
COUNTY OF BRUCE

AQUATIC HABITAT ASSESSMENT
DURHAM STREET BRIDGE REPLACEMENT



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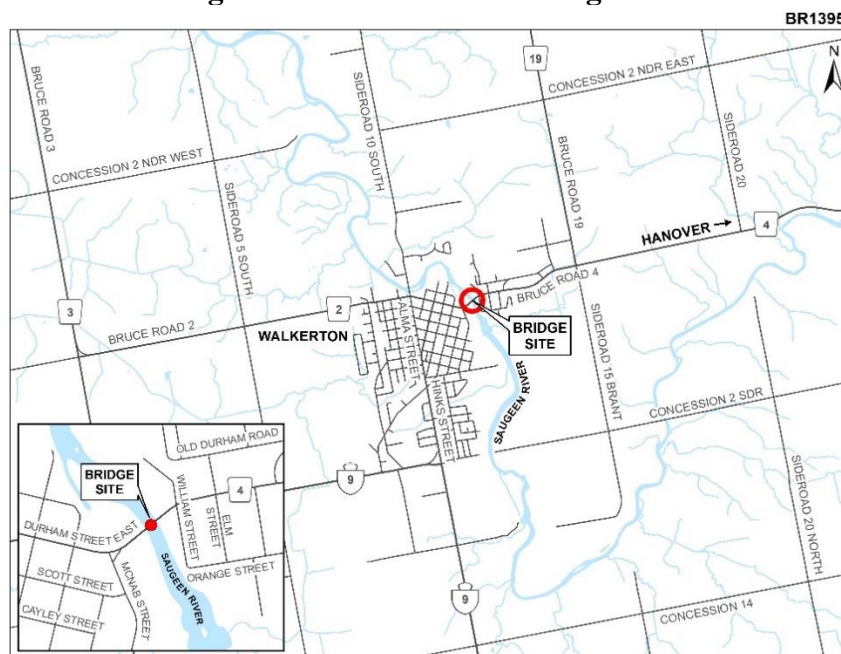
1.0 PURPOSE

The County of Bruce is considering options associated with the replacement of the Durham Street Bridge in Walkerton, Ontario. Recent engineering inspections identified significant problems with deterioration of key bridge components. B.M. Ross and Associates Limited (BMROSS) were engaged to conduct a Class Environmental Assessment (Class EA) investigation on behalf of the County. To further assess the potential impacts of construction on the receiving watercourse, an aquatic habitat assessment of the Saugeen River was undertaken by technical staff from BMROSS.

2.0 PROJECT STUDY AREA

The project study area is located along Bruce County Road 4 in Walkerton, Ontario in the Municipality of Brockton. The study area includes a portion of the Saugeen River and the areas under and adjacent to the existing bridge structure. The location of the bridge site is shown in Figure 1.

Figure 1: Location of the bridge site.



3.0 BACKGROUND REVIEW

3.1 Aquatic Species

A search of Ministry of Northern Development, Mines, Natural Resources and Forestry records and reports revealed fish information for this sub-watershed area. The Saugeen River has a coldwater thermal regime and the following fish species are present: Chinook Salmon, Trout-perch, Alewife, Blackside Darter, Bluntnose Minnow, Brassy Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Coho Salmon, Common Shiner, Creek Chub, Eastern Blacknose Dace, Emerald Shiner, Fantail Darter, Fathead Minnow, Gizzard Shad, Golden Redhorse, Hornyhead Chub, Johnny Darter, Longnose Dace, Mimic Shiner, Muskellunge, Northern Pike, Northern Redbelly Dace, Pearl Dace, Pumpkinseed, Rainbow Darter, Rainbow Smelt, Rainbow Trout, River Chub, Rock Bass, Rosyface Shiner, Sand Shiner, Sea Lamprey, Shorthead Redhorse, Silver Lamprey, Silver Redhorse, Smallmouth Bass, Sockeye Salmon, Splake, Spotfin Shiner, Stonecat, White Sucker and Yellow Perch.

The Department of Fisheries and Oceans (DFO) aquatic species at risk map was consulted to determine if aquatic species at risk and/or critical habitat is present within the project study area. It was determined that species at risk and critical habitat are not present within the project study area.

3.2 Terrestrial Species

A search of the Atlas of Breeding Birds of Ontario (2001-2005) identified bird species with confirmed, probable and possible breeding habitat in proximity to the study area. The project study area is within Square 17MJ88 in Region 8 (Bruce Region). A total of 41 birds with confirmed breeding status, 28 birds with probable breeding status and 25 birds with possible breeding status are found within the square. Of the 41 birds with confirmed breeding status, 4 of them are species at risk, including the Chimney Swift (*Chaetura pelagica*), Barn Swallow (*Hirundo rustica*), Bank Swallow (*Riparia riparia*) and Eastern Meadowlark (*Sturnella magna*).

The eBird website was also consulted to identify bird species within the Walkerton Area. A total of 75 species have been observed in the Walkerton area. Species at risk including the Bank Swallow (*Riparia riparia*), Chimney Swift (*Chaetura pelagica*), Eastern Wood-Pewee (*Contopus virens*), Barn Swallow (*Hirundo rustica*) and Bald Eagle (*Haliaeetus leucocephalus*), have been observed within the Walkerton area.

4.0 METHODOLOGY

Field investigation work was carried out on September 1, 2021 by BMROSS technical staff. Data was collected within areas that will be impacted by construction of the new crossing. Water depth, substrate composition and aquatic vegetation was recorded every 2 meters along six transects (3 per side) under the structure. Transects ran parallel to the structure from the south or north pier to the central piers, as shown in Figure 2. The structure was inspected for bird nests and observed aquatic and terrestrial species were recorded.

Figure 2: Saugeen River Aquatic Habitat Transects



5.0 RESULTS

5.1 Aquatic Habitat

On September 1, 2021 at 11:30 a.m., the air temperature was 19.0°C and the water temperature was 21.5°C at the project site. The weather was sunny and no clouds were visible. Prior to the field investigation, there had been no precipitation. Flows within the channel varied, with rapid flows observed within the middle of the channel and slower flows along the banks of the river. The water clarity was high and substrate was visible on the bottom of the channel.

Water depths ranged from 0.04 to 1.4 metres along transects, on the west side of the structure. Water depths were generally shallow along the bank area and gradually increased as the stream bottom sloped downwards towards the central pier. The substrate consisted of cobble, gravel and silt along the bank and transitioned into mostly large cobble adjacent to the central pier. No aquatic vegetation was observed in this section of the watercourse. Evidence of freshwater mussels (live mussel and shells) and an abundance of Rusty Crayfish (*Orconectes rusticus*) were observed in this section of the watercourse. Riparian vegetation was observed along the banks adjacent to the west pier.

On the east side of the structure, water depths ranged from 0.22 to 1.25 metres along the transects. Water depths were generally shallow along the bank and gradually sloped downwards towards the central pier. The substrate consisted of large cobble and silt along the bank, transitioning into smaller cobble and gravel mid transect and then into mostly large and small cobble adjacent to the central pier. A pocket of gravel and silt was present along the upstream transect, adjacent to the central pier. Semi-submerged rocks with attached algae were observed along the bank in this section of the watercourse. An abundance of Rusty Crayfish (*Orconectes rusticus*) was also observed. There was no evidence of freshwater mussels in this section of the watercourse. Riparian vegetation was observed along the bank areas adjacent to the east pier.

Table 1 contains information recorded along transects. Site photos, showing substrate composition and aquatic habitat, can be found in Appendix A.

5.2 Fish Community

During the field investigation, a live Spike (*Elliptio dilatata*) was observed under the bridge structure. Shells of other freshwater mussels including Slippershell (*Alasmidonta viridis*), Elktoe (*Alasmidonta marginata*) and Black Sandshell (*Ligumia recta*) were observed. The Rusty crayfish (*Orconectes rusticus*), which is an invasive species in Ontario, was observed under the structure. Table 2 lists species observed during the field investigation. Photos of aquatic species observed during the field investigation can be found in Appendix A.

Table 2: Observed Aquatic Species

Common Name	Scientific Name	Count	Location	Condition (live/dead/shell)
Spike	<i>Elliptio dilatata</i>	2	West side	1 Live, 1 Whole Fresh Shell
Slippershell	<i>Alasmidonta viridis</i>	1	West side	Half Fresh Shell
Elktoe	<i>Alasmidonta marginata</i>	2	West side	Whole Fresh Shells
Black Sandshell	<i>Ligumia recta</i>	1	West side	Half Fresh Shell
Rusty Crayfish	<i>Orconectes rusticus</i>	Abundant	East & West side	Live

5.3 Breeding Birds

Migratory birds and their nests are protected during the breeding season from April to September under the *Migratory Bird Convection Act*. During the field investigation, the structure was inspected for bird nests. On the east side of the structure, one bird nest was observed on top of a pipe that runs beneath the structure. The bird nest was inactive, and it is unknown which species of bird created and utilized the nest. The nest does not belong to a species at risk identified during the background review based on the size, material, and location of the nest. A photo of the bird nest can be found in Appendix A.

5.4 Riparian Vegetation

Riparian vegetation adjacent to the bridge consisted mostly of common grasses, small shrubs, and wildflowers. The following species were observed: Canada Goldenrod (*Solidago Canadensis*), Grass-leaved Goldenrod (*Euthamia graminifolia*), Tall White Aster (*Symphyotrichum lanceolatum*), New England Aster (*Symphyotrichum novae-angliae*), Swamp Milkweed (*Asclepias incarnate*), Stag-horn Sumac (*Rhus typhina*), Spotted Joe Pyeweed (*Eupatorium maculatum*), Riverbank Grape (*Vitis riparia*), Wild Teasel (*Dipsacus fullonum*), Hedge Bindweed (*Calystegia sepium*) and Himalayan Impatiens (*Impatiens glandulifera*). Photos of riparian vegetation can be found in Appendix A.

6.0 Conclusions and Recommendations

6.1 Proposed Habitat Alteration

The proposed bridge replacement will require in-water work that will consist of removing the existing structure and installing new in-water piers. To limit habitat destruction during the bridge replacement, cofferdams contained by barriers will be installed in the channel for access and to capture materials. All cofferdam material will be removed upon completion of the works. The old piers will be removed prior to construction, and the number of piers for the new bridge will not exceed the number of existing piers.

The in-water work areas will include the section of channel from the east and west shoreline to the in-water piers. A temporary work platform (cofferdam surrounded by barriers) will be installed from each shoreline comprised of clean granular material. This will prevent sediment from entering the watercourse and prevent harm to aquatic life. Before the work area is isolated, a mussel move will be completed, and mussels will be relocated upstream to a suitable location. Before the isolated work area is dewatered, aquatic life will be salvaged and released back into the watercourse. Flow will be maintained at all times as the cofferdam will not be extended across the entire river at any one time.

6.2 Conclusions and Recommended Mitigation Measures

In conjunction with the aquatic habitat assessment, the presence of freshwater mussels was confirmed. No other unique or specialized fish habitat features were identified within the project site.

It was therefore determined that removal of the structure and replacement of the in-water piers should have no measurable negative impacts to the aquatic and terrestrial environments at this site if specific site mitigation measures are followed, as described below:

- In-water work will be completed between July 15th and September 15th to prevent disturbances to spring and fall spawning fish species.
- Bird nests found on the structure will be removed prior to the breeding season (April) to prevent nesting from occurring on the structure during replacement.
- A freshwater mussel relocation will be completed when water temperatures are above 16°C within in-water work areas. The mussels will be relocated to a suitable location upstream.
- A fish salvage will be completed within the isolated in-water work areas prior to construction. Aquatic life will be released downstream of the site.
- Sediment and erosion control measures will be installed along disturbed slopes to prevent sedimentation into the watercourse.

- Disturbed riparian vegetation will be restored with native species upon project completion.
- Necessary permits will be obtained from approval agencies prior to commencement.

If you have any questions or require further information, please contact the undersigned.

Yours very truly

B. M. ROSS AND ASSOCIATES LIMITED

Per Rebecca Adams
Rebecca Adams, EPT
Environmental Research Assistant



Per Kelly Vader
Kelly Vader, MCIP, RPP
Environmental Planner

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References

1. Bird Studies Canada. Ontario Breeding Atlas. 2001-2005.
2. Department of Fisheries and Oceans Canada. Aquatic Species at Risk Mapping. Website. 2021.
3. Government of Canada. Migratory Bird Convention Act. 2017.
4. Ministry of Northern Development, Mines, Natural Resources and Forestry. Aquatic Resource Area Waterline Segment. Website. 2018.
5. Ministry of Northern Development, Mines, Natural Resources and Forestry. Species at risk in Ontario. Website. 2018.
6. The Cornell Lab of Ornithology. eBird. 2015-2021.

APPENDIX A
SITE PHOTOS

Site Photography (taken on September 1, 2021)



West side of bridge, view from bank facing east ↑



East side of bridge, view from bank facing west ↑



Substrate under the west side of the bridge ↑



Substrate under the east side of the bridge ↑



Downstream of bridge, facing north ↑



Upstream of bridge, facing south ↑



**Black Sandshell (*Ligumia recta*) right valve ↑
(external view)**



**Black Sandshell (*Ligumia recta*) right valve ↑
(internal view)**



**Elktoe (*Alasmidonta marginata*) right valve ↑
(external view)**



Elktoe (*Alasmidonta marginata*) beak sculpture ↑



Spike (*Elliptio dilatata*) left valve (external view) ↑



Spike (*Elliptio dilatata*) left valve (internal view) ↑



South Elevation ↑



Bird nest observed under bridge ↑



Algae observed on rocks under east side of bridge ↑



Invasive Rusty Crayfish (*Orconectes rusticus*) observed under bridge ↑



Vegetation on southwest bank of bridge ↑



Vegetation on northeast bank of bridge ↑



Tall white aster (*Symphyotrichum lanceolatum*) ↑



Swamp milkweed (*Asclepias incarnate*) ↑



Staghorn Sumac (*Rhus typhina*) ↑



Spotted Joe Pyeweed (*Eutrochium maculatum*) ↑



Grass-leaved Goldenrod (*Euthamia graminifolia*) ↑



Riverbank grape (*Vitis riparia*) ↑



Wild Teasel (*Dipsacus fullonum*) ↑



New England Aster (*Symphyotrichum novae-angliae*) ↑