Experimental beach reclamation utilizing scallop shells enclosed in porous bags (the project was suggested by Renée Roberge P.Eng., of the HRM's EMS Dept. (2002 and 2004)

..... *presented by Shalom Mandaville of the SWCSMH to the ESSC on October 3rd., 2024*

World class Bacterial Source Tracking (BST) of the lead indicators, Bacteroides Prevotella species, 2003 at the Maynard Lake beach in Dartmouth (funded mostly by HRM, and historical data collection partly by NSECC)

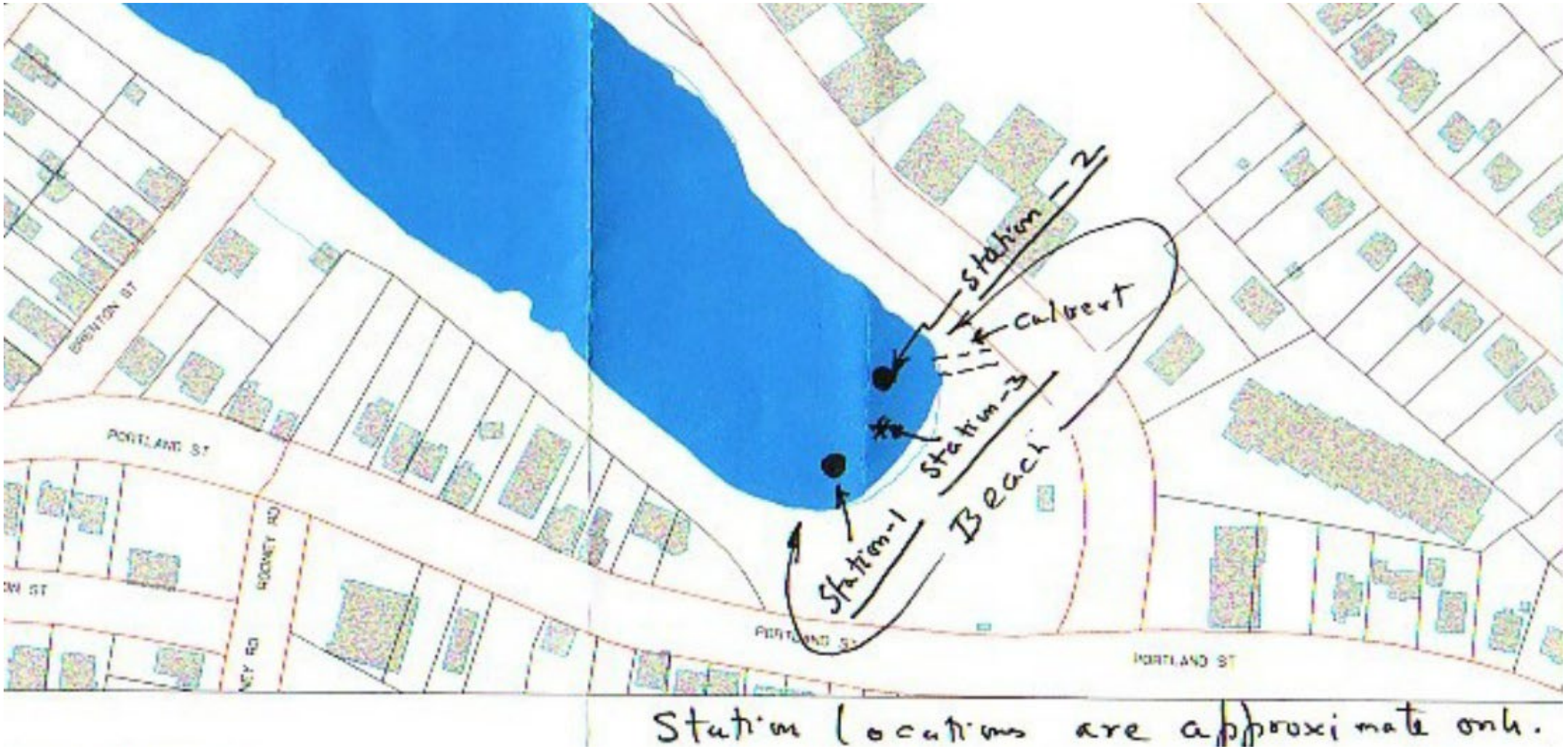
Essentially, the following report from the "The" world-class expert, Prof. Kate Field PhD of the Oregon State University on the BST based on the common anaerobic Bacteroides Prevotella species concludes that 50% of the filters were positive for one or both human markers; none of the filters were positive for the dog marker; and that all the 17 filters were positive for the non-specific fecal marker. It further states that in the obvious absence of farm animal impact, the most likely source is waterfowl since the non-specific fecal marker readily detects waterfowl fecal contamination.

For a background literature and associated synopsis on BST, see the report prepared by Applied Limnologist, Shalom M. Mandaville.

One of the technologies applied, notwithstanding the varying *E.coli* sources, was the experimental methodology implemented elsewhere by students, Trottier, Beaton-Johnson, and Fares, which has received acclaim from Director General, George Iwama PhD (pers. comm. April 17, 2003), and from Laura Brown PhD (pers. comm. May 09, 2003) of The National Research Council of Canada (NRCC), Halifax.

Trottier, Beaton-Johnson, and Fares had carried out the scallop shell experiment at other areas and at the NRCC At Maynard Lake, they installed the porous bags containing the empty scallop shells close to the beach.

Beach sampling: SWCS and HRM during 2002, and SWCS during 2004



2002	
	FC (#s/100ml)
Station-1 (August 21, 2002)	62
Station-2 (August 21, 2002)	69
Station-1 (August 28, 2002)	3,106
Station-2 (August 28, 2002)	90
Station-1 (August 30, 2002)	774
Station-2 (August 30, 2002)	4,824
Station-1 (September 04, 2002)	3,972
Station-2 (September 04, 2002)	1,374
Station-1 (September 12, 2002)	4,838
Station-2 (September 12, 2002)	2,600
Station-3 (September 24, 2002)	>4,838
Station-3 (October 03, 2002)	2,600
Station-3 (October 15, 2002)	1,034
Station-3 (October 17, 2002)	472
Station-3 (October 28, 2002)	311
Station-3 (November 07, 2002)	821
Station-3 (November 12, 2002)	>4,838
Station-3 (November 19, 2002)	140
Station-3 (November 21, 2002)	3,972
Station-3 (November 26, 2002)	>4,838

Results were encouraging when comparing the data from year-2004 with that of year-2002. We did not continue the project beyond 2004 since the HRM had declined to fund further sampling analyses.

Station-3 (July 04, 2004)	**160**
Station-3 (July 13, 2004)	**166**
Station-3 (July 16, 2004)	**35**
Station-3 (August 13, 2004)	**28**
Station-2 (August 17, 2004)	**84**
Station-2 (August 19, 2004)	**63**
Station-3 (August 27, 2004)	**51**

(Excerpts from two prior reports by Trottier, Beaton-Johnson, and Fares on the use of scallop and clam shells supported by the NRCC of Halifax. Study areas were the McIntosh Run, Spryfield, and the Springfield Lake WWTP)

"The applications of this project can be used in several areas to improve water quality. For the sewer outfalls, it may be proposed that cages of scallop shells be placed at the mouth of the outfall to reduce fecal coliform and sediment. This will eliminate the smell of the water near the outfalls as well.

This shell procedure could also be used during the summer swimming season to quickly and efficiently stabilize water that has become elevated, above accepted levels, with fecal coliforms. It would be an inexpensive, environmentally friendly, and life saving procedure."

(…… excerpts continued)

“The results from the experiment conducted on the McIntosh Runs show that the shells are effective in the field as well as in the lab. The most probable reason for this is the micro-filter present on the surface of the shell and the chemical make up of the shell itself. There are many holes the size of bacteria within the filter and that is why this is speculated. In essence, one shell can transform half a litre of sewage water into legal recreational swimming water in only one day.

The decrease in conductivity shows that the amount of metal cat-ions in the water also decreased after the shells were added.

The results from the experiment conducted at the sewage treatment plant in Springfield Lake show that the shells are effective in aiding the process of purifying sewage water even in an industrial environment. The shells proved to withstand a constant flow of sewage water for approximately twenty days without showing any sign of a drop in the shells efficiency.”

Abstract/Summary (S.M. Mandaville, February 2002 report to HRM)

Bacterial Source Tracking (BST) is a new methodology that is being used to determine the sources of fecal bacteria in environmental samples (e.g. from human, livestock, or wildlife origins). BST methodology has been described as having the ability to turn nonpoint sources into point sources. BST is also called Microbiological Source Tracking (MST), fecal source tracking, or fecal typing.

This review concludes that there is no easy, low-cost method for differentiating between human and non-human sources of bacterial contamination at the present time. Quantifying the contribution from different sources is as yet not possible.

A "toolbox" approach seems warranted where the method chosen depends on the types of fecal sources that one has to deal with (or the questions one needs answered). Obtaining similar results with different BST methods also improves the chances that the source identifications are correct.