

*The following report and diagram were supplied to Friends of Penobscot Bay on April 9, 2014 by Dr. Mark Green, PhD, Biologist, Saint Josephs College, Standish, Maine 04084. Aerial photos of site also below.*

**from:** Mark Green <[mgreen@sjcme.edu](mailto:mgreen@sjcme.edu)>

**to:** Ron Huber <[coastwatch@gmail.com](mailto:coastwatch@gmail.com)>

**date:** Wed, Apr 9, 2014 at 7:21 PM

**subject:** RE: GAC Chemical intertidal acidity sampling results - and another sampling run suggested mailed-by: sjcme.edu

*Hi Ron,*

*Here is the pH data and a brief summary of how I would interpret. You have yourselves some very acidic sediments. I'd be very concerned about several things, not the least of which is that at pH's this low, metals will certainly be mobilized where otherwise they would be locked onto sediment particles.*

*I wish I could have done more but alas it was what kept getting placed on the back burner every time something else came up.*

*I don't think this should become a divisive issue. The sediments are leaching 'battery acid' and that's not good....*

*Mark*

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*See following pages for test results and maps*

## **SUMMARY OF SEARSPORT SEDIMENT TESTING.**

By Dr. Mark Green,

St Josephs College April 9, 2014

"pH was measured in sediment samples taken from the upper Penobscot Bay adjacent to the Kidder Point shore near an eroding waste dump of phosphogypsum. pH was measured using a Accumet AB15 pH meter equipped with a Corning rugged combination electrode by slowly inserting the electrode directly into the sediment using a modified micro-manipulator. The electrode was equilibrated using standard 'Tris' buffers for seawater. pH was measured at 3 to 5 stations along a series of transects, A through E. Some general observations can be made from the resulting data.

- 1) There are multiple stations where pH falls well below anything typically reported for nearshore marine sediments. pH below ~6.7, to my knowledge, has never been recorded in nearshore, unperturbed, temperate mud. The only known exception being highly organic rich deposits where sulfide oxidation is occurring just below the sediment-water interface, as reduced S<sup>2-</sup> diffuses toward a well oxygenated overlying water. However, sediments measured here were large grained sand deposits, with little organic matter present. There was no hint of sulfide odor suggesting sulphate reduction and subsequent S<sup>2-</sup> oxidation as a source of these acids.
- 2) pH's in the 1's, 4's, 5's and low 6's should be considered extremely acidic and incapable of supporting any marine life. Indeed, quick microscopic analysis of these sediments (stations A1, A2, A3, B1, B2, B3, B4, B5, D4) found no evidence of any of the marine meiofauna normally ubiquitous in coastal temperate muds (e.g. nematodes, foraminifera, small bivalves, etc.). Sediments from a transect across the bay found several small polychaetes, benthic forams, and nematodes.

***Continued on page 3***

3) Based on the proximity of these stations to the phosphogypsum waste area at Kidder Point there is little doubt that these deposits are being severely impacted by runoff at the adjacent shoreline. Understanding the ultimate fate of these acids and some of their other impacts, in particular their role in the mobilization of potentially toxic metals, should be determined. Results presented here clearly demonstrate a significant anthropogenic acid source and should merit concern for the well being of local residents in contact with these sediments, recreation in the immediate area, and wildlife.“

[End of note]

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**See page 4, below, for pH results** at sampling sites A.B,C, D & E

**See pages 5 & 6, below, for aerial photographs** of sampling sites A.B,C & E (Site D beach south of abandoned pumphouse at north end of property, not visible on page 5

## SEDIMENT SAMPLE TEST RESULTS

Site	pH
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<u>A-1</u>	<u>1.4</u>
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<u>A-2</u>	<u>5.72</u>
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<u>A-3</u>	<u>6.44</u>
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<u>A-4</u>	<u>6.83</u>
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<u>A-5</u>	<u>6.78</u>
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<u>B-1</u>	<u>6.26</u>
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<u>B-2</u>	<u>6.38</u>
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<u>B-3</u>	<u>6.03</u>
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<u>B-4</u>	<u>6.09</u>
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<u>B-5</u>	<u>6.14</u>
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<u>C-1</u>	<u>6.39</u>
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<u>C-2</u>	<u>6.65</u>
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<u>C-3</u>	<u>7.07</u>
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<u>C-4</u>	<u>7.13</u>
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<u>C-5</u>	<u>7.15</u>
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<u>D-1</u>	<u>6.86</u>
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<u>D-2</u>	<u>6.95</u>
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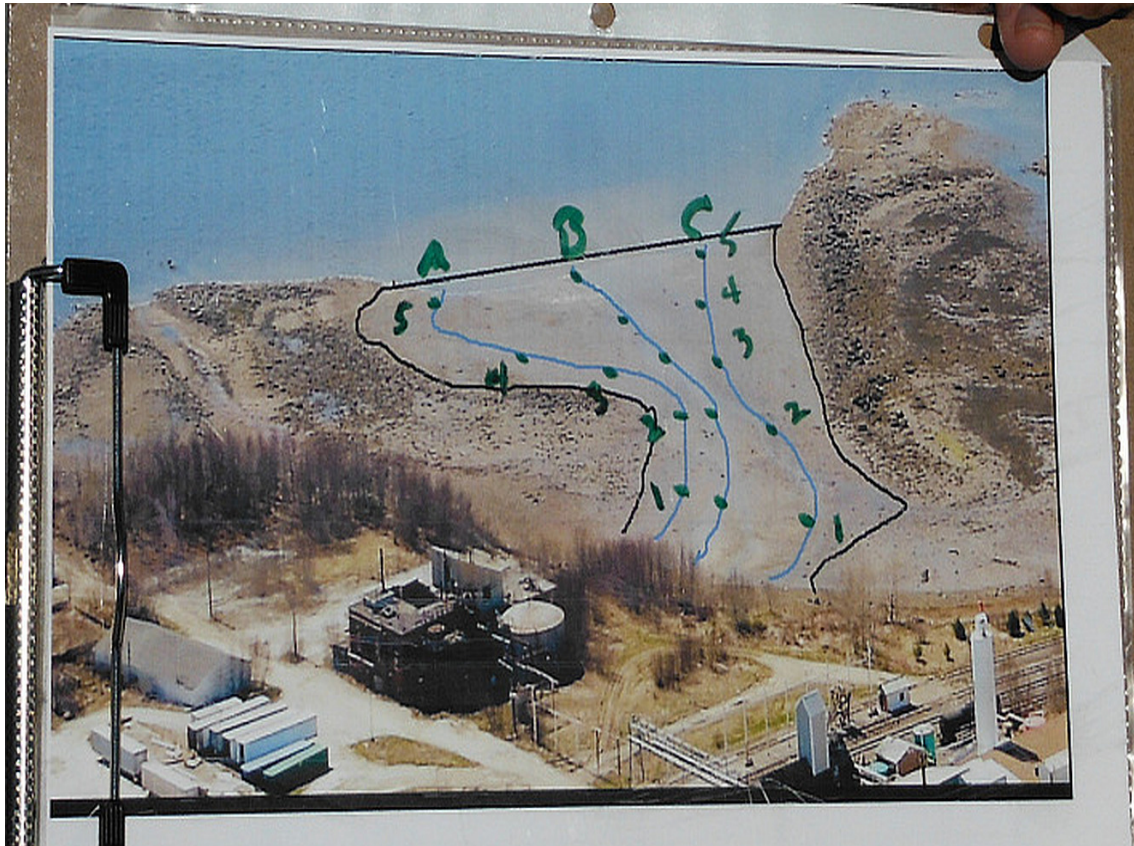
<u>D-3</u>	<u>6.72</u>
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<u>D-4</u>	<u>4.55</u>
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<u>E-1</u>	<u>7.06</u>
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<u>E-2</u>	<u>7.08</u>	Site: <b>E-3</b>	pH: <u>7.00</u>
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Sediment testing 050114. Sample lines E in lower photo)





Sediment sampling runs, Stockton Harbor, 1/30/14 for pH testing by Dr Mark Green, St Joseph's College, Standish, ME, for Friends of Penobscot Bay. Photo courtesy Project Lighthawk