An Integrated Assessment of the Torch Lake Area of Concern

N.R. Urban, J.A. Perliger, C.A. MacLennan, E. Schwaiger, A. Mandelia
Michigan Technological University

Slides from talk presented at Internat. Assoc. for Great Lakes Research Conference, June 2013, Purdue University
## Progress in Areas of Concern

<table>
<thead>
<tr>
<th>AOC</th>
<th>Original # BUIs</th>
<th>BUIs remaining</th>
<th>BUIs delisted</th>
<th>Last update</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinton River</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>2009</td>
</tr>
<tr>
<td>Deer Lake</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2011</td>
</tr>
<tr>
<td>Detroit R.</td>
<td>11</td>
<td>10</td>
<td>1</td>
<td>2008</td>
</tr>
<tr>
<td>Kalamazoo R</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>2012</td>
</tr>
<tr>
<td>Manistique R.</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>2012</td>
</tr>
<tr>
<td>Menominee R.</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>2011</td>
</tr>
<tr>
<td>Muskegon L.</td>
<td>9</td>
<td>6</td>
<td>3</td>
<td>2011</td>
</tr>
<tr>
<td>River Rasin</td>
<td>9</td>
<td>8</td>
<td>1</td>
<td>2012</td>
</tr>
<tr>
<td>Rouge R.</td>
<td>9</td>
<td>9</td>
<td>0</td>
<td>2008</td>
</tr>
<tr>
<td>Saginaw Bay</td>
<td>12</td>
<td>10</td>
<td>2</td>
<td>2012</td>
</tr>
<tr>
<td>St. Clair R.</td>
<td>10</td>
<td>6</td>
<td>4</td>
<td>2008</td>
</tr>
<tr>
<td>St. Mary’s R.</td>
<td>9</td>
<td>9</td>
<td>0</td>
<td>2012</td>
</tr>
<tr>
<td>Torch Lake</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2007</td>
</tr>
<tr>
<td>White Lake</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>2011</td>
</tr>
</tbody>
</table>
Genesis of the Problems

1862 First stamp mill built in Lake Linden on Torch Lake

State geologist Douglass Houghton makes 2nd mineral exploration in Copper Country
Lankton 2005

C & H smelter, 1887-1967; Emitted mercury plume; Removed arsenic with soda treatment of slag;

Ahmeek Mill, 1910-1957
Electricity generation, distribution components
Fish tumors observed
Site investigation
Placed on NPL
PRPs sought
Listed as AOC
Remedial Investigation
Record of Decision

PAC elections
$15M funding announced
Capping of tailings piles
AOC boundaries agreed upon
Partial site delistings
PAC request to delist
RAP Update, 2 BUIs remain

Public Meetings

U.S. EPA – SF/NPL

Placed on NPL
Record of Decision

Capping of tailings piles
Partial site delistings

EPA/MDEQ – AOC

Listed as AOC

PAC elections
AOC boundaries agreed upon
RAP Update, 2 BUIs remain

ATSDR/MDCH

Public Health Assessments

EPA – SF/ER

Emergency removals

MDEQ

Water Division - TMDLs
Remediation Div. – Site Investigations
Remediation Div. – Sec. 201 Facilities actions

<table>
<thead>
<tr>
<th>Year</th>
<th>Problem Description</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>Fish tumors</td>
<td>MDPH</td>
</tr>
<tr>
<td></td>
<td>Copper (ecol. Harm)</td>
<td>EPA</td>
</tr>
<tr>
<td></td>
<td>Airborne metals</td>
<td>EPA</td>
</tr>
<tr>
<td></td>
<td>Benthos, toxins &amp; tumors in fish</td>
<td>AOC</td>
</tr>
<tr>
<td>1990</td>
<td>PAHs in soil</td>
<td>ATSDR</td>
</tr>
<tr>
<td></td>
<td>Mercury, PCBs in fish</td>
<td>MDCH</td>
</tr>
<tr>
<td>2000</td>
<td>Arsenic, lead, PCBs</td>
<td>EPA</td>
</tr>
<tr>
<td></td>
<td>Benthos, toxins in fish</td>
<td>AOC</td>
</tr>
<tr>
<td>2010</td>
<td>Metals in soils</td>
<td>MDEQ</td>
</tr>
<tr>
<td></td>
<td>Asbestos, PCBs</td>
<td>MDEQ</td>
</tr>
<tr>
<td></td>
<td>Physical hazards, metals in soil</td>
<td>ATSDR</td>
</tr>
</tbody>
</table>
Public Perceptions after 30 years?

PAC: We’ve been going hard at this for 30 years ...
We got the money to remediate the place!
We don’t understand why it can’t be delisted; nothing has changed for 10-15 years ...
We say that EPA and MDEQ have broken their contract ...
We’re about ready to retire from this ...

Cancer incidence

Would you let your kids swim/play there?
Soil contamination: metals, PAHs, PCBs
Benthos degradation (copper), toxics in fish (PCBs, Hg)
PCBs in Torch Lake

Locations of PCBs In and Near Torch Lake

Legend
- Green circle: Detected in Sediment
- Purple triangle: Detected in Soil
- Blue square: Detected in Groundwater

Diagram showing the flow of PCBs between gas, precipitation, dissolved, particle-bound, contaminated sediments, and sediment-bound through net air-water exchange.
Summary

• Torch Lake AOC has complex mixture of pollutants, human and ecosystem health threats;
• Multiple governmental agencies are working independently on multiple facets of problems;
• Even concerned and involved members of the public do not understand the scope of the problem or possible solutions;
• Integrated assessments can provide a) new insights from new approaches; b) bridges between numerous parties; c) some level of oversight.