

Residence Description for Atlantic Mud-piddock (*Barnea truncata*) in Canada

Additional Information:

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1.0 Location of the Species' Residence

SARA states that “No person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species, or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada.” [s. 33].

SARA defines “residence” as: “a dwelling-place, such as a den, nest or other similar area or place, that is occupied or habitually occupied by one or more individuals during all or part of their life cycles, including breeding, rearing, staging, wintering, feeding or hibernating.” [s. 2(1)]

The following is a residence statement for the Atlantic Mud-piddock.

The Atlantic Mud-piddock's burrow is its residence. Once an Atlantic Mud-piddock larva settles on its preferred red mudstone substrate, it invests energy in creating a burrow that is essential to its survival. The Atlantic Mud-piddock grows and matures in its burrow. It feeds and releases spawn from within its burrows where it remains for the duration of its adult life stage.

The information that follows comes from DFO (2010), Hebda (2010) and Clark et al. (2019).

In Canada, the Atlantic Mud-piddock and its residences are found only within the Minas Basin in Nova Scotia. This species is habitat-dependent on a single geological formation, red mudstone facies. Atlantic Mud-piddock are found in five primary red mudstone habitat settings (Figure 1).

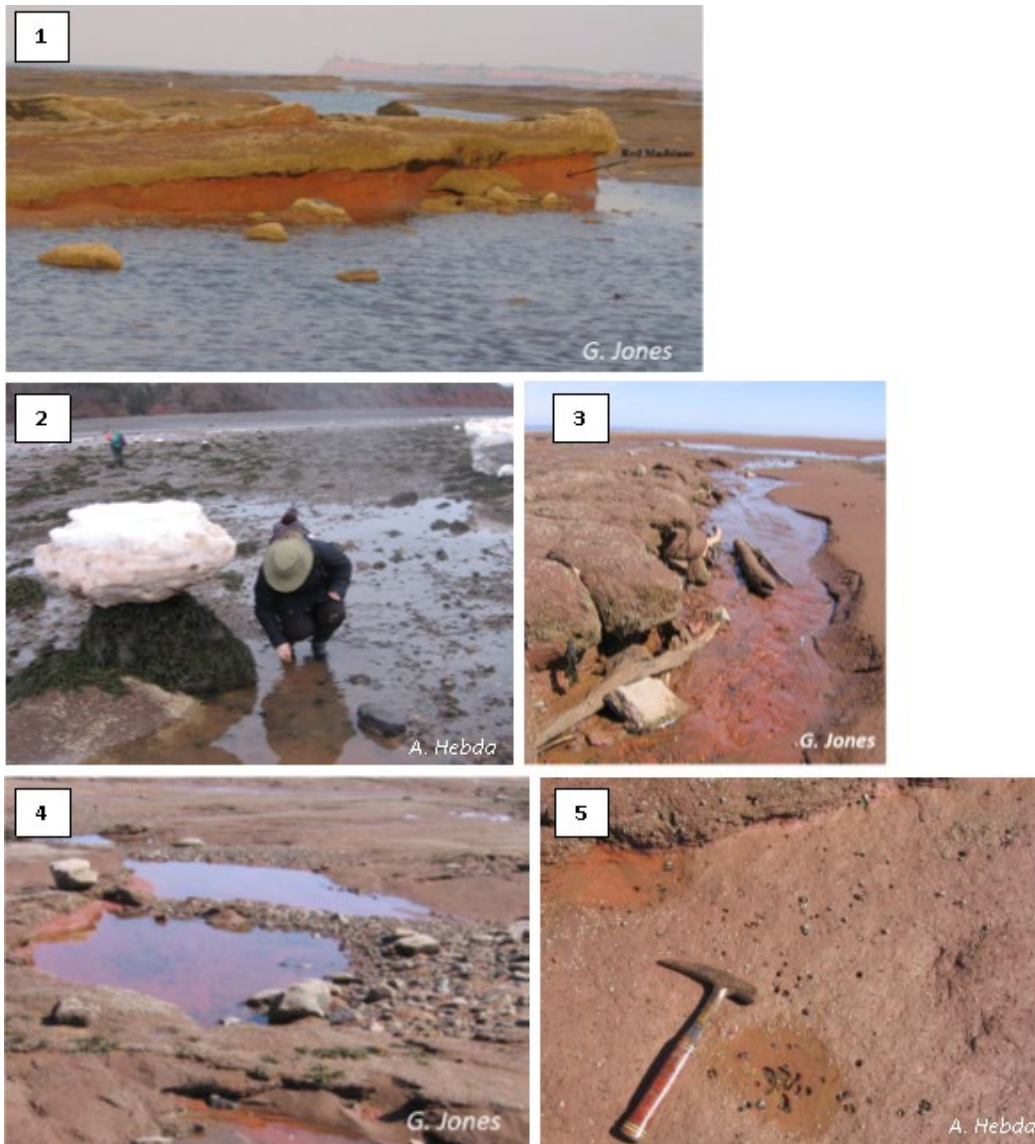


Figure 1: Atlantic Mud-piddock burrows may be found (1) embedded under resistant “capstone” substrate; (2) associated with more resistant bedrock features, such as a boulder, pictured here, or large cobbles or other exposed rock material; and in exposed surfaces created by erosion of resistant rock, e.g. in (3) rivulets, (4) tidal pools, and (5) patches in the intertidal zone.

Once an Atlantic Mud-piddock larva settles on the mudstone and creates a burrow, the individual is immobile for the remainder of its life. The suitable area of substrate for Atlantic Mud-piddock larval settlement is estimated at less than 1.84 km² and occurs in a narrow band in the intertidal where salinities typically range from 14-30 parts per thousand (ppt).

The burrow or bore hole (hereafter known as the burrow) of each individual Atlantic Mud-piddock is its residence. Since there is a one-to-one correspondence between each individual Atlantic Mud-piddock and its burrow, the distribution of residences matches precisely the distribution of the post-settlement population, and is not a sub-area of the distribution (Figure 2).

Atlantic Mud-piddock can only persist in the absence of rapid or significant sediment accumulation, as they are subject to smothering in severe sedimentation events common in many estuaries. The burrows must be located where adequate currents can prevent accumulation of sediment in the burrows, to prevent suffocation, and to allow the animals to filter feed organic matter out of the water. They also require well oxygenated waters, due to confinement in the burrows. The species is completely reliant on the conditions being suitable outside the burrows, as they cannot relocate if conditions deteriorate and become inadequate.

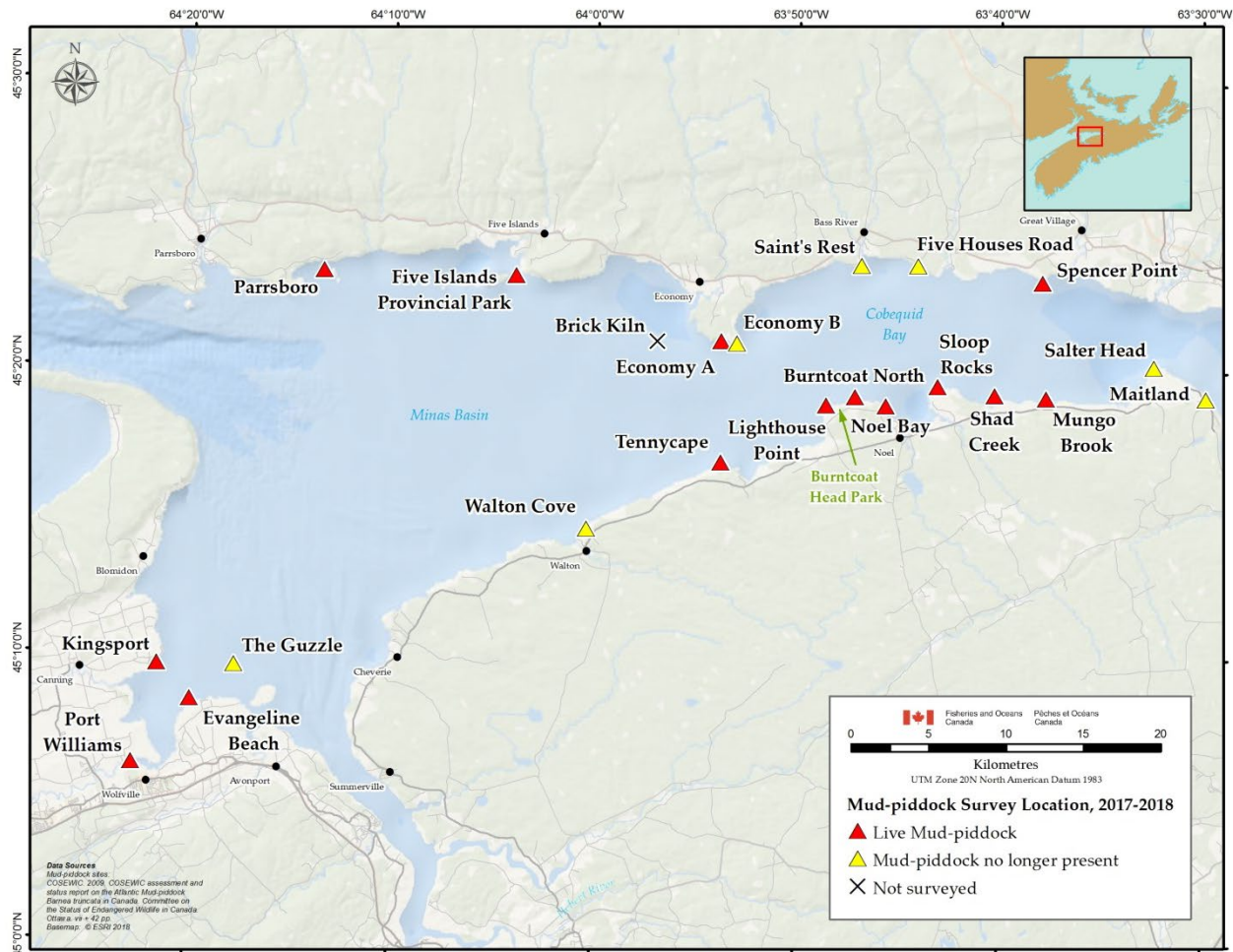


Figure 2: Distribution of Atlantic Mud-piddock in Canada based on field surveys in 2017/2018.

2.0 Structure, Form and Investment

The process of constructing a residence starts when the larva settles and actively burrows into the substrate. The presence of a functional foot and a still-functional velum (membrane) in the larval stage suggests mobility allowing for some substrate selection when the larva settles. As the Atlantic Mud-piddock grows, the size of the burrow increases in diameter resulting in a conical hole that ultimately traps the animal inside (Figure 3). The adult Atlantic Mud-piddock,

typically 3-5 cm in length, relies on its constructed burrow for protection because it is unable to fully enclose itself in its shell.

The Atlantic Mud-piddock's burrow starts at the surface of the substrate and continues to a point below the lower end of the valves (or shells). The burrow ends below the valves where the Atlantic Mud-piddock's foot temporarily anchors to the substrate (to allow for turning of the shell for reaming of the burrow) (Hebda pers. comm. 2017).

The structure and form of the burrow is the residence of the Atlantic Mud-piddock. Their investment is the act of burrowing into the substrate, entering the space and creating the bore-hole that will be occupied for the lifespan of the individual.



Mud-Piddock, Illustration by Jeff Domm / Pholade tronquée, Illustré par Jeff Domm

Figure 3: Cross section of Atlantic Mud-piddock in their burrows, illustrating the entrapment of adults within the substrate.

3.0 Occupancy and Life-Cycle Function

The Atlantic Mud-piddock occupies its burrow year-round for its entire post-larval lifespan. Life cycle functions including growth, maturation, spawning and feeding all occur from within the burrow.

Once created, the burrow of an individual Atlantic Mud-piddock is considered its residence year round for its entire adult lifespan.

4.0 References

- Clark, C.M., Hebda, A., Jones, G., Butler, S., and Pardy, G. 2019. Identification of Atlantic Mud-piddock Habitat in Canadian Waters. DFO Can. Tech. Rep. Fish. Aquat. Sci. 3295. iv + 42 p.
- DFO. 2010. Recovery Potential Assessment for the Atlantic Mud-piddock (*Barnea truncata*). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2010/068.
- Hebda, A. 2010. Information in Support of a Recovery Potential Assessment of Atlantic Mud-piddock (*Barnea truncata*) in Canada. DFO Can. Sci. Advis. Sec. Sci. Res. Doc. 2010/117.
- Hebda, A. pers. comm. 2017. Email correspondence to T. Pelrine. April 2017. Zoology Curator. Museum of Natural History. Halifax, Nova Scotia.