

St. Marys River Remedial Action Plan Annual Report to the St. Marys River Binational Public Advisory Council

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Objective of Report

The main purpose of this report is to inform the Binational Public Advisory Council (BPAC) about progress made towards fulfilling the objectives set forth by the Ministry of the Environment and Environment Canada in the funding agreement pertaining to the St. Marys River Area of Concern.

Progress to Report

The accomplishments to report span across several areas, including: communication and public outreach initiatives; technical and scientific support for RAP-related objectives; stakeholder engagement in discussions and progress specific to finalizing the delisting criteria and Implementation Annex; support of the Binational Public Advisory Council (through website updates, assistance with hosting meetings, and the recruitment of new members), and; marketing of the St. Marys River RAP both regionally and internationally.

The following summary provides a detailed breakdown of progress related to each of the ten project objectives.

Actions Coinciding with Objectives:

Objective #1

Raise local awareness of the St. Marys River Remedial Action Plan and related priority actions

- Updates were made regularly to the Water Portal (sustainablewater.org) and BPAC (www.lssu.edu/bpac) websites. Included in the updates were postings related to: the International Upper Great Lakes Study and their new regulation plan for Lake Superior outflows; news related to the Great Lakes including Asian Carp and recent fish kills (associated with higher temperatures and drought); Great Lakes grant opportunities; MNR lake surveys; upcoming BPAC meetings; local water protection and preservation workshops and events (e.g., 'Whatever Floats Your Boat', the Cloverland Electric and LSSU Aqua Lab Open House, the Green Expo, and Sault Sailabration). The breadth of information posted on the BPAC website (including downloadable materials) was also expanded upon, and improvements to the organizational structure of the website were made.
- Mr. Andrew Ault, a student on contract with SSMIC, working under the direction of Dr. Antunes and Jason Naccarato (VP of Development at the Sault Ste. Marie Innovation Centre (SSMIC)), developed a SSMIC Water Division website where the St. Marys River RAP is highlighted as one of the principle SSMIC focus areas. In addition to creating the website and uploading the content provided by Dr. Antunes and Ms. Barrett, Mr. Ault also added a new page on the Water Portal website called 'In the News' – a page that

automatically displays bi-national articles in press that deal with the St. Marys River, including any topics relevant to the beneficial use impairments.

- Mrs. Maude Barlow was invited to speak at a Speaker Series event hosted by SSMIC on January 24th. Ms. Barrett, Mr. Scornaienchi, and Ms. Lorelei Premo were all in attendance, as well as Dr. Antunes who co-presented at the event. Ms. Barrett also assisted Ms. Medaglia with promoting the event, sending invitations out to BPAC members, local First Nations, agency representatives, and local interest groups.
- Ms. Barrett and Dr. Antunes prepared a handout for the teachers and parents of the students at Anna McCrea Public School, outlining the rules of the St. Marys River contest (distributed to students March 19th, 2012). A Water Portal bookmark was also created with the help of Lorelei Premo, Marcus Scornaienchi, and the Algoma University graphic design team. This bookmark was given to the students along with the contest rules in an effort to provide students and parents with learning materials related to water sustainability and the St. Marys River RAP. To promote the contest and answer questions, Ms. Barrett visited Anna McCrea to set up a RAP booth at the front of the school which stayed up during the week. Ms. Barrett also gave a guest appearance in all of the classrooms to speak about the importance of the St. Marys River and the need to keep it clean. During the event, Ms. Barrett spoke about Canada Water Week and World Water Day. Ms. Barrett, Mr. Scornaienchi, Ms. Premo, and Dr. Antunes judged the submissions (handed in March 26th) and chose one winner from each age group. Each of the three winners won a pizza party for their entire class, and the entire school was given Freezies in appreciation for their participation. All drawings submitted were posted on the Water Portal, as well as the winning poem. Overall, the public outreach initiative was highly successful, as many teachers incorporated the St. Marys River into their curriculum for the entire week. During computer studies, students of all grades logged on to the Water Portal to learn about the St. Marys River RAP and played the water-related games and activities hosted on the Portal.
- The St. Marys River Communication Strategy was updated and comments provided by Mrs. McChristie (MOE), Ms. Taillon (EC), and Mrs. Romaneh (EC) were incorporated.
- Outreach materials related to the St. Marys River RAP (including the RAP fact sheet, BPAC handouts, and Water Portal Bookmarks) were handed out at the Coverland Electric and LSSU Aqua Lab Open House held June 29th, in Sault Ste. Marie, Michigan, at the Green Expo held in Desbarats in Bruce Mines, Ontario, on July 6th-7th, and at Sault Ste. Marie, Michigan's Oktoberfest on September 22nd. Attendees at these events were also engaged in discussions about the St. Marys River RAP and encouraged to join BPAC.
- At the request of Mrs. Joanne Robertson (Anishinaabe Outreach Officer and AMIK Coordinator), children in grades 4-6 and 4-8 were taught about water quality, the St. Marys River, and the importance of beavers in local ecosystems during 4 morning sessions at Algoma University's AMIK Summer Camp. These teaching sessions were enhanced by water quality activity centers borrowed from the Conservation Authority, which allowed children to play interactive games to facilitate learning.

- Ms. Barrett and Ms. Lorelei Premo participated in the SSMIC's Advanced Research and Technology Innovation Expo (ARTIE), where together they taught over 650 students from elementary schools throughout Sault Ste. Marie and the Algoma region about the microscopic animals that live in the St. Marys River, and how pollution can affect them and their ecosystem.

Objective #2

Facilitate the exchange of information between government agencies and non-government stakeholders, such as the BPAC

- Ms. Barrett worked with the Sediment Management Technical Team to prepare a PowerPoint presentation on the St. Marys River and Contaminated Sediment Management. Ms. Barrett presented the information to the Métis Nation of Ontario (MNO) on February 29th alongside Mrs. Taillon. Dr. Antunes also attended and helped provide answers to questions posed by the members of the MNO (along with Mrs. Kay Kim, Ms. Sue-Jin An, Mrs. Michelle McChristie, and Ms. Tara George, who participated in the presentation via conference call).
- On March 17th, 2012, Ms. Barrett travelled to Sault Ste. Marie Michigan to participate in the BPAC/LSSU Environmental Summit. At the Summit, Ms. Barrett presented RAP and BPAC related information to the public, and sat in on sessions related to Ashmun Creek Restoration, World Water Day, Native Plant Use, and Rivers as Recreation.
- A RAP Team Implementation Committee meeting held May 30th was attended by representatives of the MNR, the DFO, and the City of SSM Ontario. These agencies provided comments on the delisting criteria prior to the meeting, which were further discussed at length during the meeting. Representatives from the RCA and APH were not able to confirm attendance at the meeting, so the scope of the meeting was revised to focus on the fish health related delisting criteria (restrictions on fish consumption, body burdens, fish tumors and other deformities, and population dynamics). The minutes of this meeting were recorded and distributed to all agency representatives, as were the delisting criteria (revised as per the meeting outcome).
- The second RAP Team Implementation Committee meeting, held September 19th, was attended by representatives of the local MOE, SSMRCA, and the City of SSM Ontario. The topic of discussion was the newest draft of the Implementation Annex. Each agency provided valuable input which was incorporated into the Annex. Representatives from the MNR, DFO, and APH were not able to confirm attendance, but will be included in the ongoing follow-up and communication to this meeting (including minutes and subsequent drafts of the Annex).
- Correspondence was initiated with the DFO and Environment Canada regarding the ecological sampling planned for this past summer. This was done to inquire about possible synergies or collaborative opportunities with respect to sampling efforts, and also to understand whether aspects relevant to the St. Marys River RAP were accommodated in the planned sampling. Environment Canada followed up by providing

the workplan and scope of projects in progress related to fish and wildlife for 2011-2013.

- A grant application was written and submitted to the Local Initiatives Fund, made available by the Community Development Corporation of the city of Sault Ste. Marie. The five thousand dollars (\$5,000) requested will help to further develop the Water Portal in ways that will attract more visitors to the site, and better showcase local water-quality initiatives. This grant application was approved for funding and is now being managed by Dr. Antunes at SSMIC.
- A grant application was also prepared and submitted for the Great Lakes Guardian Fund. The objective of the proposed project is to create signage along the SMR-portion of the recreational Hub Trail, and undertake a public outreach initiative that would engage 40 high school students in completing a Watershed Management Plan project. The project is intended to teach high school students about the SMR RAP and overall factors that influence soil and water sustainability within a watershed.
- The new Michigan DEQ AOC Coordinator, Mr. Bretton Joldersma, was introduced at the July 31st BPAC meeting where Michigan's assessment of the aesthetics BUI was presented and discussed.

Objective #3

Compile a list of outstanding remedial actions based on the Stage 2 RAP report and the review conducted in 2011/12, and continue development of the Implementation Annex

- Work on the Implementation Annex continued in an effort to prioritize remaining actions such as updating delisting criteria and determining the need for sediment management action. A first draft of the Implementation Annex was submitted to the Steering Committee for review. The revised Annex was discussed among agency representatives at the September Implementation Committee meeting. Since the DFO and MNR were not able to make the September meeting – and the meeting length precluded discussion of all actions, Ms. Barrett meeting with representatives from each agency individually from October through to December. Ms. Barrett is currently updating the Annex with the agency-specific information provided at each of those meetings.

Objective #4

Finalize delisting criteria to establish clear targets for measuring each BUI

- The most recent versions of the fish health related delisting criteria were shared with EC and the MOE, and updated as per the feedback provided. This revised version was subsequently shared with representatives of the MNR, DFO, and the City at the May Implementation Committee meeting. Comments from all agencies have been incorporated. This proposed final draft is now being circulated to the Implementation Committee for final approval. It was decided during one of the bi-weekly RAP Coordinator calls that the best plan of action would be to share the finalized criteria

with the BPAC in the future as a package with the Implementation Annex and water quality related BUIs.

- Progress was also made on the water quality related delisting criteria. This included a literature search and personal communication with agencies to determine which nutrients are the most limiting to the St. Marys River, and what is removed / measured at the East End Wastewater Treatment Plant. The final drafted water quality delisting criteria were discussed individually with agency representatives of the Implementation Committee – from September to December – as there was not enough time to discuss them at the September Implementation Committee meeting. The results of those meetings are currently being incorporated into the delisting criteria.

Objective #5

Provide support to BPAC in the continued development, implementation, and progress of the St. Marys River RAP

- Both Canadian and U.S. BPAC meetings were organized and scheduled. The Canadian meetings took place on March 27th and September 26th, while the Michigan meetings took place on February 7th, May 24th, July 31st, and November 13th 2012.
- Minutes were recorded at the meetings and subsequently posted to the BPAC website (after approval from the Executive). Follow-up actions were also executed in a timely fashion.
- Assistance was provided to Dr. Greg Zimmerman (2011-2012 BPAC Chair) in reviewing a survey sent out by the Michigan SPAC requesting updated BPAC information.
- During the BPAC elections, held at the May 24th meeting, Dr. Paula Antunes was elected 2012-2013 Canadian Chair, Mr. Mike Ripley as U.S. 1st Vice Chair, and Mr. Don Marles as Canadian 2nd Vice Chair.
- A survey for BPAC members was prepared using Survey Monkey which enabled them to indicate whether they: agree with the DEQs assessment of the Aesthetics BUI; are in favor of writing of a letter of support of delisting this BUI for the U.S. St. Marys River RAP, and/or; believe there are outstanding concerns or issues that need to be addressed before delisting the aesthetics BUI. Feedback on this survey determined that the BPAC requires more information before making a final decision and discussion is ongoing. This was followed up with further correspondence with BPAC members, who have continued efforts to find an agreed-upon path forward.
- In regards to a request from a BPAC member for a presentation from the CANUSLAK oil spill response team, an email was sent to the U.S. and Canadian Coast Guard requesting that a presentation be given on spill response protocols at the next BPAC meeting. The U.S. and Canadian Coast Guards followed up with Ms. Barrett in September and agreed to come to the October BPAC meeting to discuss and/or answer any questions on International oil spill response in the St. Marys River.

- The Michigan Implementation Annex was distributed to BPAC members in order for them to review the report (now finalized).
- A file was received from a representative of the Chippewa County Health Department regarding Sugar Island and the debris that has been washing up on their beach shore. This is a topic that has been ongoing for some time, and has recently made its way into the media on two separate occasions. This file was shared with representatives from the City of SSM, ON, who invited the board members of the Chippewa County Health Department, members of the Monitoring Solutions Committee, and City officials from both sides of the river on a tour of the East End Waste Water Treatment Plant, and scheduled a meeting to discuss the issue further. The tour was well attended and a media release was written by the Monitoring Solutions Committee on the “very good” conditions of the Treatment Plant, as well as highlighting the recent accomplishments on the Ontario side.

Objective #6

Assist in evaluating and summarizing technical reports and monitoring data for the St. Marys River AOC

- Dr. Antunes managed contracts issued to Environ (Conceptual Site Model Revisions), CTech (Environmental Visualization System modeling), Mrs. Marilyn Dunnett (data formatting to support EVS modeling), and MRWright (the geotechnical study). Dr. Antunes additionally worked on data modeling for metals and petroleum derived products within the contaminated sediment. This work was done as per the MOE-SSMIC and EC-SSMIC funding agreements related to sediment management. With respect to these initiatives, Dr. Antunes and Ms. Barrett provided ongoing support to members of the Sediment Management Technical Team as needed.

The fieldwork for the geotechnical assessment of contaminated sediment in the area East of Bellevue Marine Park was carried out the week of December 6th, 2011. The purpose of this field and lab investigation (which continued into the early part of 2012), was managed by SSMIC, and carried out by a team of individuals from M.R.Wright and Associates, ConeTec, Marathon Drilling, Purvis Marine, and Guardian Rescue Services. The purpose of the study was to determine the geotechnical and geochemical properties of the sediment with depth. The results of this study show the presence of a relatively thick and very soft organic sediment layer (2.5 to 4.5 meters) over a more compact till layer present at 7 to 15 meters below the water surface, and a large hydrocarbon contamination in the uppermost 0.9 meters of sediment. The presence of a soft layer consisting mostly of ‘sensitive fines’ has significant implications for both capping and dredge material management options. These data could not be verified by chemical analysis due to difficulty retrieving sediment cores. Environ was hired to carry out a third party review of the project. The results of the geotechnical project, including comments provided by Environ, were presented to the BPAC at the July 2012 BPAC meeting.

- Dr. Krishnappan (a former Environment Canada Scientist) was contracted to further assess the stability of contaminated sediments within the St. Marys River by carrying out additional simulations of the fate and transport model using historical measurements of high and low daily flow extremes. The purpose of this modeling exercise was to ensure that short-term (daily) high-flow events that could potentially disrupt the sediment were not being overlooked. This project was completed in March 2012.

A contract was issued to ENVIRON to make additional revisions to the Conceptual Site Model (CSM) as requested by the Sediment Management Technical Team. The CSM is a document that provides a comprehensive overview of the sources of contaminants, migration pathways, human and/or ecological receptors, exposure pathways, and the linkages that exist among these varied components. This work was completed in March 2012.

- A contract was issued by SSMIC to Mrs. Marilyn Dunnett (a former Environment Canada Employee) to process archived STING, RoxAnn, Hypack, sediment particle size, and chemistry data for the St. Marys River AOC. For this contract, Mrs. Dunnett compiled all of the necessary data associated with the area East of Topsail Island, formatted data for 3D modeling, graphing and GIS. This work was carried out with the guidance of Mr. Hans Biberhofer of Environment Canada
- In a subsequent contract, issued to CTech Development Corporation (located in Houston TX), data formatted by Marilyn Dunnett were used to create bathymetric maps and estimate the volume of sediment and mass of total PAHs, iron, and chromium. Collectively, this information was used to create a 3D visualization of the sediment deposit and associated contaminants. This work was completed in March 2012.
- Chemistry data for sediment and overlying waters for the area East of Bellevue Marine Park were obtained from Mrs. Danielle Milani and Mrs. Sue-Jin An of Environment Canada. These data were used by Dr. Antunes to calculate site-specific metal speciation chemistry with the chemical equilibrium model WHAM VI. This work was carried out to determine whether consideration of the biological forms of trace metals, rather than the total metal concentrations, could reduce the variation in observed benthic organism toxicity among sampling locations. The results of the metal speciation calculations showed that consideration of the bioavailable fraction of zinc in the overlying bulk waters produced much improved dose-response correlations compared to those based on total zinc concentrations. Although the majority of observed variability in toxicity could be explained by changes in bioavailable Zn, it is possible that the results obtained could be the result of a co-correlation of bioavailable Zn concentrations with one or more organic contaminants (e.g., PAHs).
- An information package containing reports of waste materials washing up on the shores of Sugar Island was provided by a member of the U.S. Environmental Health Committee (Chippewa County Commissioners) and reviewed. This report was subsequently turned over to representatives of the City of SSM who have been in direct contact with the U.S. Environmental Health Committee about this issue.

- Ms. Barrett's request to join Essar Steel Algoma Inc.'s Community Liaison Committee was approved, and Ms. Barrett attended the February, June, and November meetings. The meetings focused mainly on recent plant upgrades and projects, as well as discussion on the results from the Health Canada/NORDIK air quality study.
- Scientific articles that constitute the essential background material for writing a research paper for the St. Marys River RAP were gathered and reviewed. Several books specific to the RAP and multi-stakeholder collaboration were purchased to supplement the SMR RAP library and obtaining important background material for the paper being written.
- The literature review completed in 2010-2011 was updated and expanded to include recently published articles as well as those specific to promoting successful multi-stakeholder collaborations and RAP-related books.
- Ms. Barrett attended the International Joint Commission's Upper Great Lakes Study update (held July 14th). Discussions at the presentation focused on local resident's concerns over lowering water levels, and implications of a "natural" flow through the compensating gates on Great Lakes water levels.

Objective #7

Organize and participate in Sediment Management Technical Team meetings

- Conference calls to discuss the Sedimentation Rate Study (managed in part by SSMIC) for the St. Marys River (for which Mr. Hans Biberhofer and Dr. Krishnappan are the lead scientific authorities) were held May 22nd and July 25th. During each of the calls, Mr. Hans Biberhofer (from the Canadian Centre of Inland Waters) provided an overview and update. The objective of the project is to determine the rate at which new sediment is being deposited within the area East of Bellevue Marine Park, and also whether the new sediment is sufficiently low in contaminant levels to support Monitored Natural Recovery for the area East of Bellevue Marine Park. As per the MOE-SSMIC funding agreement for this project, Dr. Antunes has hired Dr. Bommanna Krishnappan as a fixed-term employee of SSMIC to carry out the modeling component of this study.

Objective #8

Develop a long-term monitoring plan for the St. Marys River AOC

- A number of projects described under objective #6 that were subcontracted and managed by SSMIC, collectively served to improve our understanding of the contaminated area East of Bellevue Marine Park (otherwise referred to as East of Topsail Island), i.e.:
 - Revisions to the Conceptual Site Model (Environ)
 - Data processing and bathymetric mapping (Mrs. Marilyn Dunnett and CTech Development Corp.)

- Sediment fate and transport modeling (Dr. Krishnappan)
- Metal speciation chemistry modeling (Dr. Antunes)
- A geotechnical / geochemical assessment of contaminated sediment (M.R.Wright, Purvis Marine, ConeTec, Marathon Drilling, and Guardian Rescue Services).

The results of these projects were needed to serve as the basis for the formulation of a remediation and/or long-term management plan. These projects included:

Objective #9

Provide monthly updates to the Steering Committee and BPAC

- Regular bi-weekly conference calls (attended by Mrs. Michelle McChristie (MOE), Ms. Kate Taillon (EC), Ms. Barrett, and Dr. Antunes, and on some occasions by Ms. Tina Romaneh (EC) and Mrs. DaSilva (EC)) were held to discuss recent progress and activities. Mr. Mark Chambers replaced Ms. Taillon in September.
- Monthly reports highlighting progress made and challenges faced were submitted to EC, the MOE, and BPAC.

Objective #10

Raise awareness about the St. Marys River Area of Concern among Great Lakes scientists and stakeholders

- Ms. Barrett and Dr. Antunes attended the Great Lakes Area of Concern Remedial Action Plan Implementation Workshop from February 7th to 10th in Niagara-on-the-Lake. The workshop was extremely informative with discussion focused on the shared challenges being faced for the different AOCs (e.g., defining delisting criteria and approaches to delisting BUIs). The workshop also provided the opportunity for Ms. Barrett and Dr. Antunes to meet Mrs. Kay Kim (EC) and Mrs. Kate Taillon (EC) in person, as well as other government and non-government people working on the AOCs.
- Ms. Barrett, Dr. Antunes, Mr. Scornaienchi, and Mrs. Lindsey Palumbo (Central Algoma Freshwater Coalition) traveled together to the 47th Central Canadian Symposium on Water Quality Research, held in Burlington, Ontario, from February 20th to 22nd. Ms. Barrett presented her poster on the St. Marys River RAP, while Dr. Antunes and Mrs. Palumbo gave oral presentations on algal blooms and contaminant modeling, respectively. All presentations were very well received. Ms. Barrett was also able to meet Dr. Hans Biberhofer in person at the conference, and Mr. Biberhofer provided Dr. Antunes, Ms. Barrett, and Mr. Scornaienchi a tour of the Canadian Centre for Inland Waters.
- A PowerPoint presentation on work being done for the sediment management and RAP-coordination aspects of the St. Marys River RAP was presented at the Lake Superior

Work Group (LSWG) meeting held June 1st. The presentation was well received by members of the attending audience.

- Ms. Barrett made a PowerPoint presentation providing a general overview of the St. Marys River AOC and RAP at the Lake Links Workshop hosted by the Central Algoma Freshwater Coalition in Sowerby on July 26th. The majority of the questions asked after the presentation related to eutrophication, beach closing, and water quality improvements. The workshop was well attended (30 + people) with many individuals showing interest in the work that has been done.
- Ms. Barrett presented a scientific poster titled “Sediment contamination in the St. Marys River Area of Concern: Research to support informed management decisions” at the Aquatic Toxicity Workshop in Sun Peaks, British Columbia (September 30th – October 3rd, 2012). The poster was co-authored by Paula Antunes, Kate Taillon, Kay Kim, Sue-Jin An, Mark Chambers, Michelle McChristie, Danielle Milani, Debbie Burniston, Hans Biberhofer, and Bommanna Krishnappan. The interest and feedback received for this poster at the conference was tremendous, with many conference attendees recognizing the continuation of our work from previous conferences. During the poster presentation, Ms. Barrett was invited back to do an oral presentation at the 40th Aquatic Toxicity Workshop to be held in 2013.
- On October 22nd, Mr. Don Marles, Mr. Mike Ripley, and Mr. Klaas Oswald and Dr. Antunes (all BPAC members) made PowerPoint presentations to just over 50 members of the public at a Lake Links Workshop (featuring a Great Lakes theme) held on St. Josephs Island. The town hall, which hosted the event, was full to capacity for the Workshop, and all of the presentations were very well received.
- A PowerPoint presentation outlining the scope and outcome of the geotechnical project carried out for the area East of Bellevue Marine Park in 2011 (in collaboration with MRWright and Associates) was delivered to attending members of the public at the May BPAC meeting.