Mussel Survey at Newport Forest September 2014

Kee Dewdney

On the afternoons of August 21, 24 and 28, the valves of stranded mussels on an exposed clay beach on the lower Thames River were systematically examined on one section of beach at a time. Mussels that could not be readily identified on site were collected for further examination. Except for voucher samples, all of them were eventually returned to the beach. Some 157 individuals were classified into 16 species and the resulting counts were compiled into a standard species/abundance diagram, as in Figure 2, below.

The purpose of this survey was to treat the inventory as a random sample of mussels currently in the lower Thames River. The degree to which abundances in a sample reflect abundances in a community is statistical in nature but both sets of abundances tend to reproduce the same underlying distribution in the long run.

Figure 1. Two left-hand valves of the Threehorn Wartyback and a matching pair of valves of the Black Sandshell.

Among the more interesting finds were the Threehorn Wartyback (*Obliquaria reflexa*) and Black Sandshell (*Ligumia recta*), as shown in Figure 1. The figure illustrates a convention used in the survey. Matching pairs of valves, sometimes still connected, sometimes merely lying close together, were counted as a single individual, as with the Black Sandshell. Valves that could not be matched in this manner were counted different individuals, as with the Threehorn Wartyback. Table 1 below lists the composition of the sample, giving both common and scientific names, as well as respective NHIC S-ranks* and abundances.

Common name	Scientific name	Srank	Abundance
Mucket	*Actinonaias ligamentina*	S3	64
Ridged Wedge Mussel	*Alasmidonta marginata*	S3	1
Threeridge	*Amblema plicata*	S4	6
Purple Wartyback	*Cyclonaias tuberculata*	S3	2
Plain Pocketbook	*Lampsilis cardium*	S4	3
White Heelsplitter	*Lasmigona complanata*	S4	22
Fluted Shell	*Lasmigona costata*	S5	5
Fragile Papershell	*Leptodea fragilis*	S4	9
Black Sandshell	*Ligumia recta*	S3	1
Threehorn Wartyback	*Obliquaria reflexa*	S1	2
Pink Heelsplitter	*Potamilus alatus*	S3	10
Pimpleback	*Quadrula pustulosa*	S3	13
Mapleleaf	*Quadrula quadrula*	S3	15
Deertoe	*Truncilla truncata*	S3	4
Rainbow Shell	*Villosa iris*	S3	1

Table 1. Mussel species in the sample, with S-ranks and abundances.

The next figure shows the same data in graphical form. Each square stands for a species and its position on the horizontal axis indicates abundance. Sometimes, as in the first two abundances, more than one species occupy the position, in which case they are stacked, with the abundance position acting as a bin.

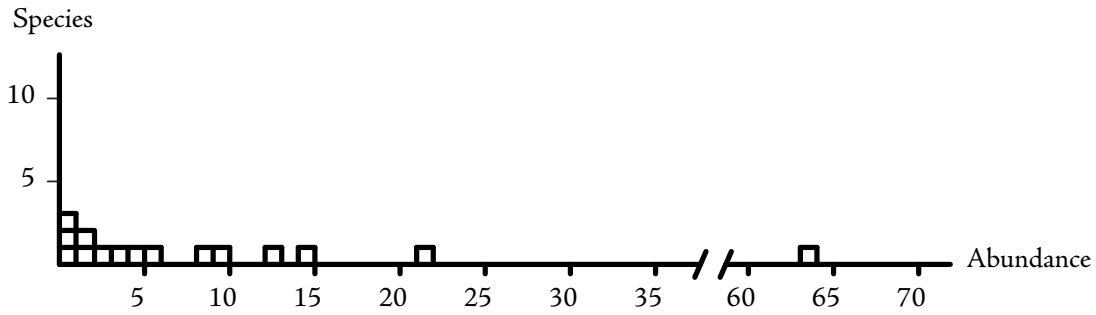

Figure 2. Species/abundance histogram of species in the sample.

With some 33 species of mussel in (or potentially in) the Lower Thames drainage, one may ask first how many actually inhabit this area and then ask which ones did

not appear in the beach sample. According to range maps in Clarke (1981) the following species, in addition to the ones listed above, are also known from the Thames River or *may* occur there.

Common name	**Scientific name**
Brook Wedge Mussel	*Alasmidonta viridis*
Cylindrical Floater	*Anodontoides ferussacianus*
Spike Clam	*Elliptio dilatata* √
Tricorn Pearly Mussel	*Epioblasma triquetra*
Wabash Pigtoe	*Fusconia flava* √
Wavy-rayed Lampmussel	*Lampsilis fasciola*
Fat Mucket	*Lampsilis siliquoidea*
Brook Lasmigona	*Lasmigona compressa* √
Pointed Sand Shell	*Ligumia nasuta*
Round Hickorynut	*Obovaria subrotunda*
Round Pigtoe	*Pleurobema sintoxia*
Kidney Shell	*Ptychobranchus fasciolaris*
Common Floater	*Pyganodon grandis* √
Salamander Mussel	*Simpsonaias ambigua*
Creeper	*Strophitus undulatus*
Lilliput Mussel	*Toxotasma parvus*
Fawns Foot	*Truncilla donaciformis*

Table 2. Mussel species that did not appear in the sample.

Some of these have been recorded at Newport Forest in previous years, as marked with a check (√). On the basis of Table 2, one could say that the mussel section of the Newport Forest ATBI list, with some 21 species recorded, is nearly 2/3 complete, especially given the uncertain nature of watershed data that forms the basis of range maps. In other words, a species may be found in one river of a watershed, but not another, yet the range map may cover the entire watershed.

The distribution of abundances shown in Figure 2 is quite typical, having a shape that is informally known as the J-curve among population biologists. There are some 10 different proposals for the theoretical distribution that underlies the J-curve, a clear indication of the unsettled nature of theoretical ecology. The problem has arisen as the result of inadequate testing of proposed distributions against real sample data. An extensive test of certain proposals against some 125 randomly selected samples of various groups has revealed an underlying distribution that is hyperbolic in nature. The hyperbolic shape, a more subdued form of which also informs the source community, is an entirely natural phenomenon. This does not

mean that protection of endangered species is not a good idea, especially in this age of hyperpollution. But it does mean that there are always "rare" species in every large community of organisms, showing up in samples just once or not act all. Of course, if species in this abundance regime are not protected, they may well be extirpated or become extinct sooner than might otherwise be the case.

* Briefly, the S-ranks have the following interpretation: S1 Critically imperiled; S2 Imperiled; S3 Vulnerable; S4 Apparently secure; S5 Secure. For more on S-ranks, read the "NHIC Newsletter 2013 - Ontario". When placed in your browser window, that title will take one directly to the document reference. Click on that.

Names Used: The common and scientific names used in this report are drawn mainly from Metcalfe-Smith et al. (2005). Some scientific names have changed over the 25 year since Clarke (1981).

About the Author: Outside of Newport Forest and its concerns, I have worked as a population biologist for over 20 years, publishing several papers while Adjunct Professor in the Biology Dept. of Western University. My new monograph is now ready for publication: *The Stochastic Community: Toward a Statistically Exact Theory of Biodiversity*.

Acknowledgement: Pat Dewdney helped collect the mussel specimens and prepare them for examination. Field assistants Sama Abid and Laura Lee also assisted with the collection.

References:

Clarke, Arthur H. 1981. *The Freshwater Molluscs of Canada.* National Museums of Canada, Ottawa CANADA.

Metcalfe-Smith, Janice, MacKenzie, Alistair, Carmichael, Ian, McGoldrick, Daryl. 2005. *Photo Guide to the Freshwater Mussels of Ontario*. St Thomas Field Naturalist Club, Inc. St Thomas ON, Canada.