Today's date: March 18, 2014

Project number: R/CE-139

Project title: Mercury Dynamics in Estuarine Sediments: Biogeochemical Controls on Bioavailability and Bioaccumulation Along a Chemical Gradient

Project initiation date: 6/1/2008

Project completion date: 9/1/2011

Principal investigator: Celia Y. Chen

Affiliation: Dartmouth College, Dept. of Biological Sciences

Accomplishments during 2/1/13 – 1/31/14 (Accomplishments are the key actions, activities or products resulting from Sea Grant research projects. They are distinct from impacts in that they reflect ongoing activities or key results that may not yet have had a significant economic, societal and/or environmental benefit but lay the foundation for such a benefit. Accomplishments may evolve into impacts in the future.)

The research conducted under this grant provided preliminary data for several grant submissions in fall 2013 to the National Institute of Environmental Health Sciences and the National Science Foundation. The findings are also reported in a review paper, Sunderland et al. 2012, "Mercury sources and fate in the Gulf of Maine" which was part of a special mercury issue in the journal, Environmental Research.

Impacts during 2/1/13 – 1/31/14 (Impacts are significant economic, societal and/or environmental benefits of research.):

NOTE: Include quantitative data to validate the impact, if possible.

The long term impacts of our research to date will be in clarifying the relationship of sediment biogeochemistry with bioavailability of MeHg in aquatic organisms. Our findings suggest that MeHg concentrations in sediments alone do not determine bioavailability to intertidal organisms and that ecologically mediated processes such as bioturbation and bioirrigation may enhance the flux of MeHg to the water column and increase bioavailability while geochemical factors such as carbon may reduce bioavailability of MeHg.

Economic benefits realized during 2/1/13 – 1/31/14 (businesses retained or created, jobs retained or created, market and non-market economic benefits):

NOTE: Please quantify and provide supporting data if possible.

There have been no economic benefits realized during this period.

Related grants and contracts (Other grants and contracts that funded this research or that were obtained as a result of this research.):

This study benefited from concurrent research funded by the Dartmouth Superfund Research Program entitled: "Toxic Metals in the Northeast: From Biological to Environmental Implications".
Publications to date received by N.H. Sea Grant:

Sedimentary Mercury Dynamics at Two Estuarine Mudflats in Great Bay, New Hampshire. Newsletter distributed to the Maine DEP (Contact, Dr. Barry Mower, E-mail: barry.f.mower@maine.gov), and the Atlantic States Marine Fisheries Commission, NOAA (Contact, Ms. Tara Trinko, E-mail: tara.trinko@noaa.gov), NH Department of Environmental Services (Contact, Mr. Steve Couture, E-mail: steven.couture@des.nh.gov), Fish and Wildlife Service (Contact, Ken Munney, E-mail: Kenneth_munney@fws.gov). UNHMP-IS-SG-12-41

Additional Publications (please cite and attach PDF or send a hardcopy; or provide possible title, authors, etc. and status if not yet published):

Peer reviewed publications:


Voytek M.A., A. Amirbahman, J. Kirshtein, C.Y. Chen, Understanding mercury dynamics in estuarine systems through microbial community analysis. (in prep.) UNHMP-JR-SG-12-11

Students Supported (see next page)
### Students Supported

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Continued or New for 2013?</th>
<th>Where is he/she now?</th>
<th>Institution/Department</th>
<th>Duration of support</th>
<th>Type of support (stipend, travel, supplies, etc.)</th>
<th>Type of degree: Undergrad Master’s PhD</th>
<th>Year degree awarded</th>
<th>Title of thesis if supported by N.H. Sea Grant</th>
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</thead>
<tbody>
<tr>
<td>Lauren Brown</td>
<td>continued</td>
<td>ENVIRON International Corp., Portland, ME</td>
<td>Civil Engineering, University of Maine</td>
<td>2 years</td>
<td>Stipend, travel, supplies</td>
<td>M.S.</td>
<td>2010</td>
<td>Sediment mercury dynamics at two estuarine mudflats in Great Bay, New Hampshire</td>
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</tbody>
</table>