Host Fish Requirements Help Locate the Rare Hickorynut Mussel in the Ottawa River

Canada

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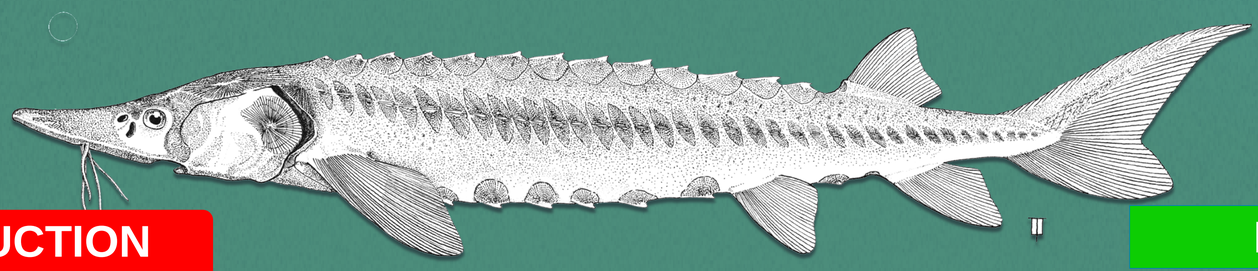


Figure 1. (left) Line drawing of an adult Lake Sturgeon

INTRODUCTION

The Hickorynut mussel, *Obovaria olivaria* (Rafinesque, 1820), is one of 55 Canadian native freshwater mussel species (Superfamily: Unionacea). It prefers deep-water habitats and occurs in only six rivers nationwide. In Canada, the conservation status of the Hickorynut mussel is Endangered (COSEWIC 2010). In Canada, the known host fish of the Hickorynut mussel is the Lake Sturgeon, *Acipenser fulvescens* (Figure 1, Brady et al 2004).

Table 1. Freshwater mussel species of the Ottawa River Watershed

Scientific name	Common name
Alasmidonta marginata	Elktoe
Alasmidonta undulata	Triangle Floater
Anodonta implicata	Alewife floater
Anodontoides ferussacianus	Cylindrical Papershell
Elliptio complanata	Eastern Elliptio
Elliptio crassidens	Elephantear
Elliptio dilatata	Spike
Lampsilis radiata	Eastern Lampmussel
Lampsilis siliquoidea	Fatmucket
Lampsilis cardium	Plain Pocketbook
Lasmigona compressa	Creek Heelsplitter
Lasmigona costata	Flutedshell
Leptodea fragilis	Fragile Papershell
Ligumia recta	Black Sandshell
Margaritifera margaritifera	Eastern Pearlshell
Obovaria olivaria	**Hickorynut**
Potamilus alatus	Pink Heelsplitter
Pyganodon cataracta	Eastern Floater
Pyganodon grandis	Giant Floater
Pyganodon sp.	Floater sp.
Strophitus undulatus	Creeper

The Ottawa River watershed has a rich freshwater mussel fauna with 21 species (Table 1). Museum records (Figure 2) confirm that this river has historically been a prime location for Hickorynuts.

Figure 2. Oldest record (1885) of Hickorynut in the Mollusca Collection at the Canadian Museum of Nature.

RESEARCH QUESTION

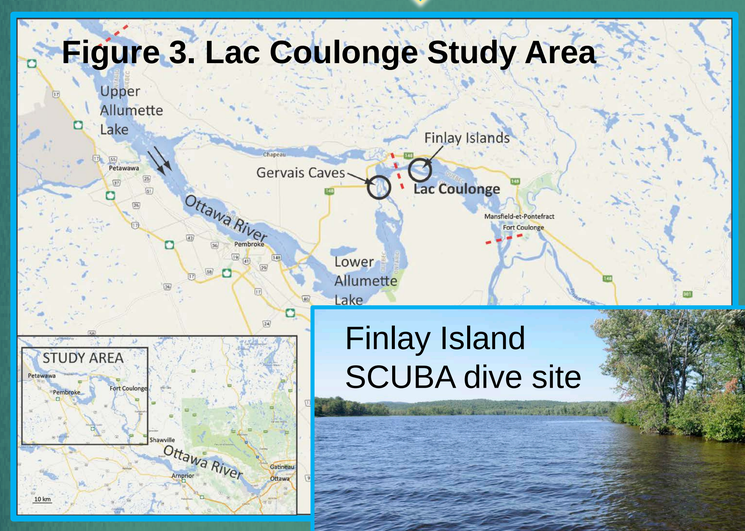
- Can we locate the best host fish habitat and align such information with the preferences of the Hickorynut in order to find a healthy population of this mussel ?

METHOD

We used publications on the distribution of Lake Sturgeon in the Ottawa River (Haxton 2007, Haxton & Findlay 2008) to identify the best sturgeon habitats in the river.

Lac Coulonge reach was identified as ideal for sturgeon and presumably for Hickorynuts. Qualitative and quantitative underwater (SCUBA) surveys of mussels (2014) were conducted near the Chênaie-des-Îles-Finlay ecological reserve. Also, a cave diver searched for mussels in Gervais Caves (2015) (Figure 3).

Figure 3. Lac Coulonge Study Area



Quantitative surveys were conducted by SCUBA divers at 3 to 6 m depth. Freshwater mussels were collected from 1 m^2 quadrats, from the upper 8 cm of the substrate.

Live mussels were identified, counted and measured on shore and returned promptly to their original location.

RESULTS

At the Finlay Islands, five unionid species were observed, including the Hickorynut (Table 2).

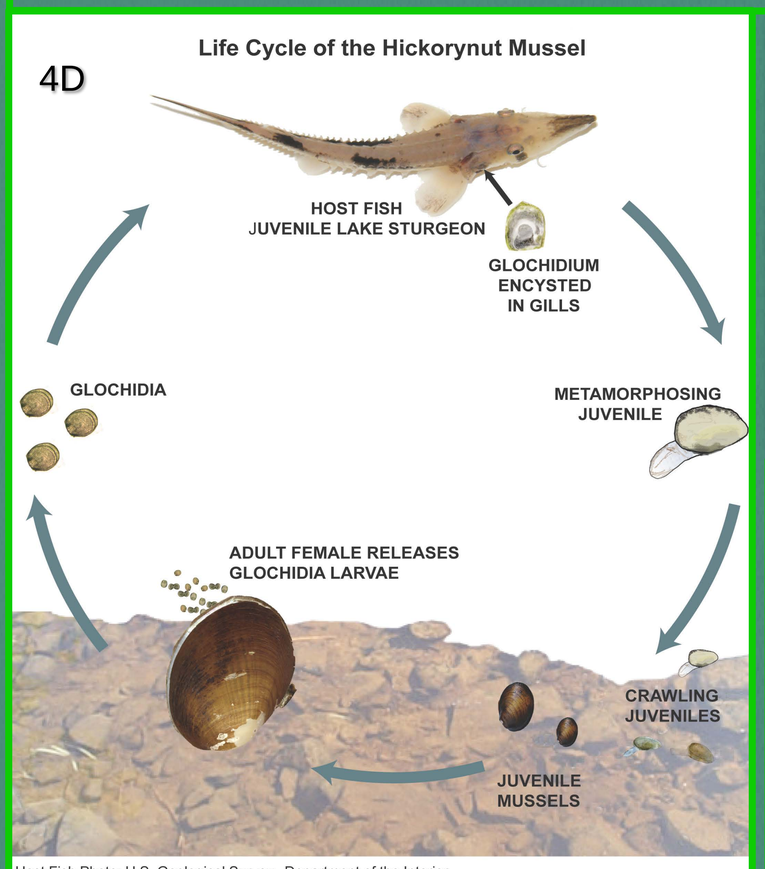
The Hickorynut was the second most abundant species, representing 22% of the total abundance of freshwater mussels (Table 2), with a mean density of 0.73 Hickorynut m^{-2}.

Historically, surveys had been conducted in shallow waters, nearshore. Yet, our study confirms that Hickorynuts prefer deep-water and are best surveyed by SCUBA divers.

Our survey shows that this endangered mussel is widespread in the Lac Coulonge reach of the Ottawa River.

The *in situ* morphology of the siphonal apertures and glochidia larvae of the Hickorynut is documented (Figure 4).

Figure 4. *Obovaria olivaria* A) Live adult Hickorynut from the Ottawa River. B-C) Glochidia larvae. D) Life cycle. E) Siphonal apertures.



Host Fish Photo: U.S. Geological Survey, Department of the Interior

Table 2. Statistics for freshwater mussels collected in 22 quadrats (1m X 1m) by SCUBA divers in the Lac Coulonge Reach, Ottawa River, 2014

Species	Σ	Mean	%
Eastern Elliptio	41	1.86	56.2
Hickorynut	16	0.73	21.9
Plain Pocketbook	14	0.64	19.2
Eastern Lampmussel	1	0.05	1.4
Triangle Floater	1	0.05	1.4
TOTAL COUNTS	**73**	3.32	100.0

CONCLUSIONS and OUTLOOK

- In Canada, Hickorynuts are found in rivers ***where Lake Sturgeon is known to occur***, as it is the host fish.
- This is the ***first quantitative report*** of a large population of Hickorynut in Canada.
- In the Ottawa River, populations of the Lake Sturgeon are still thriving in Lac Coulonge. It is ***no coincidence*** that our study shows that the Lac Coulonge reach of the Ottawa River has a healthy representation of this endangered mussel.
- The abundance of both Sturgeon and Hickorynut in this area is illustrated by ***the riverine characteristics*** of this section of the Ottawa River: 147 km of unobstructed free-flowing river, and ***without dams***.
- This research is ongoing and ***additional surveys are needed*** to further describe the size and the distribution of the population of this mussel in Lac Coulonge.

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