING	FORAGING	THERMOREGULATION
High	Sand/gravel bars devoid of vegetation which have formed within a meander or oxbow on the watercourse	Grassland, shrubland, hardwood plentiful within riparian area; may also include wet areas	Large, deep pools
Moderate	Meanders with sand/gravel bars submerged at the time of the survey	Shrubland, hardwood, plentiful within riparian zone; no apparent grasslands	Moderately sized, moderately deep pools
Low	Flat or runs with no sand/gravel bars, undetermined substrate	Other habitats	Lacking deep pools



## 4. RESULTS

This section describes the results of the suitable habitat inventory for each of the three evaluated watercourses. Habitat features and areas are illustrated in **Figure 1**. Photographs from the surveys are presented in **Appendix A – Photolog**.

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### 4.1. CORNWALLIS RIVER

Within the Project LAA, there is moderate to high foraging habitat within 200 m of the watercourse throughout the LAA; however, much of the forested areas are only accessible along very steep embankments on both sides of the watercourse. Most of the riparian area is densely vegetated with grasses, with some sedges and small Speckled Alder (*Alnus incana*) patches throughout, which are preferred foraging habitat.

Only a couple of larger deep pools suitable for Wood Turtle overwintering were identified along the main watercourse channel, located east of the proposed connector road alignment; though several larger areas of stagnant deep pools associated with the fringe wetland habitat in the eastern and western extents of the LAA were noted as moderate habitat for Snapping Turtles. Low to moderate basking sites were scattered along the watercourse.

Within the LAA, the Cornwallis River generally had sandy, loose substrate, with gravelly areas, though not a lot of potential nesting locations due to the lack of sand/gravel bars devoid of vegetation. Eight potential nesting sites of mostly moderate to high quality were identified during the survey; seven were located at the west end of the study area, with four located just outside of the boundary. The eighth site, evaluated as moderate quality, was located at the eastern end of the LAA.

Overall, the surveyed section of the Cornwallis River within the LAA has moderately suitable habitat for Wood Turtles.

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### 4.2. ROCHFORD BROOK

Within the Project LAA, Rochford Brook flows through a shrub swamp which was ranked as moderate foraging habitat. Beyond the wetland and within 200 m of the watercourse, there is low to moderate foraging habitat extending westward as a narrow stand of mixedwood forest and then as agricultural lands. The east side of the wetland is bound by Waterville Mountain Road, with a mix of grass, shrub and treed habitat to the east of Waterville Mountain Road. This habitat was not inventoried during the fall survey.

Two deep pools with high potential to be overwintering habitat were identified, and as well as one larger stagnant deep pool which was noted as moderate habitat for Snapping Turtles. Moderate basking sites were scattered along the watercourse.

Though Rochford Brook has a predominantly sandy substrate, no suitable nesting sites were identified along this watercourse within the study area.

Overall, this section of Rochford Brook has low to moderately suitable habitat for Wood Turtles.

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### 4.3. COLEMAN BROOK

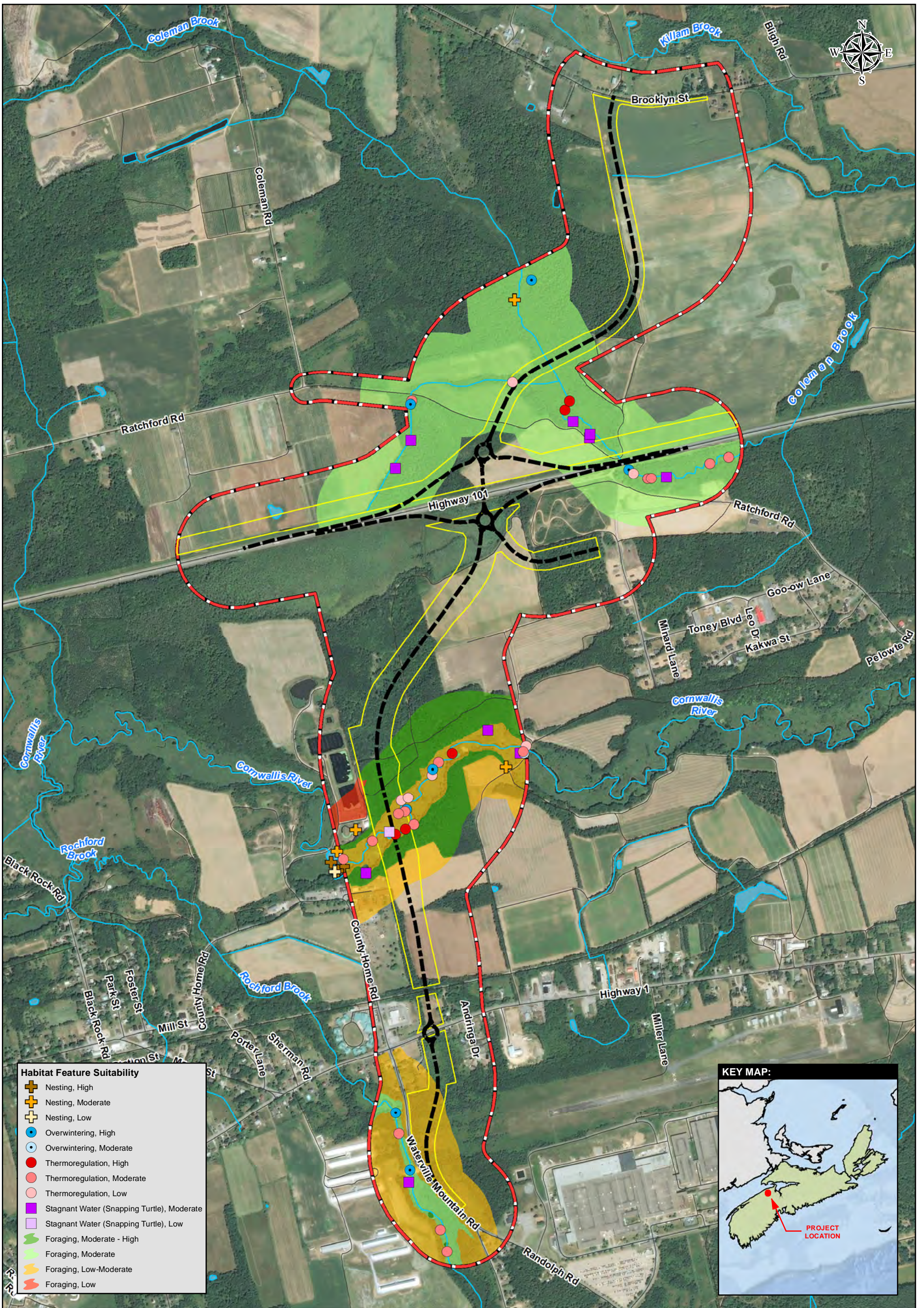
Within the Project LAA, the majority of Coleman Brook flows through shrub wetland habitat comprised mostly of Speckled Alder, sedges (*Carex* sp.), and other shrub plants, providing moderately suitable habitat for foraging and basking. Beyond the wetland habitat and with 200 m of the watercourse, there is low to moderate foraging habitat in the adjacent mixedwood forest and agricultural fields.

Three deep pools with high potential to be overwintering habitat were identified, and as well as four stagnant deep pools which were noted as moderate habitat for Snapping Turtles. Moderate basking sites were scattered along the watercourse.

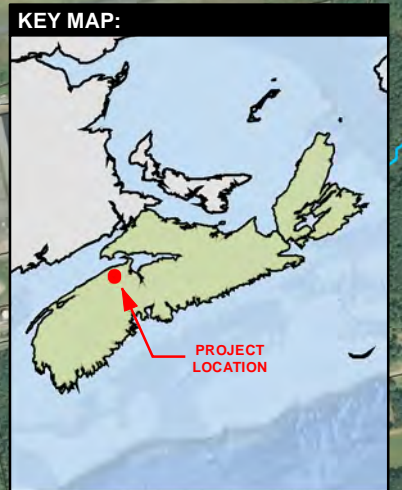
Though Coleman Brook had a predominantly sandy/gravelly substrate, only one potential nest site of moderate quality was observed within the LAA.

Overall, this section of Coleman Brook has low to moderately suitable habitat for Wood Turtles.





Habitat Feature Suitability	
+	Nesting, High
+	Nesting, Moderate
+	Nesting, Low
●	Overwintering, High
○	Overwintering, Moderate
●	Thermoregulation, High
○	Thermoregulation, Moderate
○	Thermoregulation, Low
■	Stagnant Water (Snapping Turtle), Moderate
■	Stagnant Water (Snapping Turtle), Low
■	Foraging, Moderate - High
■	Foraging, Moderate
■	Foraging, Low-Moderate
■	Foraging, Low



<b>PROJECT:</b> NOVA SCOTIA - HIGHWAY 101 CAMBRIDGE INTERCHANGE AND CONNECTOR ROADS EA KINGS COUNTY, NS		<b>FIGURE:</b> TITLE: <b>WOOD TURTLE HABITAT ASSESSMENT</b>		<b>DATUM:</b> NAD 83 CSRS		<b>LEGEND:</b> LOCAL ASSESSMENT AREA	
PROJECT NO.: <b>211-04152</b>		FIGURE NO.: <b>1</b>		REVISION NO.: <b>0</b>		PROJECT DEVELOPMENT AREA	
CLIENT: 				WSP Canada Inc. 1 Spectacle Lake Drive, Dartmouth, Nova Scotia www.wsp.com		PROPOSED ALIGNMENT	
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				CHECKED BY: C. PYTLAK		WATERCOURSE	
				CREATED DATE: (YYYY-MM-DD) 2022/01/28		WATERBODY	
				REVISION DATE: (YYYY-MM-DD) 2022/12/15		SCALE: 1:12,500 0 200 400 800 Meters	



## 5. SUMMARY

Habitat suitability surveys for Wood Turtle were conducted in support of the Highway 101 Cambridge Interchange and Connector Road project. The surveys identified the presence and suitability of habitat along three watercourses and associated riparian areas within the Project LAA. The evaluation will aid in the planning for the visual encounter surveys planned for 2023, as well as provide preliminary information for the assessment of adverse effects to Wood Turtles and their habitat during the EA process.

The Cornwallis River was identified as having overall moderately suitable habitat for Wood Turtle, while Rochford Brook and Coleman Brook both ranked as low to moderately suitable habitat for Wood Turtle. There was moderate potential for overwintering habitat for Snapping Turtle incidentally observed at all three watercourses. Areas of habitat potential have been illustrated in **Figure 1**. The results from the habitat suitability survey are based on field observations from site visits completed in October 2022

Five rounds of visual encounter surveys are planned for spring 2023 and will be presented in a separate report.

# REFERENCES

Environment and Climate Change Canada (ECCC). 2020. Recovery Strategy for the Wood Turtle (*Glyptemys insculpta*) in Canada. Species at Risk Act Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. vi + 52 pp.

# APPENDIX

## A PHOTOGRAPHIC LOG







**Photo 1:** Basking habitat (Cornwallis River)



**Photo 2:** Basking habitat (Cornwallis River)



**Photo 3:** Nesting habitat (Cornwallis River)



**Photo 4:** Foraging habitat (Cornwallis River)





**Photo 5:** Basking habitat (Coleman Brook)



**Photo 6:** Deep pool (Coleman Brook)



**Photo 7:** Deep pool (Coleman Brook)



**Photo 8:** Deep pool (Coleman Brook)





**Photo 9:** Deep pool (Coleman Brook)



**Photo 10:** Foraging habitat (Coleman Brook)



**Photo 11:** Stagnant water (Coleman Brook)



**Photo 12:** Beaverdam (Coleman Brook)





**Photo 13:** Observed fish habitat (Coleman Brook)



**Photo 14:** Agricultural drainage culvert (Coleman Brook)



**Photo 15:** Basking habitat (Rochford Brook)



**Photo 16:** Basking habitat (Rochford Brook)





**Photo 17:** Basking habitat (Rochford Brook)



**Photo 18:** Basking habitat (Rochford Brook)



**Photo 19:** Foraging habitat (Rochford Brook)



**Photo 20:** Beaverdam (Rochford Brook)





**Photo 21:** Beaver pond (Rochford Brook)



**Photo 22:** Upland foraging habitat (Rochford Brook)