Great Lakes Commission Semiannual Meeting

MARCH 14-16, 2017 • WASHINGTON, D.C.

THE MAYFLOWER HOTEL
## Tuesday, March 14
All times are EDT

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td></td>
<td><strong>Work Session (Commissioners &amp; Staff Only)</strong></td>
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<tr>
<td>All Day</td>
<td>Congressional Office Visits</td>
<td>Capitol Hill</td>
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<tr>
<td>5:00 p.m.</td>
<td>Commissioner &amp; Staff Work Session</td>
<td>State Room</td>
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<td>Call to Order</td>
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<td>Roll Call</td>
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<td>Resolutions &amp; Action Items</td>
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<td></td>
<td>➢ Ballast Water</td>
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<td>➢ Report from ballast water workshop</td>
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<td>➢ Contaminants of Emerging Concern</td>
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<tr>
<td>7:00 p.m.</td>
<td>Commissioner &amp; Staff Dinner</td>
<td>South Carolina Room</td>
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## Wednesday, March 15

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<th>Time</th>
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<tr>
<td>7:30 a.m.</td>
<td>Commissioner &amp; Staff Breakfast</td>
<td>East Room</td>
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<td>8:30-11:00 a.m.</td>
<td>Commissioner &amp; Staff Work Session</td>
<td>State Room</td>
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<td>Strategic Plan Implementation</td>
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<td>➢ Information Management</td>
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<td>➢ Economic Development and Waterfront</td>
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<td>➢ Community Revitalization; and Coastal</td>
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<td>➢ Conservation and Habitat Restoration</td>
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<td>➢ Commercial Navigation</td>
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<td>➢ Aquatic Invasive Species Prevention and Control</td>
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**Semiannual Meeting (Open to All)**

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<tr>
<th>Time</th>
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<tr>
<td>10:00 a.m.</td>
<td><strong>Registration for Guests and Observers</strong></td>
<td>District Ballroom</td>
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<td>11:30 a.m.</td>
<td><strong>Opening Remarks</strong></td>
<td>District Ballroom</td>
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<td><strong>Jon Allan, (MI), Chair</strong></td>
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<td>11:45 a.m.</td>
<td><strong>Lunch and Keynote Speaker</strong></td>
<td>District Ballroom</td>
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<td><strong>Senator Rob Portman (OH) invited</strong></td>
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<td>1:00 p.m.</td>
<td><strong>Report of the Chair and Executive Director</strong></td>
<td>State Room</td>
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<td>Looking to the Future: The Great Lakes Commission’s new Five-Year Strategic Plan</td>
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<td>Our Message for Congress and the Administration: Overview of the GLC’s 2017 Federal Priorities</td>
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<td>Special Presentation</td>
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<td>1:30 p.m.</td>
<td><strong>Discussion Panel</strong></td>
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<td>Investing in and Paying for Clean Water Infrastructure: Challenges, Opportunities for Great Lakes States and Provinces</td>
<td>Moderator: John Linc Stine, (MN) Vice Chair</td>
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<td><strong>Michele Nellenbach, Bipartisan Policy Center</strong></td>
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<td><strong>Judson Greif, US Water Alliance</strong></td>
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<td><strong>Pat Sinicropi, National Association of Clean Water Agencies</strong></td>
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<td>2:45 p.m.</td>
<td><strong>Break</strong></td>
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<td>3:00 p.m.</td>
<td><strong>Keynote Address</strong></td>
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<td>3:30 p.m.</td>
<td><strong>Observer Comments</strong></td>
<td>Great Lakes Commission’s Official Observers</td>
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<td>4:15 p.m.</td>
<td><strong>Business of the Great Lakes Commission</strong></td>
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<td>Action Items</td>
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<td>Review of past resolutions</td>
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<td>New Resolutions</td>
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<td>Ballast Water</td>
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<td>Contaminants of Emerging Concern</td>
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<td>4:45 p.m.</td>
<td><strong>Great Lakes Federal Priorities Update</strong></td>
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<td>Preparation for Great Lakes Day</td>
<td>Matt Doss, Erika Jensen, GLC staff</td>
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<td>4:55 p.m.</td>
<td><strong>Invitation to 2017 Annual Meeting</strong></td>
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<td>Sept. 19-20, 2017, Duluth, Minnesota</td>
<td>Minnesota Delegation</td>
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5:00 p.m.  **Adjourn**  
**Jon Allan**, Chair

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| 6:00 p.m.     | **Reception at the Embassy of Canada**  
Sponsored by the Government of Canada and the Healing Our Waters-Great Lakes Coalition | 501 Pennsylvania Ave. NW  
Washington, DC 20001 |
|               | Advance registration is required; no on-site registration or walk-ins will be accepted. Please bring a government-issued photo ID. |

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**Thursday, March 16**

**Great Lakes Day**

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<th>Time</th>
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| 8:15 a.m.     | **Great Lakes Congressional Breakfast Reception**  
Sponsored by the Great Lakes Commission and Northeast-Midwest Institute | Rayburn House Office Building  
Room 2168 (Gold Room)  
45 Independence Ave. SW  
Washington, DC 20515 |
|               |                                                                      |                                               |
| All Day       | **Congressional Office Visits**                                       | Capitol Hill                                  |
Memorandum

To:       GLC Commissioners  
From:     Tim Eder, Victoria Pebbles  
Date:     March 2, 2017  
Re:       Purpose and Charge for GLC Program Committees

Background

The 2017 Semiannual meeting will feature a session on implementing the GLC’s new Strategic Plan through the creation of program committees. These Committees, which align with the seven program areas in the GLC’s new Strategic Plan, offer a basis to enable greater Commissioner engagement in implementation of the new plan. The purpose of this on the agenda (March 15 at 8:30) session is to:

- inform Commissioners about purpose, role and expectations of Program Committees
- inform Commissioners about the work under each program area; and
- assist Commissioners to select participation on one or more Program Committees.

During this agenda item at the meeting, Tim will provide an overview of Program Committee purpose, anticipated operations and Commissioner roles (describe in more detail below). Commissioners will hear brief overviews of current work and opportunities for each program area. Staff will pass out note cards and Commissioners will be asked to check a box indicating their preference to serve on one or more program areas.

Purpose of Program Committees

Program committees provide a formal structure to engage Commissioners more directly in the work of the GLC. This structure allows Commissioners to provide strategic guidance and feedback for each program while leaving the day to day work to GLC staff and associated multi-stakeholder teams which typically advise individual projects. Program committees also ensure GLC work continues to align with individual state and provincial priorities as our organization aspires to achieve the regional goals and objectives outlined in the GLC Strategic Plan. Program committees are proposed to correspond to the seven program areas of the new GLC Strategic Plan:

1. Water Quality
2. Water Management and Infrastructure
3. Commercial Navigation
4. Economic Development and Waterfront Community Revitalization
5. Coastal Conservation and Habitat Restoration
6. Aquatic Invasive Species Prevention and Control
7. Information Management and Blue Accounting

DRAFT Charge and Operations of Program Committees

- Program committees are responsible for providing strategic guidance and feedback to GLC staff for each of the GLC’s program areas. Such guidance and feedback
may include ways to ensure programs and projects align with member jurisdiction priorities; suggested ways to engage with member jurisdiction personnel or related initiatives; and strategic guidance on partnerships and program development (fundraising) in order to achieve the goals and objectives for that program area outlined in the GLC Strategic Plan. Program committee members are not expected to be involved in daily project work: that will remain the purview of GLC staff and associated project teams.

- Program committees will be expected to convene (by phone or in person) no more than quarterly, but at least semiannually and shall endeavor to have at least one meeting in person in conjunction with a regular Great Lakes Commission meeting; other meetings can be held by webinar or conference call, or similar communication technology at a frequency that is necessary and appropriate to support program area goals and objectives.
- Each Commissioner should participate on at least one program committee, but can participate on as many program committees as desired. Alternate Commissioners may also serve as appropriate. GLC staff will work with the Board to ensure appropriate representation and effective commissioner engagement/committee operation.
- Program committees shall be coordinated by a designated lead GLC staff person, identified by the Executive Director. The GLC staff lead for each program area is responsible for coordinating with the program committee to set up periodic meetings and conference calls as may be needed to ensure effective communication among and engagement by the program committee.
Minutes

Attached for review and approval are minutes from the Commission’s 2016 Annual Meeting, held Oct. 6-7, 2016, in Toronto, Ontario.

Included for your information are minutes of the Board of Directors meetings held on Sept. 15, Oct. 27 and Dec. 21, 2016; and Jan. 13 and Feb. 16, 2017.
Summary of Actions


2. Approved minutes of the July 27, 2016 Special Meeting held via conference call.

3. Approved a change to the agenda to accommodate a scheduling conflict with one of the speakers.

4. Elected Jon Allan as Chair and John Stine as Vice Chair of the Commission.

5. Approved two resolutions:
   - Endorsing and supporting implementation of the Governors’ and Premiers’ Maritime Strategy
   - Providing and maintaining clean water infrastructure and services in the Great Lakes Basin

6. Approved an action item to rescind the 4 resolutions passed at the 2006 Annual Meeting

7. Announced the dates for the Commission’s 2017 Semiannual Meeting, March 14-15, in Washington, DC.

Minutes

The meeting was called to order at 2:05 p.m. EST by Jon Allan (MI), Chair. The following Commissioners, Associate Commissioners and Alternates were present:

Daniel Injerd, Ben Brockschmidt, Stephanie Comer - Illinois
Carol Comer, Steve Fisher, Kay Nelson - Indiana
Jon Allan, Ian Davison, Peter Manning, Rebekah Warren - Michigan
John Linc Stine, Ann Rest, Jennifer Schultz, Paul Torkelson - Minnesota
Jim Tierney, Don Zelazny - New York
Jim Zehringer, Karl Gebhardt, Jim Weakley, Tom Rayburn - Ohio
Bill Carr, Rob Fleming, Ranissah Samah - Ontario
Tim Bruno, Pat Lupo - Pennsylvania
Eric Marquis, Marc Gagnon, Frederic LaComte - Québec
Pat Stevens, Steve Galarneau, Dean Haen - Wisconsin

Staff present: Tim Eder, Tom Crane, Steve Cole, Matt Doss, Victoria Pebbles, Nicole Zacharda, Beth Wanamaker, Greg Parrish, Michael Polich, Edo Jakupovic, and Pat Gable.

1) Call to order, opening remarks: Chairman Allan called the meeting to order and briefly reviewed the agenda for the meeting. He extended a welcome to all those in attendance. He recognized Tim Bruno (PA), Carol Comer (IN) and Tom Rayburn (OH) as Commissioners/Alternates attending their first Commission meeting.

2) Roll Call: Executive Director Tim Eder called the roll. A quorum was present and all states were represented.
Welcome Address-The Honorable Glen Murray, Minister of Environment and Climate Change: Associate Commissioner Rob Fleming, Ontario, introduced the Honorable Glen Murray, Minister of Environment and Climate. Fleming commented how important it was to have a Minister with both the passion about the issues of environment and climate change, but also subject matter expertise. Murray thanked the Commission for the invitation and praised the organization for its leadership on Great Lakes issues especially the Great Lakes Restoration Initiative (GLRI). Murray commented that Lakes characterize much of Ontario in terms of culture, economics and quality of life. He mentioned that 96% of Ontarians get their drinking water from the Great Lakes. He mentioned the importance of Ontario’s Climate Action Plan which will go into effect in December. Murray stressed that Canada is taking its responsibilities regarding climate change very seriously and is developing a much more aggressive approach to reduce greenhouse gas emissions and its carbon footprint. He talked about pursuing the wise use of resources, more recycling and avoiding the use of virgin products in manufacturing. He talked about greater investment in the cap and trade market to reduce energy costs and make manufacturing more efficient. He closed with a challenge to the U.S. Commissioners and the U.S. partners in the audience to begin to develop more aggressive approaches toward climate change.

Great Lakes Commission business: Chairman Allan moderated over several items of Commission business. This session concluded with the report of the Chair and the report of the Executive Director.

Approval of meeting agenda: Chairman Allan introduced the agenda with a suggestion for a proposed change to accommodate the schedule of one of the speakers. He proposed convening the panel on the Governors’ and Premiers’ Maritime Strategy at 2:55 p.m. (immediately following the break) and to have Rob Fleming present on the Ontario Great Lakes Protection Act and Program following the maritime strategy panel. A motion to accept the modified agenda was made by Ohio, seconded by Pennsylvania. The modified agenda for the meeting was accepted.

Approval of minutes of 2016 Semiannual Meeting and July 27, 2016 Special Meeting: Chairman Allan called for a motion to approve two sets of minutes; the minutes of the 2016 Semiannual Meeting held February 23-24 in Washington and the minutes from the special called meeting of the Commission on July 27, 2016. A motion to approve both sets of the minutes was made by Minnesota, seconded by Illinois. The minutes were approved unanimously.

Report of the Nominating Committee: Jim Tierney (NY) provided a report on behalf of the Nominating Committee to nominate the chair and vice chair of the Commission. The Nominating Committee included commissioners Tierney, Carr (ONT) and Stevens (WI). The committee nominated Jon Allan (MI) to serve as chair and John Stine (MN) as vice chair. There were no additional nominations from the floor. Commissioner Tierney (NY) moved to close nominations and cast a unanimous ballot. Illinois seconded the motion. The election was approved unanimously.

Review of Resolutions: Chairman Allan provided information on the one action item and two resolutions to be acted on during the business session on October 7.

Allan commented that the action item and one of the resolutions can be found in the Briefing Books. The second resolution concerning clean water infrastructure and services is included in the meeting folders. The version in the folders is a revised version that has been worked on by staff and the Board since it was first developed prior to the Briefing Books being printed and mailed.

Allan first described the action item that was described in a memo from Tom Crane that provides a report of the Resolutions Review Committee with a recommendation to rescind four resolutions that were passed at the 2006 GLC Annual Meeting. Tomorrow the Commission will be asked to affirm the recommendation of the Resolutions Review Committee and act to rescind all resolutions adopted at the 2006 Annual Meeting.

Allan then listed the two new resolutions to be acted on with a brief explanation of each.
• Endorsing and supporting implementation of the Governors’ and Premiers’ Maritime Strategy; and

• Providing and maintaining clean water infrastructure and services in the Great Lakes Basin.

Allan then asked if there were comments or clarifying questions regarding the action item or the two resolutions.

Eric Marquis, Associate Commissioner, Québec, stated that the Québec delegation is offering a new “whereas” clause connecting the Governors’ and Premiers’ Maritime Strategy with the new Québec Maritime Strategy with some additional language on economic development.

Allan suggested that this amended language be provided to staff and offered as an amendment to the resolution for action on October 7.

Dan Injerd, Commissioner, Illinois, had some fundamental questions regarding the clean water infrastructure and services resolution. Injerd offered his opinion that some of the issues to be addressed in the resolution are complicated and it may be best for the resolution to focus on the formation of the work group and let the work group address the other details to be captured in a future resolution.

Vice Chair John Stine, Commissioner, Minnesota, raised a question regarding the Drinking Water Needs Assessment and Survey and the reference to funding and suggested that this clause needed to be reworked or eliminated.

Allan suggested that Stine and Injerd work together and come up with revised language to be presented for discussion the next day.

Allan concluded by reminding the Commissioners that additional editorial comments should be provided to staff after the adjournment of day one and that formal action will be taken on these items during the business session tomorrow.


Allan noted how important the work that the GLC is doing and commented how proud he is to be able to do such meaningful work to help restore the Great Lakes. Allan then focused his remarks on the Commission’s work to update its strategic plan. He mentioned that the work of the Board and Commissioners over the summer was really important to fine tune the plan and that the hope is that the plan will be final by the end of the calendar year. Allan talked about how the plan addresses emerging issues in the region and how the Commission is positioning itself to address these. He mentioned that the more than 40 million people living in the region benefit from the work that we all do together.

10) Report of the Executive Director: Eder provided brief comments on the progress toward completing the Commission’s Strategic Plan. He mentioned that final comments from Commissioners were being addressed and the plan was to approve the plan before the end of the calendar year. He commented that the Strategic Plan will be a topic for discussion at the Commissioner dinner later that evening. Eder also gave an update on legislative priorities focusing his remarks on the Water Resources Development Act (WRDA) of 2016. He mentioned that WRDA had passed both Houses and that the final provisions of the bill were being reconciled. He mentioned important provisions being considered in the bill including the reauthorization of the Fish and Wildlife Restoration Act, the authorization of the Great Lakes Restoration Initiative (GLRI) and the authorization of the Waterfront Revitalization Act. He concluded by talking about the importance of the Water Resources Development Act for the region. He mentioned that as a
result of regional advocacy efforts Harbor Maintenance Trust Fund appropriations for the Great Lakes had increased by 43% since the passage of previous WRDA in 2014.

11) **Blue Accounting Update**: Eder invited Steve Cole, Chief Information Officer to provide a brief report on the progress of the Blue Accounting Project. Cole mentioned that the genesis of Blue Accounting occurred as a result of the Governors’ and Premiers’ Summit held in 2013. As a result of the interest of the Governors and Premiers, interest in understanding the successes of our regional efforts and programs in all areas; social, economic, cultural and environmental, the program was launched in partnership with and support from numerous regional foundations. The principle investigators for Blue Accounting are the GLC and The Nature Conservancy. Cole concluded by saying that there are four pilots planned for the Blue Accounting Project: Erie Stat project for tracking P loadings and reductions in Lake Erie; Source Water Protection Initiative; Aquatic Invasive Species early detection/rapid response; and hydrologic connectivity. Eder thanked Cole for his presentation.

12) **Governors’ and Premiers’ Maritime Strategy**: Eric Marquis, Associate Commissioner, Québec, introduced a panel of presenters to talk about the Governors’ and Premiers’ Maritime Strategy, which was adopted in June 2016. Marquis mentioned the importance of the maritime transportation industry to the region and commented that the importance of maritime trade is often overlooked by our region’s leaders when talking about the importance of the Great Lakes and St. Lawrence River. He mentioned the recently adopted Québec Maritime Strategy which looks at competitiveness, assets and communities in regards to maritime trade. He then introduced the three panelists; Steve Fisher, Commissioner from Indiana and Executive Director of the American Great Lakes Ports Association, David Naftzger, Executive Director of the Conference of Great Lakes and St. Lawrence Governors and Premiers, and Matt Doss, Policy Director with the Great Lakes Commission.

Fisher talked about the process of developing the Maritime Strategy and the role that industry played in its development. He mentioned how the drafters of the Maritime Strategy benefitted from other strategies and approaches from other regions and the world including Québec, the Baltic Region, and other European nations. He commented that there is tremendous value in collaboration and coordination to avoid having to re-invent the wheel. He mentioned that the strategy is comprehensive and looks at the maritime transportation system from a variety of perspectives including economic, environmental, social, health and safety and the state of infrastructure. He concluded by saying that the Maritime Strategy was designed to look at the system strategically with an eye toward the different roles of government – federal, state, provincial and local, the private sector and communities.

Naftzger talked about the implementation of the strategy moving forward. He challenged those involved in the strategy to think big and think creatively regarding the future of maritime commerce in the Great Lakes and St. Lawrence River. He talked about how the Seaway is a fragmented system and an underutilized asset to the two countries. He commented that the Strategy should provide the mechanism for better communication, coordination and a structure for working together in the future. He mentioned that the Strategy contains more than three dozen recommendations designed to address the challenges facing the Seaway. He concluded his remarks by saying that two actions have received priority attention over the summer; the analysis of the St. Marys River dredging to remove a bottleneck for shipping and deployment of a series of U.S. Coast Guard navigation buoys that will improve safety and communications among shippers.

Doss talked about the GLC’s role in the implementation of the Maritime Strategy. He mentioned the resolution that the GLC will consider tomorrow endorsing the Strategy, the GLC’s new draft Strategic Plan that contains a renewed emphasis on maritime transportation, and the transportation and maritime priorities that are pursued under the GLC’s annual legislative priorities. Doss then talked briefly about two tasks of the Maritime Strategy that the GLC will be leading. First, is the creation of an online careers portal to provide information on careers, training, and professional development opportunities especially for ex-military professionals interested in pursuing a private sector career in maritime transportation. The second task is the update and expansion of the maritime assets inventory that was first created as part of the Maritime Strategy. The GLC will work with the asset inventory workgroup and will (possibly) form a data workgroup to assess data management needs and priorities for an updated asset inventory.
A brief question and answer period followed involving all of the Commissioners. Marquis closed the session by thanking the three panelists for their presentations.

13) **Ontario’s Great Lakes Protection Act and Strategy:** Rob Fleming, Associate Commissioner, Ontario and the Assistant Deputy Minister, for the Ontario Ministry of Environment and Climate Change provided a brief presentation on Ontario’s Great Lakes Protection Act and Strategy. Fleming began by citing some facts and figures regarding the importance of the Great Lakes to Ontarians. He mentioned that Ontario is home to 13.5 million people. More than 80% of power generation that serves 99% of all Ontarians is directly dependent on the Great Lakes. More than 60% of drinking water is supplied directly from the Great Lakes. Fleming mentioned several challenges facing Ontario including aquatic invasive species, climate change, harmful algae in water, cleaning up Areas of Concern (AOCs). He then talked about the Great Lakes Protection Act and Strategy as a geographically focused initiative to address aquatic invasive species, habitat protection, wetlands protection and improvement, harmful pollutants (including phosphorus) and water resources management efforts. He mentioned the reliance on the precautionary principle and the vision of drinkable, swimmable and fishable waters. He concluded by commenting that Ontario has invested a lot of financial resources in Great Lakes programs. He said that since 2007, the Province has invested $140 million in local projects and $660 million in infrastructure improvements. Adding in the federal investment and the total is well over $1 billion to protect and restore the Great Lakes.

14) **Observer Comments:** Chairman Allan then moderated a session for the GLC’s Observers to provide comments to the Commissioners. Each Observer was instructed to keep comments to three minutes or less.

- **Tinka Hyde, U.S. EPA – Great Lakes National Program Office (GLNPO):** Hyde introduced herself as the new GLNPO Director. She mentioned that she assumes those duties in about a week. She mentioned how valuable are all of the relationships that she built while in the Region 5 Water Division. She mentioned the important work that the Commission is undertaking through the Blue Accounting Program and singled out Erie Stat as a project to help the region measure progress to reach the 40% phosphorus loading reduction goal for Lake Erie.

- **Carl Platz, U.S. Army Corps of Engineers – Great Lakes and Ohio River Division (LRD):** Platz introduced himself at the new Great Lakes Coordinator for the U.S. Army Corps of Engineers. He gave the regards of General Toy who was unable to attend the meeting. Platz briefly mentioned the many projects that the Corps does in partnership with the GLC including the Great Lakes Dredging Team, the Tributary Modeling Program, work in the region’s AOCs and aquatic invasive species prevention and control. He closed by mentioning the importance of the Soo Locks to the region’s economy and navigation interests.

- **Lorne Thomas, U.S. Coast Guard – Ninth District:** Thomas communicated the regards of Admiral Ryan who couldn’t be at the meeting. He announced the continuing progress being made under the binational ballast water management working group. Thomas commented that no known new species have been transferred to the Great Lakes via ballast water since 2006. He mentioned that 3 applications for ballast water treatment systems have been submitted and will be acted upon within 30-45 days. He concluded by saying that the International Maritime Organization (IMO) standard will be in effect beginning in 2018 as a result of Finland’s ratification of the IMO convention.

- **Marc Gaden, Great Lakes Fishery Commission:** Gaden talked briefly about GLFC programs in the area of sea lamprey control and cooperative fishery management. He mentioned that sea lamprey levels are trending downward in all lakes, but that progress is threatened if funding for the control program is cut. He talked about the importance of the salmon fishery, the fact that alewives (forage food for salmon) are at historically low levels. He concluded by talking about the need for technology for fish passage with regard to a new pilot study on the Boardman River. He said the problem with traditional barriers is that they block both good and bad things from getting through.

- **Jon Hortness, U.S. Geological Survey:** Hortness introduced himself as the new USGS GLRI point person, a role he assumed following the retirement of Norm Grannemann in June. He referenced the
Memorandum of Understanding (MOU) that has been in effect between the GLC and USGS/GLSC since 2012 that has expanded the partnership between the two organizations. This MOU has guided collaboration between the two agencies in areas related to Harmful Algal Blooms (HABs), aquatic mussels, phragmites research and coordination and Great Lakes coastal issues.

Molly Flanagan, Alliance for the Great Lakes: Flanagan thanked the GLC for its continuing efforts to build consensus surrounding issues in the Chicago Area Waterway System (CAWS). She also mentioned the importance of the Erie Stat pilot project under Blue Accounting that will help the Lake Erie states and provinces reach the 40% phosphorus reduction target. She also expressed her support for the Maritime Strategy and encouraged leaders to pursue the goals and recommendations for environmental sustainability.

Sean Duffy, USDA Natural Resources Conservation Service (NRCS): Duffy introduced himself and said that NRCS continues to assist producers in the region to reduce nutrient loadings to the Great Lakes. He said that NRCS does this through a variety of programs including the Farm Bill, the Regional Conservation Partnership Program (RCPP), the Conservation Effects Assessment Project (CEAP) and the GLRI. He mentioned that CEAP is helping researchers understand issues surrounding phosphorus loadings and transport dynamics and CEAP models can help targeting efforts for cropland down to the farm field level.

Marvourneen Dolor, Great Lakes Observing System (GLOS): Dolor introduced herself and mentioned that GLOS is a collaboration involving 17 different agencies and partners. GLOS is one of 11 regional associations of the Integrated Ocean Observing System (IOOS), working to enhance the ability to collect, deliver, and use ocean and Great Lakes information. IOOS is a partnership among federal, regional, academic and private sector parties that work to provide data for tools and forecasts to improve safety, enhance the economy, and protect the environment. Dolor commented that GLOS tries to ensure access to data, pursues metadata standardization and promotes well-managed data to support Great Lakes decision-making.

Matthew Child, International Joint Commission: Child introduced himself and offered greetings from the IJC Commissioners and director of the Great Lakes Regional Office Trish Morris. Child talked about the triennial assessment of progress and series of meeting that took place in the week in Toronto. He commented on the success of the public forum and talked about the importance of public participation in the implementation of the Great Lakes Water Quality Agreement.

15) Award Presentation and Adjournment for the Day. After the Observer comments, Chairman Allan presented two staff awards. Tim Eder, Executive Director, received an award for 10 years of service with the GLC. Tom Crane, Deputy Director, received an award for 30 years of service with the GLC. Both Eder and Crane thanked the Commission for honoring their service to the organization.

The meeting was adjourned at 5:20 p.m. Attendees were invited to a reception in the Territories Room of the hotel sponsored by the Government of Ontario.

Allan concluded by reminding the Commissioners that editorial comments should be provided to staff after the adjournment of day one and that formal action will be taken on these items during the business session tomorrow.

Day Two

16) Call to order: Chairman Allan welcomed everyone back to the meeting and thanked the Ontario Government for hosting the previous evening’s reception. Allan then introduced Kathleen O’Neill, Director, Strategic Policy at Ministry of Environment and Climate Change, Province of Ontario to moderate a panel on the changing climate and implications for Great Lakes-St. Lawrence River water resources.

17) Panel on Changing Climate and Great Lakes-St. Lawrence River Water Resources: O’Neill briefly introduced herself and explained that the purpose of the panel was to hear perspectives on climate change
and its impacts on water resources from several sectors; agriculture, transportation, infrastructure and energy. She then introduced the panelists: Helen Noehammer, Director, Transportation and Infrastructure Planning, City of Mississauga, Ontario, Don McCabe, President, Ontario Federation of Agriculture, Skiles Boyd, Vice President of Environmental Management and Resources, DTE Energy Co.

Noehammer began by talking about the challenge that communities face in managing stormwater. She mentioned that stormwater management is a global challenge with high intensity storms becoming more frequent. She said that Mississauga has had six 100-year storm events in the past 11 years. Worldwide, flooding is the third most expensive natural disaster management; first in Ontario. She talked about infrastructure challenges and the need for improvement and outlined Mississauga’s stormwater program which began in 2015. She talked about the fee structure supporting the program, the need for good outreach and education and the need for communities to be innovative with regard to developing incentive programs and promoting green infrastructure.

McCabe talked about the importance of agriculture and the importance of land stewardship for agricultural land owners. He talked about how most landowners will do the right thing when properly motivated and educated. He talked about the importance of good science to support agriculture and rural water management. He talked about the importance of promoting conservation treatment practices with a special emphasis on soil health. He finished by talking about the importance of reducing phosphorus runoff into lakes and streams. He sees promise in phosphorus trading programs and said that we can learn from our experiences in implementing carbon trading programs.

Boyd talked about the challenges faced by the energy sector to reduce its carbon footprint. He talked about the movement toward a low carbon economy. He gave an overview of the DTE company and the different plants and fuel sources. He said that coal still dominates making more than 53% of the DTE’s total generating capacity. He concluded by talking about DTE’s investments in capital improvements to reduce the company’s carbon footprint. DTE is planning to build several natural gas plants, is making a large investment in renewables; wind, solar, etc., and is investing in modernizing infrastructure. DTE plans to retire 3 of its largest 5 coal fired plants by 2023.

18) **Keynote Address** - The Honorable Kathryn McGarry, Minister of Natural Resources and Forestry, Province of Ontario: McGarry thanked the Commission for the invitation to speak. She began by talking about the importance of the Great Lakes to Ontario. She said we are united as countries by the boundary waters between us. She talked briefly about Ontario’s Greater Growth Plan that addresses many important issues related to natural heritage, wetlands protection and management watershed protection and land use management, woodlands preservation and greenbelt development and protection. She said the Province manages these resources in partnership with communities and Conservation Authorities and mentioned the use and importance of multi-use land management authorities. She concluded by saying how proud she is to direct a Ministry that values the natural resources of Ontario and pledged to continue to refocus efforts on the important issues.

19) **Dimensions of the Great Lakes-St. Lawrence Economy**: Allan introduced Sal Guatieri from BMO Harris to talk about a recent report to the Governors and Premiers on the Great Lakes-St. Lawrence Economy. Guatieri gave a broad overview of the economic macro-climate. He mentioned the global economy is very flat with some countries being in outright recession. He talked about the U.S. and Canada in general saying that the household debt in Canada is at an all-time high. In the U.S. households are carrying less debt relative to income than in 2008. He gave a few facts and figures for the Great Lakes states and provinces. The jobless rate in Canada is about 7% but Ontario and Québec are well below the national average. He said that Ontario is the second largest growing Province in terms of jobs behind British Columbia. The U.S. is just about the natural average unemployment which is roughly 5%. He said that in the U.S. employment is growing very slowly and unemployment is decreasing very slowly. He mentioned that interest rates and inflation for both countries is pretty flat. He concluded with a few observations that he thought would help both the national and regional economies. These included things like reducing business costs (especially energy costs) lowering labor costs, pursuing growth industries such as renewable energy and biotechnology and examining opportunities to increase global trade.
Regional Economy Panel-Advancing a Regional Economic Agenda: Chairman Allan moderated a panel to explore opportunities to advance a regional economic agenda and hear about the work of the Governors’ and Premiers’ Regional Economic Task Force. He introduced the panelists: David Naftzger, Executive Director, Conference of Great Lakes and St. Lawrence Governors and Premiers, Kathryn Bucker, President, Council of Great Lakes Industries, Elise Maheu, Director of Government Affairs, 3M Canada, and Bob Lambe, Executive Secretary, Great Lakes Fishery Commission.

Naftzger began by talking about the Governors’ and Premier’s long-standing interest in economic development and trade. He mentioned that the Conference opened its first shared trade office in 1990 and now manages a network of 10 offices in places such as China, Chile, Brazil, etc. In 2004 the Governors’ and Premiers’ initiated a program of joint trade missions and since that time has led 20-plus missions and assisted more than 350 companies. Naftzger then talked about partnering with BMO Harris which completed its regional assessment of the Great Lakes-St. Lawrence economy. He mentioned how this lead to the creation of the Economic Task Force which has been charged with identifying ways to promote cross-border trade and reduce impediments; supporting innovation among different business/industry sectors; and, boosting regional manufacturing productivity. He concluded by saying that the next Governors’ and Premiers’ Summit meeting will be held October 20-22 in Detroit.

Buckner introduced herself and provided a general overview of the Council of Great Lakes Industries (CGLI). She mentioned that the vision of CGLI is to support a vibrant economy while protecting the environment and restoring the Great Lakes and St. Lawrence River. She said that CGLI has had, over the years, 76 members and that the average length of membership is about 7 years with some companies such as DTE Energy having been members for more than 25 years. She mentioned the current climate as one where industry is becoming much more involved in policy discussions and decisions that affect business and industry. She concluded by outlining a 2010 policy statement for advancing economic growth which includes the following priorities: promotion of manufacturing; attracting capital to the region; creating a competitive business climate through regional collaboration; responsible use of water and natural resources; and, promoting healthy communities and a healthy environment to attract labor.

Maheu talked about the 3M Company and offered some views on the challenges and opportunities for business in the Great Lakes-St. Lawrence River region. She said that 3M is a Great Lakes company born in the region (in Minnesota) and has a presence in 71 countries. Two-thirds of its manufacturing is still done in the U.S. and Canada and two-thirds of what is made is exported two other countries. She stated that 3M North America (U.S. and Canada) supports 60% of all employees and 100% of research and development. She concluded by saying that it is sometimes a challenge for businesses to remain and grow in the region. Companies tend to invest where global economic growth is stronger which is currently Central/South America and Asia. She said the key to a long-term commitment is good planning and being connected to the communities where people live and work.

Bob Lambe, Great Lakes Fishery Commission, talked about the economics of the Great Lakes fishery. He mentioned that the sport fishery in the Great Lakes supports a $7 billion dollar industry. As an aside he mentioned that more Canadians fish than play hockey and golf combined. He said that in 2010 Anglers spent 1.5 times more in retail sales than Tim Horton’s restaurants. He mentioned that the value of the fishery goes beyond dollars and cents. He mentioned that there are both ecological values (benefits) and intrinsic values (benefits) of the fishery that are hard to quantify. He mentioned the challenges of aquatic invasive species (AIS) prevention and control in general and the specific and ongoing challenges of sea lamprey control. He closed by saying that although no agreed to estimate is currently available regarding the cost of AIS prevention and control he mentioned that some experts believe the costs to be greater than what is spent on natural disasters in the region.

Business of the Great Lakes Commission:
Chairman Allan then introduced the business portion of the meeting and provided background on the process for introducing and approving the action item and the two proposed resolutions that were discussed the previous day. He provided a general description of the action item and two resolutions as follows:
• **Action Item** - Act to rescind the four resolutions passed at the October 2006 Annual Meeting in Duluth, Minnesota based upon the recommendation of the Resolutions Review Committee which is composed of five Commissioners and supported by staff. The resolutions review committee met via conference call on May 6. A memorandum that describes the resolution review process, copies of the four resolutions that were reviewed and the rationale for the recommendation to rescind the four resolutions is included in this section of the briefing book.

A motion to approve the action item and the recommendation from the Resolutions Review Committee was made by Illinois and seconded by Indiana. The action item was approved unanimously and the four resolutions passed at the 2006 Annual Meeting were rescinded.

• **Resolution** - Endorsing and supporting implementation of the Governors’ and Premiers’ Maritime Strategy: The resolution endorses and pledges the Commission’s support for the regional maritime strategy developed by the Conference of Great Lakes and St. Lawrence Governors and Premiers, and in the short term commits the Commission to establish a maritime careers portal, maintain the maritime asset inventory, and as appropriate, manage data and information to track progress in implementing the strategy in alignment with the Blue Accounting initiative. It calls on its member states and provinces, the U.S. and Canadian federal governments, and partners in the maritime industry to support implementation of the strategy, where appropriate.

Eric Marquis, Associate Commissioner Québec, offered the following two amendments to the sixth and seventh “Whereas” clause right before the first “Be it Resolved” clause. The suggested revised clauses read as follows:

Whereas, with its mandate to support the balanced use of Great Lakes water resources and its longstanding role as an advocate for environmentally sustainable Great Lakes-St. Lawrence River maritime transportation, the Great Lakes Commission is uniquely qualified to support implementation of the new maritime strategy in collaboration with the Great Lakes States and Provinces, federal governments, maritime industry partners, and others; and.

Whereas, sustainability and environmental performance are two of the MTS’s greatest strengths, and acknowledging that the Strategy’s goal is to double maritime trade while shrinking the environmental impact of the region’s transportation network.

The resolution as amended was moved by Michigan and seconded by Ohio. The amended resolution passed unanimously.

• **Resolution** - Providing and maintaining clean water infrastructure and services in the Great Lakes Basin.

The draft resolution calls on the U.S. and Canadian federal governments to increase water infrastructure funding to states and provinces; modify laws and policies, as needed, to ensure that funding and investments are prioritized based on regional risks and needs; and provide flexibility and authority to states, provinces and cities to implement creative solutions with multisector partners. It states that investments should be focused on existing infrastructure as well as green infrastructure and other approaches to address current and projected stressors on water infrastructure systems. It calls on the GLC to expand the scope of the working group (previously called for by the Commission) to consider all clean water infrastructure (i.e., wastewater, stormwater and drinking water infrastructure) and to provide advice to guide staff in preparing a report on the state of water infrastructure in the Great Lakes-St. Lawrence River basin.

Discussion from the previous day led to several language changes that were offered to the original resolution. These changes included: a general tightening up of the resolution and editing of the background statement; removing the reference to drinking water survey needs; minor editing of the first “Whereas” clause; modification of the first “Be it Resolved” clause and moving it to the end. Eliminating the second “Be it Resolved” clause.
Chairman Allan then offered a specific change to the first “Be it Resolved” clause as follows:

Therefore, Be It Resolved, that investments in clean water infrastructure should complement efforts to protect source water while enhancing practices that work toward restoring or recreating natural hydrologic processes; and that the Great Lakes Commission expand the scope of the working group called for in the July 2016 resolution, Maintaining safe and sustainable drinking water and infrastructure in the Great Lakes Basin, to consider all clean water infrastructure (i.e., drinking water infrastructure, wastewater, stormwater and green infrastructure); and to provide advice to guide staff in the preparation of a report on the state of water infrastructure in the Great Lakes and, where appropriate, St. Lawrence River basin that addresses topics identified in the resolution as well as similar topics for other types of clean water infrastructure. A motion to bring forth an amended resolution was made by New York and seconded by Ohio.

After additional discussion a motion was made by Michigan and seconded by New York to approve the amended resolution. The resolution as amended passed unanimously.

22) Invitation to 2017 Semiannual Meeting: Executive Director Eder, extended an invitation to the Commissioners to the GLC’s 2017 Semiannual Meeting, to be held March 14-15 at the Mayflower Hotel in Washington DC.

23) Appreciation of GLC Staff: Commissioner Don Zelazny New York directed the Commissioners to Tab 5 of the Briefing Books which contains a summary of the work that is done by the Commission staff to support the organization and implement its Strategic Plan. Zelazny commented on the volume and quality of work and commended the staff for its efforts to make the GLC a successful organization.

24) Adjournment: A motion to adjourn the meeting was made by OH, seconded by Illinois. The meeting was adjourned at 12:15 p.m. EST.

Respectfully submitted,

Tim A. Eder
Executive Director

/TC
The meeting was called to order at 3 p.m. EST by Jon Allan, Chair. The following members were present:

Dan Injerd - Illinois
Kay Nelson - Indiana
Jon Allan, Emily Finnell - Michigan
Jim Tierney - New York
Andy Ware, Jim Zehringer - Ohio
Trevor Snyder - Ontario
Eric Marquis - Quebec
Steve Galarneau, Pat Stevens - Wisconsin

Staff present: Tim Eder, Tom Crane, Beth Wanamaker, Matt Doss, Erika Jensen

1) Introductions and Call Objectives: Injerd noted that he has not yet received ROI documents that were discussed during the January meeting. Crane agreed to send the documents to the Board. Eder noted that there are two critical items on the agenda: approval of the federal priorities document and approval of the schedule for the operations and procedures document.

The agenda and minutes from the previous meeting were approved.

2) Semiannual Meeting format and Program Committees: Allan noted that the new schedule for the SAM will allow for more time to Commissioners to work together. Eder also noted that there is an internal agenda for the SAM on the Board documents site, which he discussed. He noted that the GLC is trying to get Sen. Rob Portman and Sen. Todd Young to speak. Nelson noted she liked the new agenda and asked about speakers for the investing in water infrastructure panel. Eder noted that speakers haven’t been locked down yet and invited suggestions. Allan noted that the Bipartisan Policy Center has done a national review of infrastructure needs and a speaker from that team would be ideal.

1) Operations and Procedures Guidebook: Eder noted that Board members are encouraged to send the final Strategic Plan and Operations and Procedures Document to their delegation so that they can be prepared for the March 6 all-Commissioners conference call. The documents will be posted on a password-protected site for all Commissioners. Commissioners are asked to provide comments to their Board member by March 2. On a March 3 call with the Board, staff will ask for comments as well. Crane will also include guidance for Commissioners on issues that were discussed by the Board and the Committee. Eder asked for approval of the timetable and agreement to send out the documents and guidance memo for comments from commissioners. Nelson asked if this will be voted on by the Commission; Eder and Allan clarified that there will not be a vote but Commissioners will have an opportunity to provide input.

Agreement was reached on this approach.

2) Resolutions:

Ballast Water – Allan noted that substantive progress has been achieved on this front and that the language is close. The working group will be meeting next week or early the following week. Nelson noted that she would like to submit some items to the working group; Eder asked her to send it to him and Jensen.

Chemicals of Emerging Concern – Allan noted this resolution will not be completely ready by the SAM and his preference is to formally introduce it but table it to AM. Nelson asked if the language would still be editable if the resolution was tabled; Allan confirmed it would be.
3) **Federal Priorities Document:** Allan noted this document has to go to the printer next week so approval is needed. Eder noted that comments from Bruno and the Michigan delegation have been incorporated and quotes were added to the back of the document. Tierney asked about moving the GLRI down to the third bullet point; Doss noted that it was suggested to move water infrastructure and commercial navigation to the top because of the economic focus and to group the two economy-related priorities together, followed by the environment-related priorities grouped together. Nelson asked for references for numbers in the document. Eder agreed to create a separate document with citations and send it to the Board. It was noted that additional, minor, non-substantive edits would be made to the text following approval for grammar and design.

New York moved, Ohio seconded. The motion was approved.

4) **Infrastructure Statement:** Wanamaker outlined the plan to work with partners to amplify the release of the Water Infrastructure Statement. Allan asked for a single email with the infrastructure statement in it and the schedule to be sent to the Board.

5) **New Congress and Administration Transition:** Allan noted that Michigan has sent their infrastructure priorities to the White House. Eder noted that the Great Lakes Task Force has sent two letters to the administration about Great Lakes priorities. Injerd noted that there will be a lot of asks; Nelson agreed and suggested that the GLC be very specific about its needs. She noted being seen as the national leader in that conversation and protecting maritime and commercial navigation will be important. Allan noted that Michigan’s number one ask was the Soo Locks. Tierney noted that New York projects $80 billion in needs for drinking water infrastructure, and that for every $10 million spent on clean water, 160 jobs are created.

The meeting adjourned at 4 p.m.

Respectfully submitted,

Tim A. Eder, Executive Director
/bw
The meeting was called to order at 8:30 a.m. EDT by Jon Allan, Chair. The following members were present at the GLC office, except for Schmidt, Zelazny and Carr, who participated by phone:

- Dan Injerd - Illinois
- Kay Nelson, Dan Schmidt - Indiana
- Jon Allan - Michigan
- John Linc Stine - Minnesota
- Don Zelazny - New York
- Andy Ware - Ohio
- Bill Carr - Ontario
- Tim Bruno - Pennsylvania
- Eric Marquis - Quebec
- Steve Galarneau, Pat Stevens - Wisconsin

Staff present: Tim Eder, Tom Crane, Victoria Pebbles, Steve Cole, Matt Doss, Beth Wanamaker

1) **Introductions and Meeting Objectives:**

Agenda was approved. December 21 minutes were approved after note was made to add Marquis to list of attendees.

2) **Operations and Procedures Working Group:**

The Working Group has had several calls to work through the new procedures document, with a goal of approval by the Board in advance of the Semiannual meeting in March. Crane explained the process for developing the document thus far and Stine thanked Commissioner Marc Gagnon and Schmidt especially for their work on the document. During conversation, it was suggested that the Operations Document should be developed into a shorter PowerPoint presentation for new members.

The Board considered items earmarked for focused discussion by the Working Group.

A. Rotating the chair and vice-chair among the delegations alphabetically: Stine noted that there are some capacity concerns and that delegations would need to be prepared to present a chair/vice-chair. Injerd expressed support for the change, and noted that the Water Resources Compact Council has a similar setup. Nelson also expressed support, noting that Indiana’s new administration asked when it was their delegation’s turn to serve. Zelazny noted that having a rotation schedule would allow for delegations to plan better for chairmanship. Stevens also supported a rotation while adding that there are ways to include exceptions if a particular delegation is not able to support the chairmanship at a particular time. Allan expressed concerns, noting that it may take away from the responsibility of serving on the Board. Stine suggested that the nomination committee could be given guidance on rotation; such guidance making it very clear that rotating leadership so that each delegation has a turn is a high priority. Schmidt agreed that this would be a good approach. Bruno agreed with a hybrid approach that takes into account experience and other concerns, and expressed support for a one-year term, which would ensure an eight-year rotation. Stine suggested the Board allow the Working Group to consider and revise the item.

B. “Advisors” and “observers” in relation to the GLC: Schmidt and others had questions about the usage of these terms in the document. Crane noted that “advisors and consultants” is language drawn directly from the Compact, and that the Observer program was established in in the 1990s when a change was made to the format of GLC meetings to make them more public facing. He added that
there is no requirement that Observers be financial contributors to the GLC. Schmidt noted, and Stine agreed, that additional clarity in the writing of this section is necessary. Eder noted that the GLC wants to be viewed as a regional leader in collaboration, and the observer program supports this, and that the GLC is of the few places Great Lakes organizations are able to come together, collaborate and interact. There was consideration of a mechanism to review membership in the observer program. Marquis noted that the observer program is important because it gives the GLC partners to work with in federal agencies and organizations. Stine moved to the next section.

C. Performance evaluation of the Executive Director: Stine suggested that a subset of the Board perform the evaluation and present it to the full Board for input. Eder agreed with this approach and cautioned the Board to please keep it efficient and not seek input from a broad list of Observers or others. Board members concurred.

D. Resolutions: Schmidt suggested having two sponsors for a resolution as opposed to one. Board members concurred.

E. Voting and reaching consensus: Stine noted he does not find consensus on resolutions to necessarily mean unanimity. Injerd noted that some delegations have up to five commissioners and only three votes, leading to confusion. Eder noted that Article IV the Compact indicates that votes taken on matters covered under Article VI require that states get one vote, meaning commissioners from each state have to caucus and decide how to cast that state’s vote. Stine suggested that moving forward the GLC be more specific, especially about when to use Article IV provision. Stevens suggested that if the vote is on a policy, each delegation should get one vote. Agreement was reached on this approach and that it is consistent with the Compact. Some Board members expressed support for including a vote count on the bottom of resolutions. Doss suggested that this could make communications with government officials and agencies awkward and unnecessary in most cases (where there is unanimity). Schmidt suggested that there be a way for states to indicate their no vote if necessary on a significant issue. Stine suggested having a conversation during the vote about how the resolution is communicated. Zelazny reiterated that consensus, especially in communications with the GLC’s core group, which gives the GLC respect and power. Allan suggested kicking this question back to the Committee for further consideration, with the general consensus being that votes would not be recorded at the bottom of all resolutions automatically; however, votes that are not unanimous or those where a state makes a specific request shall lead to including the vote count.

3) Strategic Plan:

Carr moved to approve the Strategic Plan and the motion was seconded. The Strategic Plan was unanimously approved.

Eder directed Board members to a memo on operationalizing the Strategic Plan. Injerd commented that he is encouraged by the Strategic Plan’s regional balance and to consider this perspective in implementation. Eder noted that staff is working strategically to better include Commissioners in operations of the GLC going forward. He also noted that staff has grown, but we should not expect significant growth in the short term. The GLC does it at its capacity limits for supporting staff to work on issues not funded with outside grants but that this is important. The commercial navigation priority of the Strategic Plan is a case in point. Allan suggested the Board has some responsibility in helping obtain staff or funding for helping to grow economic-based projects. Eder noted that the program area committees are intended to help guide staff at a high level and secure resources. Injerd noted that there are also agencies outside of NOAA and EPA that could serve as new funding sources. Eder noted that staff is beginning to chase those resources. Nelson encouraged continuing efforts to get the word out about growing the economic development portfolio.

Eder noted that program area committees will help engage Commissioners in operationalizing the Strategic Plan at a high level, including identifying emerging issues, potential resolutions and potential funding sources. A memo prepared by V Pebbles was presented. Commissioners will be expected to serve on at least one committee, with the expectation that each committee will convene (by phone or in person) no more than quarterly, but at least semiannually. Pebbles specified that the staff recommendation is that
committees will be restricted to Commissioners, Associates and alternates. Allan noted he would prefer to extend the committees to additional membership (from state agencies for example) to bring in additional expertise. Zelazny noted that alternate commissioners may not have the level of familiarity with the GLC and the way it functions; no consensus was reached. Pebbles noted they will add the word “alternates” to the memo, and remain silent for now on whether or not additional members outside of the Commissioners may be included. Stevens suggested there be a mechanism for reporting from committees back to the Board. Crane noted that staff will be providing summary notes of committee meetings. Consensus was reached on moving forward with program committees.

Eder noted that staff leads for program committees will be identified at the Semiannual meeting. Several Board members indicated that they would prefer to communicate expectations to their delegation, and staff agreed to update the memo to articulate that.

Eder moved to the conversation about coordinating with other regional watershed commissions. He noted he has begun that process and is open to additional suggestions. Injerd suggested continued coordination with the Upper Mississippi River Basin Association, which has been expanded recently. Allan suggested coordinating with the National Ocean Council.

4) New Congress and Administration Transition, Infrastructure Statement and Federal Priorities:

Eder reiterated that the change in administration does not mean the GLC’s message will change, although it will need to focus on the value of the Great Lakes to the region and the two nations and the role of the GLC as a leader. He noted that the new administration has indicated an interest in infrastructure investment, leading to the development of the infrastructure statement by the GLC.

Allan noted that he has heard infrastructure may be a year two priority for the new administration. Stine suggested that it’s not always best to be first in approaching a new administration, and cautioned the GLC not to speak too narrowly. Stevens noted that community redevelopment is not as reflected in the federal priorities document. Eder noted that the new administration may want to put their own brand on the GLRI. Allan suggested coordinating with the members and new leaders of the Great Lakes Congressional Task Force. Marquis noted that for this administration, many different people will have a say in policy.

Stevens noted he liked the wastewater infrastructure language in the document since it included an economic focus. Nelson noted that jobs will be a priority for the new administration and GLC messaging should reflect this. Injerd suggested striking climate change from the document. Stine suggested including an argument for the national security and competitiveness impact if there is a failure at the Soo Locks. Multiple Board members suggested asking infrastructure groups to build navigation into their priorities. Stevens and Stine suggested including the Harbor Maintenance Trust Fund. Bruno asked if staff had considered including seasonality and icebreaking in the document. Nelson questioned if the term “integrated water management” is well-understood; staff noted it may not be, but is the most well understood term for now.

Injerd asked that edits be incorporated to the infrastructure document and that it be sent back to the Board for approval. The Board concurred.

Eder noted that communicating the GLC’s priorities for the new Congress and Administration is highly important. Stine agreed and suggested that the second sentence better reflect the benefits of actions, not highlight the wisdom of any previous administration. There was discussion about the necessity of designating a point person for the Great Lakes. Eder noted that it has been more efficient when all of the federal agencies are working together. There was consensus on moving that portion to the end of the document. Ware suggested including language on a lighter touch and flexibility for states from federal agencies. Stevens suggested removing the last page listing funding for all federal agencies’ Great Lakes programs. Consensus was expressed. Injerd asked for the sentence on Army Corps to be revised or removed. Consensus was reached on rewriting it.

Consensus was expressed on revising the document and getting it back to the Board by February 3.
5) **Semiannual Meeting:**

Consensus was expressed on inviting Vice President Mike Pence to serve as keynote speaker.

A. **Ballast Water Resolution:** Allan argued that the GLC needs to have a position on ballast water. Stine agreed, and noted that if consensus was not reached before the SAM, the conversation should continue. Allan noted that commissioners working on this issue need to reflect their delegation and not exclusively their industry.

B. **Emerging Contaminants of Concern Resolution:** Allan noted Michigan does not have a solid position on this issue. Stine noted that there are many voices in this space, but Commissioner Jen Schultz requested that the GLC should speak up. Pebbles noted that the subcommittee could decide if there is or isn’t a role for a GLC resolution. Bruno noted that GLEC is managing this issue through an annex to the Great Lakes Water Quality Agreement. Michigan, Ohio, Ontario and New York agreed to work on the committee, but it was noted a resolution will likely not be done by the SAM.

6) **Finances/Administration**

A. **Dues Increase:** Allan noted that the current dues levels were set in 2002 and mean a lot less in value in 2016 because of inflation alone. Eder noted it is difficult to pursue all priorities equally at current general operating fund levels. He noted that to keep up with the rate of inflation alone, dues would currently be $80K. He also noted the GLC’s policy and advocacy efforts in particular can only be funded through dues.

Stine noted that the Minnesota delegation is supportive of a dues increase. Ware noted that Ohio’s budget situation is challenging, and that if the GLC can indicate exactly what it will do with the increase, it would help. Injerd noted that state dues are currently only 2.3 percent of the GLC budget, and that would have to be messaged well to justify a dues increase. He also noted that a dues increase would be judged based in part on more funding being directed to Illinois. Bruno noted that a dues increase would be a challenge in the current Pennsylvania budget environment. Zelazny noted that Board members need to make the argument that they get services and benefits from the GLC that they could not get from themselves without a regional voice. He also noted that with state dues so low and so much money coming in from the federal government, at some point the GLC will not be able to claim they are an organization made of states. Nelson noted that she had not seen an ROI document. Bertram agreed to send out the ROI documents for the past several years for review. Eder and Crane reiterated that the value proposition of the GLC is its work regionally. Injerd noted that programs like the NOAA/GLC Regional Habitat Restoration Partnership raise a question whether or not the GLC’s work is regional. Allan noted that provinces, while not paying dues, do provide other benefits like the Quebec internship program, and that formal notification of that contribution could occur.

The conversation was tabled for further consideration.

B. **Finances/Administration:** Bertram walked Board members through the memo on the GLC’s finances through November. Crane noted that in January, the GLC negotiates its indirect cost rate with U.S. EPA. Bertram noted that the rate is fairly steady over the recent several years.

Allan suggested putting a finance committee together on investment policies, the FY 18 budget and dues increase. He asked for himself, Stine, Bruno, and Injerd to serve on the committee.

7) **Priority Programs:**

A. **AIS updates:** Eder provided updates on several AIS initiatives of note, including the non-federal sponsor letter and Brandon Road. Injerd recapped an Illinois letter to the Army Corps indicating that they were willing to serve as non-federal sponsor to continue the study. Nelson reiterated that this project should be 100% paid for by the federal government. Injerd noted receiving financial credit from the Metropolitan Water Sewer District may be difficult to capture. Eder noted that if the region
believes it should be 100% paid for by the federal government, that is a viewpoint that should be conveyed to Congress.

B. Habitat: Heather Braun presented information on the NOAA-GLC Habitat Restoration Partnership, emphasizing the process for how NOAA and EPA choose and funds its projects. GLC and states have influence but do not make the decisions. The GLC is currently implementing projects at three locations: Buffalo River, Muskegon Lake, and the St. Marys River. Nelson asked why states don’t directly implement a partnership; the answer is they can and in some cases they do. However, Allan and Stine noted that there are many staffing and logistical challenges for states and that the GLC is often more nimble. Braun also discussed other advantages for GLC and its members: lower project management cost, long-term engagement in AOC restoration, and “a seat at the table” for the states’ views as NOAA implements the program. She also noted that the methodology developed by Grand Valley State University on articulating the economic benefits of habitat restoration will be available soon and is relevant for use by other projects.

C. Sediment and Nutrient Reduction Program: Crane presented historical information on the GLSNR. Prior to 2010, all areas in the Great Lakes were able to apply for grants, except for primarily urban areas. Since 2010, priority watersheds (Green Bay, Saginaw Bay and Maumee River) have been emphasized. Recently, GLC is working hard to persuade NRCS to broaden the program again. Staff is pushing to make more of the entire region (all states) eligible. Staff works with an advisory group comprised of members from each state that formulates the RFP and selects projects to be funded.

The meeting adjourned at 5:00 P.M.

Respectfully submitted,

Tim A. Eder, Executive Director
/bw
Great Lakes Commission
Board of Directors
Conference Call Minutes
September 15, 2016

The meeting was called to order at 3:00 p.m. EDT by John Stine, Vice Chair. The following members were present:

Dan Injerd - Illinois
Dan Schmidt - Indiana
Emily Finnell - Michigan
John Linic Stine - Minnesota
Jim Tierney, Don Zelazny - New York
Andy Ware, Jim Zehringer - Ohio
Eric Marquis - Quebec
Steve Galarneau, Pat Stevens - Wisconsin

Staff present: Tim Eder, Tom Crane, Steve Cole, Matt Doss, Beth Wanamaker

1) **Introductions and Call Objectives:**
Stine noted that the agenda included preparations for Annual Meeting in Toronto, reviewing the final drafts of resolutions, discussing next steps for the Strategic Plan, and updating the Board on legislative activities.

Eder added program updates to the agenda. Minutes and agenda were approved.

2) **Annual meeting, October in Toronto; resolutions:**
Annual Meeting: Eder noted that the speaker from BMO Harris for the Annual Meeting has been finalized, and that all other speakers are confirmed. He also noted that the format of the Meeting will be slightly different because of the Great Lakes Public Forum in Toronto earlier in the week, and that the dinner meeting will include discussion of the Strategic Plan and big picture issues for the GLC. Stine asked Board members to remind their delegations to review foundational documents for the GLC in advance of that conversation – those materials will be included in the briefing book sent out to Commissioners in advance of the meeting, in addition to a history of the bylaws and GLC practices and the existing welcome packet for new commissioners.

Sunsetting resolutions: Crane noted that there are four resolutions scheduled to be sunsetted at the Annual Meeting that concern: 1) Great Ships Initiative, 2) Lacey Act 3) Water Resources Act, and 4) Farm Bill. Eder noted that further information will be included in the briefing book. Schmidt asked for clarification on the 10-year period for sunsetting; Eder explained that this is the first year resolutions will be sunsetted and that a trial period of 10 years was decided upon. Consensus was reached.

Pending resolutions: Eder noted that no significant changes had been received to either resolution.

   a. Maritime resolution: Tierney will offer specific language edits regarding the “balanced use of Great Lakes water resources” clause at the Annual Meeting. Consensus was reached on moving forward with the resolution.

   b. Water infrastructure resolution: There was concern raised over the term “federalist” and its connotations. Consensus was reached on striking federalism, and including the current version of in the briefing book, with a streamlined version being developing before the Annual Meeting.

3) **Strategic Plan:**
Eder noted he had outlined a process for completing the Strategic Plan and articulating GLC processes and procedures in a memo. Consensus was reached on the plans and timetable.

4) **Legislative Update:**
a. WRDA: Eder noted that WRDA passed the Senate today and that the House may consider it in the next week or two. Eder noted that the Senate version addressed a number of Great Lakes priorities, and that the GLC is going to do a brief statement commending Senate passage.

b. Appropriations: Doss noted that Congress is considering a CR through December and then possibly passing small appropriations bills after the election.

5) Program Funding:
Eder noted that the GLC recently received two grants from the Erb Family Foundation for green infrastructure projects, including one that establishes a working group. Eder noted he will send information to the Board and ask for suggestions for members of the working group.

The meeting adjourned at 4:00 p.m.

Respectfully submitted,

Tim A. Eder, Executive Director
/bw
The meeting was called to order at 3:00 p.m. EDT by John Linc Stine, Vice Chair. The following members were present:

- Dan Injerd - Illinois
- Dan Schmidt - Indiana
- John Linc Stine - Minnesota
- Karl Gebhardt - Ohio
- Ranissah Samah, Jason Travers - Ontario
- Don Zelazny - New York
- Tim Bruno - Pennsylvania
- Eric Marquis - Quebec
- Steve Galarneau, Pat Stevens - Wisconsin

Staff present: Tim Eder, Tom Crane, Steve Cole, Matt Doss, Beth Wanamaker

1) **Introductions and Call Objectives:**

Minutes from the September 15 meeting were approved.

2) **Strategic Plan amendments:**

Eder reviewed the packet of Strategic Plan materials that the Board recently received, as well as the proposed timetable. He noted that Observer review has been removed from the timetable. The Board concurred. Schmidt noted that his team is supportive of the amendments but still reviewing, and suggested that metrics be included that show balance between environmental and economic factors and across the region.

Consensus was reached on moving the Strategic Plan forward to consideration by Commissioners. Eder will send the Plan out to Commissioners and schedule a call to discuss. He encouraged the Board to work with their delegation to discuss the plan and submit comments as a jurisdiction.

3) **Operations and Procedures compendium**

Stine reviewed the operations materials included in the packet; including that a workgroup will be formed with him and Tom Crane at the lead. Stine noted participation is welcome from all, but that each jurisdiction should be limited to one representative. Eder suggested picking several big ticket items to consider at the in-person meeting in December. Schmidt suggested better indicating that the report indicates both what the GLC does and what it should do. Stevens suggested highlighting how decisions are made, especially on communications issues.

Consensus was reached on the outline and timeline.

4) **Letter to transition teams:**

Eder noted that transition teams from both campaigns are currently thinking about priorities for their first 100 days and that the time is ripe to make sure they include the Great Lakes. He noted also that infrastructure is on the list of priorities for both and the GLC should make sure that water infrastructure and the maritime system are all included in those priorities. Schmidt asked that the letter reflect the vote count on the resolution, and called for all letters to include a vote count.
Consensus was reached on moving forward with the letter and on including the vote count. Stine and Eder noted that once a candidate is elected, there will also be follow up with his or her team.

5) **Letter to WRDA Negotiators**

Eder noted that the Senate and House have both passed WRDA and have been negotiating where they have differences. He further noted that they may not have a conference committee and may instead work it out at the staff level.

Eder noted that the points of view in letter offered are taken from previous communications or positions. Eder also noted that the GLC usually sends directly to committees and then sends an email giving the Great Lakes delegation a heads up.

Consensus was reached on moving forward with the letter.

6) **Chicago Waterways & Brandon Road**

Eder noted that there were a series of meetings in October on CAWS in Chicago, at which it was announced that the Corps will deliver a report on their work at Brandon Road in January. He noted that they need guidance on how to move forward, which may include a non-federal sponsor. Eder noted that GLC staff met with Brigadier General Toy recently, where he learned that the Corps will move forward without a non-federal sponsor, but a recommendation to Congress will not be transmitted without one. The Metropolitan Water Reclamation District of Greater Chicago head agreed to chair a subcommittee to explore finding a non-federal sponsor.

Injerd added that he had heard from the Corps that they would terminate the project without a non-federal sponsor. He also added that his agency is convening a group of stakeholders about this topic tomorrow. Finally, he noted that the Corps has put out a list of prices for various alternatives.

Eder noted that the burden of the project should not have to lie on Illinois; this is a project that affects all the Great Lakes states and provinces. Injerd noted that how costs would be divided is unclear.

7) **Audit**

Eder thanked the members of the audit committee, and noted that auditors have recently been at the GLC. Crane noted that the process is going smoothly and will be wrapped up shortly.

The meeting adjourned at 4:00 p.m.

Respectfully submitted,

Tim A. Eder, Executive Director
/bw
The meeting was called to order at 10 a.m. EDT by Jon Allan, Chair. The following members were present:

Dan Injerd - Illinois
Jon Allan - Michigan
Don Zelazny - New York
Andy Ware - Ohio
Bill Carr - Ontario
Tim Bruno - Pennsylvania
Eric Marquis - Quebec
Steve Galarneau, Pat Stevens - Wisconsin

Staff present: Tim Eder, Tom Crane, Victoria Pebbles, Beth Wanamaker, Joe Bertram, Matt Doss

1) **Introductions and Call Objectives:** Previous minutes were approved.

2) **2016 audit:** Eder pointed Board members to materials included in his previous email from the auditors. Stevens reiterated that it was an uneventful audit, and directed Board members to page nine of the Single Audit Compliance document for a good summary. Carr and Allan commended the GLC’s financial and management team for continued good work. Bruno also commended the GLC for beginning to replenish its cash reserves. Eder noted that the staff has also prepared an investment policy for future review by the finance committee. Bertram noted that Schedule of Unadjusted Differences is a document from the audit team indicating that they chose not to make an adjustment because it would be inconsequential to the final numbers.

A motion was made by Wisconsin and seconded to approve the audit. The motion carried unanimously.

3) **January 13 meeting of the Board:** Eder noted that he has sent around an agenda for the meeting. Zelazny noted that the agenda is introspective and focused on now and the near future, and proposed also spending time considering how the GLC could work more collaboratively with other watershed commissions. Eder noted that he recently attended a meeting of the Interstate Council on Water Policy, a coalition of watershed organizations, to begin networking with those groups. Eder additionally noted that he will be posting meeting materials on a password-protected website for Board members by the week prior.

4) **Resolutions Review Sub-Committee:** Eder noted that ten years ago, the GLC adopted a resolution on ballast water, along with a related resolution in 2011, and the Resolutions Review Committee recently issued a recommendation to rescind and replace both with a single updated resolution to be introduced and acted on at the Semiannual Meeting. The Committee also recommended that the Chair appoint a committee of Board members/commissioners to work with staff to draft the new resolution, with staff providing background materials on the topic. Allan committed Michigan to the committee, and asked other states to consider how they wanted to be involved.

5) **Letter from Gina McCarthy, EPA Administrator on GLRI capacity grants:** Allan noted that the letter is 95% of what the GLC asked for, the exception being base funding for LAMP work in each state. Allan noted there are questions that remain about whether it is retroactive, and if programs need to resubmit information. He noted that he is planning a call on this with Tinka Hyde of EPA. Allan asked that if resubmitting is necessary, the GLC get a commitment from Hyde that there will not be additional back-and-forth. Eder noted that this is a victory for the Great Lakes states, and that it is indicative of the success that the GLC and the states are having working together.
The meeting adjourned at 10:30 a.m.

Respectfully submitted,

Tim A. Eder, Executive Director
/bw
**Action Items**

- **Action Item – Rescind resolutions on ballast water adopted in 2007 and 2011 with the intent to replace them with a single updated resolution (presented below as a separate action item) based upon the recommendation of the resolutions review committee:** Per existing policy, the Commission reviews adopted resolutions on their ten-year anniversary and decides whether they should be retained, updated or rescinded. The resolutions review committee met on December 9, 2016 to discuss two resolutions on ballast water: one passed at the Semiannual Meeting in 2007 (Federal Legislation (U.S.) to Protect the Great Lakes-St. Lawrence River from Ballast Water Discharges of Invasive Species) and one passed at the Annual Meeting in 2011 (Ballast Water Regulation), which updated and expanded the 2007 resolution. A memorandum describing the resolution review process and copies of the two resolutions proposed to be rescinded are included in this section of the briefing book.

- **Resolution – Ballast Water Management in the Great Lakes-St. Lawrence River System:** This resolution has been the focus of substantial discussion with a subgroup of commissioners. In summary, the resolved clauses express the GLC’s support for:
  
  - Compatible U.S. and Canadian federal ballast water treatment standards and enforcement mechanisms;
  - Strong federal ballast water regulations;
  - Consultation by Congress and federal agencies with the states and to advance ballast water policies and standards;
  - Maintaining requirements for ballast water exchange and saltwater flushing in addition to treatment technology for ships entering the Great Lakes-St. Lawrence system;
  - Development of ballast water technology solutions for ocean-going ships and lakers;
  - Government and private sector financial support for ballast management technology development for lakers;
  - Review of federal discharge standards, requirements and technology on a periodic basis; and
  - A robust science and monitoring program on treatment technology and regulatory policies.

- **Resolution – Addressing Contaminants of Emerging Concern in the Great Lakes Basin:** The resolution recognizes that advancing the understanding of the harmful impacts of CECs and taking precautionary steps to impede their introduction and spread is critical to protecting the economic and ecological well-being of the Great Lakes-St. Lawrence River region. It requests that government agencies and research institutions 1) assess whether existing plans, programs and policies are adequate to understand the risks posed by CECs and protect the Great Lakes and St. Lawrence River basin and its residents from those risks; and 2) recommend additional efforts that might be needed to address current and future CECs in the Great Lakes basin.
To: Great Lakes Commission Board of Directors

Fr: Tom Crane, Deputy Director

Re: Report of the Resolutions Review Committee. Recommended actions for the resolution passed at the 2007 Semiannual Meeting and one additional resolution passed at the 2011 Annual Meeting of the GLC

Da: December 19, 2016

At its 2016 Semiannual meeting in February the Great Lakes Commission passed an action item that established a process for reviewing resolutions of the Great Lakes Commission upon their 10 year anniversary and deciding whether those resolutions should be retained (stand as originally passed), be updated or rescinded.

In March, Chairman Allan appointed a committee of five commissioners to work with the Commission staff to review the resolutions passed 10 years previously and recommend to the Board a suggested action for each resolution prior to the corresponding Annual or Semiannual Meeting.

The resolutions review committee met via conference call on December 9 to discuss two resolutions on ballast water; one passed at the Semiannual Meeting in 2007 and one passed at the Annual Meeting in 2011.

The following is a brief summary of the call and the recommended action for the resolutions reviewed:

The Commissioners present on the call were: Dan Injerd, (IL) Ian Davison (MI), Jennifer Schultz (MN), Bill Carr, (ONT) and Steve Galarneau (WI) and Patrick Stevens (WI).

Tom Crane, Deputy Director convened the call and explained the resolution review process and the charge to the committee. Crane and Erika Jensen reviewed the 2007 resolution titled: Federal Legislation (U.S.) to Protect the Great Lakes-St. Lawrence River from Ballast Water Discharges of Invasive Species. Jensen provided background and explained the discussion points that had been provided on the resolution prior to the call. During the call, the committee also inquired about the 2011 resolution titled: Ballast Water Regulation, which updated and expanded on the issues covered in the 2007 resolution.

The two resolutions are included in the link below:


The Resolutions Review Committee briefly discussed each resolution and asked a few questions regarding the genesis of the resolutions, whether the purpose of the resolutions had been accomplished, whether the issues covered in the resolutions are still important to the region today and the staff perspective on each of them.

**Recommended Action:** The Resolutions Review Committee recommends updating the 2007 and 2011 resolutions on ballast water regulation. This would mean rescinding the 2007 and 2011 resolutions and replacing both with a single updated resolution to be introduced and acted on by the Great Lakes Commission at its 2017 Semiannual Meeting. The Committee also recommends that the Chair appoint a committee of Board members/commissioners to work with Commission staff to draft the new resolution.

This recommendation will be presented for discussion on the Board of Director’s call on December 21.
Resolution

Federal Legislation (U.S.) to Protect the Great Lakes-St. Lawrence River from Ballast Water Discharges of Invasive Species

Whereas, over 180 aquatic invasive species (AIS) have been introduced into the Great Lakes St. Lawrence River and one of the most important pathways for introduction and movement of these species is ballast water from maritime commerce; and

Whereas, remediation of problems caused by AIS is an ongoing and expensive burden on the region and has resulted in significant costs to important sectors of the region’s economy, including power generation, water supply, sport and commercial fisheries and tourism; and

Whereas, addressing the problem of ballast water and AIS through federal legislation has repeatedly been identified as a top priority of the Great Lakes states in communications to Congress from the Great Lakes Commission, Council of Great Lakes Governors, Great Lakes and St. Lawrence Cities Initiative, Great Lakes Regional Collaboration Strategy To Protect and Restore the Great Lakes and others; and

Whereas, Senators Carl Levin and Susan Collins introduced comprehensive legislation in the 109th Congress (S. 770), which addressed AIS from ballast water and other vectors and which garnered broad support from the Great Lakes states and others, including some representatives of the shipping industry; and

Whereas, Senators Levin and Collins reintroduced in March 2007, the National Aquatic Invasive Species Act of 2007 (S. 725); and

Whereas, the lack of federal standards has compelled states to enact ballast water treatment requirements in Michigan and California, and other states are currently considering similar legislation; and

Whereas, in an effort to build a regional consensus on a viable regulatory approach to ballast water management and AIS prevention, the Commission convened a special advisory panel of key stakeholders including representatives of industry to examine the range of concerns surrounding ballast water regulation and to establish a slate of consensus-based objectives that should form the basis for any new legislation and the results of these discussions have helped to inform these recommendations to Congress.

Therefore, be it Resolved that the Great Lakes Commission ("the Commission") commends and encourages the efforts of the Great Lakes Members of Congress from both parties who have identified federal legislation to control invasive species from ballast water as a high priority for action this year; and

Be it Further Resolved that as the Great Lakes states, through the Commission or the Council of Great Lakes Governors or both, and the mayors of the Great Lakes and St. Lawrence Cities Initiative have, since 2005, repeatedly urged that Congress pass and the President sign comprehensive legislation, such as the National Aquatic Invasive Species Act of 2005 (as reflected in S.B. 770, H.R. 1591 and 1592), to prevent the introduction and spread of AIS from all sources; that the Commission renews this request and urges the Great Lakes Congressional Delegation to make passage of legislation that reduces and ultimately eliminates the introduction and spread of AIS from ballast water its top Great Lakes priority in 2007; and

Be it Further Resolved that the Commission strongly prefers federal ballast water treatment regulations that would be applied in a uniform and consistent fashion throughout the region, as compared to a jurisdiction-by-jurisdiction approach, provided that a federal program sufficiently protects the unique economic and ecological interests of the Great Lakes states; and
Be it Further Resolved that the Commission affirms the position taken by the Great Lakes governors in September 2005 urging Congress to pass legislation to address AIS from all vectors, and that the Commission affirms the provisions in that communication that were either desired or objectionable in proposed legislation under consideration at that time, including objections to the following provisions:

- a clause that pre-empted states from taking steps to protect against damage by invasive species from ballast water;
- a clause that superseded use of any provision of the Clean Water Act with respect to ballast water, and
- a delay for 10 years or longer the application of treatment standards to require that ships in the “no ballast on board” (NOBOB) condition, which are an important vector for invasive species and account for 90 percent of the ships entering the St. Lawrence Seaway; and

Be it Further Resolved that the Commission recommends that Congress use S. 725, the National Aquatic Invasive Species Act, as a starting point for a ballast water regulatory program that, when enacted, will meet the needs of the Great Lakes states to protect their economic and environmental interests; and

Be it Further Resolved that the Commission recommends that Congress enact ballast water legislation that would achieve the following:

- An immediate requirement that all ships exempted from current regulations because they are in the no ballast on board condition be required to treat residual ballast water by best management practices such as ballast water exchange or other technology; and
- Establishes a ballast water treatment standard regime for ocean-going vessels that includes:
  - the ultimate goal of zero discharge of viable organisms;
  - a requirement to meet an environmentally protective standard within five years following enactment, and
  - a requirement to review technology on a periodic basis both before and after the five-year period to define the best performing technology and to require application of discharge standards based on the performance of the best technology; and

Be it Further Resolved that the Commission recommends that federal legislation ensure that contingency planning and activities to control the spread by commercial shipping vessels of any AIS or pathogen introduced in the Great Lakes-St. Lawrence River can be carried out by the states, in coordination with federal agencies; and

Be it Further Resolved that the Commission recommends that federal legislation clarify the role of federal agencies so that EPA, the Coast Guard, and the departments of Interior and Agriculture work in a coordinated fashion with the states in developing and administering effective ballast water programs and that EPA should have the lead authority for defining biologically sound and environmentally effective discharge standards and the Coast Guard should have the lead authority for enforcement and for ensuring safe installation and operation of treatment equipment on ships; and

Be it Further Resolved that the Commission encourages Canada and the United States to work together to fight AIS by, among other things, harmonizing ballast water regulations and treatment requirements; and

Be it Finally Resolved that the Commission encourages all intra-lake and ocean-going commercial shipping vessels to undertake management practices with a goal of preventing AIS that are introduced into the Great Lakes-St. Lawrence River from being spread throughout the system.

Adopted by the Great Lakes Commission at its Semiannual Meeting, May 15, 2007, in Indianapolis, Ind.

The Great Lakes Commission is a binational public agency dedicated to the use, management and protection of the water, land and other natural resources of the Great Lakes-St. Lawrence system.
Resolution: Ballast Water Regulation

Whereas, ballast water discharge from vessels as a vector for the introduction and movement of aquatic invasive species (AIS) in the freshwaters of the Great Lakes and St. Lawrence River remains an important concern for the ecological integrity of the Great Lakes and the St. Lawrence River; and

Whereas, the Great Lakes Commission recognizes and wishes to build upon the measures implemented by both the private sectors and government on both sides of the border with the result that no new ballast-borne species have been discovered in the Great Lakes since 2006; and

Whereas, the Canadian federal government has signed on to the regulatory regime and timetable advanced by the International Maritime Organization; and

Whereas, AIS in the Great Lakes impact such critical sectors of the regional economy as electric power generation, commercial and sport fishing, recreational boating and tourism, and public water supply; and

Whereas, the U. S. Environmental Protection Agency (EPA)'s National Pollutant Discharge Elimination System (NPDES) exclusion for vessel discharges was legally challenged by several environmental organizations and Great Lakes States and struck down by the 9th Circuit Court, rendering all discharges incidental to normal vessel operations, including ballast water, unlawful, effective 2008, unless authorized by an NPDES permit, which is subject to certification by the states under Section 401 of the Clean Water Act that permitted discharges meet state water quality standards; and

Whereas, the Vessel General Permit (VGP) issued in December 2008 by the EPA includes 26 types of vessel discharges including ballast water and incorporated Section 401 Water Quality Certifications from individual states; and

Whereas, enactment of the U.S. Coast Guard rule on the federal ballast water discharge standard under the National Invasive Species Act, first promised in 2004 and eventually proposed in August of 2009, has been delayed by a prolonged review period; and

Whereas, installation of ballast water treatment technology will be a significant expense to the shipping industry, but treatment technology is under development, being tested and installed on some ships; and

Whereas, in the absence of adequate federal regulation of ballast water discharges and a protective federal standard for ballast water treatment, several Great Lakes states have adopted their own ballast water control and treatment requirements and imposed conditions on their Clean Water Act Section 401 Water Quality Certifications; and

Whereas, individual states’ requirements vary in implementation schedules and ballast water treatment performance standards, ranging from International Maritime Organization (IMO) equivalent standards to one thousand times IMO standards; and

Whereas, the Great Lakes Commission, the Council of Great Lakes Governors, the Great Lakes-St. Lawrence Cities Initiative, Great Lakes Panel on Aquatic Nuisance Species, among other regional institutions, have consistently expressed a strong preference for protective federal ballast water treatment standards that may be applied uniformly throughout the region, as opposed to the current jurisdiction-by-jurisdiction regulatory approach; and
Whereas, the Canadian and U.S. St. Lawrence Seaway Corporation’s ballast water control and management regulations require all vessels entering waters under Canadian or U.S. St. Lawrence Seaway Development Corporation jurisdiction to manage ballast water for the prevention of AIS; and

Whereas, in 2010, 100 percent of vessels bound for the Great Lakes-St. Lawrence Seaway from outside the Exclusive Economic Zone received a ballast tank exam (on each of the 415 transits) by joint inspection teams representing Transport Canada, U.S. Coast Guard, and the U.S. and Canadian Seaway corporations to comply with the 30 part per thousand salinity requirement.

Therefore, be it resolved, that the Great Lakes Commission renews its call that the U.S. federal government enact national policies that encourage rapid development of ballast water treatment technologies and to enforce effective and achievable ballast water treatment standards that are protective of this region’s freshwater resources; and

Be it further resolved, that the Great Lakes Commission urges Congress and U.S. federal agencies to work closely with the Great Lakes states and offers its assistance to develop ballast water policies and standards that protect the Great Lakes basin from further invasion while maintaining a level national economic playing field; and

Be it further resolved, that the Great Lakes Commission urges U.S. EPA to consult with Great Lakes states during the development of its vessel general permit to facilitate a smooth and efficient certification procedure under Section 401 of the Clean Water Act; and

Be it further resolved, that the Great Lakes Commission urges U.S. EPA and the Coast Guard to consult with the shipping industry and interest groups that will be affected by the discharge regulations; and

Be it finally resolved, that the Great Lake Commission urges the Governments of Canada and the United States to pursue continued binational harmonization of federal ballast water treatment standards and enforcement mechanisms.

Adopted at the 2011 Annual Meeting of the Great Lakes Commission, Detroit, Michigan, October 11-12, 2011.
Ballast Water Management in the Great Lakes-St. Lawrence River System

(1) Whereas, the Great Lakes-St. Lawrence River maritime transportation system has been and continues to be vital to the national economy of the United States and Canada by facilitating domestic and international trade through the movement of goods and commodities and supporting industries such as manufacturing, steel production, agribusiness and power generation; and

(2) Whereas, ballast water discharge from vessels as a pathway for the introduction and movement of aquatic invasive species (AIS) in the freshwaters of the Great Lakes and St. Lawrence River remains an important concern for the ecological integrity of the Great Lakes and the St. Lawrence River; and

(3) Whereas, implementation of policies and best management practices by the private sector and governments in the United States and Canada, including the successful implementation of ballast water exchange and salt water flushing practices for vessels entering the Great Lakes-St. Lawrence Seaway, have significantly reduced the risk of species introduction and spread through ballast water discharge and current evidence indicates that there have been no newly established non-native species resulting from ballast water discharges since 2006; and

(4) Whereas, the eight states and two provinces along the Great Lakes and St. Lawrence River recognize that binational compatibility of federal ballast water treatment standards is needed to effectively manage a multijurisdictional shipping channel and encourage long-term private investment into the maritime transportation system; and

(5) Whereas, AIS in the Great Lakes impact such critical sectors of the regional economy as electric power generation, public water supply, manufacturing, commercial and sport fishing, recreational boating and tourism; and

(6) Whereas, the federal government of Canada is a signatory to and is developing regulations to implement the International Maritime Organization (IMO) International Convention for the Control and Management of Ships’ Ballast Water and Sediments that is scheduled to enter into force on September 8, 2017; and

(7) Whereas, the U.S. Coast Guard rule finalized in 2012 uses the IMO ballast water discharge standard as the basis of its regulatory regime and requires ocean-going ships to meet the discharge standard with an approved ballast water management system (BWMS); and

(8) Whereas, the U.S. Coast Guard rule eliminates the requirement for ocean-going vessels to continue the current practice of conducting ballast water exchange or saltwater flushing prior to entering the Great Lakes-St. Lawrence system once an approved BWMS is being used; and

(9) Whereas, vendors of treatment technology for ocean-going ships are working hard to bring products to market that comply with the IMO, U.S. Coast Guard, and EPA rules and standards and the U.S. Coast Guard provided its first type approval to a treatment system in December 2016; and

Presented by the Board of Directors for consideration at the 2017 Semiannual Meeting of the Great Lakes Commission, March 14-16, 2017 in Washington, DC.
(10) Whereas, vessel operators, including those that traverse the Great Lakes-St. Lawrence system, are implementing best management practices and moving ahead of the type approval process and installing ballast water treatment systems at significant expense; and

(11) Whereas, there are inherent differences between ocean-going vessels and lake freighters ("lakers") operating on the Great Lakes in terms of their roles in the introduction and dispersal, respectively, of AIS, as well as in terms of ballast tank configurations and ballasting operations; and

(12) Whereas, the relatively small size of the laker fleet and unique ballasting configurations, vessel designs, operations within the fleet hinder the free market from pursuing cost-effective ballast management technology development for lakers; and

(13) Whereas, the U.S. Environmental Protection Agency 2013 Vessel General Permit (VGP) requires ocean-going vessels and lakers built after December 1, 2009 to meet a discharge standard equivalent to the U.S. Coast Guard rule; maintains the requirement for ballast water exchange or saltwater flushing for ships entering the Great Lakes-St. Lawrence River system; and provides for Section 401 Water Quality Certifications from individual states; and

(14) Whereas, Great Lakes states have responsibility and authority, pursuant to state law and the Clean Water Act, to protect their waters and water dependent resources through programs to manage ballast water to ensure compliance with state water quality standards; and

(15) Whereas, the St. Lawrence Seaway Development Corporation and St. Lawrence Seaway Management Corporation’s ballast water control and management regulations require all vessels entering waters under Canadian or United States St. Lawrence Seaway Development Corporation jurisdiction to manage ballast water for the prevention of AIS and requires vessels declaring “no ballast on board” to conduct saltwater flushing.

Therefore, Be It Resolved, that the Great Lake Commission urges the Governments of Canada and the United States to pursue continued binationally compatible federal ballast water treatment standards and enforcement mechanisms; and

Be It Further Resolved, that the Great Lakes Commission supports strong federal ballast water regulations that sufficiently protect the unique economic and ecological interests of the Great Lakes and St. Lawrence states and provinces; and

Be It Further Resolved, that the Great Lakes Commission urges the U.S. Congress and federal agencies to work closely and consult with the Great Lakes states and offers its assistance to advance ballast water policies and standards that protect the Great Lakes-St. Lawrence basin from further introduction and spread of AIS while having a neutral impact on the national economic playing field; and

Be It Further Resolved, that the Great Lakes Commission supports maintaining requirements for ballast water exchange and saltwater flushing in addition to using treatment technology for ships entering the Great Lakes-St. Lawrence system as additional protection against invasive species transfer from ballast water; and

Be It Further Resolved, that the Great Lakes Commission encourages governments and the private sector to continue development of effective and feasible ballast water technology solutions for ocean-going ships and lakers to protect the ecological integrity of the unique freshwater conditions of the Great Lakes and St. Lawrence; and

Presented by the Board of Directors for consideration at the 2017 Semiannual Meeting of the Great Lakes Commission, March 14-16, 2017 in Washington, DC.
(6) **Be It Further Resolved**, that the Great Lakes Commission encourages governments and the private sector to financially support cost-effective ballast management technology development for lakers; and

(7) **Be It Further Resolved**, that the Great Lakes Commission supports review of federal discharge standards, requirements and available technology on a periodic basis to ensure technology and standards are reflective of advances in scientific understanding and technology development; and

(8) **Be It Finally Resolved**, that the Great Lakes Commission supports a robust science and monitoring program to advance understanding of the effectiveness of treatment technology and regulatory policies in reducing the risk of AIS transfer from ballast water.
RESOLUTION
DRAFT - February 14, 2017

Addressing Contaminants of Emerging Concern in the Great Lakes Basin

Whereas, the waters of the Great Lakes and St. Lawrence River provide a multitude of ecological, social and economic benefits for approximately 40 million Canadian and U.S. residents; and

Whereas, the term “Contaminants of Emerging Concern” (CECs) refers to a wide variety of compounds that are present in the Great Lakes and St. Lawrence river basin¹ and that pose known or suspected risks to human health, the environment and the economy, but are not widely regulated, such as Polybrominated Diphenyl Ethers (PBDEs), Perfluorooctanoic Acids (PFOAs), pharmaceuticals, microplastics, and 1,4-Dioxane; and

Whereas, wastewater treatment plants in the U.S. and Canada discharge 4.8 billion gallons of treated effluent into the Great Lakes basin every day, and these wastewater treatment plants are only equipped to remove approximately half² of the chemicals that have been identified in sewage; and

Whereas, some CECs, including PBDEs and PFOAs are considered Chemicals of Mutual Concern (CMCs) under Annex 3 of the Great Lakes Water Quality Agreement (GLWQA) while others, such as microplastics and 1,4-Dioxane, are not part of that effort; and

Whereas, while other efforts are underway to address certain individual CECs, an effort to look at all CECs and their risks to the Great Lakes and St. Lawrence river basin economy and environment would inform the Great Lakes Commission’s ability to respond appropriately on the issue of CECs.

Therefore, be it resolved, that the Great Lakes Commission (GLC) recognizes that advancing the understanding of the harmful impacts of CECs and taking precautionary steps to impede their further introduction and spread via all known pathways is critical to protecting the economic and ecological well-being of the Great Lakes-St. Lawrence River region; and

Therefore, be it finally resolved, that the GLC requests government agencies as well as research institutions to: 1) assess whether existing plans, programs and policies are adequate to understand the risks posed by CECs and protect the Great Lakes and St. Lawrence River basin and its residents from those risks; and 2) recommend additional efforts that might be needed to address current and future CECs in the Great Lakes basin.


Presented by the Board of Directors for consideration at the 2017 Semiannual Meeting of the Great Lakes Commission, March 14-16, 2017 in Washington, DC.
An Enduring Priority

The Great Lakes form the backbone of the culture and economy of our eight-state, two-province region. Restoring, protecting and wisely managing them is an enduring, bipartisan priority for the people of the Great Lakes region and their elected leaders. With nearly one-third of U.S. and Canadian economic activity centered in the Great Lakes region and 95% of our nation’s fresh surface water, bolstering this invaluable resource is a wise strategy that benefits our nation as a whole.

The investments we are making in the Great Lakes—whether for maritime transportation, waterfront economic development or environmental cleanup—are creating jobs, protecting public health and revitalizing struggling communities. The Great Lakes states are leading this important work in collaboration with local communities, tribes, business and industry, and conservation organizations. Representing the Great Lakes states and provinces—Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Ontario, Pennsylvania, Québec and Wisconsin—the Great Lakes Commission offers these priorities to continue the progress we are making in leveraging the Great Lakes as a vital economic and environmental asset for our nation.

A Leadership Agenda for the Great Lakes

- **Invest in water infrastructure** to safeguard drinking water, rebuild failing wastewater systems, support business and industry, and help revitalize communities.
- **Strengthen the Great Lakes navigation system** by upgrading locks, ports and related infrastructure and ensuring dredging to keep waterways open to commerce.
- **Advance the Great Lakes Restoration Initiative in coordination with the Great Lakes states** and other partners to maintain and accelerate cleanup, restoration and recovery of North America’s greatest freshwater natural and economic resource.
- **Coordinate and strategically target agricultural conservation programs to prevent polluted runoff** that contributes to harmful algal blooms.
- **Manage data and information to guide Great Lakes investments, track progress and ensure accountability.**
- **Provide effective coordination of federal agencies**, ensure their programs are aligned with efforts of state and local partners, and appoint a senior Great Lakes director to ensure efficiency.

The **VALUE of the GREAT LAKES**

- **95%** of our nation’s supply of fresh surface water
- **Drinking water for 48 million people**
- **1.5 million jobs and $60 billion in wages annually**
- **$5 trillion regional economy and 30% of U.S. and Canadian economic activity**
- **$52 billion recreational economy from fishing, hunting and boating**
- **Maritime system contributing $30 billion to the U.S. and Canadian economies**

**THE GREAT LAKES**

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- Maritime system contributing $30 billion to the U.S. and Canadian economies

**VALUE**

- Drinking water for 48 million people
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- Maritime system contributing $30 billion to the U.S. and Canadian economies
MODERNIZE WATER INFRASTRUCTURE

Invest in water infrastructure to safeguard drinking water, rebuild failing wastewater systems, support business and industry, and help revitalize communities.

Our access to safe Great Lakes water is threatened by failing water infrastructure, lead in drinking water lines, toxic algae, sewage overflows from overburdened wastewater systems, and impacts from climate change. The Great Lakes Commission calls for increased federal investment to complement state and local programs to improve and manage all water infrastructure—drinking water, stormwater and wastewater. This should include support for the Clean Water and Drinking Water State Revolving Fund programs and new approaches such as the Water Infrastructure Finance and Innovation Act (WIFIA). The federal Lead and Copper Rule should be updated and federal agencies should collaborate with state and local agencies to strengthen standards and monitoring practices to detect toxic algae and safeguard drinking water supplies.

STRENGTHEN COMMERCIAL NAVIGATION

Strengthen the Great Lakes navigation system by upgrading locks, ports and related infrastructure and ensuring dredging to keep waterways open to commerce.

The Great Lakes Commission calls for policies, programs and projects needed to grow the Great Lakes and St. Lawrence River maritime transportation system and boost trade, create jobs and enhance the global competitiveness of our regional economy. Key actions include full use of monies paid into the Harbor Maintenance Trust Fund and dedicated funding for the Great Lakes; dredging to maintain channels and harbors; direction from the Army Corps of Engineers to manage the Great Lakes as a single, integrated navigation system; new options to reduce the need for disposing of dredged material in the open waters of the Great Lakes; and continued work to build a new large lock at Sault Ste. Marie, Mich., which is critical to our national security and regional economy. The Commission supports the strategy developed by the Conference of Great Lakes and St. Lawrence Governors and Premiers that aims to double maritime trade, improve environmental performance and support the region’s industrial core.

SUSTAIN RESTORATION

Advance the Great Lakes Restoration Initiative in coordination with Congress and state and local governments to maintain and accelerate cleanup, restoration and recovery of North America’s greatest freshwater resource.

The Great Lakes Restoration Initiative (GLRI) has generated unprecedented progress in restoring the largest system of fresh surface water in the world. The Great Lakes Commission urges the President to request and Congress to approve $300 million for the GLRI in FY 2018, with a focus on cleaning up heavily degraded Areas of Concern and other contaminated sites, stopping Asian carp and other invasive species, preventing polluted runoff that causes toxic algae, and restoring habitat for valuable fish and wildlife resources. Continued funding for the Initiative will build on our investments and help the region advance long-term goals for a healthy economy, sustained by a revitalized ecosystem.
PROTECT AGAINST INVASIVE SPECIES

Maintain robust, coordinated programs to protect the Great Lakes from Asian carp and other aquatic invasive species.

Strong federal leadership is needed to prevent the introduction and spread of aquatic invasive species (AIS) that threaten the environmental and economic health of the Great Lakes. The President and Congress should support successful programs established under the National Invasive Species Act, including the national task force, regional panels and state management plans; provide funding for the Great Lakes Fishery Commission’s sea lamprey control program; and strengthen federal programs to prevent the importation of harmful non-native species. Continued actions by federal and state partners under the Asian Carp Action Plan are vital to keeping these destructive invasive species out of the Great Lakes. The Army Corps of Engineers should complete a plan for preventing Asian carp from moving through the Brandon Road Lock and Dam in Joliet, Illinois, so it can be reviewed by the Great Lakes states and other interested parties. A comprehensive, long-term solution to prevent all AIS from transferring between the Great Lakes and Mississippi River watersheds is still needed.

TARGET CONSERVATION ACTIONS

Coordinate and strategically target agricultural conservation programs to prevent polluted runoff that causes harmful algal blooms.

Harmful algal blooms are a growing threat to public health, drinking water safety and local economies, particularly in vulnerable areas such as Western Lake Erie, Saginaw Bay and Green Bay. The Great Lakes Commission calls for strategic targeting of federal conservation programs to prevent the runoff of nutrients, fertilizers and other chemicals from agricultural lands that can pollute rivers and streams and contribute to harmful algal blooms. Federal programs should complement the leadership of the Governors and Premiers through the Western Basin of Lake Erie Collaborative Agreement. The federal harmful algal bloom coordinator, called for by Congress, should be empowered to improve the effectiveness of federal investments in collaboration with the Great Lakes states and other partners.

MANAGE INFORMATION

Manage data and information to guide Great Lakes investments, track progress and ensure accountability.

The Great Lakes Commission calls on federal agencies to manage and share data and information to guide investments and measure progress toward common goals for the Great Lakes. The Commission is implementing a Blue Accounting initiative together with The Nature Conservancy to provide Great Lakes leaders with information to assess progress toward desired outcomes for environmental, economic and social priorities. Expertise and collaboration from federal agencies is needed for the success of this initiative.

LEAD EFFECTIVELY

Provide effective coordination of federal agencies, ensure their programs are aligned with efforts of state and local partners, and appoint a senior Great Lakes director to ensure efficiency.

To help achieve our priorities for the Great Lakes regional economy and environment, maintain robust structures to coordinate federal programs and activities and ensure they are deployed efficiently and coordinated consistently with state and local efforts. This includes a dedicated, senior-level Great Lakes director; a Great Lakes Interagency Task Force to coordinate federal agency actions; a Great Lakes Advisory Board to provide recommendations from non-federal stakeholders; an Action Plan to strategically target restoration efforts and measure progress; and annual reports to Congress to ensure accountability. These structures will sustain progress and ensure the sound use of federal and state resources.
Voices from the Great Lakes

Great Lakes water infrastructure is a vital piece of the foundation for a strong economy and healthy communities. Sustained and strategic investments will help continue the comeback of our cities, protect public health, support economic prosperity, sustain agriculture and fuel the future of the Great Lakes region and the entire nation.

Hon. Rick Snyder, Governor, State of Michigan

Commercial navigation on the Great Lakes and St. Lawrence River contributes more than $30 billion to the U.S. and Canadian economies. It’s an absolute necessity that we maintain and strengthen this critical component of our nation’s economic infrastructure.

Mark Barker, President, Interlake Steamship Co.

Lake Erie is an economic engine for Ohio, generating nearly $13 billion in tourism sales and 120,000 jobs. Ohio’s charter boat industry is the largest in North America, fueled by a $1.5 billion sport fishery. It’s vital that we protect this economic asset from threats such as harmful algal blooms and invasive species.

Captain Paul Pacholski, President, Lake Erie Charter Boat Association

One of the world’s greatest natural resources sits in the middle of our region—the Great Lakes. The Great Lakes are a major economic force, and protecting them is critical for ongoing job creation and economic development. Enhancing the quality of the Great Lakes and maximizing their economic impact will continue to be priorities for the members of the Great Lakes Metro Chambers Coalition.

Brad Williams, Executive Director, Great Lakes Metro Chambers Coalition

Restoring the Buffalo River is a key element of our city’s economic and environmental revitalization. Great Lakes Restoration Initiative investments in dredging and living infrastructure, paired with upland recreation and commercial development, have transformed the once “dead” Buffalo River into the city’s most active waterfront destination.

Hon. Byron W. Brown, Mayor, City of Buffalo

About the Great Lakes Commission  The Great Lakes Commission was established by the Great Lakes states in 1955 to coordinate management of the water resources of the Great Lakes basin and to represent the states’ interests on Great Lakes matters before the federal government. Based in Ann Arbor, Mich., the Commission promotes the concept that a healthy environment and prosperous economy should be mutually dependent, not exclusive, goals. With appointees from the eight states and two Canadian provinces, the Commission serves as a forum for the development of regional policy and as an advocate for legislation and programs to benefit the Great Lakes. The Canadian provinces of Ontario and Québec participate in all Commission deliberations and activities as associate members.
GLC calls on U.S., Canada to rebuild critical Great Lakes water infrastructure

Ann Arbor, Mich. – The binational Great Lakes Commission (GLC) today called for U.S. and Canadian leadership to rebuild and modernize aging water infrastructure in the Great Lakes region. In a suite of comprehensive recommendations to both governments, the GLC argued that the time is right to invest in infrastructure that provides safe drinking water to more than 48 million people, transports 200 million tons of freight each year, and supports a $5 trillion economy in the eight-state, two province Great Lakes region.

Recent drinking water crises in Toledo, Ohio, and Flint, Michigan, have shined a light on the risks of aging and underfunded water infrastructure across the country. The majority of U.S. water systems are between 50 and 150 years old, and costs to maintain and update them are projected to rise steeply if action is deferred. Additionally, billions of gallons of sewage and stormwater are currently released into the Great Lakes each year from outdated and aging infrastructure. Investments are also needed for the critical Great Lakes maritime transportation system. The Department of Homeland Security has projected that an unscheduled shutdown of the Soo Locks would lead to a loss of 11 million jobs and a $1.1 trillion hit to the U.S. economy.

“Government at all levels and across both nations need to prioritize improvements to our region’s critical infrastructure systems,” said Governor Rick Snyder of Michigan. “The impact to our residents and our economies could be significant if we don't start to take the existing and emerging problems more seriously. One example of a pending and crucial need is the construction of a new lock in the Soo Locks due to the increasing threat of significant, negative consequences to the economies in our regions and across both nations. The recommendations from the Great Lakes Commission should be considered as soon as possible.

"Abundant, clean water, including Lake Superior, is one of Minnesota's most precious natural assets,” said John Linc Stine, commissioner of the Minnesota Pollution Control Agency and vice chair of the Great Lakes Commission. “Protecting and promoting clean, safe water in the Great Lakes is critical for the health and enjoyment of future generations, and Minnesota’s Governor, Mark Dayton, has made water a top environmental priority for his administration by declaring a year of water action. As Minnesota is situated at the head of the Great Lakes, the GLC’s recommendations for our water infrastructure needs -- especially drinking water and wastewater treatment systems -- should be considered as soon as possible, and is an important water action for Minnesota."

“The Great Lakes directly generate 1.5 million jobs and define our quality of life. Abundant fresh water gives the Great Lakes region a unique, competitive advantage to attract new industries and support growing cities. Failure to address our region’s aging water infrastructure puts this – and the health of our citizens – at risk,” said Tim
Eder, executive director of the Great Lakes Commission. “Protecting our region’s freshwater resources and leveraging them as an economic asset is a longstanding, bipartisan priority, and the Great Lakes states and provinces stand ready to work with our federal governments, local communities and businesses to address our infrastructure needs.”

The GLC document includes recommendations for improving drinking water, wastewater and stormwater infrastructure; supporting commercial navigation infrastructure; and sustaining infrastructure for restoring and managing the Great Lakes. It was developed with input from leaders from the public, private and nonprofit sectors across the Great Lakes basin. Several of the GLC’s member states and provinces also have comprehensive recommendations for improving all types of infrastructure systems.

To access the full GLC infrastructure statement, visit http://bit.ly/glcwaterinfrastructurepriorities.

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The Great Lakes Commission, led by Chair Jon W. Allan, director of the Michigan Office of the Great Lakes, is an interstate compact agency established under state and U.S. federal law and dedicated to promoting a strong economy, healthy environment and high quality of life for the Great Lakes-St. Lawrence region and its residents. The Commission consists of governors’ appointees, state legislators, and agency officials from its eight member states. Associate membership for Ontario and Québec was established through the signing of a “Declaration of Partnership.” The Commission maintains a formal Observer program involving U.S. and Canadian federal agencies, tribal authorities, binational agencies and other regional interests. The Commission offices are located in Ann Arbor, Michigan. Learn more at www.glc.org.
Water Infrastructure Priorities
for the Great Lakes Region
FEBRUARY 2017

The Case for Rebuilding our Water Infrastructure

The Great Lakes Commission calls on the President, Congress and Canada to implement a large-scale initiative to rebuild and modernize the infrastructure that provides our region with safe drinking water, treats wastewater, manages stormwater, facilitates commercial navigation, and safeguards the Great Lakes and St. Lawrence River as environmental and economic assets. Sustained and strategic investments will help rebuild our cities, protect public health, support business growth, sustain agriculture and fuel the economy of our industrial heartland.

Abundant fresh water gives the Great Lakes region a unique, competitive advantage to attract new industries, promote economic development, and support growing cities and farm communities. The infrastructure to effectively manage our water resources is the platform for a strong economy and healthy communities. However, after decades of under-investment, failing water infrastructure threatens our region’s future prosperity and the health of our citizens. Our national economy is at risk as well from vulnerability to disruption in the Great Lakes navigation system and its capability to deliver raw materials that are critical for our industrial base.

The Great Lakes states and provinces—Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Ontario, Pennsylvania, Quebec and Wisconsin—recognize their significant water infrastructure needs and are prepared to address them in partnership with federal governments, local communities, utilities, and the private sector. Several states and provinces have developed plans and initiatives to invest in water infrastructure, so the time is right for federal leadership.

On behalf of the Great Lakes states and provinces, the Great Lakes Commission presents these priorities for rebuilding and modernizing our region’s water infrastructure. Protecting our region’s unique freshwater resources and leveraging them as economic assets are longstanding, bipartisan priorities which should help shape infrastructure investment proposals of the federal governments.

Drinking Water, Wastewater and Stormwater Infrastructure

Our access to safe Great Lakes water is threatened by failing water infrastructure, lead in drinking water lines, toxic algae, sewage overflows from overburdened wastewater systems, and impacts from extreme weather events. The Great Lakes Commission calls for increased federal investment to help states and local communities improve and manage all water infrastructure—drinking water, stormwater and wastewater.
Drinking Water Infrastructure: Ensuring safe and reliable supplies of drinking water is fundamental to the health of our communities and the strength of our regional economy. The Great Lakes hold 90 percent of our nation’s supply of fresh surface water and more than 48 million Americans and Canadians depend on the Great Lakes and St. Lawrence River for drinking water. Upgrading and maintaining aging drinking water infrastructure is a costly challenge for many communities, including addressing threats to drinking water from lead in water lines and contamination of source water from toxins in harmful algal blooms. The 2014 closure of the drinking water system for the City of Toledo, Ohio due to toxic algae in Lake Erie, and the lead contamination of drinking water for the City of Flint, Michigan dramatically illustrate the magnitude and severity of these challenges. U.S. EPA data show that at least $384 billion will be needed through 2030 to maintain, upgrade and replace our nation’s drinking water infrastructure and these costs will grow if needed investments are delayed. More than $100 billion – a quarter of the overall national need – will be required in the eight Great Lakes states.

Wastewater Infrastructure: The majority of our region’s wastewater systems are between 50 and 150 years old and many municipalities are unable to meet rising costs to maintain and upgrade their systems. In 2014, 22 billions of gallons of untreated sewage and stormwater were released into the Great Lakes from outdated and aging infrastructure that remains prevalent in many of the region’s largest cities and many smaller municipalities. These sewage discharges endanger public health, degrade water quality and damage local economies by closing beaches and discouraging recreation in rivers and lakes. In 2013, beaches in the Great Lakes region had the highest rate of sampled waters exceeding federal action values for E. coli bacteria of any coastal region in the country. Nearly a quarter of Michigan’s beaches suffered closures in 2015; a single beach closure on Lake Michigan can result in economic losses as high as $37,030 per day. Preventing these and other impacts will not be cheap: U.S. EPA data show that at least $245 billion is needed to maintain and upgrade wastewater infrastructure, of which approximately $73 billion – nearly one-third of the national total – will be needed for the eight Great Lakes states.

Stormwater Infrastructure: Current stormwater infrastructure that was designed to function under historical conditions is becoming increasingly compromised by additional stressors including rising populations, increases in impervious surfaces from urban development, and human-caused changes to river systems. More frequent severe storm events further exacerbate this problem. These compounding factors often lead to increased runoff that can overwhelm stormwater systems and cause increased flooding, sewer overflows, and nutrient runoff that causes harmful algae blooms. As a result, managing stormwater from both rural and urban sources is a growing challenge for cities and towns in the Great Lakes region. U.S. EPA data show that communities need to invest $19 billion in stormwater infrastructure, with nearly $5 billion needed in the Great Lakes region.

Failure to invest in our nation’s water infrastructure is impacting our economy now and will only worsen without action. For example, the American Society of Civil Engineers projects a $500 billion loss to our national economy and the loss of nearly 500,000 jobs by 2025 from not making needed investments in our nation’s water infrastructure. In contrast, water infrastructure investments will create jobs and strengthen our economy. Every $1 million spent on water infrastructure is projected to generate nearly $3 million in economic output, and every new job created in the water workforce is estimated to add almost four new jobs in the national economy. Many states and provinces have successful infrastructure financing programs, so federal support will leverage and complement state and provincial leadership.

Recommendations:

- **Support the Clean Water and Safe Drinking Water State Revolving Funds (SRF):** These programs are invaluable financing tools that enable the states to assist communities in upgrading drinking water and wastewater systems. They have been highly successful and should be adequately funded and revised, where appropriate, to improve their efficiency and the ability to link with other financing options. These and other programs should prioritize assisting disadvantaged communities and those facing immediate risks to public health or the environment.

- **Fund and implement new approaches for financing water infrastructure:** New approaches are needed to secure the public and private financing required to meet our nation’s water infrastructure needs. With a relatively small federal investment, innovative tools such as the Water Infrastructure Finance and Innovation Act (WIFIA) program can leverage private capital to support low-cost financing for infrastructure projects. For
example, the Office of Management and Budget estimates that a $50 million appropriation for WIFIA could leverage $3.35 billion in financing. Other innovative financing tools should be explored, such as infrastructure banks and public-private partnerships. Financing programs should be structured to enable communities to expedite water infrastructure projects.

- **Promote integrated water resource management:** Federal programs and policies should facilitate and provide incentives for state and local efforts to integrate drinking water, wastewater and stormwater infrastructure to improve efficiency, reduce energy use, conserve water, lower costs and provide environmental benefits for communities.

- **Support the use of green infrastructure to help communities manage stormwater:** Green infrastructure uses natural features, such as detention ponds, rain gardens and permeable pavement, to manage stormwater. This type of infrastructure can reduce the burden on existing “grey” infrastructure for drinking water, storm water, and wastewater and increase the effectiveness of existing water management systems. Green infrastructure also offers ecological benefits by restoring more natural flow regimes and filtering water so that cleaner water is returned to rivers and streams. Many types of green infrastructure also have recreational or scenic values that provide benefits such as increased property values and revitalization of urban areas. Green infrastructure is being coupled with urban renewal efforts in several cities in the Great Lakes region.

### Commercial Navigation Infrastructure

The Great Lakes and St. Lawrence River maritime transportation system is vital to the economies of the United States and Canada and to our country’s overall national security. The system links more than 100 U.S. and Canadian ports to the world economy, moves 181 million tons of cargo annually, generates more than 225,000 jobs, and supports industries such as manufacturing, steel production, agribusiness and power generation. However, the economic viability of the Great Lakes navigation system is threatened by insufficient funding for dredging, diminishing options for disposing dredged material and aging navigation infrastructure, including critical choke points such as the Soo Locks in Michigan, which link vital deposits of iron ore in Minnesota and Michigan with industries in other states. The Department of Homeland Security (DHS) has described the Soo Locks as the “Achilles’ heel of the North American industrial economy” and emphasized their vulnerability to an unplanned closure, which would have “devastating consequences for industries … and the National economy.” Currently, commercial navigation accounts for about 90 percent of global trade and is predicted to double by 2030. Maximizing the economic potential of commercial navigation on the Great Lakes will require maintaining and investing in harbors, ports, shipping channels, locks and related infrastructure, including regular dredging. The Conference of Great Lakes and St. Lawrence Governors and Premiers recently issued a comprehensive strategy that aims to double maritime trade, improve environmental performance and support the region’s industrial core ([Strategy for the Great Lakes-St. Lawrence River Maritime Transportation System, June 2016](https://www.glgp.org/)). It recommends actions to maintain and expand the maritime transportation system and establishes a regional committee to coordinate state and provincial efforts. Fortunately, the $9 billion surplus in dedicated funding in the industry-paid Harbor Maintenance Trust Fund can be utilized for many of these investments.

### Recommendations:

- **Construct a new large lock at the Soo Locks in Michigan:** The Soo Locks are a vital part of the Great Lakes commercial navigation infrastructure. They connect Lake Superior with the rest of the Great Lakes and the world economy. Nearly 4,000 vessels pass through the locks every year carrying approximately 80 percent of the raw materials needed for U.S. steel production, coal for power generation, and grain for overseas export, among other cargo. However, 70 percent of the U.S. flag fleet and 90 percent of their cargo – which supports more than 3 percent of total U.S. GDP – are limited to the Poe Lock, the one large lock at the complex. Our sole reliance on this single, 50-year old lock puts our regional and national economies at risk. For example, the DHS projects that a six-month, unplanned closure of the Poe Lock would result in a nearly complete shutdown of regional steel production, 11 million job losses, a severe recession, and a $1.1 trillion decrease in national GDP. Planning has been underway for three decades to build a new large lock to provide needed
capacity and resiliency. A recent Treasury Department report identified a new Soo lock as one of 40 infrastructure projects of major economic significance for the nation. The study put the project’s benefit-cost ratio at 2.0-4.0 – well above the level required to be included in the Administration’s budget – and projected a net economic benefit of up to $1.7 billion. The Army Corps of Engineers is re-evaluating a previous, flawed benefit-cost report that has been contradicted by both the DHS and Treasury Department reports. This re-evaluation is scheduled to be completed in late 2017. Congress should provide funding to begin construction of a new large lock to safeguard our regional economy and national security.

- **Address system constraints and maintain waterways at their authorized depths:** The Great Lakes-St. Lawrence River navigation system is significantly under-utilized, with key components operating at only about 50 percent of their full capacity. Inadequate dredging has left waterways and ports clogged with 15 million cubic yards of sediment, preventing vessels from carrying full loads. An estimated $200 million is needed to remove this dredging backlog in federal channels and harbors and an additional $250 million is needed to repair failing breakwalls and other navigation infrastructure, which often are nearly a century old. The Army Corps of Engineers and the Department of Transportation should evaluate bottlenecks and constraints in the Great Lakes navigation system to help guide future public and private investments.

- **Ensure appropriation of all annual revenue from the Harbor Maintenance Trust Fund (HMTF):** These funds are critical for maintaining commercial navigation infrastructure, including shipping channels and dredging in the Great Lakes. However, revenue paid into the HMFT has not been fully spent and it now has a surplus of $9 billion. Water resources legislation passed by Congress in 2014 calls for 100 percent of annual HMTF revenue to be appropriated by 2025. Congress should comply with the direction in this legislation and ensure that appropriations from the HMTF are used as intended to support dredging and maintenance of navigation infrastructure in the Great Lakes and St. Lawrence River.

**Infrastructure for Restoring and Managing the Great Lakes**

The Great Lakes form the backbone of the culture and economy of our eight-state region. More than 1.5 million jobs and $62 billion in wages are directly connected to the Great Lakes, which are the foundation for a $52 billion recreational economy from fishing, hunting and boating. Recognizing their value, the past two presidents – with strong, bipartisan support from Congress – have made restoring the Great Lakes a national priority. The Great Lakes Restoration Initiative (GLRI) is implementing our restoration strategy with a focus on cleaning up toxic hotspots, controlling Asian carp and other invasive species, preventing polluted runoff that causes toxic algae, and restoring habitat for valuable fish and wildlife resources. Cleanup work under the GLRI is helping communities revitalize degraded or underutilized waterfront areas and develop new opportunities for recreation, business growth and other uses. For example, removing contaminated sediments from the Ashtabula River allowed the return of normal commercial navigation and recreational boating and sustained the economic viability of the Port of Ashtabula. Cleaning up the Kinnickinnic River south of downtown Milwaukee brought back boaters, revitalized existing businesses and stimulated new development. A large-scale shoreline restoration project on Muskegon Lake in Michigan created new recreation opportunities that are projected to attract 65,000 new visitors, generate more than $1 million in new spending and contribute $600,000 in new tax revenues annually. Fully implementing the restoration strategy is projected to generate $50 billion in long-term economic benefits. Continued funding, policies and management structures are needed to sustain this progress.

**Recommendation:**

- **Advance the Great Lakes Restoration Initiative in collaboration with Congress:** The GLRI has generated unprecedented progress in restoring the largest system of fresh surface water in the world. The Great Lakes Commission urges the President to request and Congress to approve $300 million for the GLRI in FY 2018. Continued funding for the Initiative will build on our investments and help the region advance long-term goals for a healthy economy, sustained by a revitalized ecosystem.
Speaker Topics

Status of Ballast Water Discharge Regulations in the Great Lakes Region
Prepared by the Great Lakes Commission, Updated November 2016

Briefing Paper for the Great Lakes Commission: Great Lakes and St. Lawrence Ballast Water Workshop, Prepared by Great Ships Initiative, November 16-17, 2016

Bridging the Gap Together: A New Model to Modernize U.S. Infrastructure
Bipartisan Policy Center, May 2016


US Water Alliance: One Water for American Listening Sessions: Crafting a National Water Strategy, Project Description, Fall 2016

A Blueprint to Rebuild America’s Infrastructure
U.S. Senate, Democratic Caucus, January, 2017

Preface

This document summarizes the current state of international, national and state rules in the Great Lakes-St. Lawrence River region for regulation of ballast water discharge from commercial vessels in order to prevent the introduction and spread of aquatic invasive species. It is intended to provide information to support ongoing policy and management discussions by outlining the primary regulatory vehicles and approaches used by different jurisdictions, as well as key commonalities and differences.

Ballast water regulatory regimes are being implemented at the international, national and state levels. Until recently, regimes have required ballast water exchange and saltwater flushing for oceangoing vessels entering the Great Lakes-St. Lawrence River system. Agencies are adopting numeric standards for the concentration of living organisms in ballast water discharge and it is expected that, initially, vessel owners will comply with these requirements by installing treatment technology. These numeric standards are derived from the 2004 International Maritime Organization (IMO) adopted the International Convention for the Control and Management of Ships’ Ballast Water and Sediments. The Convention will enter into force on September 8, 2017. Canada ratified the IMO convention in 2010 and is beginning to develop implementing regulations. Although the U.S. is not likely to ratify the IMO Convention, both U.S. Coast Guard (USCG) discharge rules and the U.S. Environmental Protection Agency (USEPA) 2013 Vessel General Permit (VGP) use the IMO discharge standards as the basis of their respective regulatory regimes. Great Lakes states have also taken action through enactment of individual laws and permit requirements that vary in some specific ways from the federal requirements.

The U.S. Coast Guard and IMO discharge standards have been determined to be a technologically achievable and practicable standard by some federal and state agencies; however, some have questioned whether they provide sufficient protection for the Great Lakes and St. Lawrence River. Some of the regulatory regimes retain ballast water exchange/saltwater flushing requirements in addition to the numeric standards, citing a potential for added protection by combining the two approaches. There is also debate over how to address “laker” vessels, i.e., vessels that remain within the Great Lakes and St. Lawrence River system. These are key points to address in policy and management discussions regarding opportunities to harmonize approaches, reduce burden on industry, and protect the water resources of the Great Lakes and St. Lawrence River.
**TERMINOLOGY**

**Definitions**

*Ballast water*: any water and suspended matter taken on board a vessel to control or maintain, trim, draft, stability, or stresses of the vessel, regardless of how it is carried

*Ballast water capacity*: the total volumetric capacity of any tanks, spaces, or compartments for carrying, loading, or discharging ballast water, including any multi-use tanks, space or compartment designed to allow carriage of ballast water

*International Maritime Organization*: the United Nations specialized agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships

*Ballast water exchange*: to replace the water in a ballast tank, using one of the following methods:

- “Empty/refill exchange” means to pump out the “ballast water” taken on in ports, estuarine, or territorial waters until the tank is empty, then refilling it with water
- “Flow through exchange” means to flush out “ballast water” by pumping in water into the bottom of the tank and continuously overflowing the tank from the top until three full volumes of water has been changed to minimize the number of original organisms remaining in the tank (USCG and USEPA)

*Laker vessel or laker*: vessels that operate exclusively in Lake Ontario, Lake Erie, Lake Huron (including Lake St. Clair), Lake Michigan, Lake Superior, and the connecting channels (St. Marys River, St. Clair River, Detroit River, Niagara River, and St. Lawrence River), including all other bodies of water within the drainage basin of such lakes and connecting channels (USEPA)

*Existing vs. new vessel*: vessels are differentiated as “existing” or “new” in ballast water regulations using their date of construction; vessels constructed before the specified date are considered “existing” and vessels built after the specified date are considered “new”

- The USCG and USEPA and the states of Indiana and Wisconsin define existing vs. new vessels using the date December 1, 2013
- The state of Minnesota defines existing vs. new vessels using the date January 1, 2012

*Oceangoing vessel*: a vessel that operates beyond the U.S. boundary line established by 46 CFR part 7 (USCG); the Great Lakes do not have any boundary lines per 46 CFR part 7, the western end of Anticosti Island is used as a line of demarcation for applying ballast water treatment requirements for any vessels that operate along the coast and in and out of the Great lakes and St. Lawrence Seaway.

*Saltwater flushing*: the addition of ocean water to empty ballast water tanks; the mixing of the added water with residual ballast water and sediment through the motion of the vessel; and the discharge of the mixed water until loss of suction, such that the resulting residual water remaining in the tank reaches a specified salinity (USEPA)

**Abbreviations**

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<th>Abbreviation</th>
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<td>BW</td>
<td>ballast water</td>
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<td>BWE</td>
<td>ballast water exchange</td>
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<td>BWM</td>
<td>ballast water management</td>
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<td>BWTS</td>
<td>ballast water treatment system</td>
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<td>CSA</td>
<td>Canadian Shipowners Association</td>
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<tr>
<td>CWA</td>
<td>Clean Water Act</td>
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<td>USCG</td>
<td>U.S. Coast Guard</td>
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<td>cfu</td>
<td>colony forming unit(s)</td>
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<td>USEPA</td>
<td>U.S. Environmental Protection Agency</td>
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<tr>
<td>EEZ</td>
<td>Exclusive Economic Zone</td>
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<tr>
<td>GLSLS</td>
<td>Great Lakes-St. Lawrence Seaway</td>
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<tr>
<td>GLWQA</td>
<td>Great Lakes Water Quality Agreement</td>
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<td>IMO</td>
<td>International Maritime Organization</td>
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<tr>
<td>NAS</td>
<td>National Academy of Sciences</td>
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<tr>
<td>NISA</td>
<td>National Invasive Species Act of 1996</td>
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<tr>
<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
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<tr>
<td>NOBOB</td>
<td>No ballast on board</td>
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<tr>
<td>NANPCA</td>
<td>Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990</td>
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<tr>
<td>SAB</td>
<td>Science Advisory Board</td>
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<tr>
<td>SF</td>
<td>saltwater flushing</td>
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<tr>
<td>TBEL</td>
<td>technology based effluent limit</td>
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<tr>
<td>VGP</td>
<td>Vessel General Permit</td>
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<tr>
<td>WQBEL</td>
<td>water quality based effluent limit</td>
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</tbody>
</table>
**I. INTERNATIONAL AND FEDERAL BALLAST WATER DISCHARGE REGULATIONS**

**International Maritime Organization**
The International Maritime Organization (IMO) adopted the *International Convention for the Control and Management of Ships’ Ballast Water and Sediments* in 2004. The IMO Convention “aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships’ ballast water and sediments.” The Convention applies to oceangoing ships and requires a ship-specific ballast water management plan, record book and international ballast water management certificate. The Convention also establishes ballast water standards to be phased in over a period of time. These standards include both a ballast water exchange standard (Regulation D-1) and a ballast water performance standard (Regulation D-2). The D-1 exchange standard is required only until the D-2 performance standard goes into effect. The Convention requires a review of the D-2 performance standard considering several criteria and including a determination of whether technology is available to meet the standard. The Convention will enter into force 12 months after it has been ratified by 30 member states, representing at least 35 percent of the world’s merchant shipping tonnage. On September 8, 2016, the Convention met the minimum ratification requirements and is now ratified by 53 states representing 53.28 percent of the world’s merchant shipping tonnage (as of 10/31/2016). The Convention will enter into force on September 8, 2017. The U.S. has not ratified the Convention; Canada ratified the Convention in 2010.

The IMO is currently reconsidering the implementation timeline for the requirements. The original timeline was set prior to full ratification and needs to be revised. The IMO adopted Resolution A.1088(28) in December 2013 that established an agreement to defer enforcement of the D-2 standard for existing vessels until their first IOPP renewal survey following entry into force. This resolution forms the basis for a draft amendment that has been agreed to by the IMO Marine Environment Protection Committee (MEPC), and which will be circulated immediately following entry into force for consideration of adoption. A subsequent proposal has been put forward to extend the period following entry into force for some ships to the second IOPP renewal survey following entry into force (alternative proposals are possible when the draft amendment comes under consideration). The MEPC is scheduled to meet again July 2017.

**More Information**
- [IMO Ballast Water Management](#)
- [IMO Ballast Water Convention](#)

**U.S. Coast Guard**
Under authority provided through the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA), the U.S. Coast Guard (USCG) began requiring ballast water exchange for vessels entering the Great Lakes in 1993. This requirement was expanded nationwide in 2004 pursuant to requirements in the 1996 reauthorization of NANPCA, the National Invasive Species Act (NISA). Vessels declaring ‘no ballast on board’ (NOBOB) were exempt from these requirements. In 2009, USCG issued a “Notice of Proposed Rulemaking” proposing standards for the allowable concentration of living organisms in ships’ ballast water discharged in U.S. waters. This rulemaking was finalized in March 2012 and went into effect in June 2012. The final rule requires all ocean-going vessels, including NOBOBs, to meet ballast water management (BWM) requirements. Vessels have a range of options, including the use of water from a U.S. Public Water System (PWS), discharge to reception facilities, or installation and use of an approved treatment technology, to meet the numeric discharge standard. This standard is nearly same as the IMO performance standard, but differs by targeting “living” organisms, while the IMO standard specifies “viable” (i.e., able to reproduce) organisms.

Existing ships must meet the management requirement by their first scheduled dry-docking after January 1, 2016 (or January 1, 2014 for ships with a certain ballast water capacity). The USCG may grant an extension to the implementation schedule only in those cases where the master, owner, operator, agent, or person in

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1 International Oil Pollution Prevention Certificate (IOPP), Renewal Survey, carried out every 5 years
charge of a vessel can document that, despite all efforts, compliance with the ballast water management requirement is not possible. Currently, no ballast water ballast water treatment systems (BWTS) have been type-approved by the USCG for use. Further, exclusive use of PWS or discharge to facilities are currently impracticable. Vessels also have the option of using a system that has been accepted as an alternate management system (AMS). An AMS is a BWTS that has been approved by a foreign administration under the International Ballast Water Management Convention, and temporarily accepted by the USCG for use in lieu of BWE. Under the AMS provision, an AMS installed on a ship prior to the ship’s compliance date may also be used for up to 5 years after the compliance date. It is expected that this 5-year window will provide sufficient time for the AMS manufacturer to obtain USCG type approval, or for the ship owner to make arrangements for replacing the AMS with use of an approved management method (e.g., installation of a USCG approved BWM system). Alternatively, vessels wishing to use PWS to ballast must either have previously cleaned the ballast tanks (including removing all residual sediments) and not subsequently introduced ambient water; or have never introduced ambient water to those tanks and supply lines. The USCG rules do not require confined lakers to meet the discharge standard and it do not require BWE/SF once the standard goes into effect.

The USCG press release states that the “numerical limits set by the discharge standard in this Final Rule were supported by reports from the National Academy of Science and the U.S. Environmental Protection Agency Science Advisory Board in 2011 as the most stringent that vessels can practically implement and that the Coast Guard can enforce at this time.” USCG findings published in the final rule also state that existing BWE requirements are not a desirable long-term approach because “results from several studies have shown the effectiveness of BWE varies considerably and is dependent on vessel type (design), exchange method, ballasting system configuration, exchange location, and method of study” and “a significant number of vessels are constrained by design or route from conducting BWE in compliance with existing regulations prior to their arrival into waters of the United States.”

The USCG is required to conduct a practicability review to determine if more stringent requirements can be met and update standards by no later than January 1, 2017. This practicability review was completed and published in the Federal Register on May 11, 2016. The review concludes that “at this time, technology to achieve a significant improvement in ballast water treatment efficacy onboard vessels cannot be practically implemented. The reason for this determination is that, as of the date of completion of the Practicability Review, there are no data demonstrating that ballast water management systems can meet a discharge standard more stringent than the existing performance standards.”

More Information
- USCG Ballast Water Management
- Code of Federal Regulation

U.S. Environmental Protection Agency
In 2008, the U.S. Environmental Protection Agency (USEPA) issued the Vessel General Permit (VGP). This action followed a 2006 U.S. District Court decision vacating USEPA’s longstanding permit exclusion of discharges incidental to the normal operation of a vessel (including ballast water discharges) under the Clean Water Act (CWA) National Pollutant Discharge Elimination System (NPDES). The VGP provides NPDES permit coverage for 25 incidental discharges into waters of the U.S. from commercial vessels greater than 79 feet in length and for ballast water from commercial vessels of all sizes. The 2008 VGP reflected, at the time, existing USCG mandatory ballast water management and exchange standards. Consistent with CWA section 401 for state

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certification of USEPA permits, a state may include additional permit conditions it deems necessary to further protect water quality in its state. A number of states provided such conditions in their certifications and EPA added them to the VGP pursuant to CWA section 401(d).

The 2008 VGP was issued for a five-year period, expiring in December 2013. In March 2013, the USEPA issued the 2013 VGP to replace the 2008 permit. The 2013 VGP, which will expire in December 2018, requires ocean-going vessels to meet a discharge standard equivalent to the IMO performance standard (IMO D-2) and, with a few notable exceptions, generally aligns with the USCG final rule. One difference is that the VGP contains discharge monitoring requirements to demonstrate BWTS are functioning correctly. In addition, the VGP retains the BWE/SF requirement for ships entering the Great Lakes-St. Lawrence River system. A number of Great Lakes states continued to impose state-specific 401 certification requirements on the 2013 VGP. USEPA found that this 401 certification had unusual circumstances which warranted additional time and provided over 9 months for the certification process, as opposed to the 60-day regulatory norm for NPDES permits.

The 2013 permit requires ocean-going vessels to meet a discharge standard equivalent to the IMO performance standard (IMO D-2) by their first scheduled dry-docking after January 1, 2016 (or January 1, 2014 for ships with a certain ballast water capacity) for existing vessels, defined as vessels built prior to December 1, 2013. Vessels built after December 1, 2013 are expected to have technology installed that allows vessels to meet this standard upon delivery. The USEPA “does not require the use of U.S. government approved pollution prevention systems” for purposes for the VGP; but provides the option of using either a U.S. or other foreign government approved system as necessary to meet this discharge standard.\(^5\)

In December 2013, USEPA, in consultation with USCG, issued an Enforcement Response Policy, noting that there are no USCG approved BWTS, and therefore, vessel owner/operators who have received an extension of their compliance deadline from the USCG, and have complied with all other applicable BWM requirements under USCG rule and the VGP, would be considered a low enforcement priority for their failure to comply with the VGP’s numeric ballast water effluent limits.

Lakers built prior to 2009 (existing lakers) are exempt from the meeting the discharge standard but are required to conduct best management practices. Lakers built after 2009 (new lakers) must meet the numeric discharge standard consistent with the implementation schedule for ocean-going vessels. In the permit reissuance notice, the EPA justifies this decision of “January 1, 2009 as the cutoff date because this is the date that IMO originally first required treatment for some new build vessels. Any vessel owner/operators building or contracting vessels after this date were well aware of the need to design their systems to meet ballast water discharge limits and EPA therefore assumes that such vessels were so designed.”\(^6\) New lakers must also conduct the BMPs required of all vessels, but are not required to meet the additional BMPs required of existing lakers. Vessels owned by the Canadian Shipowners Association (CSA) are not subject to EPA regulations.

The USEPA and USCG jointly commissioned two scientific studies to inform understanding of ballast water discharges. USEPA considered the results of these studies in developing the VGP. The National Research Council of the National Academies of Science (NAS) study “Assessing the Relationship Between Propagule Pressure and Invasion Risk in Ballast Water,” released in June 2011, provided technical advice to inform the derivation of numeric standards. Based on this report, USEPA determined that developing a numeric water-quality based effluent limit would be “infeasible to calculate” at the time, given “available data and information.”\(^7\) A second report, “Efficacy of Ballast Water Treatment Systems: A Report by the EPA Science


\(^7\) Ibid.
Advisory Board (SAB),” evaluated the status of ballast water treatment technologies. The July 2011 report found that systems exist to meet the IMO D-2 standard and that some of those systems may achieve a limit 10 times more stringent; however, due to the detection limitations of current monitoring technology and approaches, the SAB could not definitively determine whether systems could meet this more stringent limit.

USEPA cited the reason for retaining the BWE requirement for vessels entering the Great Lakes as adding “another measure of protection against invasive species to reduce the compatibility of source and recipient regions when freshwater or brackish water is transported via ballast tanks into the Great Lakes.” USEPA also wrote that “requiring BWE in addition to the application of effluent limits that reflect available treatment technologies... will achieve applicable water quality standards, as we expect continued BWE to further decrease the probability that non-native organisms will be introduced into and establish themselves in the Great Lakes.”

Research cited documenting the effectiveness of BWE included:


In addition, the USEPA VGP retains the saltwater flushing requirement because it has been shown to be an effective method of reducing AIS invasion risks from vessels with residual ballast water and/or sediment, such as NOBOB vessels, citing the following technical memorandum:


The USEPA’s 2013 VGP was challenged in court and eventually heard in the U.S. Second Circuit Court of Appeals. The court found that USEPA acted “arbitrarily and capriciously” in several of its VGP decisions and requirements. Namely, the Court identified the following major issues with the permit:

- USEPA provided no evidence in the record as to why it did not impose a standard higher than the IMO D-2, but lower than 100 times as stringent as IMO;
- USEPA did not fully analyze onshore treatment and did not conduct a “cost-benefit” analysis comparing shipboard to onshore treatment;
- the justification for the exemption for lakers based on a lack of supply of updated shipboard systems is not legitimate because the best available technology (BAT) standard is meant to force technology;
- the justification for demarcating between pre- and post-2009 built lakers does not make sense; and
- the narrative water quality-based effluent limit lacked specificity and did not provide for monitoring.

The Court determined that USEPA ignored contrary evidence or failed to satisfactorily explain the choices it made, leading to the rejection of the permit aspects mentioned above. The Court upheld the VGP’s technology-based monitoring provisions. The Court did not vacate the VGP, but instead allowed it to remain in place until the next issuance of the permit.

8 Ibid.
9 Ibid.
10 Ibid.
12 Ibid.
More Information

- USEPA Vessel General Permit

Transport Canada

In 1989, Canada issued guidelines for voluntary BWE for vessels entering the Great Lakes. In 2000, these guidelines were expanded to cover all Canadian waters and were renamed the Guidelines for the Control of Ballast Water Discharge from Ships in Waters under Canadian Jurisdiction, TP 13617. In 2006, under the Canada Shipping Act 2001, all vessels entering Canada were required to manage their ballast water. The regulations required BWE as well as saltwater flushing for vessels entering the Great Lakes. The regulations also adopted the IMO D-2 performance standard for ballast water treatment; however, there are currently no obligations at this time for vessels to install BWTS. Vessels are expected to exchange or treat their ballast to the D-2 standard prior to discharge in waters under Canadian jurisdiction.

Canada ratified the IMO Convention in 2010 and the treatment requirement will go into effect when Canada brings the Convention into force through amendments to its Ballast Water Control and Management regulations. Although the regulatory process to implement the Convention is not formally begun, consultation has occurred. Transport Canada issued a discussion paper outlining a proposed regulatory approach to bring the Convention into force in Canada, and invited comment from Canadian and U.S. stakeholders. The proposed approach would require ships operating internationally to comply with the Convention, including Great Lakes ships that operate binationally. The proposed approach would also retain the BWE/SF requirements for vessels entering Canadian fresh waters. Canada’s justification for retaining this requirement is that scientific research has shown that “residual ballast water and sediment is an important vector for introduction of ship-mediated non-native species” and “that exposure to high salinity is extremely effective in killing high-risk freshwater and estuarine organisms contained in residual ballast water and sediments.” The research cited for this justification is:


A number of comments were submitted on the paper, some of which raised “technical issues pertaining to both the efficacy of BWTS with respect to Great Lakes conditions and the feasibility of installing BWTS on Great Lakes ships.” In response to the comments, Transport Canada commissioned two independent studies on the efficacy of BWTS and the feasibility of fitting them onboard ships that operate on the Great Lakes. Transport Canada held a one-day workshop to review study results. In March 2015, Transport Canada published a complete record of the technical comments, studies, workshop and associated information resulting from release of the discussion paper. The summary conclusions reached by the agency following this process is that while “existing BWTS processes could be applicable to Great Lakes conditions and could be fit and operated on Great Lakes ships...there is a need to address the confirmation testing...and/or to allow the U.S. to complete its BWTS approval processes before Great Lakes shipowners can fit BWTS with confidence,” and finally, that there are “technical challenges for ships operating primarily on the Great Lakes-St. Lawrence Seaway system.”

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15 Ibid.
Great Lakes-St. Lawrence Seaway
The U.S. and Canadian St. Lawrence Seaway agencies enacted saltwater flushing requirements for NOBOB vessels in 2008. In addition, lakers must agree to comply with voluntary best management practices.

More Information
- Great Lakes-St. Lawrence Seaway System, Ballast Water
- Shipping Federation of Canada, Code of Best Practices for Ballast Water Management
- Lake Carriers’ Association and Canadian Shipowners Association, Voluntary Management Practices to Reduce the Transfer of Aquatic Nuisance Species Within the Great Lakes

Great Lakes Water Quality Agreement
The newly renegotiated Great Lakes Water Quality Agreement (GLWQA), signed by the U.S. and Canada in September 2012, requires the two federal governments to work together to “establish and implement programs and measures that protect the Great Lakes Basin Ecosystem from the discharge of Aquatic Invasive Species in Ballast Water.” Specifically, Annex 5 of the agreement makes the following commitments in relation to ballast water:

- Preventing the release of harmful aquatic invasive species and pathogens as a result of accumulation of microorganisms, plants, algae, or animals on ships
- Preventing the discharge of aquatic invasive species in ballast water

More Information
- Binational.net, Discharges from Vessels (Annex 5)
- USEPA, Great Lakes Water Quality Agreement
- Environment Canada, Great Lakes Water Quality Agreement

Table 1. Summary of IMO and U.S. Federal Ballast Water Regulations

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<thead>
<tr>
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<tbody>
<tr>
<td><strong>Applicability</strong></td>
<td>Ocean-going vessels</td>
<td>Ocean-going vessels</td>
<td>Ocean-going vessels</td>
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<tr>
<td></td>
<td>Confined lakers are exempt from the discharge standard</td>
<td>BWE/SF until a vessel is required to meet the discharge standard with an approved BWMS. An alternate management system (AMS) may be used if it was installed prior to the date the discharge standard goes into effect; the AMS may be used for up to 5 years after the discharge standard goes into effect</td>
<td>Best management practices (including BWE) until requirements to meet the numeric discharge standard. Prohibits discharges violating applicable state water quality standards and maintains the BWE/SF requirement for vessels entering the Great Lakes in addition to meeting the discharge standard (water quality-based effluent limits).</td>
</tr>
<tr>
<td><strong>Requirements</strong></td>
<td>Requires vessels to meet the D-1 ballast water exchange standard until the D-2 ballast water performance standard is phased in</td>
<td>D-2 performance standard:</td>
<td>Practicability Review published in the Federal Register on May 11, 2016 with determination on (1) whether a more stringent standard can be met and (2) whether testing protocols can be implemented that can accurately measure treatment efficacy to meet a more stringent standard.</td>
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<td></td>
<td>• Organisms &gt; or = 50 micrometers:</td>
<td>EPA does not have a practicability review process; however, upon permit expiration (not to exceed 5 years), EPA must reissue the permit in compliance with the CWA, including conducting “Best Available Technology” and water quality analyses.</td>
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<tr>
<td></td>
<td></td>
<td>&lt;10 <em>viable</em> organisms per cubic meter</td>
<td>• Organisms &gt; or = 50 micrometers:</td>
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<tr>
<td></td>
<td></td>
<td>• Organisms &lt; 50 micrometers and &gt; or = 10 micrometers:</td>
<td>&lt;10 living organism per cubic meter</td>
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<tr>
<td></td>
<td></td>
<td>&lt;10 <em>viable</em> organisms per milliliter (mL)</td>
<td>• Organisms &lt; 50 micrometers and &gt; or = 10 micrometers:</td>
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<tr>
<td></td>
<td></td>
<td>• Indicator microorganisms:</td>
<td>&lt;10 living organisms per milliliter (mL)</td>
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<td></td>
<td></td>
<td>o <em>Vibrio cholerae</em>: &lt; 1 colony forming unit (cfu) per 100 mL (or &lt; 1 cfu per 1 gram (wet weight) zooplankton samples)</td>
<td>• Indicator microorganisms:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o E. coli: &lt; 250 cfu per 100 mL</td>
<td>o <em>Vibrio cholerae</em>: &lt; 1 colony forming unit (cfu) per 100 mL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Intestinal enterococci: &lt; 100 cfu per 100 mL</td>
<td>o E. coli: &lt; 250 cfu per 100 mL</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>o Intestinal enterococci: &lt; 100 cfu per 100 mL</td>
</tr>
<tr>
<td><strong>Discharge Standard</strong></td>
<td>D-2 performance standard:</td>
<td>For vessels using a USCG approved BWMS:</td>
<td>• New lakers constructed after Jan. 1, 2009 and before Dec. 1, 2013:</td>
</tr>
<tr>
<td></td>
<td>• Organisms &gt; or = 50 micrometers:</td>
<td>• New vessels constructed on or after Dec. 1, 2013:</td>
<td>On delivery</td>
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<tr>
<td></td>
<td>&lt;10 <em>viable</em> organisms per cubic meter</td>
<td>On delivery</td>
<td>• New vessels constructed after Dec. 1, 2013:</td>
</tr>
<tr>
<td></td>
<td>• Organisms &lt; 50 micrometers and &gt; or = 10 micrometers:</td>
<td>• Existing vessels constructed before Dec. 1, 2013:</td>
<td>On delivery</td>
</tr>
<tr>
<td></td>
<td>&lt;10 <em>viable</em> organisms per milliliter (mL)</td>
<td>o BW capacity &lt;1500 cubic meters:</td>
<td>• Existing vessels constructed after Dec. 1, 2013:</td>
</tr>
<tr>
<td></td>
<td>• Indicator microorganisms:</td>
<td>first drydocking after Jan. 1, 2016</td>
<td>o BW capacity &lt;1500 cubic meters:</td>
</tr>
<tr>
<td></td>
<td>o <em>Vibrio cholerae</em>: &lt; 1 colony forming unit (cfu) per 100 mL</td>
<td>o BW capacity 1500-5000 cubic meters: first drydocking after Jan. 1, 2014</td>
<td>first drydocking after Jan. 1, 2016</td>
</tr>
<tr>
<td></td>
<td>o E. coli: &lt; 250 cfu per 100 mL</td>
<td>o BW capacity &gt; 5000 cubic meters: first drydocking after Jan. 1, 2016</td>
<td>o BW capacity 1500-5000 cubic meters: first drydocking after Jan. 1, 2014</td>
</tr>
<tr>
<td></td>
<td>o Intestinal enterococci: &lt; 100 cfu per 100 mL</td>
<td></td>
<td>o BW capacity &gt; 5000 cubic meters: first drydocking after Jan. 1, 2016</td>
</tr>
<tr>
<td><strong>Practicability Review</strong></td>
<td>IMO is required to review the D-2 standard, taking into account a number of criteria. The review should include a determination of whether appropriate technologies are available to achieve the standard, an assessment of the specified criteria, and an assessment of the socio-economic effect(s).</td>
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<tr>
<td><strong>Implementation Schedule</strong></td>
<td>The timeline in the original convention was set prior to its ratification and is in the process of being revised.</td>
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II. CURRENT U.S. GREAT LAKES STATE BALLAST WATER DISCHARGE REGULATIONS

Illinois
The Illinois Environmental Protection Agency found that the 2013 USEPA VGP would comply with state water quality standards and issued a series of conditions on the permit. These conditions do not change the numeric ballast water discharge standard or implementation schedule required by the VGP.

Indiana
The Indiana Department of Environmental Management certified the 2013 USEPA VGP with state conditions including a requirement that oceangoing vessels entering the GLSLS from beyond the EEZ to perform BWE/SF before entering the GLSLS. In addition, the state conditions reiterate the timeline for meeting VGP discharge standards for existing vessels (those constructed prior to Dec. 1, 2013) as the first scheduled drydocking after Jan. 1, 2016 and new vessels (those constructed after Dec. 1, 2013) prior to operation in Indiana state waters.

Michigan
Michigan passed legislation in 2005 requiring all oceangoing vessels engaging in port operations in the state to obtain a permit from the Michigan Department of Environmental Quality (MDEQ) beginning Jan. 1, 2007. This legislation also prohibits the discharge of any ballast water from oceangoing vessels in Michigan waters without a permit. The permit applies to oceangoing vessels that: a) engage in port operations in Michigan and do not discharge ballast water into state waters; b) discharge ballast water treated by one or more of the ballast water treatment methods specified in the permit; or c) have not otherwise been determined to need an individual permit. The permit allows for four types of ballast water treatment: (1) hypochlorite treatment; (2) chlorine dioxide treatment; (3) ultra violet light radiation treatment preceded by suspended solids removal; and (4) deoxygenation treatment. Any oceangoing vessel that discharges ballast water must use one of the approved treatment types. Permit applicants may propose and receive approval under an individual permit to use an alternate treatment method upon demonstration of effectiveness and environmental soundness. The general permit was first issued in 2006 and, following its expiration, was reissued in 2012 with minimal modifications. The current permit will expire in 2017 and MDEQ is working on updates to the permit.

The MDEQ has also issued conditions on the 2013 USEPA VGP. These conditions require oceangoing vessels engaging in port operations or discharging ballast water to obtain the aforementioned state permit. In addition, oceangoing vessels entering Michigan waters with ballast on board must perform BWE/SF in waters outside the EEZ and at least 200 nautical miles from shore.

Minnesota
The Minnesota State Legislature passed legislation in 2008 establishing ballast water management requirements. In response, the Minnesota Pollution Control Agency (MPCA) developed a ballast water discharge general permit which was issued in September 2008 and reissued in October 2013. The permit covers all commercial vessels, ocean-going and lake, that transit the Minnesota waters of Lake Superior. The current state permit concurs with the VGP numeric discharge standards and implementation schedule. For lake vessels built prior to 2009, vessels must meet the numeric discharge requirements in the VGP by their first scheduled dry-docking after March 30, 2018, unless the permittee can demonstrate that the USCG has not type approved any ballast water treatment system commercially available and compatible for the permittee's vessel as of that date. The permit expires in September 2018.

The MPCA also issued state conditions on the 2013 USEPA VGP. These conditions require vessels to obtain a state permit and perform BWE/SF before entering Minnesota waters. Further, the MPCA may prohibit a discharge, require a discharge to occur in a particular area, or require emergency treatment of any ballast water it designates as “high risk” ballast water. The state conditions also specify best management practices for lake vessels and impose monitoring requirements for all vessels. For vessels required to meet the EPA VGP

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21 This summary reflects the most recent state regulations and state 401 certification conditions on the 2013 USEPA VGP.
numeric discharge limits (i.e. ocean-going vessels and vessels built after 2009), once-per-year monitoring of ballast water is required. As of December 2015, lakers built before 2009 are required to have installed equipment allowing the collection of samples from ballast water discharges and to collect and analyze total organisms in ballast water discharges annually. These analyses may be completed by ship-owners on their own or in cooperation with others.

In its 401 certification letter to USEPA, MPCA states in regards to the discharge standard “MPCA is unable to conclusively determine a numeric standard which would definitely protect water quality and an unaltered species composition of the ecosystem.” Further, in regards to maintaining the BWE/SF requirement in addition to meeting the treatment standard, MPCA says “This requirement... effectively serves as an interim WQBEL prior to a numeric WQBEL calculation that will be protective of state water quality until the numeric WQBEL is fully implemented.” MPCA cites S.A. Bailey et al. (2011) as part of its justification for this requirement, as well as recent but unpublished land-based testing at the Great Ships Initiative facility. Further, in MPCA’s comments to USEPA on the draft VGP, it is noted that exempting lakers from the numeric discharge standard will allow dispersion of invasive species “between water bodies within the Great Lakes System” to go “unchecked for the duration of the permit,” citing the report *Non-Native Species of Concern and Dispersal Risk for the Great Lakes and Mississippi River Interbasin Study.*

**New York**

The New York Department of Environmental Conservation (NYDEC) issued state conditions on the 2013 USEPA VGP. NYDEC conditions state that the numeric discharge standard in the VGP cannot be made less stringent without violating state water quality standards. In addition, state conditions require oceangoing vessels to perform BWE/SF before entering New York state waters in addition to meeting the ballast water treatment requirements. The conditions also require a set of best management practices for laker vessels and a set of recommended BMPs to reduce the risk that VHS will be spread. NYDEC states the state conditions “combine water quality protection with operational flexibility. They provide flexibility to the industry by allowing further development of a treatment technology and test protocols.” The NYDEC fact sheet on the VGP provides additional clarification and justification for the NYDEC 401 certification conditions and states “the IMO D-2 standard may not adequately treat all AIS” and “numeric WQBELs more stringent than IMO D-2 are justified, and can be developed in the future based on additional data collection, analysis, and modeling.” However, because USEPA did not include a more stringent standard in the VGP, NYDEC included in its certification the requirement that vessels conduct BWE/SF in addition to meeting the IMO D-2 standard as a “an interim WQBEL that will be protective of state water quality until a numeric WQBEL is developed and implemented.” NYDEC includes the following citations to support its findings:

- E. Briski et al., Efficacy of ‘saltwater flushing’ in protecting the Great Lakes from biological invasions by invertebrate eggs in ships’ ballast sediment, Freshwater Biology 55, 2414-2424 (2010)
- S. Santagata et al., Effects of osmotic shock as a management strategy to reduce transfers of non-indigenous species among low-salinity ports by ships, Aquatic Invasions 3, 61-76 (2008)

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23 Ibid.
27 Ibid.
• D.F. Reid et al., Identifying, Verifying, and Establishing Options for Best Management Practices for NOBLOB Vessels, Final Report, NOAA (June 2007).

In comments submitted to USEPA on the draft VGP, the NYDEC states “a WQBEL of at least 100 x the IMO D2 standard is needed to protect water quality, and this WQBEL should be included as a goal in the VGP.” NYDEC cited the California State Lands Commission report *2011 Update: Ballast Water Treatment Systems for use in California Waters* (September 2011) and its own (NYDEC) evaluation of BWTS which found that treatment systems are available that meet standards greater than IMO.28

**Ohio**
The Ohio Environmental Protection Agency (OEPA) found that the 2013 USEPA VGP would comply with state water quality standards and issued a series of conditions on the permit. These conditions do not change the numeric ballast water discharge standard or implementation scheduled required by the VGP. The state conditions reiterate the VGP requirement that vessels entering the GLSLS from beyond the EEZ to perform BWE/SF before entering the GLSLS, in addition to the VGP treatment requirements.

In its certification letter, the OEPA states “Ohio EPA is certifying IMO standards because they are the most widely accepted and tested standards in the world” and that “IMO certification combined with ballast water flushing and exchange is sufficient demonstration that these treatment standards are "practical and possible" methods for meeting ballast water treatment standards for ocean-going ships.”29 In addition, “Ohio EPA also believes that there are reasons to treat existing vessels that operate exclusively within the Great Lakes differently than those that operate outside the Lakes” and “IMO treatment standards are not "practical and possible" at this time for existing vessels operating exclusively within the Great Lakes, as defined in the VGP.”30

**Pennsylvania**
The Pennsylvania Department of Environmental Protection found the 2013 USEPA VGP to be consistent with state water quality standards and did not issue any state conditions.

**Wisconsin**
The Wisconsin Department of Natural Resources (WDNR) issued a general permit for ballast water discharge under Wis. Stat. §283.31 which provides the state the authority to regulate discharges of pollutants of the waters of the state. The Wisconsin permit went into effect on February 1, 2010. Starting on that date all vessels, oceangoing and lakers, were required to adopt best management practices and adhere to seawater and or biocide discharge limits, if utilized. The permit was reissued on April 1, 2015 and continues to require oceangoing ships to conduct BWE/SF, and to meet a discharge standard equivalent to the IMO D-2 standard following the 2013 USEPA VGP schedule: the effective date for new oceangoing vessels is December 1, 2013 and existing oceangoing vessels (those constructed prior to December 1, 2013) is the first dry-docking after January 1, 2016. The reissued permit also requires that lakers install ballast water treatment systems during their first dry docking starting March 30, 2018. The permit states that a BWTS “must work in freshwater” and be type approved by the USCG. Delay of BWTS installation is allowed if there are no USCG type approved systems available for use in fresh water. The permit will expire in March 2020; however, it is currently being contested in regards to the Laker requirement to meet IMO standards. It should also be noted that the original permit set a more stringent standard at 100 times the IMO D-2 standard which was subsequently changed to the IMO D-2 standard following a feasibility review and determination that treatment technologies are not available and not yet feasible to install that would meet the more stringent standard.31

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30 Ibid.
31 Wisconsin Department of Natural Resources. 2010. Wisconsin Ballast Water Treatment Feasibility Determination.
The WDNR also issued state conditions on the 2013 USEPA VGP. These conditions require vessels to obtain a state permit and perform BWE/SF before entering the GLSLS. The state conditions also allow for emergency treatment of “high risk” ballast water and indicate that lakers will be addressed in the next Wisconsin permit expected in 2015.

A fact sheet on the WDNR permit states “It is the Department’s belief that exchange or flushing, in addition to treatment, is a necessary practice for better protection of the waters of the Great Lakes from AIS.” Further, in comments submitted to USEPA on the draft VGP, WDNR recommended that “national numeric water quality based effluent limits (WQBELs) for live organisms in ballast water discharges that are protective of water quality in the entire Great Lakes basin be adopted and imposed.”

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32 Wisconsin Department of Natural Resources. March 6, 2013. Permit Modification Fact Sheet.
33 Wisconsin Department of Natural Resources. February 17, 2012. Letter to U.S. Environmental Protection Agency.
Table 2. Summary of Great Lakes State Ballast Water Regulations

<table>
<thead>
<tr>
<th>State (Agency)</th>
<th>Regulatory Vehicle</th>
<th>Existing oceangoing</th>
<th>New oceangoing</th>
<th>Existing lakers</th>
<th>New lakers</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois (IL Environmental Protection Agency)</td>
<td>401 Certification</td>
<td>- (VGP requirements)</td>
<td>- (VGP requirements)</td>
<td>- (VGP requirements)</td>
<td>- (VGP requirements)</td>
<td>State conditions on the VGP do not impact standards or implementation schedules</td>
</tr>
<tr>
<td>Indiana (IN Dept. of Environmental Management)</td>
<td>401 Certification</td>
<td>State conditions repeat VGP requirements</td>
<td>State conditions repeat VGP requirements</td>
<td>- (VGP requirements)</td>
<td>- (VGP requirements)</td>
<td>State conditions on the VGP require oceangoing vessels to perform BWE/SF before entering the GLSLS</td>
</tr>
<tr>
<td>Michigan (MI Dept. of Environmental Quality)</td>
<td>State Permit 401 Certification</td>
<td>State permit - Approved treatment technology or no discharge effective 1/1/2007</td>
<td>State permit - Approved treatment technology or no discharge effective 1/1/2007</td>
<td>- (VGP requirements)</td>
<td>- (VGP requirements)</td>
<td>State conditions on the VGP require oceangoing vessels engaging in port operations or discharging ballast to obtain the state permit; oceangoing vessels must perform BWE/SF before entering Michigan waters</td>
</tr>
<tr>
<td>Minnesota (MN Pollution Control Agency)</td>
<td>State Permit 401 Certification</td>
<td>State permit - Vessels constructed prior to 1/1/2012 State permit – IMO standards by 1/1/2016</td>
<td>State permit - Vessels constructed after 1/1/2012 State permit – IMO standards prior to operation in Minnesota waters of Lake Superior</td>
<td>State permit - Vessels constructed after 1/1/2009 State permit – IMO standards by first dry-docking after 3/30/2018 State permit – IMO standards by first dry-docking after 3/30/2018 401 Certification – best management practices</td>
<td>State permit* – IMO standards by first dry-docking after 3/30/2018</td>
<td>State conditions on the VGP require vessels to obtain a state permit and perform BWE/SF before entering Minnesota waters, and allow for emergency treatment; state permit also requires BWE/SF</td>
</tr>
<tr>
<td>New York (NY Dept. of Environmental Conservation)</td>
<td>401 Certification</td>
<td>- (VGP requirements)</td>
<td>- (VGP requirements)</td>
<td>Best management practices</td>
<td>Best management practices</td>
<td>State conditions on the VGP require oceangoing vessels to perform BWE/SF before entering New York waters</td>
</tr>
<tr>
<td>Ohio (OH Environmental Protection Agency)</td>
<td>401 Certification</td>
<td>- (VGP requirements)</td>
<td>- (VGP requirements)</td>
<td>- (VGP requirements)</td>
<td>- (VGP requirements)</td>
<td>State conditions on the VGP require oceangoing vessels to perform BWE/SF before entering the GLSLS</td>
</tr>
<tr>
<td>Pennsylvania (PA Dept. of Environmental Protection)</td>
<td>401 Certification</td>
<td>- (VGP requirements)</td>
<td>- (VGP requirements)</td>
<td>- (VGP requirements)</td>
<td>- (VGP requirements)</td>
<td>No state conditions were added to the VGP</td>
</tr>
<tr>
<td>Wisconsin (WI Dept. of Natural Resources)</td>
<td>State Permit 401 Certification</td>
<td>State permit and 401 certification - Vessels constructed prior to 12/1/2013 IMO standards by first dry-docking after 1/1/2016 (state permit) and VGP deadline (401 certification)</td>
<td>State permit and 401 certification - Vessels constructed after 12/1/2013 IMO standards prior to operation in Wisconsin waters by VGP deadline</td>
<td>State permit* – Best management practices; IMO standards by first dry-docking after 3/30/2018</td>
<td>State permit* – Best management practices; IMO standards by first dry-docking after 3/30/2018</td>
<td>State conditions on the VGP require vessels to obtain a state permit and perform BWE/SF before entering the GLSLS, and allow for emergency treatment; state permit also requires BWE/SF</td>
</tr>
</tbody>
</table>

*Prepared by the Great Lakes Commission

34 The Wisconsin state permit is currently being contested over laker requirements to meet IMO standards
Abstract

This briefing paper provides background material to participants in a Great Lakes and St. Lawrence Ballast Water Workshop. The paper summarizes biological efficacy testing and certification of Ballast Water Management Systems (BWMSs) for use in the U.S. and Canada. The BWMS regulatory testing framework defines freshwater as comprising a range of conditions from low salt (<1PSU) to pure “sweet” water like that in the Great Lakes. The BWMS certification testing framework seeks to show likely performance to the IMO/USCG standard in the field through up front testing on land and on ships in a range of water qualities and climate conditions. This testing does not define an operational window, however, just performance under a set of known, relatively challenging conditions. Ultimately, the ship owner remains liable for BWMS actual performance to the standard in the field under the entire range of possible challenge conditions. Most certification testing organizations meet the minimum required challenge conditions in their tests through natural or artificial means. These tests may or may not be predictive depending upon extent to which the tests adhere to quality assurance and quality control measures, and the extent to which the minimum challenge conditions provided reflect actual conditions in harbors globally. No BWMS have yet received USCG Certification, but many have IMO approvals. Most of the BWMS with approvals operate using up to two of a limited number of available BWMS treatment processes; these include variations of filtration, UV, electrolytic chlorination, and straight chlorination. Most BWMSs that have IMO approvals claim to perform effectively in all salinities. Those that do not may exclude freshwater as a type of water that the BWMS can treat. That said, several may declare operational limits other than salinity. In any case, BWMSs seeking approvals may or may not have been tested well, or at all, in natural pure freshwater systems with natural assemblages of organisms and physical chemical challenges. Those which have not been tested well or in pure freshwater, may have regulatory approval for operation in pure freshwater, but cannot be considered fully vetted relative to real world pure freshwater operation. It is important for stakeholders of effective BWMS to carefully review certification testing conditions and quality, in addition to received certifications, in judging BWMS effectiveness.

1. The BWMS Regulatory Paradigm, Certification Testing Framework and Freshwater

The overall testing framework for purposes of BWMS regulatory approvals coevolved between deliberations at the IMO and within the U.S., including contributions from the USCG and the U.S. Environmental Protection Agency’s (USEPA’s) Environmental Technology Verification (ETV) Program.  

Authors: Allegra Cangelosi, Nicole Mays, Mary Balcer, Euan Reavie, Matt TenEyck.

1 http://www.imo.org/en/OurWork/Environment/BallastWaterManagement/Pages/Default.aspx and
GSI personnel participated in these discussions which took place during the decade between 2002, just prior to the IMO Convention (2004) and issuance of USCG regulations (2012). Though since that time, continuous refinements are underway, the fundamental framework for IMO/USCG testing appears to be set for the foreseeable future.

1.1. **IMO/USCG Belt and Suspenders Regulatory Paradigm**

First, the framework is rooted in the structure sometimes described as “Belt and Suspenders Regulation.” That is, the IMO and the USCG require pre-certification of BWMSs used on board ships based upon Certification evaluations, like those described in the IMO’s G8 and G9 Guidelines, and those contained in USCG type approval regulations. However, the framework is equally rooted in a system of Port State Control, meaning irrespective of pre-certifications, BWMSs must perform to the discharge standards, or the user of the BWMS may be legally liable. This latter condition makes ship-owners, in addition to natural resource protection advocates, stakeholders in the ability of Certification testing to predict performance in the real world.

1.2. **IMO/USCG Certification Testing Framework**

Perhaps due to the Belt and Suspenders regulatory paradigm, a great deal of attention from all parties has been devoted to designing a BWMS Certification process that is truly predictive of real-world performance. But how can all of the possible types of challenges associated with the varied harbor water and ship conditions globally be adequately captured in an affordable and reasonable set of Certification tests such that they accurately predict BWMS performance to the USCG/IMO standard irrespective of ship type, location, time of year, and climatic conditions?

A multi-dimensional testing framework emerged. First, Certification testing includes:

- Environmental Testing (so-called “shake-rattle and roll” tests) to determine whether the BWMS is ship-worthy mechanically; and
- Biological Efficacy Testing at the land-based and ship board scales to determine whether the BWMS can meet the regulatory discharge standard and water quality requirements under a set of minimum challenge conditions.

Second, the Biological Efficacy Testing (including residual toxicity and operational performance considerations) is further broken down into the testing categories, starting with land-based and ship board, which are to take place in each salinity regime (as defined by IMO/USCG) for which Certification is sought (Figure 1).

http://homeport.uscg.mil/ballastwater
Third, testing cannot be undertaken under extremely easy conditions, such as in water with organism densities already almost meeting the standard. To this end, the USCG and IMO G8 guidelines define minimum organism densities, minimum dissolved organic carbon (DOC) loads, and minimum total suspended solids (TSS) loads, for example, which represent some level of challenge. They did not define maximum challenge conditions for Certification tests; if nature serves up a doozy during a test cycle, such as historically high plankton numbers, the test is just as valid as one in which the bare minimum challenges are met; the BWMS is accountable to succeed in any case.

1.3. Meeting Minimum Challenges, Not a “Stress Test”

Importantly, the Certification test framework was not designed as a “stress test” verifying the operating window of a specific BWMS meets a certain required window, or even what that window might be in general. Further, they were not defined to verify BWMS performance under the most challenging circumstances which may be encountered in nature. Consider, for example, that the required concentration of DOC, which is an important challenge to chlorine based systems, as well as UV systems since it interferes with the ultimate dose available to impair organisms, is 6 mg/L. Duluth Superior Harbor water can have DOC levels well over 15 mg/L for much of the summer. It is likely that other inland freshwater shipping ports globally such as on the Yangtze River, and those in northern Europe present similar challenges. Yet most testing facilities amend water to just meet the minimum requirement. The results of Certification tests in which the DOC minimum is just met are likely not predictive of BWMS performance in many real world ports. The same logic pertains to all parameters for which minimum challenges are defined for both land-based and ship board tests. Therefore, it is in
the interest of the ship owners to purchase certified BWMSs with demonstrated performance success beyond the minimums required in Certification tests.

1.4. Vendor-Declared BWMS Operating Condition Limitations

Clearly, there may be efficiencies associated with BWMSs that “specialize” in certain conditions. Thus, nothing in the BWMS Certification Testing Framework prohibits a vendor from declaring operational limitations associated with a Certification. For example, some BWMSs require a certain level of UV transmittance in the source water to be effective. Others may require a certain ballast retention time. These limitations, if declared at the outset, become part of the test validity determinations, and the ultimate Certification will be limited to them.

2. “Freshwater” BWMS Performance Assessments, Not “Sweetwater”

Both the IMO and the USCG (via the ETV BWMS Land Based Testing Protocol, v 5.1) define freshwater solely on the basis of salt content, if inconsistently in that regard (Table 1).

<table>
<thead>
<tr>
<th>Aquatic Ecosystem Type</th>
<th>IMO G8 Guidelines</th>
<th>USCG (ETV Land-Based Protocol, v. 5.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh</td>
<td>&lt; 3 PSU</td>
<td>&lt; 1 PSU</td>
</tr>
<tr>
<td>Brackish</td>
<td>3-32 PSU</td>
<td>10-20 PSU</td>
</tr>
<tr>
<td>Salt</td>
<td>&gt; 32 PSU</td>
<td>28-36 PSU</td>
</tr>
</tbody>
</table>

Thus, ecosystems with up to 1 PSU (USCG Regulations) or 3 PSU (IMO G8), qualify as freshwater and source systems with a mixture of fresh and brackish water and corresponding organisms can be tapped to meet a freshwater testing requirement for BWMS Certifications. Indeed, some land-based testing facilities use the identical source system for both fresh and brackish water tests by simply adding salt or waiting for tidal action to distinguish intake water salinity to meet requirements.

2.1. Pure Freshwater versus Low Salt Water in the Great Lakes and Globally

Figure 2 provides an overview of the salinity gradient across the Great Lakes and St. Lawrence Seaway System (GLSLSS). Most of the system is pure freshwater. Lakes Erie and Ontario have the highest salinity readings, at around 0.1 PSU, while Lake Superior, with a reading near 0.05 PSU, is lowest. The salinity of the GLSLSS doesn’t switch to brackish until the St. Lawrence River near Quebec City.

Figure 3 provides an overview of the salinity gradient across the globe. As evident, Great Lakes ports are not alone in posing pure freshwater challenges to BWMSs. Pure freshwater ports exist in Northern Europe, South America, China, and along the Panama Canal, etc. (Figure 3).
Figure 2. Great Lakes Salinity Gradient (Courtesy https://svs.gsfc.nasa.gov/3652).
Figure 3. Global Salinity Gradient (Courtesy https://svs.gsfc.nasa.gov/3652).
2.2. Does Freshwater Regulatory Testing Have Relevance to the Great Lakes?

Outcomes of freshwater BWMS certification tests may or may not be unreliable predictors of potential BWMS performance in pure freshwater ports, like those in the Great Lakes and environmentally matched systems globally. Salinity regimes in aquatic ecosystems carry with them associated biological and chemical distinctions not specified in the USCG/IMO testing requirements, such that meeting the letter of the regulation in this way can mean missing the spirit of it. Several factors influence relevance, the first of which being universal across salinities.

- The scientific quality of the tests – There is no substitute for testing with high quality control/quality assurance (QAQC) components, irrespective of salinity issues. Test outcomes generated without strong QAQC have no value at all, unfortunately.
- The degree to which organism challenge is met with natural pure freshwater assemblages – Some facilities are adding non-native, readily cultured organisms, to intake water to achieve organism density requirements for freshwater testing. Diversity requirements for intake water are then met through the presence of low levels of background organisms across taxa. But BWMS performance in the context of naturally abundant and diverse challenge water in Certification tests will be most predictive of performance across diverse source water conditions.
- The degree to which freshwater test physical/chemical challenge is met with natural sweet water physical chemical conditions – In the absence of tidal influences, pure freshwater systems may be more often affected by natural sources of DOC from tannins in run-off from boreal forests, as in the Great Lakes.

Deserving special focus is the fact that the species composition of the Great Lakes freshwater zooplankton communities and matched ecosystems can be quite distinct from those in marine and brackish water ecosystems. Freshwater zooplankton communities are often numerically dominated by members of the phylum Rotifera, which are relatively small, while marine systems usually have more crustaceans, primarily copepods and their immature nauplii stages, which are an order of magnitude larger (Figure 4). In the nearshore waters of the GLSLSS rotifers can comprise over 90 % of the zooplankton density (Gannon, 1981). Rotifers may also become dominant in nontidal freshwater coastal lagoons bordering the Baltic Sea during the summer months (Ojaveer et al., 1998; Heerkloss and Schnese, 1999).

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High numbers of small rotifers, dominant in freshwater, can withstand filtration (i.e., pass through filters unharmed) more readily than the dominant taxa in low salt, brackish and salt water source systems which are larger. Many BWMS are designed to remove zooplankton with the filter and inactivate remaining organisms, largely protists and bacteria, with a post filtration secondary treatment system. In these cases, due to biological assemblage differences, outcomes of BWMS operation relative to the USCG/IMO standard in the Great Lakes and matched ecosystems, where high numbers of small zooplankton pass through the filter, could be quite a bit different from outcomes of operation in low salt, brackish and salt water systems, where they do not.

Further, freshwater contains significant populations of rotifers which fall below 50 µm and are entirely “below the radar” from a regulatory standpoint. These species may be in treated discharge in large numbers without affecting type approval outcomes because they are outside the regulatory size class (and too sparse to affect tallies of the next smaller size class). Consequently, even if a BWMS technically meets the IMO standard for the ≥ 50 µm size category in sweet water, it may or may not deliver reliable performance relative to transfers of small live zooplankton endemic to pure freshwater systems.
Tests in low salinity, brackish and salt water systems also may not tell the whole story about potential BWMS performance against pure freshwater protist species. Protists, often phytoplankton, comprise the organisms in the smaller of the two regulatory size classes. Unfortunately, the protist size class lower bound in the IMO/USCG Certification testing protocol also is not as amenable to capturing the majority of Great Lakes protist abundances and diversity as it may be for other salinity regimes. In the Great Lakes, pure freshwater, the proportion of protist cells, often part of larger colonies, that fit within the regulatory size class is relatively low. The relatively small size of a large proportion of cells in freshwater protist species applies across the range of morphological subgroups (filamentous, globular, and single celled forms) (Reavie et al., 2014). Figure 5 contrasts densities of cells ≥ 10 µm in minimum dimension with protist densities ≥ 5 µm in any dimension across a series of intake water measurements at GSI in 2013, illustrating the low frequency of protists that exactly fit the regulatory size class in freshwater. Moreover, the trend toward low abundances of protists with cells above the lower bound of the size class is also evident in at least some freshwater systems outside the Great Lakes (Muylaert et al., 2000).

![2013 filter testing data](image)

**Figure 5.** Stacked Histogram of Protist Cell Densities per mL at GSI (Summer of 2013) with Cells Between 5 and 10 µm in Any Dimension versus Cells Greater than 10 µm in Minimum dimension.


Finally, naturally high dissolved organic carbon in Great Lakes and matched ecosystems can pose very different challenges to UV and disinfection-based BWMSs from artificial chemicals added by many facilities to meet USCG/IMO DOC minimum challenge requirements. First, some freshwater testing facilities add artificial sources of DOC to even meet the minimum requirement in the USCG/IMO challenge conditions for certification tests. At least some if not all of the artificial additives in use do not pose the same kind or intensity of challenge to UV and disinfection-based BWMSs as natural DOC’s do. Further, the minimum level required by USCG/IMO challenge conditions (6 mg/L) may be far less than what is found naturally in pure freshwater river estuaries, such as Duluth Superior Harbor, where levels can reach above 20 mg/L.

In summary, if the IMO/USCG freshwater regulatory testing is actually taking place in low salt water (0.5 to 3 PSU), using spiked non-native freshwater organisms to meet live organisms density requirements, and/or through adding artificial sources of DOCs to meet minimum chemical challenge conditions, then BWMS performance in the Certification tests may not be indicative of performance with respect to the Great Lakes and, more importantly, to environmentally matched systems globally. Equally important are the QAQC procedures in place to assure that test outcomes are meaningful.

3. Status of BWMS Freshwater Evaluations and Approvals

Table 2 summarizes the BWMSs that at the time of publication, had received IMO approval (basic and/or final), national administration approval, USCG AMS approval, and/or applied for USCG Type Approval. (Note: To date no BWMS has received USCG Type Approval). Table 2 also shows salinity ranges of land-based and ship boards tests which were conducted to support these approvals, where data were publically available.

More than 60 BWMSs have received national administration approval, some systems from multiple nations (Table 1). Of these, only 14 BWMSs have accessible information on approval contingencies and limiting conditions; for example, operation of many of the 14 BWMSs is limited to brackish and marine salinities and/or restricted to minimum ballast holding times (Table 2).

Though information is generally quite sparse on approval conditions of BWMSs, an analysis of the 14 BWMSs that have received administration approval that are governed by operational limitations, found that only 11 BWMSs have been approved for use in all water types, including freshwater. Yet, as evident in Table 2, there is limited information available on the salinity ranges of land-based and/or shipboard testing that these systems have been subjected to. Where evidence exists the information is not encouraging. For example, one BWMS appears to have received USCG AMS approval with no limitations on water type, yet it has received national administration approval that limits its use to brackish and marine waters (Table 2). This same system, based on available public information, has undergone land-based testing using challenge water not less than 20 PSU (Table 2). Moreover, shipboard tests were conducted in salinities approaching 30 PSU with densities of organisms in the challenge water extremely low, i.e., organisms ≥ 10 and < 50 µm ranged 111 – 338/mL (Table 2).
In terms of USCG AMS approval, 51 BWMSs have been accepted into this program, while over 30 have submitted a letter of intent (LOI) to apply for USCG type approval (Table 2). Yet across the entire gamut of IMO, administration and USCG approval processes, there are large inconsistencies in terms of land-based and shipboard testing challenge water conditions that these systems have been subjected to, with testing relevant to pure freshwater generally lacking across the board.

4. Discussion and Conclusion

The IMO and USCG designed a testing regime which involves testing BWMS against relatively challenging conditions in three salinity regimes. Yet testing against what are assumed to be “average” conditions means real world performance in the context of extreme conditions, which exist, is unknown despite Certification. This situation is particularly of concern relative to BWMS performance in pure freshwater, where the USCG/IMO require challenge conditions for organism sizes and densities are not a good fit for native assemblages, and low salt conditions are characterized as freshwater. In addition, water chemistry challenge conditions of particular concern for UV and chlorine treatment performance often naturally far exceed minimum testing requirements. The BWMS Certification process is in the early stages and the importance of these issues will play out with time. Designers of the current framework for testing BWMSs for purposes of regulatory Certification face a difficult task. Aquatic systems globally, and the challenges they present to BWMS performance, vary widely spatially and over time. Further, individual physical/chemical/biological parameters that challenge BWMS performance are in constant flux across all source water systems. If worst-case scenario levels of the various important parameters are combined together in a single test, the challenge to the BWMS may be so great that the result is over-engineered BWMSs, or no certified BWMSs. But simply creating minimum challenges across the board which may be met by non-natural additives leads to a situation in which vendors of BWMSs may seek Certification testing under conditions which just meet the minimums and which may not reflect even average actual BWMS challenge conditions. This situation is particularly of concern relative to BWMS performance in pure freshwater, where many organisms do not comfortably fit within the regulatory size classes, and where testing within low salt conditions is characterized as freshwater testing. The BWMS Certification process is in the early stages and the importance of these issues will play out with time.
Table 2. Summary of BWMSs that have Received IMO Approval (Basic and/or Final), National Administration Approval, USCG AMS Approval, and/or applied for USCG Type Approval, along with Available Land-based and Shipboard Test Methods.

<table>
<thead>
<tr>
<th>System Name</th>
<th>Manufacturer Name and Country</th>
<th>Date of IMO Approval</th>
<th>Administration Approval</th>
<th>Land-Based and Shipboard Test Methods</th>
<th>USCG Alternate Management System (AMS) Approval</th>
<th>Systems in Service Globally or Orders Received</th>
<th>Applied for USCG Type Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEDNA® Ballast Water Management System (Hydrocyclone + Filtration + Peraclean® Ocean)</td>
<td>Degussa GmbH, Germany</td>
<td>Basic: March 2006 (MEPC 54) Final: April 2008 (MEPC 57)</td>
<td>Germany (June 2008).</td>
<td>Land-based testing conducted at NIOZ using challenge water approx. 21 PSU (six test cycles) and approx. 33.5 PSU (six test cycles). Hold time was 5 days. Shipboard testing conducted by Stephan Gollasch on board container vessel OOCL Finland in salinities 5.2 – 20.5 PSU. Five shipboard test cycles conducted. Hold time ranged 30 to 52 hours. Two test cycles had low protist densities in challenge water. For example test cycle 4 had 184 organisms ≥ 10 and &lt; 50 µm in the challenge water and test cycle 5 had 41 organisms.</td>
<td>--</td>
<td>N/A - Withdrawn from the market.</td>
<td>--</td>
</tr>
<tr>
<td>System</td>
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</table>
| FineBallast™ OZ (cavitation + ozonation) | Mitsui Engineering & Shipbuilding Co. Ltd., Japan | October 2006 (MEPC 55) Final: October 2010 (MEPC 61) | Japan (June 2011). | **Land-based testing** conducted by Laboratory of Aquatic Science Consultant Co. Ltd., Japan. Five test cycles conducted using challenge water > 32 PSU. Five test cycles conducted using challenge water ~ 20 PSU.  
**Shipboard testing** conducted by Laboratory of Aquatic Science Consultant Co. Ltd., Japan on board MV Mol Express. Five test cycles conducted, two were invalid due to insufficient live organism densities in challenge water. Salinity ranged 29 - 34 PSU in the three valid test cycles. Low densities of Low intake densities (i.e., 10^7 - 479/mL) in organism size class ≥ 10 and < 50 µm in two test cycles. Concentrations of bacteria also extremely low to non-detectable in intake challenge water. | --    | --    | --    |
| CleanBallast (filtration + electrochemical) | RWO GmbH, Germany | October 2006 (MEPC 55) Final: July 2009 (MEPC 59) | Germany (September 2010, reissued September 2014). | **Land-based testing** conducted at NIVA using challenge water ≥ 32 PSU (seven test cycles) and 20 – 22 PSU (five test cycles). Hold time was 5 days.  
**Shipboard testing** conducted by Stephan Gollasch on board MV Maersk Penang in salinities ≥ 31 PSU. Five shipboard test cycles conducted.  
Two test cycles did not met min. protist density requirements in challenge water. For example test cycle 4 had 8 organisms ≥ 10 and < 50 µm in the challenge water and test cycle 5 had 7 organisms. | AMS acceptance issued April 2013 and updated December 2014. Limited to marine and brackish water > 1 PSU. | N ≥ 2 | --    |
<table>
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<tr>
<th>System</th>
<th>Company/Location</th>
<th>Basic: Final: (MEPC)</th>
<th>Testing Details</th>
<th>AMS Acceptance Date</th>
<th>LOI Submission Date</th>
<th>Notes</th>
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<tr>
<td>PureBallast System (UV + Filtration)</td>
<td>Alfa Laval/Wallenius AB, Sweden</td>
<td>Basic: July 2007 (MEPC 56) Final: July 2007 (MEPC 56)</td>
<td><strong>Norway</strong> (June 2008, March 2011, June 2014, January 2015 and July 2015). <strong>Liberia</strong> (May 2014). Limited to brackish and marine waters. Land-based testing conducted by DHI Environmental Laboratory using challenge water ~ 34 PSU (7 test cycles) and 17 – 19 PSU (7 test cycles). Shipboard testing conducted by DHI Environmental Laboratory on board MV Turandot in salinities 17 - 35 PSU. Four test cycles conducted. Low intake densities (i.e., less than 180) in organism size class ≥ 10 and &lt; 50 µm in two test cycles. Concentrations of bacteria also extremely low to non-detectable in intake challenge water.</td>
<td>AMS acceptance granted April 2013, updated June 2014 and April 2015. Systems employing approved Filtrex filters are accepted for use in all waters, including those &lt; 1 PSU. Systems employing Hydac or Boll &amp; Kirch filters are limited for use in waters &gt; 1 PSU.</td>
<td>N ≥ 1,200</td>
<td>In progress. LOI submitted February 2016.</td>
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<tr>
<td>NK-O3 BlueBallast System (Ozone)</td>
<td>NK Company Ltd., Republic of Korea</td>
<td>Basic: July 2007 (MEPC 56) Final: July 2009 (MEPC 59)</td>
<td><strong>Republic of Korea</strong> (November 2009). <strong>Norway</strong> (December 2012). <strong>Liberia</strong> (December 2014). Limited to brackish and marine waters. Land-based testing conducted by Korea Marine Equipment Research Institute in salinities &gt; 32 PSU (five test cycles) and 18 - 21 PSU (five test cycles). Shipboard testing conducted by Korean Marine Equipment Research Institute on board the MV Hyundai Hong Kong. Four test cycles conducted in salinities 28 – 34 PSU. Low intake densities (i.e., range = 26 to 247) in organism size class ≥ 10 and &lt; 50 µm across test cycles. Concentrations of bacteria also extremely low to non-detectable in intake challenge water.</td>
<td>AMS approval granted April 2013. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ 4</td>
<td>In progress. LOI submitted May 2015.</td>
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<tr>
<td>Hitachi Ballast Water Purification System (ClearBallast) (coagulation + magnetic separation)</td>
<td>Hitachi, Ltd./Hitachi Plant technologies, Ltd., Japan</td>
<td>Basic: April 2008 (MEPC 57) Final: July 2009 (MEPC 59)</td>
<td><strong>Japan</strong> (March 2010). Vendor conducted land-based and shipboard tests conducted in 2008-09.</td>
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<td>N ≥ 2</td>
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<td>End (Final)</td>
<td>Country/Region</td>
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<tr>
<td>Resource Ballast Technologies System (hydrodynamics + electrochlorination + ozone + filtration)</td>
<td>Basic: April 2008 (MEPC 57)</td>
<td>Final: March 2010 (MEPC 60)</td>
<td>South Africa (April 2011 and January 2013)</td>
<td>Cannot immediately find evidence of land-based or shipboard tests.</td>
<td>--</td>
<td>N ≥ 0</td>
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<tr>
<td>GloEn-Patrol Ballast Water Management System (filtration + UV)</td>
<td>Final: March 2010 (MEPC 60)</td>
<td>Republic of Korea (December 2009), Liberia (January 2013).</td>
<td>No limitations on water type.</td>
<td>Land-based testing conducted by Korea Ocean Research and Development Institute using challenge water approx. 21 PSU (five test cycles) and &gt; 32 PSU (five test cycles). Shipboard testing conducted by Korea Ocean Research and Development Institute on board MV Ty Ever in salinities 25-31 PSU. Three test cycles conducted. Low intake densities (i.e., less than 800) in organism size class ≥ 10 and &lt; 50 µm in two test cycles.</td>
<td>--</td>
<td>N ≥ 80</td>
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<tr>
<td>OceanSaver® Ballast Water Management System (filtration + electrodialysis)</td>
<td>Basic: April 2008 (MEPC 57)</td>
<td>Final: October 2008 (MEPC 58)</td>
<td>Norway (April 2009, December 2011, March 2013), Liberia (July 2015). Limited to water &gt; 1 PSU.</td>
<td>Land-based testing conducted by NIVA using challenge water ~21 PSU (six test cycles) and ~32 PSU (five test cycles). Shipboard testing conducted by University of Bergen on board MV Hoegh Trooper. Five test cycles conducted using challenge water 35 – 38 PSU. Organism densities in challenge water across the five test cycles were generally quite low: organisms ≥ 50 µm ranged 1,549 – 4,933/m3; organisms ≥ 10 and &lt; 50 µm ranged 10 – 5,704/mL. Concentrations of bacteria also low to non-detectable in intake challenge water.</td>
<td>AMS approval granted September 2013. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>In progress. LOI submitted December 2014.</td>
</tr>
<tr>
<td>JFE BallastAce® Ballast Water Management System (filtration + chemical injection)</td>
<td>JFE Engineering Corporation, Japan</td>
<td>Basic: October 2008 (MEPC 58) and July 2011 (MEPC 62) Final: March 2010 (MEPC 60) and October 2012 (MEPC 64)</td>
<td>Japan (May 2010, March 2011 and June 2013). Liberia (January 2015). Limited to marine and brackish waters.</td>
<td>Land-based testing conducted by Korea Ocean Research and Development Institute (TG Ballastcleaner as active substance) and NIVA (Neo-Chlor Marine as active substance) using challenge water approx. 21 PSU (five test cycles per active substance) and &gt; 32 PSU (five test cycles per active substance). Shipboard testing conducted by Fuyo Ocean Development &amp; Engineering Co. Ltd (Japan) on board MV Saga Pioneer. Three test cycles conducted in salinities 27 – 29 PSU. Low intake densities (i.e., 760/mL) in organism size class ≥ 10 and &lt; 50 µm in one test cycle. Low densities of bacteria in challenge water across all test cycles, i.e., &gt; 50 CFU. AMS approval granted April 2014 and revised March 2015. No limitations on salinity.</td>
<td>N ≥ 1,000</td>
<td>In progress. LOI submitted July 2016.</td>
</tr>
<tr>
<td>ARA PLASMA BWTS Ballast Management System (Filtration + Plasma + UV)</td>
<td>SAMKUN CENTURY Company Ltd., Republic of Korea</td>
<td>Basic: March 2010 (MEPC 60) Final: October 2010 (MEPC 61)</td>
<td>Republic of Korea (June 2012, reissued February 2015). Liberia (October 2014). Limited to brackish and marine waters.</td>
<td>Land-based testing conducted by Korea Marine Equipment Research Institute. Seven test cycles conducted in challenge water &gt; 34 PSU and seven test cycles conducted in challenge water 22 – 23 PSU. Shipboard testing conducted by Korea Marine Equipment Research Institute on board MV Ty Gloria in salinities 24 – 33 PSU. Three test cycles conducted. Intake densities of organisms ≥ 10 and &lt; 50 µm ranged 111 – 180. Intake concentrations of E. coli, V. cholerae and Enterococcus ranged from 0 – 113 CFU in two of the three test cycles. AMS acceptance issued October 2013 and revised April 2015. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ ?</td>
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<td>System Name</td>
<td>Manufacturer</td>
<td>Basic Approval</td>
<td>Final Approval</td>
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<td>Water Types</td>
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<tr>
<td>Blue Ocean Shield Ballast Water Management System (filtration + UV)</td>
<td>China Ocean Shipping (Group) Company (COSCO), China</td>
<td>Basic: July 2009 (MEPC 59)</td>
<td>China (February 2011)</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
<td>AMS approval granted November 2013. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ 100</td>
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<tr>
<td>BallastMaster ultraV (formerly AquaTriComb™ Ballast Water Treatment System) (filtration + UV)</td>
<td>GEA Westfalia Separator Systems GmbH, Germany</td>
<td>Basic: July 2009 (MEPC 59)</td>
<td>Germany (August 2012).</td>
<td>Land-based testing at NIOZ conducted using challenge water = 23.8 PSU and 35.3 PSU. Shipboard testing conducted by Stephan Gollasch on board MV Timbus in salinities 9.8 to 33.4 PSU.</td>
<td>AMS acceptance granted January 2016. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ 2</td>
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<tr>
<td>RayClean™ Ballast Water Treatment System (filtration + UV)</td>
<td>DESMI Ocean Guard A/S, Denmark</td>
<td>Basic: March 2010 (MEPC 60) Final: October 2012 (MEPC 64)</td>
<td>Denmark (November 2012 and September 2014)</td>
<td>Land-based testing at DHI conducted using challenge water 17 - 18 PSU (five test cycles) and 0.1 - 0.4 PSU (five test cycles). Shipboard testing conducted by DHI on board Thuro Maersk using challenge</td>
<td>AMS acceptance granted January 2015. No limitations on water type.</td>
<td>N ≥ 20</td>
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<td>System Name</td>
<td>Company Name</td>
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<tr>
<td>BalClor™ Ballast Water Management System (filtration + disinfection)</td>
<td>Qingdao Sunrui Corrosion and Fouling Control Company, China</td>
<td>March 2010 (MEPC 60)</td>
<td>October 2010 (MEPC 61)</td>
<td>China (January 2011), Norway (August 2012 and February 2013), Liberia</td>
<td>Land-based testing and shipboard testing conducted by DHI. Results not available.</td>
<td>AMS acceptance granted May 2013. Limited to marine and brackish water &gt; 1 PSU.</td>
</tr>
<tr>
<td>HiBallast Ballast WaHiBallast Ballast Water Management System (electrolysis)</td>
<td>Hyundai Heavy Industries Co., Ltd., Republic of Korea</td>
<td>March 2010 (MEPC 60)</td>
<td>July 2011 (MEPC 62)</td>
<td>Republic of Korea (November 2011), Liberia (January 2015). Limited to salinities 1 – 35 PSU. Operation in &gt; 1 to &lt; 15 PSU requires mixing 1 % by volume salt water from holding tank. Shipboard testing conducted by Korea Marine Equipment Research Institute on board MV Hyundai Unity in challenge water 22 – 33 PSU. Three test cycles conducted. Low intake densities (i.e., less than 165) in organism size class ≥ 10 and &lt; 50 µm across all test cycles. Concentrations of bacteria also low to non-detectable in intake challenge water.</td>
<td>AMS approval granted June 2013 and revised December 2014. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ 10</td>
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<tr>
<td>BioViolet Ballast Water Treatment System (UV)</td>
<td>Kwang San Co., Ltd., Republic of Korea</td>
<td>March 2010 (MEPC 60)</td>
<td></td>
<td>Republic of Korea (April 2015)</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
<td>AMS approval granted November 2015. Limited to marine and brackish water &gt; 1 PSU.</td>
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<tr>
<td>Name</td>
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<td>Final</td>
<td>Location</td>
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<tr>
<td>BalPure® (electrolytic disinfection)</td>
<td>DeNora Water Technologies LLC, Germany</td>
<td>Basic: March 2010 (MEPC 60)</td>
<td>Final: October 2010 (MEPC 61)</td>
<td>Germany (July 2011).</td>
<td>Land-based testing at NIOZ conducted using challenge water = 23.9 PSU and 33.6 PSU. Shipboard testing conducted by Moss Landing on board Golden Bear in salinities 18.7 to 34.8 PSU. Four shipboard test cycles conducted.</td>
<td>AMS acceptance issued April 2013 and revised November 2015. To be operated in water ≥10 PSU. When ballasting in fresh or very low salinity water, the aft peak ballast tank be filled with seawater prior to ballasting.</td>
</tr>
<tr>
<td><strong>MICROFADE™ Ballast Water Management System (filtration + active substance)</strong></td>
<td><strong>Kuraray Co., Ltd., Japan</strong></td>
<td><strong>Basic: October 2010 (MEPC 61) Final: March 2012 (MEPC 63)</strong></td>
<td><strong>Japan (May 2012, revised May 2014)</strong></td>
<td><strong>Land-based testing at Laboratory of Aquatic Science Consultant Co. Ltd. conducted using challenge water = 18 - 20 PSU (five test cycles) and &gt; 32 PSU (five test cycles). Shipboard testing conducted by Laboratory of Aquatic Science Consultant Co. on board unidentified vessel in salinities 31 - 33 PSU. Three shipboard test cycles conducted.</strong></td>
<td><strong>AMS approval granted October 2013 and revised October 2014. Limited to marine and brackish water &gt; 1 PSU.</strong></td>
<td><strong>N ≥ ?</strong></td>
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<tr>
<td><strong>ERMA FIRST BWTS (filtration + electro-chlorination)</strong></td>
<td><strong>ERMA FIRST ESK Engineering Solutions S.A., Greece</strong></td>
<td><strong>Basic: July 2011 (MEPC 62) Final: March 2012 (MEPC 63)</strong></td>
<td><strong>Greece (May 2012, amended January 2015). Liberia (March 2016). Approved for salinities 0.9 – 35 PSU. Operation in &lt; 0.9 PSU requires mixing with brine or salt water stored in a holding tank.</strong></td>
<td><strong>Land-based testing conducted by NIOZ. Five test cycles conducted using challenge water ~ 34 PSU, five test cycles conducted using challenge water ~ 24 PSU, and two test cycles conducted using challenge water ~ 0.9 PSU. Intake challenge water densities of E. coli, V. cholerae and Enterococcus &lt;11 to non-detectable across all test cycles. Shipboard testing conducted by NIOZ on board MV Cosco Guangzhou. Three test cycles using challenge water 28 – 34 PSU. Organism densities in challenge water across the three test cycles were quite low: organisms ≥ 10 and &lt; 50 µm ranged 374 – 1,647/mL. Concentrations of bacteria were also low, i.e., &lt; 28 CFU to non-detectable across the three test cycles.</strong></td>
<td><strong>AMS approval granted October 2013 and revised March 2015. Limited to water types with a salinity ≥ 0.9 PSU.</strong></td>
<td><strong>N ≥ 20</strong></td>
</tr>
<tr>
<td><strong>BlueSeas Ballast Water Management System (electrolysis)</strong></td>
<td><strong>Envirotech and Consultancy Pte. Ltd., Singapore</strong></td>
<td><strong>Basic: July 2011 (MEPC 62)</strong></td>
<td><strong>--</strong></td>
<td><strong>Cannot immediately find information on land-based or shipboard tests.</strong></td>
<td><strong>--</strong></td>
<td><strong>N ≥ 0</strong></td>
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<tr>
<td>System</td>
<td>Company</td>
<td>Date Basic</td>
<td>Date Final</td>
<td>Country</td>
<td>Period</td>
<td>Land-based or Shipboard Tests</td>
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<tr>
<td>SKY-SYSTEM® Ballast Water Management System (Peraclean® Ocean)</td>
<td>Katayama Chemical, Inc., Japan</td>
<td>July 2011</td>
<td>March 2014</td>
<td>Japan</td>
<td>October 2014</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
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<tr>
<td>Smart Ballast BWMS (electrolysis)</td>
<td>STX Heavy Industries Company, Ltd., Republic of Korea</td>
<td>March 2012</td>
<td>October 2012</td>
<td>Republic of Korea</td>
<td>September 2013</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
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<tr>
<td>MARINOMATE™ Ballast Water Management System (electrolysis)</td>
<td>KT Marine Co. Ltd., Republic of Korea</td>
<td>October 2012</td>
<td>October 2014</td>
<td>--</td>
<td>N ≥ ?</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
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<tr>
<td>OceanDoctor Ballast Water Management System (filtration + UV + oxidation)</td>
<td>Jiujiang Precision Measuring Technology Research Institute, China</td>
<td>Basic: October 2012 (MEPC 64) Final: May 2013 (MEPC 65)</td>
<td>China (November 2014)</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
<td>AMS acceptance issued June 2014 and updated December 2014. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ ?</td>
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<td>REDOX AS Ballast Water Management System (Ozonation)</td>
<td>REDOX Maritime Technologies AS, Norway</td>
<td>Basic: May 2013 (MEPC 65)</td>
<td>--</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
<td>--</td>
<td>N ≥ ?</td>
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<td>ECOLCELL BTs Ballast Water Management System (electro-chlorination)</td>
<td>Azienda Chimica Genovese (ACG), Italy</td>
<td>Basic: April 2014 (MEPC 66)</td>
<td>--</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
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<td>N ≥ ?</td>
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<td>System Description</td>
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<tr>
<td>Ecomarine Ballast Water Management System (filtration + UV)</td>
<td>Sumitomo Electric Industries, Ltd., Japan</td>
<td>Basic: April 2014 (MEPC 66) Final: May 2015 (MEPC 68)</td>
<td>Japan (June 2014). Land-based testing conducted in Japan using challenge water of high salinity (five test cycles) and brackish salinity (five test cycles). Detailed results not available. Shipboard tests conducted on board Asuka II. Three test cycles conducted. Salinity not provided. Low densities of organisms ≥ 10 and &lt; 50 µm in challenge water across test cycles, i.e., 142 - 763/mL. Detailed results not available.</td>
<td>AMS acceptance issued December 2014. Limited to marine and brackish water &gt; 1 PSU.</td>
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<tr>
<td>ATPS-BLUEsys Ballast Water Management System (electrolysis)</td>
<td>Panasonic Environmental Systems &amp; Engineering Co. Ltd., Japan</td>
<td>Basic: April 2014 (MEPC 66) Final: April 2016 (MEPC 69)</td>
<td>-- Cannot immediately find information on land-based or shipboard tests.</td>
<td>-- N ≥ ?</td>
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<tr>
<td>KURITA™ Ballast Water Management System (chemical injection)</td>
<td>Kurita Water Industries Ltd.</td>
<td>Basic: April 2014 (MEPC 66) Final: October 2014 (MEPC 67)</td>
<td>-- Cannot immediately find information on land-based or shipboard tests.</td>
<td>-- N ≥ ?</td>
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<tr>
<td>ElysisGuard ballast water management system (filtration + electro-chlorination)</td>
<td>KALF Engineering Pte. Ltd., Singapore</td>
<td>Basic: October 2014 (MEPC 67)</td>
<td>-- Cannot immediately find information on land-based or shipboard tests.</td>
<td>-- N ≥ ?</td>
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<tr>
<td>ECS-HYCHEM™ System (filtration + chemical injection)</td>
<td>Techcross Ltd., Republic of Korea</td>
<td>Basic: May 2015 (MEPC 68)</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
<td>N ≥ ?</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
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<tr>
<td>ECS-HYBRID™ System (electrolysis)</td>
<td>Techcross Ltd., Republic of Korea</td>
<td>Basic: May 2015 (MEPC 68)</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
<td>N ≥ ?</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
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<tr>
<td>VARUNA Ballast Water Treatment System (filtration + electro-chemical)</td>
<td>Kadalneer Technologies Pte. Ltd., Singapore</td>
<td>Basic: May 2015 (MEPC 68)</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
<td>N ≥ ?</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
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<tr>
<td>Shanghai Hengyuan Ballast Water Treatment System (filtration + UV)</td>
<td>Shanghai Hengyuan Marine Equipment Co. Ltd., China</td>
<td>China (August 2013)</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
<td>N ≥ ?</td>
<td>AMS acceptance issued September 2014. Limited to marine and brackish water &gt; 1 PSU.</td>
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</tbody>
</table>

- **ECS-HYCHEM™ System (filtration + chemical injection)**: Techcross Ltd., Republic of Korea. Basic: May 2015 (MEPC 68). Cannot immediately find information on land-based or shipboard tests. N ≥ ?
- **ECS-HYBRID™ System (electrolysis)**: Techcross Ltd., Republic of Korea. Basic: May 2015 (MEPC 68). Cannot immediately find information on land-based or shipboard tests. N ≥ ?
- **VARUNA Ballast Water Treatment System (filtration + electro-chemical)**: Kadalneer Technologies Pte. Ltd., Singapore. Basic: May 2015 (MEPC 68). Cannot immediately find information on land-based or shipboard tests. N ≥ ?
- **Shanghai Hengyuan Ballast Water Treatment System (filtration + UV)**: Shanghai Hengyuan Marine Equipment Co. Ltd., China. China (August 2013). Cannot immediately find information on land-based or shipboard tests. AMS acceptance issued September 2014. Limited to marine and brackish water > 1 PSU. N ≥ ?
<table>
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<th>System (filtration + UV)</th>
<th>Optimarin, Norway</th>
<th>Basic – N/A. Does not employ active substance</th>
<th>Norway (November 2009 and July 2014)</th>
<th>Test conducted by NIVA. Results not available.</th>
<th>marine and brackish water &gt; 1 PSU.</th>
<th>AMS approval granted April 2014 and revised November 2014. Limited to marine and brackish water &gt; 1 PSU.</th>
<th>N ≥ 500</th>
<th>In progress. LOI submitted October 2014.</th>
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<tr>
<td>OptiMarin Ballast System (OBS) (filtration + UV)</td>
<td>Wuxi Brightsky Electronic Cop. Ltd., China</td>
<td>Basic – N/A. Does not employ active substance</td>
<td>China (March 2011 and June 2013)</td>
<td>Land-based testing conducted by First Institute of Oceanography, SOA. Five trials conducted in challenge water &gt; 32 PSU and five test cycles conducted in challenge water ~ 17 PSU. Shipboard testing conducted by First Institute of Oceanography, SOA, on board the MV Hua Chang. Four test cycles conducted. Salinity ranged 0.8 to 31.4 PSU.</td>
<td>AMS approval granted October 2013. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ 250</td>
<td>In progress. LOI submitted April 2015.</td>
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<tr>
<td>Ocean Protection System® OPS (filtration + UV)</td>
<td>Mahle Industriefiltration GmbH, Germany</td>
<td>Basic – N/A. Does not employ active substance</td>
<td>Germany (April 2011, July 2011, April 2013).</td>
<td>Land-based testing at NIOZ conducted using challenge water = 23.4 PSU and 33.2 PSU. Shipboard testing conducted by Stephan Gollasch on board MV Thuroe Maersk in salinities &gt; 34 PSU. Four test cycles conducted.</td>
<td>AMS acceptance issued February 2014. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ 6</td>
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<td>System Name</td>
<td>Company</td>
<td>Country</td>
<td>Basic</td>
<td>N/A. Does not employ active substance</td>
<td>Test Methodology</td>
<td>Water Types</td>
<td>Limitations</td>
<td>AMS Approval</td>
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<tr>
<td>Cyeco™ Ballast Water Management System (filtration + UV)</td>
<td>Shanghai Cyeco Environmental Technology Co. Ltd., China</td>
<td>China</td>
<td>Basic - N/A. Does not employ active substance</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
<td>AMS acceptance issued July 2014. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ 4</td>
<td>In progress. LOI submitted August 2015.</td>
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<td>MMC Ballast Water Management System (filter + UV)</td>
<td>MMC Green Technology AS, Norway</td>
<td>Norway</td>
<td>Basic - N/A. Does not employ active substance</td>
<td>Test conducted by NIVA. Results not available.</td>
<td>AMS approval granted August 2013. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ 70</td>
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<td>BALWAT Ballast Water Management System (filtration + UV)</td>
<td>Shanghai Jiazhou Environmental Mechanical &amp; Electrical Co. Ltd, China</td>
<td>China</td>
<td>Basic - N/A. Does not employ active substance</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
<td>--</td>
<td>N ≥ ?</td>
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<tr>
<td>BIO-SEA® Ballast Water Treatment System (filtration + UV)</td>
<td>BIO-UV SAS, France</td>
<td>France</td>
<td>Basic - N/A. Does not employ active substance</td>
<td>Land-based testing and shipboard tests conducted by DHI. Results not available.</td>
<td>AMS acceptance granted March 2014 and updated June 2016. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ 4</td>
<td>In progress. LOI submitted March 2015.</td>
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<tr>
<td>HY™-BWMS (filtration + UV)</td>
<td>Shanghai Hengyuan Marine Equipment, China</td>
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<td>Basic - N/A. Does not employ active substance</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
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<tr>
<td>FineBallast MF (pre-filter + membrane)</td>
<td>Mitsui Engineering &amp; Shipbuilding Co. Ltd., Japan</td>
<td>Japan</td>
<td>Basic - N/A. Does not employ active substance</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
<td>AMS acceptance issued September 2014. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ ?</td>
<td></td>
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<tr>
<td>KBAL Ballast Water Management System (pressure vacuum + UV)</td>
<td>Knutsen OAS Shipping AS, Norway</td>
<td>Basic – N/A. Does not employ active substance</td>
<td>Norway (November 2012)</td>
<td>Land-based testing conducted by NIVA in brackish and seawater. Detailed results not available. Shipboard testing conducted on board MT Gijon Knutsen. Detailed results not available.</td>
<td>AMS acceptance issued March 2014. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ 4</td>
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<tr>
<td>Seascape® Ballast Water Management System (filtration + UV/US)</td>
<td>Elite Marine Ballast Water Treatment System Corp., China</td>
<td>Basic – N/A. Does not employ active substance</td>
<td>China (December 2013 and December 2015)</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
<td>AMS acceptance issued October 2014. Limited to marine and brackish water &gt; 1 PSU.</td>
<td>N ≥ ?</td>
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<td>Trojan Marinex™ Ballast Water Management System (filtration + UV)</td>
<td>Trojan Technologies, Canada</td>
<td>Basic – N/A. Does not employ active substance</td>
<td>Norway (March and December 2013). Liberia (January 2016). Approved for fresh, brackish and marine waters.</td>
<td>Land-based testing conducted by DHI, Denmark. Seven test cycles conducted using challenge water ~ 34 PSU, eight test cycles conducted using challenge water ~ 18 PSU, and five test cycles conducted using challenge water 0.4 PSU. Shipboard testing conducted by the Golden Bear Test Facility on board the MV Golden Bear. Three test cycles conducted using challenge water 16 – 30 PSU. Organism densities in the ≥ 10 and &lt; 50 µm size class were low in two test cycles: 320/mL and 100/mL respectively. Concentrations of bacteria were low to non-detectable in intake challenge water across all three test cycles.</td>
<td>AMS acceptance issued August 2014. No limitations on water type.</td>
<td>N ≥ 25</td>
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| System Name                                      | Company                | Country/Region | Type |Physical Testing
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<tbody>
<tr>
<td>Miura Ballast Water Management System (Filtration + UV)</td>
<td>Miura Co. Ltd., Japan</td>
<td>Japan (March 2014 and January 2016), Liberia (January 2015).</td>
<td>Basic – N/A, Does not employ active substance</td>
<td>Land-based testing conducted by Laboratory of Aquatic Science Consultant Co. Ltd., Japan, using challenge water &gt; 32 PSU (five test cycles) and ~ 20 PSU (five test cycles). Shipboard testing conducted by Laboratory of Aquatic Science Consultant Co. Ltd., Japan, on board MV Himawari in salinities ~ 27 PSU. Three test cycles conducted. Intake densities of organisms ≥ 10 and &lt; 50 µm ranged 111 – 338. Intake concentrations of E. coli, V. cholerae and Enterococcus ranged from 0 – 333 CFU.</td>
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<tr>
<td>Cathelco Ballast Water Management System (filtration + UV)</td>
<td>Cathelco Ltd., United Kingdom</td>
<td>Germany (July 2014).</td>
<td>Basic – N/A, Does not employ active substance</td>
<td>Land-based testing at NIOZ conducted using challenge water 27 – 36 PSU and 0.4 PSU. Shipboard testing conducted by MEA-nl on board the M.V. Eddystone in salinities 33.36 to 37.13 PSU.</td>
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<tr>
<td>PACT marineTM Ballast Water Management System (filtration + UV)</td>
<td>PACT Environmental Technology Co. Ltd., China</td>
<td>China (July 2014), Russia (November 2015)</td>
<td>Basic – N/A, Does not employ active substance</td>
<td>Cannot immediately find information on land-based or shipboard tests.</td>
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<tr>
<td>Ballast System</td>
<td>Company</td>
<td>Basic</td>
<td>Does not employ active substance</td>
<td>Year</td>
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<tr>
<td>Bawat™ BWMS (heat treatment + oxygen stripping/displacement)</td>
<td>Bawat A/S, Denmark</td>
<td>Basic – N/A.</td>
<td>Does not employ active substance</td>
<td>Denmark (January 2015)</td>
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<tr>
<td>AHEAD®-BWMS Ballast Water Management System (UV)</td>
<td>Ahead Ocean Technology Co. Ltd., China</td>
<td>Basic – N/A.</td>
<td>Does not employ active substance</td>
<td>China (January 2015)</td>
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<tr>
<td>YP-BWMS Ballast Water Management System (filtration + UV)</td>
<td>Zhejiang Yingpeng Marine Equipment Manufacturer co., Ltd., China</td>
<td>Basic – N/A.</td>
<td>Does not employ active substance</td>
<td>China (February 2015)</td>
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<tr>
<td>AVITALIS™ Ballast Water Management System (filtration + Peraclean Ocean)</td>
<td>TeamTec &amp; Evonik, Norway</td>
<td>Basic: March 2006 (MEPC 54) for Peraclean Ocean</td>
<td>Final: April 2014 (MEPC 66)</td>
<td>--</td>
</tr>
<tr>
<td>Shanghai Hengyuan Ballast Water Treatment System (filtration + UV)</td>
<td>Shanghai Hengyuan Marine Equipment Co. Ltd., China</td>
<td>--</td>
<td></td>
<td>China (August 2013)</td>
</tr>
<tr>
<td>CrystalBallast® Ballast Water Treatment System (filtration + UV)</td>
<td>Auramarine, Ltd., Finland</td>
<td>--</td>
<td><strong>Norway</strong> (July and December, 2013)</td>
<td>Land-based testing conducted by NIVA. Results not available. Shipboard tests were carried out onboard a Finnish bulk carrier and a Finnish Ro-Ro vessel operating in the Baltic and North Sea. The tests were analyzed by DHI laboratory in Denmark. Results not available.</td>
</tr>
</tbody>
</table>
Bridging the Gap Together:

A New Model to Modernize U.S. Infrastructure

May 2016
ACKNOWLEDGMENTS

BPC staff produced this report in collaboration with a distinguished group of senior advisors and experts. BPC would like to thank Aaron Klein, Fellow, Economic Studies and Policy Director, Initiative on Business and Public Policy, the Brookings Institution, and the council’s staff for their contributions and continued support.

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EXECUTIVE COUNCIL ON INFRASTRUCTURE

The Executive Council on Infrastructure is a working group of corporate CEOs and executives drawn from the financial, industrial, logistics, and services industries. The council has developed recommendations to help facilitate increased private sector investment in U.S. infrastructure.

DISCLAIMER

This report is a product of the BPC Executive Council on Infrastructure, whose membership includes executives of diverse organizations. The council reached consensus on these recommendations as a package. The findings and recommendations expressed herein do not necessarily represent the views or opinions of the council member companies, the members of the Political Advisory Group, the Bipartisan Policy Center’s founders or its board of directors.
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Co-Chair, Executive Council on Infrastructure

Susan Story
President and CEO, American Water
Co-Chair, Executive Council on Infrastructure

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Vice Chairman and Managing Director, Moelis & Co.
Former House Majority Leader

Patrick Decker
President and CEO, Xylem Inc.

Michael Ducker
President and CEO, FedEx Freight

Jack Ehnes
Chief Executive Officer, California State Teachers’ Retirement System (CalSTRS)

Jane Garvey
Chairman of North America, Meridiam

P. Scott Ozanus
Deputy Chairman and COO, KPMG

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Consultant

Sarah Kline
Principal, SK Solutions LLC
**Table of Contents**

<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Letter from Executive Council Co-Chairs</td>
</tr>
<tr>
<td>6</td>
<td>Letter from Political Advisory Group</td>
</tr>
<tr>
<td>7</td>
<td>Executive Summary</td>
</tr>
<tr>
<td>13</td>
<td>Chapter 1: Opportunity and Risk - What the Future Holds</td>
</tr>
<tr>
<td>19</td>
<td>Chapter 2: A New American Model for Investing in Infrastructure</td>
</tr>
<tr>
<td>27</td>
<td>Chapter 3: Barriers to Putting the New American Model into Practice</td>
</tr>
<tr>
<td>33</td>
<td>Chapter 4: Recommendations for Achieving the New American Model</td>
</tr>
<tr>
<td>34</td>
<td><strong>Recommendation 1</strong>: Emphasize Outreach, Engagement and Education</td>
</tr>
<tr>
<td>39</td>
<td><strong>Recommendation 2</strong>: Establish Broad Enabling Framework</td>
</tr>
<tr>
<td>43</td>
<td><strong>Recommendation 3</strong>: Inventory All Public Assets</td>
</tr>
<tr>
<td>47</td>
<td><strong>Recommendation 4</strong>: Exercise Full Optionality</td>
</tr>
<tr>
<td>52</td>
<td><strong>Recommendation 5</strong>: Simplify the Process</td>
</tr>
<tr>
<td>57</td>
<td><strong>Recommendation 6</strong>: Expand Revenue Options</td>
</tr>
<tr>
<td>65</td>
<td><strong>Recommendation 7</strong>: Create New and Leverage Existing Financial Tools</td>
</tr>
<tr>
<td>78</td>
<td>Conclusion</td>
</tr>
<tr>
<td>81</td>
<td>Appendix:</td>
</tr>
<tr>
<td>83</td>
<td>A. Research Questionnaire</td>
</tr>
<tr>
<td>90</td>
<td>B. P3-Enabling Model State Legislation</td>
</tr>
<tr>
<td></td>
<td>C. Highlighted Infrastructure Case Studies</td>
</tr>
</tbody>
</table>

* All case studies cited within the report are highlighted for reference
As American business leaders, we are committed to increasing investment in our nation’s infrastructure. The condition of roads, bridges, water and wastewater systems, airports and civic buildings, serving communities all across this country, is deeply concerning. But, as with any crisis, we must recognize the incredible opportunities presented. Our council is proof of the willingness among bipartisan political leaders and the business community to come together with a renewed focus and imperative to invest in our nation’s shared future.

The connected infrastructure systems that support households and industry are central to America’s continued economic success and growth. Citizens must be able to live and work in areas with safe roads and bridges, clean water, and easy access to transportation. Businesses must enhance productivity and move goods efficiently to markets around the world to stay competitive. This is possible only with modern, robust, and well-maintained infrastructure.

Our determination to invest, however, is based on more than our businesses’ bottom lines. America is the land of the innovator, and there are unprecedented opportunities to build emerging technologies into our communities, making them safer, healthier, and more connected. Unfortunately, government investments in infrastructure are not keeping pace and private capital has yet to be fully engaged. Complacency and competition for limited resources have led to the neglect of both our nation’s valuable existing assets and the needs of a growing population. We have failed to incorporate new delivery methods that would help communities build, maintain, and operate their infrastructure more seamlessly, with less risk, and at a lower cost.

This report commits business leaders not just to ideas but to action, and in that way, our effort is different from previous work on this topic. The private sector brings access to capital, innovation, and expertise that we are eager to commit to a long-term investment in our nation’s infrastructure, and we will work with the public sector to deploy these resources over the full life-cycle of our nation’s infrastructure assets. However, we acknowledge and firmly believe that every investment must first be guided by a sincere statement of public purpose and fortified with a commitment by all parties to the proposed plan of action. Indeed, partnership between the public and private sectors is the only way to maximize the value of our shared investment.

Let’s get to work!

Sincerely,

Doug Peterson      Susan Story
President and CEO, S&P Global     President and CEO, American Water
Letter from Advisory Group Members

Among the most important challenges facing our nation today is the need to invest in our infrastructure. Indeed, there are few issues that historically, and still now, garner such bipartisan support. Investing in our nation’s roads, rails, bridges, ports, waterways, aviation, and civic buildings creates jobs and prosperity. Over the long term these investments also make Americans safer and healthier, allow our economy to operate with maximum efficiency, and capture innovative technological advances.

The public sector, however, lacks the resources to make these necessary investments. As a result, our infrastructure, the very foundation of our communities and economy, is literally falling apart. The private sector has available capital and expertise to deploy. Yet decades of bureaucratic decision making has created layers of regulatory hurdles, which, together with a fundamental lack of needed data, are making it overly burdensome and cost prohibitive for the private sector to invest. As former mayors and governors, we have welcomed the opportunity to work with prominent U.S. business leaders leading the BPC Executive Council on Infrastructure to develop an approach that is assured to attract private capital to invest in our nation’s most critical infrastructure.

The model put forward in this report will bring stakeholders together to make investments in the public interest; it underscores how future infrastructure decisions must take into account the full life-cycle costs of an asset, allocate risks across various parties involved in a transaction, and rely on strategic partnerships between the public and private sectors. Employing this model in states and municipalities across the country will bring about not only more, but better quality projects, completed quickly to support not only Americans today, but also future generations.

Together, we can demonstrate the leadership and courage needed to improve the infrastructure systems vital to the American standard of living. These are investments assured to have incredible returns. We stand ready to assist in advancing this new approach, acknowledging that it is time for a new American partnership – one that breaks down the barriers to private sector investment and collaboration.

Sincerely,

Haley Barbour
Former Governor

Steve Bartlett
Former Congressman
Former Mayor

Henry Cisneros
Former Secretary of HUD
Former Mayor

Antonio Villaraigosa
Former Mayor

Haley Barbour
Steve Bartlett
Henry Cisneros
Antonio Villaraigosa
Executive Summary

We have an extraordinary opportunity in America — to confront the pressure being placed on our nation’s roads, water systems, ports, airports, and energy grid with available private capital. This report establishes the framework to unite projects that need funding with private capital ready to invest in a transparent system that allocates risks and resources to the public’s benefit.

America is a nation of innovators — we are inspiring new industries through interconnected devices, commercializing suborbital space flight, and advancing cures to life-threatening diseases. Yet if we hope to foster the next generation of entrepreneurs that can push our economy forward and maintain our quality of life, we must invest in our infrastructure. Wise infrastructure investments would create millions of jobs, maintain the health, safety, and security of our communities, and set our nation on track for decades of greater prosperity.

This is a choice between action and paralysis. Not making decisions today has serious consequences for tomorrow. We are already confronting prior mistakes as our infrastructure today is failing us. We are living at risk: driving every day on eroding roadways, questioning whether our water is really safe to drink, and sending our children off to schools built for our parents’ generation. The problem is growing worse. It shouldn’t be this way in a country that for so long has led and inspired the world.
The Challenge We Face: Short-Term Focus Fuels Mounting Liabilities

The investments made 50 to 100 years ago are nearing the end of their useful life. We have no coordinated vision or plan for their replacement. And public agencies have struggled to maintain existing assets or plan for their replacement, let alone to make the investments necessary to support future population growth and economic needs.

The price tag to adequately prepare America for the future is hefty — likely requiring trillions of dollars to upgrade, modernize, and expand our infrastructure. Long-term needs — operations and maintenance, repair, expansion and modernization of infrastructure systems — are too often ignored in favor of a focus on short-term costs.

There are many competing demands for public resources — healthcare, public pensions, and existing debt — that are expected to overwhelm public budgets. If we are to meet our nation’s future needs and preserve our American quality of life, the public sector cannot continue to cover the cost and absorb the risk of our degrading infrastructure alone. We have to act before lasting damage is done to our economy and the next infrastructure-related failure consumes another American community.

The Solution Is Clear: Long-Term Outlook Compels New Model, Delivers More Infrastructure

There is another way. The private sector stands ready to partner and assist — bringing an appetite for risk, necessary capital, and valuable expertise. Investors with hundreds of billions of dollars to deploy are actively seeking infrastructure projects to support.

Unfortunately, there are a number of barriers preventing the investment of private capital into U.S. infrastructure projects. As a result, America is leaving dollars on the table as capital flows to more receptive shores.

Case Studies: Partnerships across the United States

Some state and local leaders in the United States have successfully partnered with the private sector to deliver needed infrastructure improvements. These partnerships include a range of financing mechanisms and risk-sharing approaches. For example:

Pennsylvania will make major strides toward addressing its backlog of bridge repair needs through an innovative approach that bundled more than 550 small bridges into a single procurement. The economies of scale engendered by this approach will allow the private consortium to repair and maintain the bridges for 25 years at less cost than the state would have had to spend to do the work itself.

Facing billions of dollars in courthouse repair needs, the state of California contracted with a private partner to build, operate, and maintain a new courthouse in Long Beach. The state will pay a set amount each year, subject to the private partner meeting specific standards for upkeep of the building. This approach will ensure that the new courthouse building is maintained to a high standard, with many years of life remaining when it is turned over to the state at the end of the 35-year lease.

In Phoenix, the private sector partnered with the city to design, build, and operate a new water treatment plant designed to serve 400,000 homes. Construction was completed in 2007, and the water treatment plant will be operated and maintained by the private partner until 2022, with the option for a five-year extension. The public-private partnership model saved the city an estimated $30 million.
Together the public and private sectors can establish a new model for infrastructure investment that confronts risk and captures value over a project’s full life-cycle — propelling America’s infrastructure into a modern, technologically advanced, and integrated network that enables prosperity long into the future. Our council aims to increase the flow of private capital into U.S. infrastructure projects — by:

- addressing the pervasive underappreciation of future infrastructure liabilities in America;
- encouraging partnerships with the private sector to share risks and maximize the value the public receives from infrastructure assets;
- ensuring communities across the country have tools to make necessary investments.

The challenge before us is enormous, but we have the resources to address it — if we can overcome the barriers that are pushing those resources away.

**Understanding the Barriers**

Private investment in infrastructure is happening around the globe, serving as a major source of capital in countries such as Canada, Australia, and the UK. Yet, here in the United States it is rare, due to a number of unique barriers associated with the American market. We identified three major risks hindering the flow of private capital to U.S. infrastructure: the lack of a project pipeline, political risk, and permitting risk.

**Lack of a project pipeline.** The key barrier is the lack of identified projects that are both attractive to private investors and tied to a clear public benefit. Public agencies, including the federal government, are not conducting the analyses needed to put forward projects that satisfy these criteria, so there are few opportunities for private investment.

**Political risk.** The United States has a well-developed economy, a strong democratic tradition, and a clear legal code; however, competing stakeholders and interests, parochial opposition, and the current lack of political consensus and commitment to long-term investments create political risk. There are many cases where projects have been canceled or delayed for political reasons unrelated to their merits as infrastructure projects. These actions are particularly unsettling to private capital looking to invest in the United States.

**Permitting risk.** Infrastructure projects are subject to various environmental and planning statutes and typically require multiple permits, from many levels of government. The risk that a project will be delayed due to sequential permitting and reviews is one of the biggest barriers to getting projects done. Concerns remain high among private companies that the project they invest in may take years longer than anticipated, adding time, increasing costs, and exacerbating political risks due to unnecessary delays in permitting.

**Achieving a New American Model for Investing in Infrastructure**

We propose a new model for the way we plan, pay for, and deliver infrastructure projects. This model is simple. It begins with ongoing collaboration between government and the private sector. It is transparent to the public, focuses on long-term costs and benefits, allocates risks efficiently, and puts all available resources to work, whether public or private.

The core principles of the New American Model for Investing in Infrastructure are:

- Projects proceed only after public benefits have been identified and clearly stated;
- Infrastructure investment decisions incorporate full life-cycle evaluation, beyond upfront costs;
- Project benefits, costs, and risks are completely accounted for and made publicly transparent;
- The risk of not investing is quantified and compared against the costs of action; and

The core principles of the New American Model for Investing in Infrastructure are:

- Projects proceed only after public benefits have been identified and clearly stated;
- Infrastructure investment decisions incorporate full life-cycle evaluation, beyond upfront costs;
- Project benefits, costs, and risks are completely accounted for and made publicly transparent;
- The risk of not investing is quantified and compared against the costs of action; and
- Public and private sector partners share these risks, costs, and benefits.

The new model will transform both how we invest and how much we invest. It will result in infrastructure investments that meet the country's growing needs and are able to effectively respond to the shifting demands of our nation in the coming century. As more projects are completed through this new model, supported by transparent financial and performance data, the United States will be able to develop a tradeable infrastructure asset class to attract an even greater share of global capital.

This report provides a plan to develop an American infrastructure market that is competitive in the search for investment capital — reducing pressure on public budgets — and successful at getting more projects done.

**Recommendations**

Our recommendations for a New American Model for Investing in Infrastructure rely on the dedication and commitment of actors at all levels of government, and private industry partners. In order for this new model to be met, the following recommended actions must be followed:

**Emphasize Outreach, Engagement, and Education**

Every project should begin with a statement of public value. Stakeholder outreach, engagement, and education throughout project development is central to a project’s success.

We recommend:
- Public and private partners associated with a project assess public value and disclose that information.
- Public and private partners develop a transparent process for public outreach and engagement with continuous opportunities for stakeholder feedback throughout the life cycle of an investment.
- The private sector identify, standardize, and publish project data in an accessible format.
- The private sector work with nonprofits and educational institutions to develop customized training and technical assistance tools for understanding and participating in public-private partnerships.

**Establish Broad Enabling Framework**

Appropriate conditions and transparent expectations must be set for investments to occur; therefore, a viable legal framework needs to be put in place.

We recommend:
- States adopt the Bipartisan Policy Center (BPC) model legislation enabling public-private partnerships which includes:
  - Authorization of the full range of partnerships between the public and private sectors for all types of infrastructure, at all levels of government; and
  - Establishment of an expert coordinating office with the authority to convene multiple agencies, focused on attracting private investment to infrastructure.
- States and localities set up a dedicated development fund to provide financial assistance to meet the upfront costs of public-private partnerships.

**Inventory All Public Assets**

Establishing a standardized inventory of the physical and economic condition of all public assets is critical to understanding and meeting infrastructure needs.

We recommend:
- Federal, state, county, and municipal governments and independent public authorities develop and publish a complete list of all assets owned, including transportation
infrastructure (streets, bridges, stations, ports), water systems, civic buildings (schools, courthouses, convention centers), vacant land, and underutilized real estate, including air rights.

- Those entities develop a complete inventory that includes the physical and economic conditions of each asset with estimates of the cost of maintaining it over its remaining useful life, the cost of replacement, and the potential impact of a failure.

**Exercise the Full Range of Options for Project Delivery and Financing**

Public officials must identify the infrastructure needs they are best positioned to own and operate, which needs could be shared with the private sector, and which needs could be fully transferred.

We recommend:

- States and local governments prioritize projects for investment based on clearly identified, measurable goals.

- State and local governments conduct an “optionality analysis” to match infrastructure projects with the best delivery and financing options.

**Simplify Project Development and Permitting**

Permitting and environmental review, particularly when executed sequentially, is one of the most significant deterrents to private capital investing in U.S. infrastructure projects.

We recommend:

- The federal government, states and localities establish and enforce implementation of simultaneous agency review of projects.

- Public agencies identify all required permits and clearly delineate responsibility and timelines for acquiring them, prior to entering into a project contract.

- Public agencies collect data and publish tracking reports of permitting timelines, making delays transparent, increasing accountability, and improving coordination and communication.

- The public and private sectors work together to develop model forms, standardized documents, and contract language to make it easier for investors to assess candidate projects.

**Expand the Range of Revenue Options Available**

Project sponsors must identify revenue to leverage financing. Where possible the source of revenue should have a nexus to the project, where those who will benefit from the project pay for it with user fees, tolls or explicitly-tied taxes.

We recommend:

- Federal and state action to provide long-term, stable infrastructure funding, derived from the breadth of revenue options available, such as: motor fuel tax, vehicle miles traveled charge, facility use charge, sales tax, rate payer fees, and license surcharge.

- Project sponsors identify a broad range of revenue options, including blending multiple sources, to meet the needs of identified projects.

- Public and private sector leaders maximize the use of emerging funding sources that directly engage the private sector: value capture, naming rights, crowdfunding, and private development capital.

**Create New and Leverage Existing Financial Tools**

Increasing the variety and strength of financial tools will attract new private capital that has not traditionally been invested in infrastructure, while preserving the existing tax-exempt bond market.
We recommend:

- Public and private sectors work together to activate new or broaden use of existing investment vehicles that would stimulate the development of a project pipeline: REITs, MLPs, asset-backed securities, regional infrastructure funds, and pension pools.

- The federal government consolidate credit programs that have been important for private investment into a single infrastructure loan provider open to all types of infrastructure, set funding levels commensurate with demand, and modernize program terms and credit scoring to reflect actual experience and best practices.

- The federal government authorize and expand promising initiatives such as Build America Bonds, QPIBs, and Move America Bonds.

- The federal government conduct an audit of its tax regulations and other infrastructure-related guidance and amend any that create unneeded barriers to private investment in infrastructure.

- The private sector develop benchmarks for infrastructure investments that will lead infrastructure into a tradable asset class.

Our Call to Action

American competitiveness and quality of life depends on continuous investment in public infrastructure. The short-term gains of job creation, efficient transportation, safe drinking water, and harnessed technological advances will be tremendous. Moreover, the long-term gains of a robust market of infrastructure assets attracting substantial capital with reduced risk on public balance sheets, producing a system of interconnected infrastructure that is the envy of the world, are essential.

As American business and political leaders, we call for public and private resources to be put to use to build necessary public infrastructure. We call for an America open for business in the market for global capital. By working together to put the New American Model for Investing in Infrastructure into action, we can create jobs, ensure our businesses can deliver goods to market efficiently, protect the health and safety of our communities, and give our children something to aspire to with investments that capture the cutting-edge technologies and innovations of tomorrow.
December 2, 2016

President-Elect Donald J. Trump
725 5 Avenue
New York, NY, 10022

Dear President-elect Trump:

Congratulations on your successful campaign and election as the President of the United States of America. The US Water Alliance stands ready to work with you to build stronger communities, move our economy forward, and elevate water as a national priority.

The US Water Alliance is a national nonprofit organization dedicating to advancing policies and programs to secure a sustainable water future for all. We bring together diverse interests to identify and advance common-ground, practical, and achievable solutions to solve our nation’s most pressing water challenges. Our membership includes water providers, public officials, business leaders, environmental organizations, community leaders, policy organizations, and water reliant industry leaders including agriculture, commerce, manufacturing, and power.

We believe that investment in our nation’s infrastructure assets is one of the smartest and most important policies that can be advanced by your administration. And, the most important place to start is with water infrastructure. All Americans rely on water, no matter where they live or what they do. When we embrace the true value of water—our drinking water, wastewater, and stormwater systems; the water we use for agriculture, manufacturing, and power production; our lakes and rivers—the full water life cycle can be optimized to drive economic development, maximize societal returns, and build strong communities.

Unfortunately, many of the approaches we have historically used to design, build, and operate our existing water systems are inadequate to meet future needs. The EPA has estimated that $300 billion in wastewater infrastructure investments and $335 billion in drinking water infrastructure investment is needed over the next 20 years. Shifting populations, economic development, investment needs, new energy supply strategies, and changing weather patterns, all threaten to overwhelm the physical infrastructure and management systems that previously met the nation’s water needs. Forward-looking leaders across the country are implementing innovative solutions to address water challenges. Many of those local, regional, and state successes are ripe for widespread replication.

That is why we are pleased to present the following policy priorities for water infrastructure development and investment.

**Policy Priorities**

*Increase Investment in Water Infrastructure*

The US Water Alliance believes that there should be robust funding and financing options that provide the capital needed for safe, reliable, and sustainable water infrastructure. The US Water Alliance supports policies that increase capital investment in water infrastructure projects in the United States—particularly policies that increase funding and expand access to financing tools. Our communities need reliable and affordable access to
both public and private capital markets so that appropriate and responsible investments can be made in water infrastructure. We urge your administration to:

- Provide robust funding for the Clean Water State Revolving Fund and the Safe Drinking Water State Revolving Fund.
- Support the tax exemption for municipal debt vehicles used to fund water infrastructure projects.
- Expand financing options for water infrastructure projects, such as:
  - Fully implementing and funding the Water Infrastructure Financing and Innovation Act.
  - Establishing state or national infrastructure financing authorities including the establishment of a national infrastructure bank.
  - Eliminating the cap on state allocations of private activity bonds for water infrastructure projects.

**Build a 21st Century Water Workforce**
There is a workforce investment opportunity in the water sector, as a generation of workers retire. Policies and programs that promote workforce training across the range of occupations in the water industry—from engineers to plant operators—are needed. We urge your administration to:

- Expand training opportunities in the water industry through the Workforce Investment Act, at the Department of Labor, and other federal agencies.
- Support federal programs that encourage student interest and retention in Science Technology Engineering and Math (STEM) studies.

**Incentivize technological advances in water systems.**
The US Water Alliance believes that technological breakthroughs and innovation can build new market sectors and help more effectively manage water systems into the future. The US Water Alliance supports policies that incentivize, enable, and implement technological advances in the water sector. We urge your administration to:

- Increase funding for research and development of water technologies.
- Foster programs that encourage consumer-driven water conservation technologies.
- Establish investment tax credits for capital expenditures on technologically advanced water systems (waste, reuse, desalination, or others).

**Ensure Water is Available and Affordable**
Since water is fundamental to public health, community well-being, and quality of life, everyone should have a basic level of access to safe, reliable, and affordable drinking water and wastewater service. The US General Accountability Office recently issued a report focused on ten industrial cities and the challenges they face in providing reliable service in the face of economic decline. Nine of the ten cities were found to have rates considered “unaffordable” by the EPA. The US Water Alliance supports policies that will assist communities such as those, by making sure there is shared investment in water systems – from utilities, ratepayers, business, and government. We urge your administration to:

- Establish a program that provides federal relief for lower-income households for water utility expenses.
- Expand funding and innovative financing mechanisms for struggling water and wastewater systems.

**Foster Collaboration to Drive Efficiencies**
The US Water Alliance believes that a secure water future requires local and regional cooperation. The US Water Alliance supports policies that serve as a guidepost for how federal agencies, state capitals, and city halls
can better coordinate how water is managed in the United States for the benefit of regional economies and communities. We urge your administration to:

- Expand funding and support for regional planning and management programs.
- Support for a range of One Water management approaches such as resource recovery, natural infrastructure investment, water reuse, and regional planning and cooperation.
- Establish incentives that encourage cross-agency and cross-sector efficiencies including project or investment bundling.

As a nation, our challenges are great, but our capacity to create solutions has never been greater. That is true across many of our most pressing issues, and particularly in the case of the array of our nation’s water challenges. We look forward to partnering with you on developing some of those solutions and being a resource as you move forward.

Sincerely,

[Signature]

Radhika Fox  
Chief Executive Officer  
US Water Alliance
One Water for America Listening Sessions: Crafting a National Water Strategy
Project Description
Fall 2016

Project Summary

The US Water Alliance, in collaboration with its members and partners, will convene a series of listening sessions to craft a national water strategy to advance a sustainable water future for all. These listening sessions will draw upon the expertise of innovative leaders in regions across the country. The framework that will be co-created through this process will equip local, state, and federal policymakers and stakeholders with an ambitious and achievable agenda that recognizes the critical role water plays in advancing economic prosperity, community well-being, and environmental sustainability. The framework will serve as a call to action to elevate water as a national priority—one that supports and reinforces the important policy work being undertaken by a range of organizations within the water industry and beyond.

Some critical questions—which we will refine with our partners—that will be addressed through the listening sessions include:

- How do we significantly increase infrastructure investments over the next two decades so that we can make meaningful progress in improving our nation’s water and wastewater systems?
- How do we align water infrastructure investment with practices that support thriving and sustainable cities and regions?
- How do we make these investments in a manner that maximizes economic competitiveness, community well-being, and environmental sustainability?
- How can a comprehensive water strategy help us address mega-challenges such as flooding, drought, the degradation of critical waterways, sewer overflows, climate resilience, and social and economic equity?
- How can water policy decisions at the local, state, and federal level better support and enable integrated water management in the United States?
- What are the promising management practices and innovations in water that are being advanced at the local, regional, and state level that federal policy can support and scale?
- What are the policy principles that should guide the next administration to accelerate integrated water resource management and investment in water infrastructure?

Key Activities

- **Craft a Discussion Document.** We will develop a short framing paper to lay the foundation for the listening sessions. The discussion document will outline the pressing water challenges affecting local and regional communities, including aging infrastructure, water quality and quantity challenges,
affordability, and more. The discussion document will pose a series of questions to serve as a launch pad for discussion—intended to inspire, not limit, the dialogues.

- **Convene Listening Sessions.** Listening sessions will be hosted in at least 10 regions across the country to gather diverse perspective on the challenges, opportunities, guiding principles, and promising policy ideas to secure a sustainable water future for all. Each session will convene a cross-section of leadership from the public, private, and nonprofit sectors in guided discussion on how water policy and investments can promote economic prosperity, community well-being, and environmental sustainability.

- **Develop a Recommendations Report.** Through these listening sessions, we will surface the best ideas and thinking from innovative leaders across the country. With the project partners, we will develop a report that outlines a national water strategy. It is our goal to create a document that can serve as a call to action that elevates water as a national priority among public officials and stakeholders at the local, state, and federal level. The document will serve as a valuable resource tool for other organizations advancing key policy initiatives on behalf of the water sector.

- **Educate and Disseminate.** At the conclusion of the listening sessions, we will produce a national water strategy, which will serve as a tool to educate policymakers and other key stakeholders at the federal, state, and local levels. The national water strategy will be released in the first quarter of 2017 with a multi-faceted communications strategy that will continue over the course of the year. The dissemination strategy will be jointly developed with project partners and will include briefings in DC and around the country, earned and social media, and other activities such as webinars.

### Partnership Framework

The US Water Alliance is seeking partners to inform the regional listening sessions and collaborate on the creation of the final report. The partnership framework for this project includes:

**National Program & Funding Partners**

National Program and Funding Partners are deeply engaged in the listening sessions and report development process and are encouraged to:

- Invite key members or staff to participate in each listening session;
- Shape the national report by crafting key themes and review opportunities throughout;
- Shape the outreach, communications, and dissemination strategy; and
- Be prominently identified in all materials as a National Program and Funding Partner.

**Regional Co-Hosts**

Regional Co-Hosts bring their regional expertise and innovation to shape a particular listening session and are encouraged to:

- Collaboratively develop the invitation list and lead local outreach for their hosted listening session;
- Help tailor the listening session agenda for the regional context;
- Review and provide input to the national report;
- Be actively engaged in the dissemination with a focus on spotlighting regional successes; and
- Be prominently identified as Regional Co-Host in the final report.
National Collaborators
National collaborators will be critical partners to the listening sessions by ensuring the sessions represent a wide array of sectors and by providing national amplification of the program and are encouraged to:
- Participate in up to two listening sessions in regions of their choice;
- Provide feedback on an early draft of the final report;
- Receive an advance, embargoed copy of the final report and final policy recommendations; and
- Be identified as a national collaborator in the report.

Schedule for Listening Sessions

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Regional Co-Hosts</th>
</tr>
</thead>
</table>
| August 9     | Northeast Ohio         | ○ Northeast Ohio Regional Sewer District  
○ Cleveland Water Alliance          |
| September 8  | Chicago, IL            | ○ Current/World Business Chicago                                                  |
| September 28 | New Orleans, LA        | ○ Water Environment Federation  
○ Note: Focused on theme of innovation and technology |
| September 28 | New Orleans, LA        | ○ Sewerage and Water Board of New Orleans  
○ Water Environment Federation  
○ Note: Focused on theme of regional collaboration |
| September 29 | Atlanta, GA            | ○ Atlanta Regional Commission                                                     |
| October 18   | Kansas City, MO        | ○ Mid-America Regional Council                                                    |
| October 20   | Ankeny, IA             | ○ Iowa Agriculture Water Alliance                                                 |
| December 5   | Seattle, WA            | ○ Washington State Department of Health  
○ Water Supply Forum                 |
| December 7   | Tucson, AZ             | ○ Tucson Water                                                                    |
| December 8   | Miami, FL              | ○ The Everglades Foundation                                                      |
| December 15  | San Francisco, CA      | ○ Bay Area Council  
○ San Francisco Public Utilities Commission  
○ Santa Clara Valley Water District |
| January 27   | Raleigh, NC            | ○ The Conservation Fund                                                           |
| January 31   | Detroit, MI            | ○ Detroit Water and Sewerage Department                                           |
About the US Water Alliance

The US Water Alliance is dedicated to advancing policies and programs to advance a sustainable water future for all. Established in 2008, the Alliance is a nationally-recognized nonprofit organization which educates the nation on the true value of water and the need for investment, accelerates the adoption of one water policies and programs, and celebrates innovation in water management. The Alliance brings together diverse interests to identify and advance common-ground, achievable solutions for our nation’s most pressing water challenges. Our membership includes water providers, public officials, business leaders, environmental organizations, community leaders, policy organizations, and more. To learn more: http://uswateralliance.org/
A Blueprint to Rebuild America’s Infrastructure  
Creating Over 15 Million New Jobs

America’s physical infrastructure is the backbone of our economy, impacting how we get to work and school, how much groceries cost at the store, the size of our water and sewer bills, and so much more. The availability and quality of infrastructure determines where companies locate and where jobs are created. In short, Americans depend on our nation’s infrastructure every single day.

Yet, despite its critical importance to our lives and our economy, we have allowed our nation’s infrastructure to fall into a state of disrepair. Today, we spend less on infrastructure as a percentage of GDP than at any time in the past twenty years, and the results are plain to see. Every day, Americans get stuck in traffic jams, drive on potholed roads, cross bridges in disrepair, and ride in overcrowded subways. Far too many students attend school in buildings that are crumbling, and millions of Americans lack access to high-speed internet. Local governments are stuck with the impossible choice of allowing water and sewer systems to deteriorate further or raising local taxes.

The American Society of Civil Engineers says we must spend $1.6 trillion above current levels just to get our infrastructure to a state of good repair. Our deteriorating infrastructure already costs the economy close to $200 billion a year, and if we do not make these needed investments now, they will simply cost us more later.

The Senate Democrats’ “Blueprint to Rebuild America’s Infrastructure” would make a historic $1 trillion federal investment to modernize our crumbling infrastructure and create more than 15 million jobs that our economy desperately needs.

Our Blueprint will improve the daily lives of millions of American families by creating a 21st century transportation network, rebuilding water systems and schools, making our electric system stronger and our communities more resilient, and much more. Our Blueprint will invest directly in communities because Democrats know that we can’t fix a problem of this magnitude simply by tolling more highways or privatizing water and sewer system that profit on ratepayers. We will prioritize projects and communities all across the country. We will have robust set-asides for small towns, rural communities, tribal lands, and underserved populations.

At a time when our middle class is struggling, wages are stagnating, and people are working longer hours just to get by, we will create 15 million new jobs. Moreover, these jobs will be in sectors of the economy especially hard hit by the Great Recession and that have been slower to recover, like the construction trades and manufacturing. And, these will be decent paying middle-class jobs that cannot be outsourced.

Instead of undermining American workers, we will adhere to basic principles that should govern all federal infrastructure spending:

- Buy America provisions to rebuild America with American products
- Strong protections for working men and women, like Davis-Bacon prevailing wages
- Strengthened participation of minority- and women-owned businesses
- Accelerated project delivery while adhering to important environmental protections

Lastly, our Blueprint is fiscally responsible, closing tax loopholes used by corporations and super-wealthy individuals to offset associated costs.
Overview of investments that will create 15 million new jobs over the next 10 years:

<table>
<thead>
<tr>
<th>Investment</th>
<th>Funding</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reconstruct Roads &amp; Bridges</td>
<td>$100B</td>
<td>Improve Airports</td>
</tr>
<tr>
<td>Revitalize Main Street</td>
<td>$100B</td>
<td>Address Ports &amp; Waterways</td>
</tr>
<tr>
<td>Expand TIGER</td>
<td>$10B</td>
<td>Build Resilient Communities</td>
</tr>
<tr>
<td>Rehabilitate Water and Sewer</td>
<td>$110B</td>
<td>21st Century Energy Infrastructure</td>
</tr>
<tr>
<td>Modernize Rail Infrastructure</td>
<td>$50B</td>
<td>Expand Broadband</td>
</tr>
<tr>
<td>Repair &amp; Expand Transit</td>
<td>$130B</td>
<td>Invest in Public Lands &amp; Tribal Infrastructure</td>
</tr>
<tr>
<td>Vital Infrastructure Program</td>
<td>$200B</td>
<td>Modernize VA Hospitals</td>
</tr>
<tr>
<td>Rebuild Public Schools</td>
<td>$75B</td>
<td>Provide Innovative Financing Tools</td>
</tr>
</tbody>
</table>

$210 billion to repair crumbling Roads and Bridges, saving the average American family over $1,700 a year.

Rebuilding America’s Roads & Bridges: $100 billion – Creating 1.3 Million New Jobs

**Problem:** According to the Society of Civil Engineers, almost one-third of our nation’s roads are in poor or mediocre condition, and more than 40 percent of urban highways are congested. The current national backlog of structurally deficient bridges is $123 billion and the maintenance backlog of the Federal-aid highway system is over $800 billion. Incredibly, Americans make more than two hundred million trips every day across almost 59,000 structurally deficient bridges. These crumbling and out-of-date roads and bridges have real costs to American families and businesses. Each year our deficient roads and bridges cost Americans an estimated $154 billion, and Americans spend 5.5 billion hours stuck in traffic.

**Solution:** We will provide a major increase in federal funding to repair crumbling roads and bridges on the Federal-aid Highway System, to ensure efficient and safe passenger travel and the movement of freight. Additionally, a portion of this new funding would be available on an incentive basis to encourage States and Metropolitan Planning Organizations to set and achieve ambitious performance goals for improving local infrastructure conditions. We also believe that an infrastructure package should include a bipartisan plan that ensures the long-term solvency of the Federal Highway Trust Fund in order to prevent our roads and bridges from returning to a state of disrepair after this initial investment.

Revitalize America’s Main Streets: $100 billion – Creating 1.3 Million New Jobs

**Problem:** From our largest cities to our smallest towns, communities across the country are struggling to meet the challenges of changing populations and aging infrastructure. Local communities are plagued by congestion, blighted buildings, a lack of affordable housing, and inefficient transportation networks. Too often, jobs are available only in office parks distant from residential neighborhoods, resulting in unnecessarily expensive and time-consuming commutes. In many cases, these problems directly and adversely affect the local economy, job creation and public safety, whether from blighted buildings or from pedestrian fatalities, which increased nearly 10 percent in 2015. There is a $26 billion backlog of physical repairs to remediate health, safety and
other threats in publically-owned housing. Cities and towns have new ideas for how to improve safety, enhance quality of life, generate economic development, address housing challenges, and improve mobility through innovation. Collectively, these local initiatives could transform the nation, one neighborhood at a time. However, too little funding is available to support local efforts to revitalize and modernize communities.

**Solution:** We will make a historic investment in our cities, towns, and rural communities, to address their unique challenges. Federal funding will enable communities to rethink their downtowns, creating places for people to live, work, and thrive. Projects could include safety improvements, congestion reduction, grade crossings, resilient infrastructure projects, intelligent transportation systems, bicycle and pedestrian safety projects, and other locally-determined priorities. Funding could also be used to address housing challenges, remove blighted buildings, or remediate lead and other hazards in the 1.25 million homes where children are at high risk of lead poisoning. Further, funding could be used to support solutions geared toward helping the more than 11.4 million households that pay more than half of their income monthly on rent, including expanding existing tax incentives and other affordable housing federal programs.

**Expand the Successful federal TIGER Grant Program $10 billion – Creating 130,000 New Jobs**

**Problem:** The bipartisan TIGER Grant program has been highly successful in helping States and local communities make multi-modal transportation investments that address congestion, improve safety and expand economic opportunities across the country. However, demand for this program far exceeds available funds, making TIGER one of the most oversubscribed federal programs. In the most recent round, USDOT was able to fund only 5% of the total amount requested by States and local communities, leaving many projects unfunded.

**Solution:** We will significantly increase funding for the highly successful TIGER Grant program. This will provide States and local communities with the means to mobilize transportation projects that the traditional formula grant programs are unable to accommodate. By increasing funding to TIGER, we will enable more highly qualified multi-modal projects to be funded that will improve safety and mobility, fix freight bottlenecks, shorten commutes, expand access to jobs and schools, and generate economic development.

$110 billion to modernize Water & Sewer systems without burdening local communities or raising ratepayer fees.

**Rehabilitating Water & Sewer Systems: $110 billion – Creating 2.5 Million New Jobs**

**Problem:** The vast majority of America’s drinking water and wastewater systems were built over 50 years ago, and in some cities, critical water infrastructure is as much as 150 years old. The effects of this problem can be felt everywhere in America from big cities to small towns. Each year our
country experiences about 240,000 water main breaks, costing cities, towns, and ratepayers over $2.6 billion in losses as a result of leaked and wasted drinking water. Moreover, billions of gallons of raw sewage is discharged into local waterways each year as a result of aging sewer systems ill-equipped to handle modern volumes. According to the EPA, we must invest over $655 billion dollars in our water infrastructure over the next 20 years to keep pace with projected investment needs.

Solution: We will make major investments in the Clean Water and the Drinking Water state revolving funds, and USDA water programs, to address the growing backlog of water and sewer projects. We will also give States new flexibility to provide communities with more grants rather than loans. This will unlock thousands of new water and sewer infrastructure projects without burdening local ratepayers. In addition, we propose decreasing the local matching funds required of states and local governments who simply cannot afford to take on more debt. Finally, we will increase funding for the Water Infrastructure Finance and Innovation Act program that provides federal loans to support large-scale water infrastructure projects with national and regional significance.

$180 billion to replace & expand Rail and Bus Systems, making the daily commute safer & cheaper for millions of Americans.

Modernize America’s Rail Infrastructure $50 billion – Creating 650,000 New Jobs

Problem: Our energy-efficient railroads move more freight than ever, and Amtrak’s ridership has never been higher. Around the nation, Amtrak serves more than 500 destinations supporting the development of state and local economies, connecting communities, and contributing nearly $7 billion to the US economy. In the Northeast alone, each day 750,000 people travel on rail systems from Washington, DC to Boston, contributing $50 billion to our national economy. Yet, much of our nation’s passenger rail infrastructure was built during the New Deal and WWII and each day is falling into a further state of disrepair. In its current state, service disruptions on the Northeast Corridor alone cost the national economy over $500 million per year and a loss of transit service on the Corridor for a single day would cost the US $100 million. While we debate the merits of high-speed rail, countries across Europe and Asia have built vast rail networks that whisk passengers around at more than 150 miles per hour.

Solution: We will invest in critically important passenger and freight rail projects. Specifically, we will provide federal funding for grant programs passed with strong bipartisan support, including: Amtrak, the Consolidated Rail Infrastructure and Safety Improvement program, the Federal-State Partnership program, and Restoration and Enhancement grants. This will improve and grow passenger rail service, enhance the movement of freight by rail, and accelerate the deployment of safety measures like Positive Train Control. More convenient and safer rail service will also help reduce congestion on our roads and airports.
Repairing and Improving Public Transportation: $130 billion – Creating 1.9 Million New Jobs

Problem: Public transit ridership has increased by 37 percent over the past twenty years, nearly double the rate of population growth, but repair, construction and expansion projects have not kept pace with the dramatic increase in demand. The U.S. Department of Transportation estimates there is a $90 billion backlog of repair projects facing the nation's public transportation systems. Decades of heavy use and underinvestment have resulted in decayed infrastructure and aging vehicles that need replacement. These circumstances contribute to significant delays and service outages for transit riders, and the risk of riders and workers being exposed to unsafe conditions is increased. Meanwhile, many subway and bus routes are overcrowded, yet 45% of American households – many in suburban and rural areas – lack any meaningful access to transit. Existing federal grant programs have huge funding backlogs causing significant delays in project delivery and increased construction costs.

Solution: We will invest $90 billion to reverse the national repair backlog: $15 billion to support large, urgent repair projects that address critical safety risks, $30 billion to replace many of the 46,000 buses and 8,000 rail vehicles that will exceed their useful service life by 2025, and $45 billion to increase core formula programs, which support repair projects across the country. Formula investments also support rural transit, tribal transit and specialized transit services for seniors and persons with disabilities. To address overcrowding and ridership growth, we will invest $25 billion to advance subway, light rail, streetcar and bus rapid transit projects that are under development but lack funding and $15 billion to expand existing public transportation facilities, like stations. An infrastructure package should also include a bipartisan plan that ensures the long-term solvency of the Federal Highway Trust Fund, including the Mass Transit Account.

$200 billion for a new Vital Infrastructure Program (VIP) that will direct major federal investments to the most critical national projects.

Thinking Big and Get Major Projects Moving $200 billion – Creating 2.6 Million New Jobs

Problem: Our country has always been a leader in innovative, game changing infrastructure projects. However in recent decades, big, transformative projects that could catapult our economy frequently get left on the planning room floor, because of their size, complexity, or cost. We no longer build the world’s tallest buildings, the world’s fastest trains, or the world’s most efficient highway systems. While other countries have invested in major infrastructure projects, we’ve fallen further and further behind. And it’s not for a lack of ideas – Americans still think big, and we remain global leaders in innovation – but federal investments have not been available to put those ideas into action. Investing in these major projects is an investment in the future of our country, one that will redefine communities and regional economies for generations to come.
A Blueprint to Rebuild America’s Infrastructure
Creating Over 15 Million New Jobs

Solution: We propose creating the Vital Infrastructure Program (VIP) to focus major federal investments on the nation’s most critical and transformative transportation projects. The Vital Infrastructure Program will be a valuable tool in jumpstarting innovative new projects that connect communities from coast to coast. From changing the way we move goods and freight, to modernizing our highways and transit systems, the Vital Infrastructure Program will provide the federal funding needed to make big ideas a reality. This new federal funding program would be available for priority projects with broad eligibility for all modes of surface transportation and significant funding to enable immediate completion of major projects across the nation.

$75 billion to rebuild America’s Schools, ensuring our next generation learns in a State-of-the-Art Environment without raising local property taxes.

Strengthening America’s Public Schools $75 billion – Creating 975,000 New Jobs

Problem: There is an urgent and compelling need to make investments in our nation’s K-12 school facilities in order to ensure safe, healthy and modern learning environments for our students. The Department of Education estimates that half of America’s schools are in need of repairs, renovations, and modernizations at an estimated cost of $197 billion.

Solution: We will invest $75 billion to jumpstart public school modernization. The funds would be distributed on a formula basis to the public schools with the greatest and most urgent needs. Funding will ensure that school construction and modernization projects can get underway quickly without placing an undo financial burden on local taxpayers. We will also reauthorize the Qualified Zone Academy Bonds program and expand its use to help public schools located in economically-distressed and high-poverty communities invest in their school districts.

$65 billion to modernize America’s Ports, Airports, & Waterways helping move people and goods, and building more resilient communities.

Improving America’s Airports: $30 billion – Creating 390,000 New Jobs

Problem: Aviation infrastructure is critical to our national economy. It’s estimated that aviation adds more than $1 trillion in economic activity. Yet, despite how critical airports are to our national economy, investments in our airport infrastructure are significantly behind the estimated need. According to FAA’s latest estimate, over the next five years there will be $32.5 billion worth of airport projects eligible for federal Airport Improvement Program funds, and at current spending levels only $16.5 billion will be available to meet those needs. Additionally, investment in FAA’s own facilities and equipment has fallen by $328 million since 2010, resulting in a growing
A Blueprint to Rebuild America’s Infrastructure
Creating Over 15 Million New Jobs

maintenance backlog. Furthermore, as air traffic increases, congestion, noise and environmental issues will also increase. NextGen technology has made successful strides in addressing these challenges, as well as improving productivity and efficiency in the industry. Unless we continue to invest in NextGen, passengers and the industry won’t realize the full benefits of this critical technology.

Solution: We will make a major investment in America’s airports. Specifically, we will provide a major increase in appropriations to the FAA’s annual facilities and equipment budget, the Airport Improvement Program (AIP), and additional investments to accelerate the continued implementation of the NextGen modernization program, which is deploying technology to improve aviation performance and safety. These investments will not only improve public safety and modernize our airspace, but can also help improve efficiency and productivity in the aviation industry.

Addressing our Ports and Waterways $10 billion – Creating 130,000 New Jobs

Problem: Every day, our ports and waterways handle millions of tons of domestic and international cargo; in 2014 alone, $1.7 trillion worth of U.S. goods moved through our ports. Additionally, the US Army Corps operates nearly 25,000 miles of commercial waterways, contributing to $18 billion of national revenues and over 500,000 jobs, annually. Yet, despite their importance we have continued to under-invest in our nation’s Ports and water infrastructure. Today not a single U.S. container port is in the top 15 container ports globally according to the Journal of Commerce, and the Army Corps of Engineers reports a total backlog of $56 billion in construction projects and $3.24 billion in Operations and Maintenance.

Solution: We will invest $10 billion to support, dredging, maintenance of locks, dams, harbors and other coastal and inland navigable waterway projects, including environmental infrastructure projects, shore protection, and ecosystem restoration. This funding will be available to the Army Corps Construction, Operations & Maintenance, and Investigations accounts, as well as projects supported by the Bureau of Reclamation.

Building More Resilient Communities $25 billion – Creating 325,000 New Jobs.

Problem: Hurricanes, severe flooding, tornadoes and wildfires, destroy housing, local businesses, and public infrastructure, displace families and force thousands of Americans into homelessness each year. Since the 1990s, the frequency and severity of natural disasters in the United States has increased – from an average of 47 per year to 61 in the 2010s, with a high of 97 in 2011. Many of these major natural disasters occur repeatedly in disaster-prone regions. In fact, over the last decade, 30 states have received 10 or more major disaster declarations, and 6 states have received 20 or more during that same period. As these communities strive to recover, rebuilding homes and restoring public facilities are vital. However, limited state and federal resources can only restore this critical infrastructure to its pre-disaster condition and those dollars do little to help communities withstand future disasters.
**Solution:** To help communities better prepare for disasters, we will invest $25 billion to support three individual resiliency programs. The federal funding will be used to (1) support a critical infrastructure resiliency competition; (2) support a new Resilient Communities Revolving Loan Fund; and (3) to support the National Oceans and Coastal Security Fund that supports projects that raise or relocate coastal infrastructure at risk of flooding, and promotes smart coastal development. These three programs will provide high-risk communities with the tools to prepare, prevent, and recover from future disasters in order to minimize the cost of recovery from future events.

$100 billion in new funding to build 21st century **Energy Infrastructure**, upgrade our failing power grid, and lower electric bills.

**Next Generation Energy Infrastructure $100 billion - Creating 1.3 Million New Jobs**

**Problem:** America’s electrical grid consists of an antiquated patchwork of interconnected power generation, transmission, and distribution facilities, some of which date back to the early 1900s. Not surprisingly, the grid suffers from hundreds of avoidable power failures each year, costing our economy between $25 and $70 billion annually. Our grid simply is not up to 21st century challenges like resiliency to extreme weather events and cyber-attacks. Incredibly, the World Economic Forum ranks our electric grid at 24th in the world in terms of reliability, just behind Barbados. In addition, our current energy tax incentives which are intended to promote growth in alternative energy resources, are overly complex and far less effective than they should be. Today, there are 44 different energy tax incentives. More than half are too short-term, while others are targeted to niche technologies, impeding certainty and undermining the ability to stimulate significant, long-term investment in new energy technologies and the infrastructure necessary to support them.

**Solution:** We will invest $100 billion in much-needed power transmission and distribution upgrades, and we will consolidate and reform existing tax incentives for clean, renewable energy. These investments will improve the reliability and resiliency of our electric power grid, protect against cyber-attacks, and prepare for more locally generated renewable energy. In addition, a permanent incentive would be given for electricity generation, transportation fuels, and energy efficiency improvements. The level of incentive would be based on performance: the cleaner the technology or the more energy conserved, the larger the incentive. Technology-neutral energy tax credits would reward clean energy and promote innovation and investment in renewable energy and energy conservation. With this new certainty in the tax code, large investments to support next generation energy infrastructure will be viable, supporting new energy opportunities that will increase efficiency, protect the environment and bring down consumer costs.
$20 billion to Expand High-Speed and Affordable Broadband access for millions of Americans, and Improve Public Safety.

Connecting America’s Communities $20 billion – Creating 260,000 New Jobs

Problem: Access to quality and affordable high-speed internet is no longer a luxury; it is a necessity for 21st century commerce, education, telemedicine, and public safety. High-speed internet can unlock communities’ full economic potential, help rural areas attract new employers, improve healthcare outcomes, and help students succeed. Yet, despite its importance, according to recent Federal Communications Commission (FCC) data, as of January 2016, nearly 40% of Americans living in rural areas and 10% of Americans living in urban areas lack access to quality high-speed broadband. The Organization for Economic and Co-Operation Development (OECD) ranks the U.S. 16th in the world in terms of broadband access, and we are 12th in terms of average broadband speed.

Solution: To close the rural-urban divide, and to push toward ubiquitous access to high-speed broadband, we will invest $20 billion to fund the build out of high-speed broadband in unserved and underserved areas. This funding will be available to projects currently eligible under programs at both the Department of Commerce and the US Department of Agriculture. We also propose expanding the programs to enable grant recipients to use grant funds to deploy various types of infrastructure capable of offering, middle-mile, last-mile wired and wireless broadband access, and adding evaluation criteria in the awards process to ensure that the funding goes to the most effective and efficient uses. Finally, we propose ensuring additional funding is available to help upgrade our nation’s aging 9-1-1 system and other critical infrastructure technology.

$20 billion to address critical infrastructure backlogs on Public Lands and in Indian Country.

Investing in America’s Public Lands & Tribal Infrastructure $20 billion – Creating 260,000 New Jobs

Problem: Despite America’s public lands being a driver of economic growth, the natural infrastructure that makes this possible has been long overlooked and suffers from serious backlogs. The outdoor industry alone contributes $646 billion to the US economy and supports over 6 million direct jobs, yet we have failed to make investments in facilities, roads, trails, and other restoration needs on Federal lands. In 2015 alone, over 307 million people visited National Parks, yet the Park Service has a deferred maintenance backlog of $12 billion. Furthermore, throughout Indian Country there are serious infrastructure backlogs and deficiencies. The Indian Health Service estimates that $10 billion is needed to renovate health facilities. Additional funding is needed to address construction backlogs at tribal and Bureau of Indian Education-run schools, and on Bureau of Indian Affairs roads, bridges, water and sewer systems, and more. By making investments in our
Federal lands and throughout Indian Country, we can ensure that this economic engine continues to be a catalyst of economic development for communities and business in rural America and across the country.

**Solution:** We will invest $20 billion in federal funding in public lands and tribal infrastructure. This includes funding for construction, maintenance and restoration projects at the four Federal land management agencies – the National Parks Service, the US Forest Service, the Bureau of Land Management, and the US Fish and Wildlife Service. We also propose significant federal funding, above current tribal set asides in other programs, for tribal health care facilities, schools, roads, public safety maintenance and other construction needs. Investments of this type have bi-partisan support and this blueprint makes a significant down payment toward the construction backlog on federal and tribal lands.

$10 billion to modernize **Department of Veterans Affairs Hospitals**, Extended Care Facilities, and other infrastructure critical to our nation's heroes.

**Modernizing VA & National Guard Facilities $10 B – Creating 130,000 New Jobs**

**Problem:** Sixty percent of VA’s buildings are 50 years or older and the VA’s rolling facilities assessment shows almost $10 billion in code deficiencies at existing clinics and hospitals across the country. In addition, the VA’s Long Range Strategic Capital Investment Plan estimates a need of $41-$50 billion over a 10 year period to close currently identified gaps in capital infrastructure. Moreover, VA often relies on the States for assistance in meeting the long-term care needs of America’s Veterans. For instance, State Veterans homes provide more than half of VA’s long-term care workload, yet these homes receive less than 15 percent of VA’s long-term care budget. In addition our Army National Guard Readiness Centers are falling further and further behind. Readiness Centers are critical to protecting communities across the country from any number of threats, but a lack of investment threatens to push these critical centers into failing condition within the next 10 years.

**Solution:** To address this backlog and ensure that our Veterans get the modern care they deserve, we will invest $8.5 billion in funding for on-going and high priority major VA construction projects. In addition, we will invest $500 million to help foster partnerships with States to construct high-priority extended care facilities, and $1 billion to help address capital backlogs at domestic military installations, including National Guard and Reserve centers.
A Blueprint to Rebuild America’s Infrastructure
Creating Over 15 Million New Jobs

$10 billion to support the creation of New Innovative Financing tools aimed at unlocking capital and increasing infrastructure investment.

Closing the Infrastructure Financing Gap $10 billion - Creating 1.3 Million New Jobs

Problem: The American Society of Civil Engineers reports that the US would have to invest $3.6 trillion just to bring our existing Infrastructure into a state of good repair by 2020 – a level that far outpaces current federal investments. Estimates are that this continued gap could strip 2.5 million jobs and $4 trillion of gross domestic product from the economy. While this Blueprint will go a long way toward addressing this shortfall, more can and should be done to drive even greater investment into our infrastructure and tap new and innovative pools of potential investments.

Solution: To leverage additional funding and help drive greater investment into our nation’s infrastructure, we will invest in a new infrastructure finance entity, like an ‘I-Bank’, that would unlock pools of capital to provide low-cost loans or loan guarantees for appropriate projects across a broad range of sectors, including transportation, energy, affordable housing, and water infrastructure. It’s estimated that the creation of such a fund with $10 billion in seed money could leverage over $100 billion in private investment over 10 years for infrastructure projects. In addition, we propose protecting and strengthening the existing financing programs available under USDOT and other agencies, including the Railroad Rehabilitation & Improvement Financing (RRIF) program, the Transportation Infrastructure Finance and Innovation Act (TIFIA), and EPA’s Water Infrastructure Finance and Innovation Act (WIFIA). These traditional financing programs have been critical tools in advancing a number of projects across the country. All projects must abide by federal prevailing wage requirements, environmental rules, ‘Buy America’ provisions and other requirements that would apply to a federally-assisted project within a particular infrastructure sector.

This is our blueprint to rebuild America. It will improve the lives of all Americans, and create fifteen million jobs that our economy desperately needs. It will invest directly in communities across America, and will not privatize critically important public assets. It will also provide adequate resources for the Government Accountability Office and agency Inspector Generals to ensure taxpayer funds are not wasted.

It is a realistic plan that we can all get behind. Join us.
Infrastructure Funding & Financing

Water and wastewater treatment is responsible for some of the greatest gains in public health over the past hundred years and are cited as among the top ten health advances that have changed the world. In fact, medical researchers conclude that advances in clean water at the turn of the 20th century are responsible for a 74% reduction in infant mortality rates and a 62% reduction in child mortality rates. Today, diseases such as typhoid fever and cholera have largely been eradicated in the U.S. due to investment in clean and safe water infrastructure. Investments in water infrastructure in the forty years since enactment of the Clean Water Act in 1972 have not only led to these public health gains, but have led to a nearly 50% increase in the number of rivers and streams deemed fishable and swimmable.

However, the recent drinking water crisis in Flint, Michigan and the current drought in the West that has stressed water supplies are raising questions among the public and our nation’s leaders as to whether we are taking these public health and environmental gains for granted. The American Society of Civil Engineers’ 2013 Infrastructure Report Card gives a “D” grade to our clean water infrastructure, and the U.S. Environmental Protection Agency reports that over $600 billion in additional investment is needed to repair and replace water and wastewater treatment systems.

Most of this needed investment will come from ratepayers who already see water and sewer rates rise at approximately twice the rate of inflation each year in order to pay nearly $100 million annually for water and wastewater services. For low-income ratepayers whose wages have stagnated for several decades, affording the investment that is needed is quickly becoming a financial impossibility, with some viewing the affordability of water and sewer bills a significant civil rights issue.

NACWA’s advocacy is focused on ensuring that the federal government remains a strong partner with local communities to ensure Americans have access to clean and safe water through federal investment in programs that provide low-cost (and in some cases, no cost) financing for wastewater infrastructure.

Federal funding and financing programs for which NACWA advocates include:

**Tax-exempt municipal bonds** - For more than a century, tax-exempt municipal bonds have been the most important source of funding for water and wastewater infrastructure projects in the United States. Since 2003, municipalities have issued $258 billion worth of tax-exempt municipal bonds to fund water and wastewater infrastructure—comprising approximately 16 percent of all municipal bond issuance for all infrastructure projects over this period. Maintaining the federal exemption status for investment income derived from municipal bonds is critical to the water sector.

**Clean Water State Revolving Fund Program** - The Clean Water State Revolving Fund (CWSRF) program is a federal-state partnership that provides communities a permanent, independent source of low-cost financing for a wide range of water quality infrastructure projects.

**Water Infrastructure Finance and Innovation Act (WIFIA)** - The WIFIA program will accelerate investment in our nation’s water infrastructure by providing attractive low-interest loans for regionally and nationally significant projects. The WIFIA program was established in the Water Infrastructure Finance and Innovation Act of 2014.

**Bureau of Reclamation’s Title XVI Grant program for water reuse and recycling** - Title XVI of P.L. 102-575, as amended (Title XVI), provides authority for Reclamation’s water recycling and reuse program, titled “Title XVI.” Through the Title XVI program, Reclamation identifies and investigates opportunities to reclaim and reuse wastewaters and naturally impaired ground and surface water in the 17 Western States and Hawaii. Title XVI includes funding for the planning, design, and construction of water recycling and reuse projects, on a project specific basis, in partnership with local government entities.

Additionally, NACWA’s Financial Survey and Index provide an unparalleled look at the clean water sector’s revenues, expense capital need, sewer service charges, rates and more. NACWA works to ensure Congress and the U.S. Environmental Protection Agency (EPA) have access to and understand this critical utility investment information.
Paying for Clean Water
Clean Water for the 21st Century - Rates, Funding and Community Affordability

With an aging infrastructure system, new regulatory drivers demanding more spending, and sewer and water rates now nearing $1,000 per household, a vital dialogue has formed around one very basic question: who will pay for all of this?

The federal government has substantially reduced its funding role, leaving the burden almost exclusively with local governments. At the same time, the political stars may be aligning for a significant new federal infrastructure funding bill. While the vast majority of funds invested in clean water infrastructure will continue to be local dollars, NACWA is committed to ensuring that there continues to be a federal funding presence – but is also focused on exploring other options with the private sector that can successfully leverage private dollars.

- **Advance a Federal Infrastructure Bill** – The 2016 elections have created potential opening for a large infrastructure bill, providing a platform for the new Trump Administration and Congress to find bipartisan agreement. If such a bill moves forward, NACWA will work hard to ensure the highest possible funding level for water infrastructure.

- **Preserving and Increasing the Clean Water State Revolving Fund (CWSRF)** – The CWSRF has been the primary source of federal clean water funding since the end of the construction grants program. It has not kept up with the need and has been repeatedly targeted for cuts in recent years. NACWA continues to press for increased funding to the CWSRF.

- **Water Infrastructure Finance and Innovation Act (WIFIA)** – NACWA believes the WIFIA program is an important new financing option which will allow clean water utilities to leverage federal financial support of needed infrastructure investments.

- **Protecting Tax Exempt Municipal Bonds** – Tax exempt municipal bonds have played a key role in helping municipal clean water utilities secure financing for infrastructure investment. They support tens of billions of dollars in clean and safe water investments annually. NACWA is aggressively defending the tax exemption along with a broad coalition of groups and will push back on any attempt at rolling back or repealing the tax-exemption.

- **Public-Private Partnerships** – In an era of constrained governmental resources, municipal clean water agencies are more interested than ever before in looking to the private sector for financing help. NACWA is supportive of public-private partnership (P3) arrangements when they are to further the mission of public clean water utilities and are prudent for public utility ratepayers.

At the same time, many local governments and their utilities are facing huge affordability challenges. Some have shrinking rate bases, but even those with growing populations are witnessing growing segments of their rate base that are unable to afford the rising costs of clean water. In short, local infrastructure investments are disproportionately impacting the poorest segments of communities’ populations.

Addressing this low income affordability challenge is one of the most critical issues for municipal clean water utilities, and requires two major initiatives:

- **Low Income Rate Assistance** – Utilities have worked hard to establish local community assistance programs, but the extent of the assistance these programs can provide is constrained by limited local funding sources.
The time has come for a national low income rate assistance program that provides a subsidy to the poorest households in a community to help ensure that utilities can set rates that reflect the true cost of clean water services. A national low income water rate assistance program would allow clean water utilities to raise the revenue necessary to meet their infrastructure requirements while also lessening the burden on the poorest households.

NACWA believes the federal government is the appropriate entity to fund this type of program, similar to the federal Low Income Home Energy Assistance Program (LIHEAP) that currently assists low income households in affording residential energy bills and energy-related repairs. Currently, many households in the lowest income brackets are spending well over the 2% of median household income (MHI) figure that EPA has determined is affordable to ensure compliance with federal requirements – an unsustainable situation. Federal support for a low-income program is appropriate since many of the clean water investments made by local communities are needed to meet federal mandates, and it would also reaffirm the federal government’s original commitment under the Clean Water Act to partnering with local governments in achieving clean water.

- Updating EPA’s Affordability Guidance – EPA’s 1997 Affordability Guidance has long been the Agency’s benchmark in determining affordability. This is especially true with federal enforcement actions and consent decrees, which are often the largest drivers of clean water infrastructure that any community undertakes. But the document, which was written in the context of combined sewer overflow compliance, has never been updated and is now grossly outdated and uninformed by modern economic conditions. Most concerning, it continues to rely heavily on MHI as the indicator of affordability.

NACWA has long pushed for revisions to the guidance, and continues to do so aggressively in both a regulatory and legislative context. Although EPA has taken positive steps in recent years to acknowledge, in other contexts, that the guidance should look beyond MHI, updating the guidance is a critical next step. Most importantly, the guidance must be untethered from MHI and must instead evaluate utility financial capability long-term based on a range of indicators.

The challenges of infrastructure funding and affordability concerns facing clean water utilities will only grow. But the municipal clean water sector is well-positioned to meet these challenges with a combination of innovative solutions, local resources, and a unified national advocacy effort to reestablish the federal government as a critical partner in addressing low income affordability needs and ensuring consistent federal investment support. NACWA is, and will continue to be, a leader in this effort and ensure that every community can pay for clean water.
To: Commissioners, Associate and Alternate Commissioners, and Observers

From: Tim Eder, Executive Director

Date: March 3, 2017

Re: Strategic Plan Updates

On the following pages are updates prepared by staff on work done on the Great Lakes Commission’s projects and activities since the 2016 Annual Meeting last October. The updates are organized according to the program areas identified in the recently-adopted strategic plan:

- Water Quality
- Water Management and Infrastructure
- Commercial Navigation
- Economic Development and Waterfront Community Revitalization
- Coastal Conservation and Habitat Restoration
- Aquatic Invasive Species Prevention and Control
- Information Management and Blue Accounting

Each program area includes an objective to be achieved by carrying out a series of strategic actions, which are supported by specific projects and activities the Commission is undertaking, or hopes to undertake moving forward. The Commission’s work since the October Annual Meeting is summarized under each strategic action. An additional update is provided on the Commission’s policy and advocacy activities and recent developments in this area.
**Water Quality**

**Objective:** Identify, promote, and share innovative solutions to water quality challenges in both urban and rural settings, and advance approaches that encourage collective action to protect and improve water quality across diverse landscapes within watersheds.

More information about the GLC’s water quality work can be found at [www.glc.org/work/water-quality](http://www.glc.org/work/water-quality).

**Strategic Actions:**

1. Protect and improve water quality by: leading and partnering on projects; facilitating dialogue and building consensus; and delivering information that improves the region’s ability to measure progress on water quality protection and improvement. Lead the ErieStat project to track progress toward the shared goal of reducing phosphorus into western Lake Erie by 40% by 2025 and begin a drinking water supply pilot as part of the Blue Accounting initiative.

   **ErieStat**
   ErieStat is a pilot project within the Blue Accounting program (see Information Management and Blue Accounting program update) that will provide Indiana, Michigan, Ohio and Ontario with a tool for tracking progress toward the 40% phosphorus reduction goal for the Western Lake Erie Basin (WLEB). A workgroup of state and federal agency representatives and leading academic institutions first met in October 2016 and will work through 2017 to identify initial metrics and data for tracking progress toward the 40% reduction goal. ErieStat has also been recognized as an affiliate workgroup of the Annex 4 Subcommittee, which was established under the 2012 Great Lakes Water Quality Agreement to coordinate binational actions to manage phosphorus concentrations and loadings. Data supporting the selected metrics will be aggregated and presented through an easy-to-understand website intended to provide reliable information to Great Lakes decision-makers and concerned citizens.

   **Great Lakes Source Water Initiative**
   A second Blue Accounting program pilot, the Great Lakes Source Water Initiative (SWI; formerly known as the Drinking Water Supply), will bring together water professionals from around the Great Lakes to identify shared goals for protecting sources of drinking water and use Blue Accounting to measure progress toward those goals. As with ErieStat, the SWI pilot will recommend metrics for tracking progress toward the shared goals and deliver information about progress through a web-based interface that is part of the broader Blue Accounting website. Information delivered from the SWI pilot will focus on source water protection investments and outcomes and will highlight gaps where additional information is needed to measure progress. The information and how it is delivered aims to help Great Lakes leaders better set priorities and allocate limited resources to ensure source water for communities throughout the Great Lakes. Examining source water protection within the framework of the Blue Accounting program also presents as opportunity to develop services for local communities engaged in watersheds- or community-based efforts to contribute data to track progress toward shared Great Lakes goals. Launched in early 2017, the SWI pilot will identify pilot geographic areas in the Great Lakes basin, including one within the Western Lake Erie Basin, to test Blue Accounting services. The project seeks to produce results for public review in early 2018.

   **Michigan Clean Water Corps (MiCorps)**
   The GLC administers the MiCorps program, which funds volunteer water quality monitoring programs; the collection and dissemination of volunteer monitoring data using standardized methodologies; small-scale stream cleanup events; and educational initiatives related to water quality in Michigan. In November 2016 staff convened the 12th annual MiCorps conference at the Kettunen Center in Tustin, Mich., featuring presentations on monitoring and citizen science initiatives as a way to maintain the health of Michigan’s freshwater systems, as well as volunteer training from regional experts. The 2016 conference focused on the use of volunteer monitoring data to inform management decisions and protect and improve water quality.
Great Lakes Tributary Modeling Program
The GLC continues to provide technical and administrative support to the U.S. Army Corps of Engineers (USACE) for the Great Lakes Tributary Modeling Program. GLC staff facilitates communication among the Corps’ three Great Lakes districts (Buffalo, Chicago and Detroit) through participation in quarterly program teleconferences and convenes an annual Great Lakes Sedimentation Workshop. The dates and location for the 2017 sedimentation workshop will be announced in late winter/early spring. The GLC also manages the program website which provides updates and progress reports on special studies, training sessions, models and tools developed under the program.

Lake Michigan Monitoring Coordination Council (LMMCC)
The LMMCC continues to bring together agencies and organizations involved in environmental monitoring on Lake Michigan and the data they collect. During this period staff convened the council’s fall 2016 meeting at the University of Wisconsin-Milwaukee School of Freshwater Sciences. The meeting featured an update on the Lake Michigan Lakewide Action and Management Plan working groups, the status of the Science in the Great Lakes (SiGL) Mapper, an overview of the Great Lakes Mass Marking Program, and presentations on microplastics in the Milwaukee area and monitoring geologic and nearshore dynamics to improve shoreline sustainability. Staff facilitated the LMMCC Executive Committee and conducted regional and national monitoring outreach and communications via the LMMCC listservs. Staff also worked with the GLC communications staff to update the LMMCC website. Staff are planning the LMMCC spring webinar and making early plans for the fall 2017 LMMCC meeting.

2. Protect and improve water quality in urban and urbanizing areas by leading and partnering on green infrastructure projects and related activities, such as the Green Infrastructure Technology Transfer Collaborative, that can create enabling conditions to restore the fractured water cycle.

Green Infrastructure Tech Transfer
With funding from the Erb Family Foundation, the GLC is partnering with Lawrence Technological University to explore the need for and help stand up a stormwater technology transfer collaborative in the Great Lakes basin. An advisory team has been formed to guide the project, which is also guiding the Green Infrastructure Champions Pilot Program (see below). Interviews with more than 35 stormwater professionals from the public and private sectors were recently completed and will provide an initial assessment of needs that will be further scoped and validated through three focus groups in spring 2017 (Syracuse, NY, Cleveland, OH, and Ontario, TBD). The results of the surveys and focus groups will validate stormwater technology transfer needs and identify opportunities for a regional collaborative to support those needs. The premise for a regional stormwater technology transfer collaborative will be presented at a session at the 2017 Great Lakes and St. Lawrence Green Infrastructure Conference in Detroit. The goal is to develop a self-sustaining collaborative, run independently of the GLC and Lawrence Technological University. The one-year project began July 2016 and will run through June, 2017.

Great Lakes Green Infrastructure Champions Pilot Program
Also funded by the Erb Family Foundation, the GLC launched a green infrastructure (GI) champions pilot program in October, 2016. As a complement to the stormwater technology transfer project, the GI Champions pilot program aims to build green infrastructure capacity within small and mid-sized communities across the Great Lakes basin. Two workshops, a small grants program, and a peer-to-peer mentoring network are part of the strategy to achieve that goal. An advisory team, largely comprised of the same individuals on the tech transfer advisory team, has been formed to guide the project. For efficiencies sake, the GLC will hold single meetings of the advisory team to guide both projects. The advisory team has met twice, December 2016 and March 2017. An RFP is under development for the small grants program with intended release summer 2017. Workshop planning is in early stages, with workshops expected to be held late summer/early fall 2017 (locations TBD). The Champions program will run through September 2018.
3. Protect and improve water quality in rural and agricultural areas by leading and partnering on projects and activities that reduce sediment and nutrient loads into Great Lakes basin waters through ongoing partnerships with NRCS, conservation districts, authorities, and agricultural interests. Work will range from administering funds to reduce sediment and nutrient runoff to leading or supporting projects that advance traditional and innovative approaches to manage sediment and nutrient loading in Great Lakes Restoration Initiative (GLRI) priority watersheds and watershed-based solutions across the basin.

**Demonstration Farms Network (Lower Fox River)**
Since its inception in 2014, the Lower Fox Demonstration Farms Network has promoted the adoption of conservation practices that allow local farmers to play an increasing role in reducing nutrients and sediment from farm runoff that drains into tributaries to the Lower Fox River and Green Bay. The project is funded by the GLRI through Wisconsin NRCS. In partnership with both NRCS and the Brown County Land and Water Conservation Department (the contractor to the GLC), the initial suite of four participating farmers was expanded in 2016 with two additional farms for the 2017 crop year. Primarily focused on the promotion of cover crops, including interseeding with cash crops, the project is looking to broaden practices to include advanced grazing techniques utilizing crop stubble and cover crops. Since the last update, the GLC has negotiated modified workplans with NRCS and Brown County that better align roles and enable an accelerated timeframe for the project, which will conclude in September 2017. The GLC continues to manage the website, and coordinate a Project Management Team as well as a project Outreach Committee.

**Great Lakes Sediment and Nutrient Reduction Program**
The GLC administers the Great Lakes Sediment and Nutrient Reduction Program, which provides grants to state and local governments and nonprofit organizations to implement conservation to reduce sediment and phosphorus runoff into the Great Lakes. Funding is provided by NRCS through the GLRI. Six separate agreements with NRCS have provided funding for 80 grants since the program’s inception. The 2017 grant program request for proposals (RFP) was released in February 2017 and was substantially revised from previous years’ programs. The 2017 grant program is being expanded to include all areas of the Great Lakes basin as well as all land uses with critical erosion and nutrient runoff concerns. Also, the 2017 RFP will focus on the installation of permanent conservation practices. The small-scale project dollar limit was increased to $50,000. The 2012 program closed at the end of 2016 and the final report is being compiled.

4. Explore opportunities to support the states and provinces in tackling complex aspects of water quality, including water quality trading and other market-based approaches, leveraging the region's abundant clean freshwater assets to advance more sustainable methods of agricultural production, and linking urban or urbanizing landscapes with rural/agricultural landscapes to improve water quality across entire watersheds. Support the states and provinces in planning and adapting to water quality implications of climate change.

**Erie P Market**
The Erie P Market project was launched in early 2016 through a two-year Conservation Innovation Grant from NRCS (a first award for the GLC from this nationwide grant-making program). During its first year, the project team developed a multijurisdictional framework for water quality trading (WQT) among the three WLEB states of Indiana, Michigan and Ohio. The framework also includes Ontario to lend binational weight to this effort focused on consistent principles for WQT of total phosphorus credits within the WLEB. Modeled on the existing Ohio River Basin project involving Indiana, Ohio and Kentucky, the Erie P Market project seeks to provide another valuable tool in the suite of activities that the U.S. and Canada are pursuing to achieve a 40% reduction in phosphorus loads to the WLEB. In 2017 the project will test the process set forth in the framework through pilot trades between nonpoint and point sources in the WLEB, with a preference for trades that cross jurisdictional boundaries.

**Fox P Trade**
The Fox P Trade project, which tested Wisconsin’s 2013 WQT guidance in the TMDL-limited Fox River Watershed, concluded at the end of 2016. Templates for documents to support phosphorus credit trading were developed and tested through hypothetical trades. Workshops and webinars were held to share progress, teach stakeholders about WQT, and gain feedback on key elements of a trading program. The project culminated in a pilot trade of total phosphorus credits between a farm in the Apple Creek
watershed of Outagamie County and NEW Water (the brand name of the Green Bay Metropolitan Sewerage District), becoming the first water quality trade in a TMDL watershed in Wisconsin. While this initial trade is not necessary for NEW Water to comply with its current Wisconsin Pollutant Discharge Elimination System permit, it lays the groundwork for trading as a future compliance option and demonstrates how the trading process works in a TMDL watershed. The 3.5-year project, funded by the GLRI through Wisconsin NRCS, was a valuable exercise in assisting stakeholders in the watershed and Wisconsin DNR to better understand issues that arise as the guidance is implemented in impaired watersheds. A trading handbook and website tailored to this watershed are key final products. Continued use of the tools and information developed through Fox P Trade will occur under the guidance of the local Fox-Wolf Watershed Alliance.

The GLC is a subcontractor on two GLRI grants awarded in the FY 2014 funding cycle. Both are five-year projects that will run from 2015-2019.

**Targeting Outcome-Based Sediment Reduction in the Lower Fox Watershed**
The GLC is a subcontractor to the Fox-Wolf Watershed Alliance to assist with certain elements of this five-year GLRI-funded project. The goal of the project is to reduce agricultural sediment and nutrient loading to the Lower Fox River and Green Bay by installing conservation practices in key sections of Plum and Kankapot creeks. The project will test innovative practices and monitor the effects of those practices to guide implementation throughout the region. The GLC will assist the project by exploring how water quality trading might be implemented alongside or provide long-term funding for ongoing conservation practices in selected subwatersheds of Lower Fox River. The GLC is also assisting by organizing workshops and webinars to coordinate among GLRI grantees in the three GLRI priority watersheds, specifically to share progress and methods for measuring ecological outcomes. The second webinar-based workshop will be held in spring 2017 to reconvene representatives from GLRI 2014-funded projects in Green Bay, Saginaw Bay, and Maumee River/Bay to provide updates on methods each project is using to measure progress and ecological outcomes. The first meeting of the group was in March 2016.

**Accelerating Outcome-Based Ag Conservation in Saginaw Bay**
The GLC is a subcontractor to The Nature Conservancy (Michigan) to assist with certain elements of this five-year GLRI-funded project. The goal of the project is to accelerate farmer adoption of conservation practices through a strategic agricultural conservation program that is funding a dedicated conservation technician to expedite federal contracts and provide technical assistance to Certified Crop Advisors (CCAs). The project aligns performance-based conservation with the almost $20 million in funding secured under the Saginaw Bay Regional Conservation Partnership Program (RCPP). The GLC will work with the Delta Institute to explore market-based mechanisms to support conservation after federal funding is exhausted. The GLC’s engagement to date has been minimal, with most of the work effort to occur between 2017 and 2019.

5. Address critical water quality challenges, such harmful algal blooms, by facilitating regional forums, including collaboratives, such as the Harmful Algal Blooms (HABs) Collaboratory, and participating in others, such as the Great Lakes Water Quality Agreement’s annexes, to build consensus around shared water quality goals and associated solutions to achieve those goals.

**Harmful Algal Blooms (HABs) Collaboratory**
The GLC is partnering with the U.S. Geological Survey’s (USGS) Great Lakes Science Center to lead the HABs Collaboratory, which is providing a framework for communication and coordination among scientists and between scientists and managers. Since its launch in late 2015, the HABs Collaboratory has made progress in a variety of its subgroups. Accomplishments include completion of an eight-part summer webinar series; facilitating individual “mythbusters” groups (focused on addressing common misconceptions about HABs); an “End of the Field Season” webinar summarizing 2016 bloom conditions across the Great Lakes; coordinating a session at the 2017 International Association of Great Lakes Research conference (with 23 talks and 11 posters); and presentation of a joint webinar with the Invasive Mussels Collaborative. These efforts have brought together researchers, practitioners and others to share the latest science on HABs and to help build our collective knowledge, which can make research results more impactful as our region tackles the challenges presented by HABs in freshwater ecosystems. A public
6. Advocate for refinements to U.S. federal policy and legislation to protect and improve water quality, including the U.S. Clean Water Act, the U.S. Safe Drinking Water Act, the U.S. Water Resources Development Act, and the U.S. Farm Bill.

In December 2016 Congress passed water resources legislation, titled the Water Infrastructure Improvements for the Nation (WIIN), that included a variety of provisions related to water infrastructure, drinking water security, commercial navigation, the Great Lakes Restoration Initiative and other programs of interest to the Great Lakes. See the Policy Coordination and Advocacy update below for additional details.

Water Management and Infrastructure

Objective: Ensure that the waters of the Great Lakes and St. Lawrence River basin continue to support the needs of communities, businesses, industries and ecology; are protected from development impacts, pollution, climate change and other stressors; and are managed in a balanced and sustainable manner for the use, benefit and enjoyment of people today and future generations.

More information about the GLC’s water management and infrastructure work can be found at www.glc.org/work/water-management.

Strategic Actions:

1. In partnership with the Conference of Great Lakes and St. Lawrence Governors and Premiers, support decision-making and measure progress under the Sustainable Water Resources Agreement and Water Resources Compact by compiling, interpreting and disseminating consistent water withdrawal, diversion and consumptive use information; supporting the cumulative impact assessment called for under the Compact and the Agreement; and providing information on regional trends and state and provincial programs, practices and policies related to water use and conservation.

Great Lakes-St. Lawrence River Regional Water Use Database

Through a cooperative agreement with the Conference of Great Lakes and St. Lawrence Governors and Premiers, the GLC continues to manage the Great Lakes-St. Lawrence River Regional Water Use Database under the Great Lakes and St. Lawrence River Water Resources Compact and Sustainable Water Resources Agreement. In this capacity, the GLC works with its member states and provinces to collect annual water use data and issue annual water use reports and interim cumulative impact assessments. The GLC and the Conference work together to continuously improve the quality and usefulness of the database. A meeting of the region’s water use managers was convened in August 2016 to review and update processes and protocols for reporting and to explore opportunities to develop complementary information, such as estimation of consumptive water-use and demand forecasts for key water use sectors. Staff continue to work with water managers across jurisdictions to develop a shared understanding of methods used to estimate consumptive use and will publish a summary report of findings later this year. The GLC compiled state and provincial water use data and associated metadata through its water use data management portal for the 2015 annual water use report, which was completed and presented to the Regional Body and Compact Council in December 2016. Water use reports and data for previous years are available on the GLC website. See http://glc.org/work/water-use
2. Lead and engage in the development and dissemination of data and information necessary for implementing drinking, storm and wastewater management programs that identify critical needs and advance solutions to the benefit of public health and safety, water infrastructure and delivery, ecosystem health and water quality.

As part of the Great Lakes Blue Accounting program, the GLC has established a Source Water Initiative to establish goals and metrics for the desired outcome of “a safe and sustainable domestic water supply.” See the Water Quality Program update for more details.

3. Identify and advance solutions to water management and infrastructure challenges by facilitating forums, initiatives and partnerships, including the GLC’s working group on water infrastructure.

**Clean Water Infrastructure and Services Working Group**

At its 2016 annual meeting the GLC adopted a resolution, *Providing and maintaining clean water infrastructure and services in the Great Lakes Basin*, that recognizes the challenge that aging water infrastructure poses to providing safe and sustainable drinking water and managing wastewater and stormwater. In previous resolutions on drinking water infrastructure and integrated water management, the GLC further recognized the need to integrate drinking water, wastewater, and stormwater infrastructure, invest in green infrastructure, and increase federal water infrastructure funding. All three resolutions call for the Great Lakes Commission to explore or establish a working group to address these issues. In consultation with the GLC Board of Directors, staff are working to launch a water infrastructure working group in 2017 to address water infrastructure issues. In December 2016 the GLC’s member jurisdictions were asked to appoint representatives to the working group. Staff are waiting for additional representation to launch this group. General funds will be used to support the effort until additional funds are secured.

4. Raise awareness of the fundamental value of water and the need for infrastructure improvements by advocating for federal legislation and funding to support and accelerate drinking, storm and wastewater infrastructure improvements through the Clean Water and Drinking Water State Revolving Fund programs and other water management programs and by promoting the benefits of integrating water delivery and wastewater management services to the states, provinces and municipalities in the region.

It is anticipated that the **Clean Water Infrastructure and Services Working Group**, described above, will address this priority in part.

**Advocacy for Clean Water and Safe Drinking Water State Revolving Fund Programs**

The GLC continues to convey to Congress the critical need to support level or enhanced funding for the Clean Water and Drinking Water State Revolving Fund programs. These programs are featured in the GLC’s 2017 federal priorities statement as well as a more detailed statement on water infrastructure priorities for the Great Lakes region that was released in early March. For additional details, see the Policy and Advocacy update below.

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**Commercial Navigation**

**Objective:** Improve the efficiency, competitiveness, security and sustainability of the Great Lakes-St. Lawrence River maritime transportation system to support the regional and national economies of the United States and Canada.

More information about the GLC’s commercial navigation work can be found at [www.glc.org/work/commercial-navigation](http://www.glc.org/work/commercial-navigation).

**Strategic Actions:**

1. Collaborate with the Regional Maritime Entity and other stakeholders to support implementation of the governors’ and premiers’ Strategy for the Great Lakes-St. Lawrence River Maritime Transportation System, with a focus on establishing a maritime careers portal, maintaining the maritime asset inventory, managing data and information to track progress in implementing the strategy, and aligning data collection and reporting with the Blue Accounting initiative.
Support for the Governors’ and Premiers’ Maritime Strategy

The Conference of Great Lakes and St. Lawrence Governors and Premiers has requested that the GLC support implementation of the new maritime strategy, with a focus on establishing a maritime careers portal, maintaining an inventory of maritime assets, and managing data and information to track progress under the strategy. The GLC has convened a data working group with representatives from the states and provinces to assist with these tasks and presented to the new Regional Maritime Entity at its first meeting in late September 2016 in Montreal and in several subsequent conference calls with the entity. The data working group was convened in October and a plan for updating the maritime asset inventory was presented and discussed. GLC staff are presently working with the data working group to collect data from the jurisdictions. The data collection and quality control process will be completed in the spring and the updated maritime asset inventory and port traffic data will be compiled in advance of the governors’ and premiers’ meeting in the fall.

GLC staff have done research and conducted interviews with more than a dozen maritime entities to gather information, assess needs, and solicit recommendations for a maritime careers portal. Initially, this will take the form of a website with a comprehensive aggregation of information on ship-side maritime careers in the Great Lakes, including background on the field, links to educational institutions, job types, training and certification requirements, etc. An initial website will be established by spring and reviewed with maritime stakeholders, after which it will be refined and placed online. The GLC will explore opportunities to expand the website with new features (e.g., job postings) and associated activities, such as the potential to implement a “military to maritime” outreach program to recruit military retirees to enter the maritime field in the Great Lakes.

The GLC is in the process of leveraging funding to manage data and information to track progress under the strategy as a maritime pilot project within the Blue Accounting program, similar to the other Blue Accounting pilots discussed above. This is to be considered an “advance” on funds that the staff, together with Commissioners and industry, will need to raise to fully execute the initiative. This will require close collaboration with the Regional Maritime Entity to agree on shared goals for the Great Lakes Maritime Transportation System, identify measures of progress toward those goals, secure the necessary data and information, and other tasks.

A key challenge will be to secure the resources needed to build capacity to sustain a long-term program of activities in support of the Great Lakes Maritime Transportation System and the recommendations in the governors’ and premiers’ regional strategy.

2. In collaboration with the Regional Maritime Entity and other stakeholders, identify and advocate for priorities to maintain and strengthen the Great Lakes-St. Lawrence River maritime transportation system, including allocating funds from the Harbor Maintenance Trust Fund; constructing a new large lock at the Soo Locks; dredging to maintain authorized depths of channels and harbors and additional depth needed in critical areas; repairing and investing in aging navigation infrastructure; ensuring adequate icebreaking capacity; developing sustainable strategies for managing dredged material; and supporting the development of technologies to improve the system’s environmental performance.

Great Lakes Priorities in the Water Resources Development Act

The GLC has advocated with Congress for provisions in WRDA legislation that support the Great Lakes Navigation System, including appropriation of all funds collected for the Harbor Maintenance Trust Fund, allocation of funding for the Great Lakes, and continued study of building a new large lock at the Soo Locks. The water resources legislation passed by Congress in December 2016 addressed several of these priorities. See additional details in the Policy and Advocacy Program report below. Priorities for Great Lakes navigation infrastructure were included in the GLC’s statement on water infrastructure needs released in March, with a major focus on the need for a new Soo lock.

Recycling of dredged material in the Great Lakes

In 2015 the GLC partnered with the University of Wisconsin’s National Center for Freight and Infrastructure Research and Education (CFIRE) on a project to explore the concept of recovering and recycling dredged material from confined disposal facilities (CDFs). The project was completed in 2016.
3. Convene or participate in regional partnerships, forums and initiatives related to the Great Lakes-St. Lawrence River maritime transportation system, including the Regional Maritime Entity, Great Lakes Dredging Team, Great Ships Initiative, and the Great Lakes Small Harbors Coalition.

**Great Lakes Dredging Team**

The GLC continues to serve as secretariat to the Great Lakes Dredging Team (GLDT), which works with state and federal agencies and industry partners to maintain navigation access to Great Lakes ports and harbors while pursuing sustainable and environmentally responsible dredging operations and management of dredged material. The GLDT held its semiannual meeting in the form of a webinar on December 8, 2016. More than 45 people participated on the webinar. The GLC also produced the fall 2016 issue of the GLDT newsletter the *Great Lakes Dredging Dispatch*, which included articles on the WRDA bill, a summary of a panel that was held at the 12th Annual Great Lakes Restoration Conference in Sandusky, Ohio, in September 2016, and an update from GLDT members. The GLDT’s 2017 annual meeting will be held May 22-23 in Duluth, Minnesota.

**Great Ships Initiative**

GLC Executive Director Tim Eder is a member of the Great Ships Initiative (GSI) Advisory Committee, which provides advice to GSI leadership on program direction and activities. The GLC worked with the GSI to plan a Great Lakes ballast water management workshop in November 2016. See the Aquatic Invasive Species Prevention and Control program update below for details.

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### Economic Development and Waterfront Community Revitalization

**Objective:** Support the efforts of the states and provinces – in collaboration with federal agencies, local communities, and nongovernmental stakeholders – to restore and revitalize waterfront areas and advance policies, programs and funding to leverage water resources to support a strong regional economy and high quality of life.

More information about the GLC’s economic development and waterfront community revitalization work can be found at [www.glc.org/work/economic-development](http://www.glc.org/work/economic-development).

**Strategic Actions:**

1. Support research, disseminate information, and collaborate with regional leaders to quantify the economic value of Great Lakes water resources, the return on investments in environmental restoration and water-related infrastructure, and the ecosystem benefits and services generated by the Great Lakes, and facilitate a cooperative, regional approach to advancing the “Blue Economy.”

**Understanding and Advancing the “Blue Economy” in the Great Lakes**

GLC staff are engaged in discussions with several partner organizations to define and address key questions related to the “Blue Economy” and the historic and current value of fresh water in the Great Lakes region, including quantifying the value of Great Lakes water resources and their role in advancing business growth and economic development; the value of abundant fresh water as a strategic asset to companies and capital markets; how the region can leverage fresh water to attract new companies and industry clusters; and the associated policy implications for investing in water resources. In November GLC staff met with staff from the Federal Reserve Bank of Chicago’s Detroit Branch to explore opportunities to collaborate in addressing these issues. Discussions are also underway with faculty at Central Michigan University and the University of Michigan on research opportunities in this area. These discussions are ongoing and we hope to develop a suite of specific actions and research themes to pursue in collaboration with other partners.
IAGLR Symposium on Great Lakes Areas of Concern
GLC staff are serving on a steering committee that is organizing a symposium that will review achievements and lessons learned from the Great Lakes Areas of Concern (AOC) program, to be held as part of the 2017 International Association for Great Lakes Research (IAGLR) conference being held May 15-19 in Detroit, Michigan. GLC staff are leading the session on “life after delisting” and assessing ecosystem services related to AOC restoration.

Study of Socio-Economic Benefits from Cleanup Efforts in the Muskegon Lake AOC
As part of its new regional habitat restoration partnership with NOAA (described in the Coastal Conservation and Habitat Restoration section below), the GLC is coordinating a study of socio-economic benefits from restoration efforts in the Muskegon Lake AOC in Michigan. The study will be conducted by faculty with Grand Valley State University (GVSU) and will complement and update a similar study completed in 2011 by GVSU that projected a 6-to-1 return on investment from the $10 million NOAA-Recovery Act funded habitat restoration project for Muskegon Lake coordinated by the GLC. The new study is expected to be completed in early 2018.

2. Support the work of the Conference of Great Lakes and St. Lawrence Governors and Premiers’ regional economic task force, and collaborate with other partners such as the Council of Great Lakes Industries and the Great Lakes Metro Chambers Coalition, to strengthen water-related infrastructure, industries and commerce and facilitate a cooperative approach to improve regional economic performance and competitiveness.

GLC staff are engaged in ongoing discussions on how to best support related initiatives. Staff with the Council of Great Lakes Industries are working with the GLC to explore opportunities to advance the “Blue Economy,” as discussed previously.

3. Support implementation of the GLRI and other regional programs to clean up and restore waterfront areas, and advance policies, funding and information exchange to assist the states, provinces and local communities in strategically leveraging water resources to strengthen local economies and provide benefits for residents and visitors.

Communicating with U.S. EPA on State Engagement to Support GLRI Implementation
Supporting the GLRI – including continued funding and legislative authorization by Congress – continues to be a top priority for the GLC. Over the past year the GLC has coordinated communications from the Great Lakes states to U.S. EPA regarding better communication, coordination and funding support to the states to support GLRI implementation. In 2015 U.S. EPA proposed a new approach to funding state support to the GLRI and broader Great Lakes management efforts. Responding to state concerns communicated by the GLC, the U.S. EPA administrator invited the states to participate in quarterly meetings with the federal Regional Working Group regarding work under the GLRI. Following extensive discussions among the states, the GLC sent a letter to the administrator in August 2016 proposing a revised formula for state capacity funding for the GLRI and related Great Lakes programs. The letter emphasized that state capacity funding is essential to carrying out state responsibilities but has not been adequate to keep up with the increasing workload. In December U.S. EPA responded with a revised formula for providing state capacity funding for the AOC and LaMP programs. While the impacts vary from state to state based on previous funding levels, the revised funding formula appears to provide more funding, or maintain level funding, for most of the states. The GLC will continue to coordinate the states’ collective views to U.S. EPA to ensure successful implementation of the GLRI and other Great Lakes programs.

Support for the Statewide Public Advisory Council for Michigan’s AOC Program
GLC staff assist the State of Michigan in supporting the Statewide Public Advisory Council for Michigan’s AOC Program. Staff attended the fall council meeting in October and provided updates on GLC activities, including policy and advocacy efforts in support of the AOC program.

Support for the 2017 Annual Conference for the U.S. Great Lakes AOC Program
GLC staff is assisting in planning and convening the 2017 Annual Conference for the U.S. Great Lakes AOC program, sponsored by U.S. EPA and the Michigan Dept. of Environmental Quality and being held
March 29-30 in Grand Rapids, Michigan. The conference website with the agenda and other details is at https://www.epa.gov/great-lakes-aocs/2017-great-lakes-areas-concern-conference.

4. Advocate with Congress and federal agencies for programs, policies and funding that support state and local efforts to clean up and revitalize waterfront areas, including the GLRI, Coastal Zone Management Act, National Sea Grant College Program, and brownfields redevelopment programs, and assist in effectively implementing these programs and linking them with state and provincial priorities.

**Waterfront Community Revitalization and Resiliency Act**
The GLC continues to explore opportunities to support state and local efforts to revitalize waterfront areas, particularly those benefiting from restoration work under the GLRI. In July the U.S. Senate passed the Waterfront Community Revitalization and Resiliency Act, sponsored by Wisconsin Sen. Tammy Baldwin. The bill creates a voluntary Resilient Waterfront Community designation within the U.S. Department of Commerce; establishes a Resilient Waterfront Communities network; and provides technical assistance to communities to support waterfront planning and development. It is national in scope but is especially important for the Great Lakes region. The bill was passed as part of the Senate version of water resources legislation, but was dropped when the final House-Senate version was adopted. Sen. Baldwin plans to reintroduce the bill and the GLC will support it and call for a House companion. Building on its longstanding work supporting AOC cleanup efforts, coastal zone management and related activities, the GLC hopes to advance continued progress in revitalizing waterfront communities in collaboration with other partners.

5. Collaborate with other water-related commissions in the U.S., Canada, and abroad to share information, exchange strategies, and advance common goals directed at solving problems affecting water resources and leveraging them as vital regional assets.

**“Tri-Commission” Coordination**
The GLC continues to collaborate with the Great Lakes Fishery Commission and the International Joint Commission on periodic “Tri-Commission” discussions to share information, identify common priorities, and communicate collectively with U.S. EPA and other parties on Great Lakes issues. Efforts have been focused on four topics of mutual interest: operationalization of indicators (relates to Blue Accounting); hydrocarbon transport; ballast water; and nutrients; and two process oriented-topics: outreach and education related to LAMPs; coordination between the 3 Commissions and EPA/EC/the Parties. GLC prepared coordinated on delivery of talking points for December 2016 Summit (a Summit between the Parties and the three commissions occurs every three years under the GLWQA). Those remarks highlighted our collaboration on the six topics and also reflected on institutional relations between the three commissions and the Parties, looking back and to the future.

**Coordination with other Water Commissions**
Substantial potential exists for the GLC to collaborate with other water-related commissions, particularly those involving the Great Lakes states, to advance common priorities. Executive Director Eder attended and presented at the annual meeting of the Interstate Council on Water Policy, a coalition of water commissions, in October. The GLC is evaluating additional opportunities to advance this objective.

**Coastal Conservation and Habitat Restoration**

**Objective:** Conserve coastal ecosystem functions and values that contribute to the diversity, resilience and economy of the Great Lakes-St. Lawrence River basin by protecting natural communities that sustain populations of desirable fish and wildlife species; restoring degraded areas; and managing coastal resources to improve ecosystem services while supporting sustainable economic development.

More information about the GLC’s coastal conservation and habitat restoration work can be found at www.glc.org/work/habitat.
Strategic Actions:

1. Lead and support regional programs that restore, protect and manage valuable habitat and water resources through implementation of the NOAA-GLC Regional Partnership in Areas of Concern, and in coordination with U.S. EPA, NOAA, the states and provinces, and local organizations.

   **NOAA Regional Partnership to Support Habitat Restoration in Areas of Concern**

   The GLC is leading two NOAA Regional Partnerships under the GLRI to support habitat restoration in Great Lakes Areas of Concern (AOC). Since 2013 more than $29 million has been allocated for 13 habitat restoration projects in the St. Marys River and Muskegon Lake AOCs in Michigan, and the Buffalo River AOC in New York. In August 2016 the GLC was awarded a new NOAA Regional Partnership with the potential to administer up to $40 million over five years for AOC habitat restoration projects. To date, $8 million has been awarded under the 2016 Partnership to support habitat restoration in the Muskegon Lake AOC; a socio-economic study on the benefits of restoration; and communication videos about NOAA’s work in Great Lakes AOCs. Additional projects to be supported by the partnership are being identified by NOAA in consultation with U.S. EPA, the states and local AOC leaders. Ongoing restoration projects funded under the NOAA-GLC partnership include:

   - **St. Marys River AOC:** $9,441,749 for the Little Rapids Restoration Project to restore 70 acres of river rapids and aquatic habitat, in partnership with the Chippewa County Road Commission. Construction of the new 600-foot bridge to improve habitat is complete, follow-up plantings and ecological monitoring will occur in 2017.

   - **Buffalo River AOC:** $6,276,558 for eight restoration and design projects that will restore 6,320 linear feet of shoreline habitat, 10.67 acres of riparian habitat and 3.31 acres of invasive species management in partnership with the Buffalo Niagara Riverkeeper. These projects are in various stages of construction: two sites are complete and in the monitoring phase and the other six are in the design phase with major construction anticipated during summer 2017.

   - **Muskegon Lake AOC:** $21,822,519 for four restoration projects that will restore 7,011 feet of shoreline, 65.3 acres of emergent wetland, 44.6 acres of open water wetland, and 27.9 acres of fill removed (272,228 tons) in partnership with the West Michigan Shoreline Regional Development Commission. New funding allocated in August 2016 will complete the final habitat restoration project for the Muskegon Lake AOC; completion of all partnership projects is anticipated to lead to the removal of the AOC’s habitat-related beneficial use impairments. Three projects are currently being implemented with two undergoing major construction; the most recently funded project is currently being designed. GLC staff also finalized sub recipient agreements for the 2016 Partnership projects. Construction is anticipated to be completed in 2017 and 2018.

   As part of the 2016 NOAA Regional Partnership, the GLC is leading a communications project using a solutions journalism approach to explore the topic of AOC habitat restoration. This project highlights NOAA and GLC and promotes the impact of our partnership, as well as the impact the work is having on the quality of life of the affected communities. This effort has resulted in a video series showcasing projects in the Muskegon Lake and St. Marys River AOCs and will be released in 2017 along with supplemental print stories. The videos on the Muskegon Lake Habitat Restoration Projects and the St. Marys River-Little Rapids Habitat Restoration Project are available on NOAA’s YouTube channel at [http://bit.ly/AOCvideos](http://bit.ly/AOCvideos).

   GLC staff participated in the Restore America’s Estuaries Conference in December and presented information about the 2011 Muskegon socio-economic study that showed a 6-to-1 return on restoration investment and the 2017 follow up study.

   GLC staff also held meetings and coordinated with state agency staff and local AOC leaders in New York and Ohio to discuss upcoming AOC opportunities with funding under the new 2016 Partnership.

2. Elevate awareness of coastal conservation issues among decision-makers, managers, researchers and the public by convening meetings, coordinating action and developing communication products such as websites, webinars, and publications.
Joint Workplan Activities with the USGS-Great Lakes Science Center

The GLC is partnering with federal agencies to facilitate communication and coordination between states and federal research laboratories. GLC staff, in cooperation with staff from USGS, are engaged in multiple activities outlined in the fourth annual joint workplan under a five-year Memorandum of Understanding between the USGS-Great Lakes Science Center and the GLC. The joint workplan includes the following three funded initiatives (detailed updates are provided elsewhere in this workplan update):

1. Phragmites (Great Lakes Phragmites Collaborative, Collaborative for Microbial Symbiosis and Phragmites Adaptive Management Framework)
2. Nutrients and Harmful Algal Blooms (HABs Collaboratory)
3. Invasive Mussels Collaborative

GLC and USGS staff met in February to initiate development the 2017 joint workplan and to discuss development of a new cooperative agreement to continue these initiatives and future opportunities.

3. Explore and develop data and information-sharing opportunities to support ongoing coastal wetland restoration prioritization, contribute to decision-making and measure progress on coastal conservation and habitat restoration across the region.

Mapping Avian Resources in the Great Lakes

The third phase of Monitoring and Mapping Avian Resources Over Selected Areas of the Great Lakes is underway with a $260,000 grant from the U.S. Fish and Wildlife Service. During phases 1 and 2 the GLC coordinated aerial bird surveys over selected areas of lakes Michigan, Huron, St. Clair and Erie, with more than 1.8 million bird observations collected from 2012-2014. In Phase 3, previously collected data will be used to develop a set of over-lake models for individual bird species that will be relevant to natural resource managers. The GLC is leading a data and information needs assessment directed at wildlife and natural resource management. A staff member attended the 2016 State of Stopover Symposium held in Milwaukee, WI, in October 2016, and connected with interested stakeholders from the Great Lakes region. A poster on the project was also presented at the “Restore America’s Estuaries / The Coastal Society” meeting held in New Orleans, LA, in December 2016.

Adaptive Management Framework for Phragmites (PAMF)

The GLC is partnering with USGS to develop an adaptive management framework for the non-native plant Phragmites. The adaptive management approach will help improve the management of Phragmites through increased management efficiency and reduced uncertainty associated with treatment options, contributing to the restoration of ecologically resilient and diverse ecosystems at both the local and regional scales. With funding through the USGS, the GLC hired a program specialist to provide regional coordination for this program, provide communication and outreach and engage state and federal natural resource managers and other partners. Additional details are provided in the aquatic invasive species program update below.


Great Lakes Landscape Conservation Cooperative

The GLC sits on the steering committee of the Upper Midwest and Great Lakes Landscape Conservation Cooperative and participates on the Coastal Conservation Working Group. The Steering Committee met in May and decided to embrace Blue Accounting as the framework for an information platform to mark progress toward habitat and species conservation goals. The GLC cooperates with other federal partners, including NOAA, USGS and the U.S Army Corps of Engineers on habitat and coastal projects and programs.

5. Advocate for legislation and funding for federal programs, policies and laws, such as the GLRI, Great Lakes Fish and Wildlife Restoration Act and the Farm Bill, and support their effective implementation and alignment with state and provincial priorities.
Great Lakes Fish and Wildlife Restoration Act and Great Lakes Fishery and Ecosystem Restoration Program

In December 2016 Congress reauthorized the Great Lakes Fish and Wildlife Restoration Act and the Great Lakes Fishery and Ecosystem Restoration Program as part of the larger water resources bill. The GLC supported these provisions in letter to the relevant congressional committees and to the Great Lakes Congressional delegation. For additional details, see the Policy and Advocacy update below.

Aquatic Invasive Species Prevention and Control

Objective: Prevent the introduction and spread, and when necessary, advance the management and control of aquatic invasive species that are or have the potential to negatively impact water resources or the economy of the Great Lakes-St. Lawrence River basin.

More information on the GLC’s aquatic invasive species prevention and control work is available at www.glc.org/work/invasive-species.

Strategic Actions:

1. Develop and promote communication products and services, including websites, webinars, and publications (e.g., Great Lakes Aquatic Invasions) that provide AIS information and advance progress on AIS prevention and control.

Great Lakes Aquatic Invasions Publication

The GLC continues to work with members of the Great Lakes Panel on Aquatic Nuisance Species (GLP) to revise, update and reprint the Great Lakes Aquatic Invasions booklet, last published in 2007. Draft content for the updated booklet is currently under review by GLC staff and GLP members. The group is aiming to have the updated booklet available in 2017.

2. Develop and promote the use of adaptive management frameworks and data and information integration platforms in order to support decision making (including evaluating costs and benefits) and measure progress on AIS prevention and control across the region.

Great Lakes Blue Accounting – AIS Pilot

GLC AIS program staff are working with staff at The Nature Conservancy to develop and implement the AIS pilot of the Great Lakes Blue Accounting program. The pilot is focused on developing metrics and reporting progress on regional goals for AIS prevention and control. The project team presented a proposed approach for the AIS pilot to the GLP at their fall meeting and the GLP is currently considering how to engage in the effort. Initial outcomes are anticipated by the end of 2017 and are likely to be focused on tracking regional investments in AIS prevention and control.

Phragmites Adaptive Management Framework (PAMF)

The GLC is developing and promoting a collaborative effort to establish an adaptive management framework to address the non-native plant Phragmites across the Great Lakes basin. PAMF will improve the management of Phragmites at both the local and regional scales and result in ecologically resilient and diverse ecosystems by increasing management efficiency and reducing uncertainty associated with treatment options. PAMF is being developed with by a team of Phragmites experts from across the basin that advises a core science team composed of researchers at the USGS and the University of Georgia. The GLC is coordinating the development of quantifiable models, monitoring protocols and an online database and user interface. The GLC also facilitates all communications between the core science team and the Phragmites experts, and provides outreach on adaptive management through presentations and written documents necessary to launch the program in 2017.

Sea Lamprey Control Map

The GLC, in collaboration with the Great Lakes Fishery Commission, has maintained the barrier mapping application built over the last two years, which displays the location of lamprey barriers in the Great Lakes.
basin. It provides historical maximum extent data, showing how far up waterways sea lamprey larvae have been found, barrier factsheets, and images of lamprey traps, where relevant.

**Geospatial Data Exchange for Invasive Species Monitoring**

GIS and data management staff are continuing their collaboration with the Michigan Department of Environmental Quality under a U.S. EPA Exchange Network challenge grant to develop a data integration tool for citizen-scientist observations of invasive species. The project is a test case for a larger regional data integration tool that will allow data from multiple species identification and tracking programs to be consolidated into a central database. Finalized data transformation protocols are being implemented on a database housed at Michigan State University.

3. Facilitate regional forums and collaboratives working to advance effective and coordinated approaches to AIS prevention and control, including the Great Lakes Panel on Aquatic Nuisance Species, the Chicago Area Waterway System Advisory Committee, and the Great Lakes Phragmites and Invasive Mussel collaboratives, among others.

**Great Lakes Panel on Aquatic Nuisance Species**

The GLC continues to provide staff support to the GLP and its committees. The GLP held its fall meeting in Ann Arbor, Michigan on November 2-3, 2016. The next meeting is being scheduled for June 2017 in Erie, Pennsylvania. Staff are supporting two GLP ad-hoc committees focused on grass carp and risk assessments. Committee information, meeting summaries, presentations and other materials are available on the GLP website.

**Chicago Area Waterway System Advisory Committee**

The GLC continues to convene a 30-member advisory committee that is the primary regional stakeholder forum seeking solutions to the threat of Asian carp and other AIS passing through the Chicago Area Waterways System (CAWS) while maintaining current uses of the system. The committee last met on October 14, 2016 in Chicago. The meeting provided updates on activities of the Asian Carp Regional Coordination Committee (ACRCC), the Army Corps of Engineers Brandon Road Feasibility Study, concepts for AIS lock design and other planned studies; and identified needs for future engineering and technology investigations. The next meeting of the Advisory Committee will be May 9 in Chicago and will likely focus on reviewing the Army Corps of Engineers’ tentatively selected plan for a control point at the Brandon Road Lock and Dam.

**Great Lakes Phragmites Collaborative (GLPC)**

The GLC continues to expand a partnership with the USGS-Great Lakes Science Center to lead communications and regional efforts to address the invasion of the non-native plant *Phragmites*. The GLPC engages the resource management community by facilitating regional collaboration, supporting technology transfer, linking science and management, and providing needed information products. The GLPC provides outreach via an [interactive web hub](#), webinar series, social media, case study directory, and email list. The GLPC is guided by a regional advisory and steering committee using an approach known as Collective Impact. This approach provides structure to the collaborative necessary to address complex natural resource challenges. The GLPC was described in the GLRI Action Plan II as a model for invasive species collaboratives and showcased in an April 2016 paper in the journal Biological Invasions. In February 2017 the GLPC hosted an interactive workshop with a diverse range of partners to define a Common Agenda for Phragmites management in the Great Lakes basin and to outline a plan for key actions. The work of the GLPC was also shared at the 2016 Restoring America’s Estuaries Conference and the 2017 Stewardship Network Conference. The GLPC is also advancing the science of non-native Phragmites management by launching the Phragmites Adaptive Management Framework (PAMF), discussed above.

**Invasive Mussel Collaborative**

Working in partnership with USGS, the Great Lakes Fishery Commission and NOAA, the GLC is supporting the Invasive Mussel Collaborative, which is providing a framework for communication and coordination among scientists, managers and others to share information and lessons learned, guide supporting research, and inform management actions related to control of zebra and quagga mussels. The collaborative is organized around a steering committee and a science team. This spring the collaborative will begin work on a strategy for *dreissenid* research and management in the Great Lakes. The Collaborative
is hosting webinars to facilitate learning and information sharing on topics related to control of dreissenid mussels; webinar announcements and recordings are available online. The website and an email listserv have been established to share information, webinar announcements and recent news, and to connect researchers, managers and others interested in dreissenid management.

4. Collaborate with other partner groups engaged in AIS prevention and control to support and advance common AIS priorities, including the GLWQA Annex 6 Subcommittee, the Conference of Great Lakes Governors and Premiers AIS Task Force, the Great Lakes Fishery Commission, the International Joint Commission, the federal Aquatic Nuisance Species Task Force, and other regional ANS panels, among others.

**Regional Coordination**
The GLC participated in national Aquatic Nuisance Species Task Force (ANSTF) meeting in November. ANSTF meeting information and materials are available online. Staff also participates on the GLWQA Annex 6 Subcommittee and coordinates regional AIS meetings and related efforts with the subcommittee.

5. Advocate for legislation and funding to support effective implementation of federal programs, policies and laws, such as the National Invasive Species Act, Lacey Act, GLRI, and Asian Carp Action Plan.

**Funding for National Invasive Species Act Programs**
The GLC is preparing a letter in support of funding for important AIS prevention and control programs under the National Invasive Species Act. Specifically, the letter expresses support for funding for both state AIS management plans as well as the six regional AIS panels, including the Great Lake Panel on Aquatic Nuisance Species. The letter will be sent to the leaders of the House Interior Appropriations subcommittee and the House Natural Resources Committee.

6. Lead regional projects that advance policies and solutions to reduce the risk of AIS introduction and spread through priority pathways including internet sales of organisms in trade, canals and waterways and ballast water.

**Great Lakes Detector of Invasive Aquatics in Trade**
The GLC is continuing operation of the web-crawling software system – the Great Lakes Detector of Invasive Aquatics in Trade (GLDIATR). In addition, the GLC is working under a GLRI grant to make improvements to the system and target reductions in the availability of specific species. The GLC also convened a stakeholder advisory committee to provide input on system updates and coordinate outreach and management activities. Current funding will support this work into 2018.

**Asian Carp and the Chicago Area Waterway System (CAWS)**
The GLC participates as a member of the Asian Carp Regional Coordinating Committee (ACRCC) and the Executive Steering Committee of the Great Lakes and Mississippi River Interbasin Study (GLMRIS), and serves as convener of the CAWS Advisory Committee (discussed above). The technical consultant for the Advisory Committee, HDR Inc., completed a scoping exercise to outline potential hydrologic, hydraulic, and water quality investigations that are needed to inform and evaluate the conceptual elements identified by the committee for a long-term solution to AIS transfer through the CAWS. Results of the scoping exercise were shared with the CAWS Advisory Committee at their October meeting. Concurrently, the Metropolitan Water Reclamation District of Greater Chicago (MWRD) announced that it was commencing a four-year study on the impact of invasive species control alternatives on the hydraulics, water quality, sedimentation, and navigation conditions on the CAWS as well as potential impacts on sewer conveyance and basement flooding, taking into account mitigation measures such as green infrastructure and reservoir storage capacity. The study will be conducted by the University of Illinois using a suite of hydrologic/hydraulic/water quality models developed by the university’s Department of Civil and Environmental Engineering for MWRD. The MWRD study is scheduled to be completed by 2020 and will provide valuable information on the impacts of potential AIS controls on the CAWS.

**Great Lakes Ballast Water Workshop**
In November the GLC convened a workshop for the Great Lakes and St. Lawrence community – including representatives of federal, state and provincial agencies, industry, ports, research facilities,
environmental groups and other key stakeholders – to share information and develop a common base of understanding of contemporary conditions and associated challenges and opportunities related to ballast water management. The workshop included presentations and discussion on the current regulatory framework (including federal legislation), the status of treatment technology, the state of the science, and stakeholder perspectives on ballast water management in the U.S. and Canada. Two briefing papers were prepared to provide background information for workshop participants, including a summary of the status of ballast water management regulations in the region (prepared by the GLC and included in the meeting briefing book), and a summary of the biological efficacy testing and certification of ballast water management systems for use in the U.S. and Canada (prepared by the Great Ships Initiative). In addition, a GIS-based story map was developed to simulate a real ship’s voyage and the ballast water management compliance steps it would implement along the way.

Information Management and Blue Accounting

**Objective:** The GLC’s member states and provinces have access to high-quality, curated information about Great Lakes issues from a neutral and authoritative source.

More information on the GLC’s information management and Blue Accounting work is available at www.glc.org/work/info-management.

**Strategic Actions:**

1. Deliver consistent, continuous and unbiased information to the GLC’s member states and provinces on issues and outcomes of mutual interest and concern, including the support of other GLC Program Areas described in the Strategic Plan.

   **Great Lakes Commission’s Information Architecture**
   
   The GLC’s websites are a central element of its information delivery program. Over the past six months, GLC staff have been implementing a new approach to delivering information. This will consolidate into a new GLC website key elements of the Great Lakes Information Network (GLIN), including GLIN Daily News, the Great Lakes Calendar, the GLC Listservs, and many of the information pages about the lakes. This transformation is in progress and is expected to be completed, in phases, in the first half of 2017. After a short period of overlap, GLIN will be retired and links forwarded to glc.org. Daily News, list serves and the calendar will be maintained. At the same time, GLC staff are moving key services to the cloud from GLC-owned and -operated servers. The transition is expected to improve reliability of these services while reducing operating costs.

2. Establish Blue Accounting as the leading information service to track the region’s progress toward shared goals and outcomes using consistent data, metrics and methods, working with The Nature Conservancy and other partners in both countries. Specifically, provide support to the Source Water Initiative and ErieStat, described in the Water Quality Program Area, as Blue Accounting pilot projects.

   **Blue Accounting Initiative**
   
   The development of Blue Accounting – a strategic approach and information delivery system that supports the region’s priority water outcomes – has been initiated by the GLC in response to a 2013 request from the Great Lakes governors and premiers. In May 2015 the GLC signed a Memorandum of Agreement with The Nature Conservancy that formalizes a partnership between the two organizations with the purpose of collaborating to implement Blue Accounting and develop a new, regional online information management and delivery platform. A Great Lakes Blue Accounting Advisory Committee has been formed to support the initiative with representation from state, federal and local governments, business, academia and NGOs from the Great Lakes basin. This committee meets quarterly and provides invaluable advice to the program.

   The Blue Accounting initiative includes the development of four pilot programs. Two pilots led by The Nature Conservancy are being developed to measure progress in reconnecting rivers and streams, and managing aquatic invasive species. The GLC is leading two pilot programs that support the desired
outcome for a “safe and sustainable domestic water supply: the ErieStat program and a Source Water Initiative. These pilots are described above in the Water Quality program report.

The GLC’s work in building the Blue Accounting initiative and the two pilot programs is supported by a cornerstone grant of $4 million from the C.S. Mott Foundation with additional grants from the Erb Family Foundation, the Joyce Foundation, the Dow Family Foundation and an anonymous funder.

3. Develop and maintain mutually-beneficial relationships with agencies and entities across the region, in both nations, at federal, state, provincial, tribal/First Nations, local and municipal scales to coordinate information management and provide information to the Commission for use by its members.

Through its programs and projects GLC staff continue to work across the region to develop information services and products that support its members. Staff are actively involved in the GLWQA Annexes, the Information Coordination and Flow workgroup of the IJC’s Science Priority Committee and the Science and Information Subcommittee of the Great Lakes Advisory Board. Staff also continue to support other Great Lakes programs and projects as advisors and collaborators to develop and deliver timely and useful information to GLC members.

4. Support and enhance the efforts of Annex 10 of the GLWQA, the IJC’s Science Priority Committee and the Great Lakes Advisory Board’s Science and Information Subcommittee to improve information coordination and flow between entities and agencies in the Great Lakes region.

GLC staff are actively engaged in the efforts of Annex 10 of the GLWQA, the IJC’s Science Priority Committee and the Great Lakes Advisory Board to find ways to improve the flow of relevant and timely information across Great Lakes institutions. The GLC was engaged by the Information Coordination and Flow workgroup of the IJC’s Science Priority Committee to help the workgroup better understand the status of data collection and flow in support of environmental decision-making in the Great Lakes region and provide recommendations for improvement. Steve Cole from the GLC staff continues to contribute to the Great Lakes Advisory Board’s Science and Information Subcommittee, which has provided recommendations on the consideration of duration and longevity of benefits in GLRI investments in project selection, and is framing charge questions for the development of Action Plan 3 for the GLRI.

5. Coordinate and provide information to support spill prevention and response programs, working with U.S. EPA across the Great Lakes basin and continuing current work with the Region 5 Regional Response Team to build intergovernmental relationships that improve planning and make response efforts more efficient.

**Inland Sensitivity Atlas**

GLC staff maintain the Inland Sensitivity Atlas (ISA) for Michigan, Ohio and Indiana for use by spill responders and emergency response planners. Staff are currently updating the Indiana ISA. The update to the Ohio ISA has paused due to an unavailable hazardous materials dataset. Staff continue to work closely with the federal Region 5 Regional Response Team to support the team’s website, tools, “story maps” and the Region 5 Regional Contingency Plan. As part of this work, staff has been working with U.S. EPA On-Scene Coordinators and local agencies to develop contingency planning for the Patoka River Planning Area supporting the Patoka River National Wildlife Refuge and Management Area in Indiana. One of the goals of this work is to advance best practices for other Sub-Area plans throughout the Great Lakes states. Staff continue to work with U.S. EPA staff and other regional responders to develop and support “field days” in the region by collecting data, creating enhanced mapping products, and developing documents for emergency response plans.

6. Provide facilitation and information management services to support development of strategies and policies to ensure protection of the region’s water resources in the context of increases in North American oil production and associated oil transportation to and through the Great Lakes and St. Lawrence River region.

**Oil Transportation**

In 2015 the GLC received a small grant from the Mott Foundation to commission research and prepare a series of briefing papers on oil transportation topics related to risk, infrastructure and economic analysis. A Request for Qualifications (RFQ) was issued in July 2016 and the GLC received several proposals. In
September 2016 three projects were selected and funded. One project will describe the current status of the infrastructure and its capability to handle future demands. The second project will focus on environmental risk assessment related to oil transportation in the region. The last project will present an overview of the economic characteristics of crude oil transportation in the Great Lakes-St. Lawrence River region. Contractors submitted their mid-project report in January 2017 and the papers will be completed by March 2017.

The GLC’s Oil Transportation Advisory Committee met once since the 2016 Annual Meeting. A conference call meeting was held on November 28, 2016. Another meeting will be scheduled in early to mid-spring 2017.

The GLC has been expanding its collaboration with other groups on oil transportation. Staff has been partnering with the Great Lakes Sea Grant Network on a series of webinars on issues related to crude oil transportation across the Great Lakes Basin. The GLC co-hosted a panel session at the Restore America’s Estuaries-The Coastal Society joint conference in December 2016. During that conference, Michele Leduc-Lapiere gave a presentation on issues related to risk in the Great Lakes-St. Lawrence River region. The GLC is co-planning a symposium with the Sea Grant Network (Great Lakes and Gulf of Mexico) to be held on June 8-9, 2017 in Cleveland, Ohio. Work on this symposium is being partially supported by a small grant from the Joyce Foundation. The GLC has also been invited to participate in the International Joint Commission’s (IJC) energy transport science synthesis working group.

The GLC’s current Sea Grant fellow, Michael Polich, is working on issues related to oil transportation in partnership with the Great Lakes Sea Grant Network. Staff has convened weekly phone calls with the Sea Grant coordinator and several products, including factsheets and a briefing paper, will be produced between now and June.

**Policy Coordination and Advocacy**

**Communications with the New Presidential Administration**

The GLC has prepared over the past year for a new president and administration. This began with a resolution adopted at the 2016 semiannual meeting calling on the presidential candidates to recognize the importance of the Great Lakes in their campaigns. This was complemented by a joint statement of Great Lakes campaign platform priorities developed with other regional organizations and submitted to all presidential candidates at the time.

Shortly before the election the GLC sent identical letters to the two transition directors urging them to consider the importance of the Great Lakes. After the election the GLC wrote to President-Elect Trump congratulating him on his election and urging him to consider Great Lakes priorities as he developed his administration’s agenda.

GLC staff continue to track the evolving agenda of the new administration and look for opportunities to advance Great Lakes issues and priorities. At this time there has been few clear indications of the administration’s positions on specific Great Lakes issues. Advancing an infrastructure initiative is a clear priority for the administration, but no specific plans have been proposed. There has been much interest in whether the administration will continue the Great Lakes Restoration Initiative (GLRI). As part of his Senate confirmation hearings, the new U.S. EPA Administrator Scott Pruitt responded to a question for the record about the GLRI as follows:

> If confirmed, I will continue EPA’s support for the Great Lakes Restoration Initiative, which was formally authorized by Congress in December 2016.

When pressed on whether he would support at least $300 million for the GLRI, Pruitt responded:

> I note that $300 million has been the annual appropriation for the Great Lakes Restoration Initiative for the past several years, even though the prior Administration proposed to cut that funding to $250 million. Three hundred million also is the Congressional authorized level of funding. If confirmed, I will take into account that funding history and Congressional authorization when making recommendations to the Office of Management and Budget regarding EPA’s appropriations.”
The Administration is expected to release an outline of its FY 2018 budget the week of March 13, which will provide more clarity about their intended budget priorities for various federal agencies and programs.

Progress on the GLC’s 2016 Federal Priorities

The centerpieces of the GLC’s policy coordination and advocacy program are its annual legislative priorities statement and Great Lakes Day in Washington. The 2016 statement, Sustaining Great Lakes Restoration and Economic Revitalization, was released on February 25 – Great Lakes Day 2016 – and guided the GLC’s advocacy activities in 2016. The top priorities for 2016 were:

- Pass authorizing legislation to strengthen and accelerate efforts to revitalize the Great Lakes economy and environment.
- Provide resources to maintain and enhance critical infrastructure that supports the Great Lakes Navigation System, including dredging and a new lock at Sault Ste. Marie, Michigan.
- Continue progress in restoring the health of the region’s most polluted areas by sustaining funding for the Great Lakes Restoration Initiative in Fiscal Year 2017.
- Coordinate with Illinois and other Great Lakes states and federal and local partners to maintain successful monitoring and control efforts that have reduced the carp population in the Illinois River. Provide the necessary funding to the Army Corps of Engineers to complete the current study to fully assess the viability of strengthening a single control point at the Brandon Road Lock and Dam to prevent the one-way, upstream transfer of aquatic invasive species while maintaining or enhancing beneficial uses of the waterway system for flood control, water quality, recreation and barge transportation.
- Help communities upgrade aging water infrastructure and safeguard drinking water.
- Ensure Farm Bill programs are effectively targeting watersheds contributing the most polluted runoff to the Great Lakes.

Below is a brief summary of actions taken on these federal priorities since the 2016 Annual Meeting, as well as reports on other policy and advocacy issues affecting the Great Lakes that have come up since then.

FY 2017 Appropriations for Major Great Lakes Programs

The following table summarizes appropriations (in millions of dollars) for selected Great Lakes programs for Fiscal Year 2016, President Obama’s budget request for FY 2017, and Congressional action to date on FY 2017 appropriations. In December Congress passed a continuing resolution through April and there has been no Congressional action on FY 2017 appropriations since that time. It is unclear what action Congress will take to finalize appropriations for the remainder of FY 2017. President Trump is expected to release an outline of his FY 2018 budget in mid-March.

<table>
<thead>
<tr>
<th>Program</th>
<th>Final FY 2016 Appropriations</th>
<th>FY 2017 Budget Request</th>
<th>Congressional Actions to Date on FY 2017 Appropriations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Lakes Environmental Research Laboratory</td>
<td>$10.5</td>
<td>$10.5</td>
<td>House: No detail provided</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Senate: No detail provided</td>
</tr>
<tr>
<td>Chicago Sanitary and Ship Canal Dispersal Barrier</td>
<td>$30</td>
<td>$12</td>
<td>House: $12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Senate: $12</td>
</tr>
<tr>
<td>Harbor Maintenance Trust Fund</td>
<td>$1,254</td>
<td>$950</td>
<td>House: $1,263</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Senate: $1,300</td>
</tr>
<tr>
<td>Great Lakes and Mississippi River Interbasin Study</td>
<td>$11</td>
<td>$2.6</td>
<td>House: $2.6</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Senate: $2.6</td>
</tr>
<tr>
<td>Clean Water State Revolving Fund</td>
<td>$1,394</td>
<td>$980</td>
<td>House: $1,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Senate: $1,350</td>
</tr>
<tr>
<td>Drinking Water State Revolving Fund</td>
<td>$863</td>
<td>$1,021</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Senate: $1,021</td>
</tr>
<tr>
<td>Great Lakes Restoration Initiative</td>
<td>$300</td>
<td>$250</td>
<td>House: $300</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Senate: $300</td>
</tr>
<tr>
<td>BEACH Grants</td>
<td>$9.5</td>
<td>$0.0</td>
<td>House: $0.0</td>
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<td></td>
<td></td>
<td></td>
<td>Senate: $9.5</td>
</tr>
<tr>
<td>Great Lakes Science Center</td>
<td>$8.5</td>
<td>$9</td>
<td>House: No detail provided</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Senate: No detail provided</td>
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Engineers to complete guidance on managing the Great Lakes as a single, comprehensive navigation system

Lakes Navigation System

permanent the allocation of

The WIIN Act included several provisions supporting the Great Lakes Navigation System, including m

Provide resources to maintain and enhance critical infrastructure that supports the Great Lakes

Navigation System, including dredging and a new lock at Sault Ste. Marie, Michigan

The WIIN Act included several provisions supporting the Great Lakes Navigation System, including making permanent the allocation of 10 percent of priority funds from the Harbor Maintenance Trust Fund for the Great Lakes Navigation System; setting minimum appropriations level from the fund; and requiring the Army Corps of Engineers to complete guidance on managing the Great Lakes as a single, comprehensive navigation system, as directed in the 2014 WRDA bill. The GLC advocated for these provisions in several communi-cations with Congressional committees and the Great Lakes Delegation urging passage of the WIIN Act.

The GLC continues to track the Corps of Engineers’ progress in implementing an approach that manages the Great Lakes Navigation System as a single, comprehensive system, as directed in the 2014 WRDA bill. We also are following work on an Economic Re-evaluation Report on constructing a new large lock at the Soo Locks in Sault Ste. Marie, Michigan, which is updating the cost-benefit analysis for this project. GLC staff emphasized this priority in a recent round of Congressional office visits and urged the Great Lakes Delegation to sign on to a bipartisan, House-Senate letter to the Army Corps of Engineers urging completion of an accurate and credible economic re-evaluation report. With interest from both the President and Congress in major infrastructure

<table>
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<tr>
<th>Program</th>
<th>Final FY 2016 Appropriations</th>
<th>FY 2017 Budget Request</th>
<th>Congressional Actions to Date on FY 2017 Appropriations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 106 Water Pollution Control</td>
<td>$231</td>
<td>$246</td>
<td>House: $231</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Senate: $231</td>
</tr>
<tr>
<td>Great Lakes Fishery Commission</td>
<td>$21.177</td>
<td>$20</td>
<td>House: $24.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Senate: $24.8</td>
</tr>
<tr>
<td>Great Lakes Fishery and Ecosystem Restoration</td>
<td>$0</td>
<td>$0</td>
<td>House: $0.0</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Senate: $0.0</td>
</tr>
<tr>
<td>National Sea Grant College Program</td>
<td>$64</td>
<td>$62</td>
<td>House: $64</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Senate: $64</td>
</tr>
<tr>
<td>Coastal Zone Management Act (grants only)</td>
<td>$75</td>
<td>$75</td>
<td>House: $65</td>
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<td></td>
<td></td>
<td></td>
<td>Senate: $65</td>
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</tbody>
</table>

1Funding for operation and maintenance only; construction of barrier is expected to be completed with remaining FY2016 funds.
2An additional $2.6 million is being provided from the GLRI for the Brandon Road feasibility study in FY 2016, which is being conducted under GLMRIS.  
3Includes $3.45 million for sea lamprey control and water quality improvements in the Lake Champlain Basin.  
4Includes $15 million for Regional Coastal Resilience Grants

Pass authorizing legislation to strengthen and accelerate efforts to revitalize the Great Lakes economy and environment

In December Congress passed the Water Infrastructure Improvements for the Nation (WIIN) Act, PL 114-322, which included traditional Water Resources Development Act provisions for the Army Corps of Engineers as well as a variety of additional provisions to improve drinking water infrastructure, authorize Great Lakes restoration and fish and wildlife programs, and other issues. The WIIN Act included previously-passed House legislation, sponsored by Rep. David Joyce (R-OH), that authorizes the GLRI at $300 million a year for five years. Other provisions direct U.S. EPA to consult with states, tribes and stakeholders in implementing the GLRI; authorize use of GLRI funds for U.S. EPA’s Great Lakes office, the Great Lakes Legacy Act and for grants to nonfederal entities; require the GLRI Action Plan to be updated every five years in consultation with the states and others; require monitoring and reporting on progress under the GLRI; and direct U.S. EPA to designate a point person from an appropriate federal agency to coordinate GLRI activities involving harmful algal blooms. The WIIN Act also reauthorized the Great Lakes Fish and Wildlife Restoration Act and the Great Lakes Fishery and Ecosystem Restoration Program. (Other provisions of interest to the Great Lakes are summarized below.)

Passage of legislation formally authorizing the GLRI is a significant accomplish and achieves one of the GLC’s top legislative priorities. GLC staff consulted with House and Senate staff during the legislative process and advocated for provisions that would strengthen the GLRI and ensure effective consultation with the states and other regional stakeholders. The GLC communicated regularly with key Congressional committees and the Great Lakes Delegation and joined with other agencies and organizations urging passage of the legislation. In short, the GLC was an influential voice – together with our regional partners – in achieving this important priority for the region.

Provide resources to maintain and enhance critical infrastructure that supports the Great Lakes Navigation System, including dredging and a new lock at Sault Ste. Marie, Michigan
investments, a new Soo lock will continue to be a prominent feature of the GLC’s advocacy efforts over the coming year.

Navigation infrastructure priorities, including a new Soo lock, were also highlighted in the GLC’s statement on water infrastructure priorities for the Great Lakes region, released in late February and included in Tab 4 of the briefing book along with the GLC’s 2017 Federal Priorities Statement.

**Continue progress in restoring the health of the region’s most polluted areas by sustaining funding for the Great Lakes Restoration Initiative in Fiscal Year 2017**

Congressional support for the GLRI continues to be strong and several recent Congressional letters to President Trump have highlighted the importance of the program and advocated continued funding for it. The GLC has urged the Great Lakes Delegation to sign on to these letters. In their work on FY 2017 appropriations bills, both the House and Senate have allocated $300 million for the GLRI. While it is unclear how Congress will finalize FY 2017 appropriations, it is hoped that it will provide this level of funding for the program in FY 2017.

**Coordinate with Illinois and other Great Lakes states and federal and local partners to maintain successful monitoring and control efforts that have reduced the carp population in the Illinois River.**

Provide the necessary funding to the Army Corps of Engineers to complete the current study to fully assess the viability of strengthening a single control point at the Brandon Road Lock and Dam to prevent the one-way, upstream transfer of aquatic invasive species while maintaining or enhancing beneficial uses of the waterway system for flood control, water quality, recreation and barge transportation.

The GLC continues to work with Congress and regional stakeholders to advance measures to prevent the movement of Asian carp and other invasive species through the Chicago Area Waterway System (CAWS) and other pathways. Following release of the Great Lakes and Mississippi River Interbasin Study (GLMRIS) in January 2014, there is significant interest in Congress and among regional stakeholders to develop and implement short-term actions to reduce the risk of Asian carp movement while a long-term solution is developed. GLC staff participate on the Asian Carp Regional Coordinating Committee and the Executive Steering Committee for GLMRIS and continue to communicate with agency staff and congressional leaders on funding and legislative priorities in this area.

As discussed above in the aquatic invasive species program update, the GLC continues to convene the CAWS Advisory Committee as a forum for convening stakeholders, reviewing information, and articulating consensus policies related to preventing AIS movement through the CAWS. The committee has expressed support for the evaluation of the Brandon Road Lock and Dam as a control point to prevent Asian carp and other species moving from the Mississippi River into the Great Lakes basin. The Army Corps of Engineers is expected to release a Tentatively Selected Plan under the Brandon Road Feasibility Study shortly. This will be an important milestone for assessing a proposed plan and costs for the deployment of control technologies to prevent the one-way, upstream movement of Asian carp and other AIS at this location.

The GLC continues to monitor and, where possible, support the regional Asian carp action plan, emergency procedures, rapid response protocols, monitoring, and other measures developed by the Corps of Engineers, U.S. Fish and Wildlife Service, the State of Illinois, and other partners.

**Help communities upgrade aging water infrastructure and safeguard drinking water**

There has been considerable focus in Congress on drinking water safety in reaction to the drinking water crisis in Flint, Michigan and other communities. As shown in the table above, Congress may appropriate $200 million more for the Drinking State Revolving Fund (DWSRF) program for FY 2017 than was provided in FY 2016, and $50 million more than the President’s budget request. Numerous bills were introduced in Congress addressing various issues associated with drinking water infrastructure. Provisions from many of these bills were incorporated into WIIN Act, described above, including a new grant program to address lead or other contaminants in drinking water (including replacement of private water lines); authorization of new DWSRF uses (including additional loan forgiveness for projects using innovative technologies); and mandatory and discretionary funding to aid the City of Flint. A summary of the WIIN Act is available [here](#).
The Trump Administration has identified infrastructure investments as a priority and there is significant interest in Congress in advancing a large-scale infrastructure initiative. No specific plan has been proposed by the Administration, however, and there is considerable uncertainty about when a proposal will be forthcoming and what it will include. The GLC has released a detailed suite of recommendations for water infrastructure priorities in an effort to build on interest in this area and to ensure that needs in the Great Lakes region are considered.

Ensure Farm Bill programs are effectively targeting watersheds contributing the most polluted runoff to the Great Lakes

The GLC has advocated for GLRI funding to address nutrient runoff and is demonstrating the value of the GLRI through various water quality projects, discussed above. In addition to its current work under the GLRI, the GLC’s Water Quality Program is laying the foundation for efforts to strengthen agricultural pollution prevention programs in the Great Lakes in the 2018 Farm Bill.

Other Policy and Advocacy Issues

Ballast Water

In January the Senate Commerce Committee approved S. 168, the Commercial Vessel Incidental Discharge Act (CVIDA). Like its predecessor legislation from the 114th Congress (known as VIDA), CVIDA is intended to harmonize federal and state vessel discharge rules and consolidate regulatory oversight in the U.S. Coast Guard. It sets the 2012 U.S. Coast Guard ballast treatment regulations as the uniform standard nationwide, with the U.S. EPA in a consultation role and state authority significantly reduced, among other provisions. The bill requires vessels entering the Great Lakes through the St. Lawrence River to conduct saltwater flushing.

In Feb. 8 letter to Senate leaders, more than 300 organizations conveyed support for S. 168, including vessel operators, ports, maritime labor, cargo shippers, railroads, and transportation trade associations. Conversely, ten state attorneys general (including those from Michigan, Illinois and New York) have written to Senate leaders opposing the legislation, as have many conservation organizations.

More information about the GLC’s policy coordination and advocacy work is available at www.glc.org/work/advocacy.
Strategic Plan for the Great Lakes Commission

2017 – 2022

ADOPTED JANUARY 2017

Introduction

The Great Lakes Commission is a public agency established by the Great Lakes Basin Compact in 1955 to help its Member states speak with a unified voice and collectively fulfill their vision for a healthy, vibrant Great Lakes-St. Lawrence River region. The Canadian provinces of Ontario and Quebec joined the Commission as associate members via a Declaration of Partnership in 1999. The Compact created the Commission to implement its terms and requirements, as noted in Article I:

1. To promote the orderly, integrated, and comprehensive development, use, and conservation of the water resources of the Great Lakes Basin.

2. To plan for the welfare and development of the water resources of the Basin as a whole as well as for those portions of the Basin which may have problems of special concern.

3. To make it possible for the states of the Basin and their people to derive the maximum benefit from utilization of public works, in the form of navigational aids or otherwise, which may exist or which may be constructed from time to time.

4. To advise in securing and maintaining a proper balance among industrial, commercial, agricultural, water supply, residential, recreational, and other legitimate uses of the water resources of the Basin.

Collectively, these terms and the rest of the Compact consistently speak to the intertwining of economic uses of water resources, conservation and the creation of an organization to lead a path that strikes a balance among multiple uses.

Vision

The Great Lakes Commission is a binational leader and a trusted voice ensuring the Great Lakes and St. Lawrence River support a healthy environment, vibrant economy and high quality of life for current and future generations.

Mission

The Great Lakes Commission represents, advises and assists its member states and provinces by fostering dialogue, developing consensus, facilitating collaboration and speaking with a unified voice to advance collective interests and responsibilities to promote economic prosperity and environmental protection and to achieve the balanced and sustainable use of Great Lakes-St. Lawrence River basin water resources.
Values

The following core values guide the work of the Great Lakes Commission and set the standards that we aspire to achieve in serving our member states and provinces.

- **Member led:** We are guided by and serve the common interests of our member states and provinces.
- **Regional perspective:** We bring a regional perspective to federal, state and provincial programs, policies, projects and priorities.
- **Leadership:** We are ambassadors for the Great Lakes-St. Lawrence River region and serve as liaisons within and beyond the region.
- **Collaboration:** We advance our objectives in close coordination with the Conference of Great Lakes and St. Lawrence Governors and Premiers, the International Joint Commission, the Great Lakes Fishery Commission, and constant dialogue with other regional institutions and relevant entities.
- **Partnerships:** We respect the roles of other regional institutions and agencies and collaborate to achieve common goals and interests.
- **Transparency:** We are open and transparent in carrying out our work.
- **Integrity:** We strive for the highest levels of honesty, credibility and accuracy in the information, recommendations and perspectives that we convey.
- **Objective:** We are nonpartisan, balanced and science-based in our work, while promoting a vision of a healthy environment and vibrant economy, pursued by each of our member states and provinces.
- **Open-minded:** We are inclusive and welcome diverse views.
- **Sustainability:** We incorporate principles of sustainable development and adaptive management in our work.

Core Competencies

The Great Lakes Commission is uniquely equipped to serve its member states and provinces with the following core services, which constitute the skills, knowledge base, professional competencies and leadership attributes that are applied across all of its program areas. The core competencies are how the Commission conducts its work to achieve its goals, fulfill its mission and advance its vision.

**Communications and Outreach:** The Commission raises awareness; communicates with federal, state/provincial, and local agencies and stakeholders; and provides information technologies and outreach services to support effective decision-making and stewardship.

**Information Management and Delivery:** The Commission collects, integrates and makes accessible high quality and unbiased data and information to enable its member jurisdictions and other parties to develop sound policies, manage and adapt programs, and make informed decisions affecting the water resources of the Great Lakes-St. Lawrence River region.

**Facilitation and Consensus Building:** The Commission facilitates, convenes and participates in forums that address issues of interest to its members. By serving as a neutral broker of information and research and facilitating dialogue among diverse perspectives, it helps build consensus on solutions to challenges and opportunities facing Great Lakes and St. Lawrence River water resources.

**Policy Coordination and Advocacy:** The Commission helps its member states and provinces speak with a common voice by coordinating, analyzing, advising, communicating and advocating shared policy priorities. The Commission also collaborates with other regional, national and international organizations to advance common interests.
Regional Project Management: The Commission secures resources and coordinates activities that address common interests of its member jurisdictions and provides the capacity to manage projects and administer funding to member states, provinces and other partners to advance shared goals.

Program Areas

The Great Lakes Commission designs the work of its programs to support its goals and vision. The Goals articulate general outcomes we hope to achieve through our collective work across all Program Areas. Each of the Program Areas includes one Objective and, under each, a series of Strategic Actions that indicate what the Commission seeks to accomplish, while recognizing that the Commission’s work alone will not completely fulfill these Objectives. The strategic actions reflect what the Commission does and the projects and activities the Commission will undertake to address its goals, objectives and fulfill its mission over the next five years.

Goals

The Great Lakes Commission’s goals articulate the outcomes it seeks to advance over the five-year timeframe of its strategic plan by building on its mission and vision and working in partnership with its member states and provinces and other entities.

- Businesses, communities and agriculture leverage water resources as assets to support strong economies and a high quality of life for residents.

- Great Lakes and St. Lawrence River water resources are protected from pollution and impacts from climate change; are accessible to people; provide high quality drinking water; and are managed in a balanced and sustainable manner for the benefit of current and future generations.

- Aquatic habitats support diverse and healthy fish and wildlife populations, are protected from the negative impacts of aquatic invasive species, and provide cultural and economic benefits to local communities.

- Harbors and waterways support recreational uses and a Great Lakes-St. Lawrence River maritime transportation system that efficiently moves goods and enhances the competitiveness of the region’s economy and international trade.

1. Water Quality

Challenges and Opportunities:

The Great Lakes basin’s abundant supply of clean, fresh water is vital to the regional economy and the health of its communities. Recognizing this, federal, state and provincial laws have been designed to ensure that water quality is sufficient to allow for a safe and sustainable public water supply, water-dependent economic activities, agriculture, healthy fish and wildlife populations, and water-related tourism and recreation. Additionally, water quality is increasingly linked to water quantity, in particular as governments address the threat of climate change. With expert knowledge of water issues and strong relationships with water quality practitioners across many sectors, the Commission is well-positioned to identify and share innovative solutions to water quality challenges, and to advance regional approaches to water quality protection and improvement. The Commission will utilize its expertise and capacity to maximize its members’ collective impact to improve and protect water quality in urban and urbanizing areas; in rural and agricultural areas; and other diverse stakeholders within sub-watersheds across the basin.

Objective: Identify, promote, and share innovative solutions to water quality challenges in both urban and rural settings, and advance approaches that encourage collective action to protect and improve water quality across diverse landscapes within watersheds.
Strategic Actions:

- Protect and improve water quality by: leading and partnering on projects; facilitating dialogue and building consensus; and delivering information that improves the region’s ability to measure progress on water quality protection and improvement. Lead the ErieStat project to track progress toward the shared goal of reducing phosphorus into western Lake Erie by 40% by 2025 and begin a drinking water supply pilot as part of the Blue Accounting initiative.

- Protect and improve water quality in urban and urbanizing areas by leading and partnering on green infrastructure projects and related activities, such as the Green Infrastructure Technology Transfer Collaborative, that can create enabling conditions to restore the fractured water cycle.

- Protect and improve water quality in rural and agricultural areas by leading and partnering on projects and activities that reduce sediment and nutrient loads into Great Lakes basin waters through ongoing partnerships with NRCS, conservation districts, authorities and agricultural interests. Work will range from administering funds to reduce sediment and nutrient runoff to leading or supporting projects that advance traditional and innovative approaches to manage sediment and nutrient loading in Great Lakes Restoration Initiative (GLRI) priority watersheds and watershed-based solutions across the basin.

- Explore opportunities to support the states and provinces in tackling complex aspects of water quality, including water quality trading and other market-based approaches, leveraging the region’s abundant clean fresh water assets to advance more sustainable methods of agricultural production, and linking urban/urbanizing landscapes with rural/agricultural landscapes to improve water quality across entire watersheds.

- Support the states and provinces in planning and adapting to water quality implications of climate change.

- Address critical water quality challenges, such as harmful algal blooms, by facilitating regional forums, including collaboratives, such as the Harmful Algal Blooms (HABs) Collaboratory, and participating in others, such as the Great Lakes Water Quality Agreement’s annexes, to build consensus around shared water quality goals and associated solutions to achieve those goals.

- Advocate for refinements to U.S. federal policy and legislation to protect and improve water quality, including the U.S. Clean Water Act, the U.S. Safe Drinking Water Act, the U.S. Water Resources Development Act, and the U.S. Farm Bill.

2. Water Management and Infrastructure

Challenges and Opportunities:

Strengthening the effective management of the Great Lakes and St. Lawrence River basin water resources to meet the needs of the region’s citizens continues to be a top priority of Great Lakes governors and premiers. Due to its history, mandate and expertise the Great Lakes Commission is uniquely qualified to lead and support efforts in this area, and has already assisted the Conference of Great Lakes and St. Lawrence Governors and Premiers in implementing the regional water resources agreements. At the local level, aging and degraded water infrastructure (drinking, storm and wastewater) is increasingly threatening communities’ access to this valuable freshwater resource. Water and wastewater infrastructure challenges are exacerbated by climate change impacts, such as increased runoff caused by more severe and frequent storm events, that often lead to increased flooding, sanitary and storm sewer overflows, and risks to public health and the health of the Great Lakes. The Commission has supported innovative projects focused on maximizing investments in water conservation and green infrastructure to support water management, and is working to establish new partnerships, identify new solutions to water infrastructure challenges, develop tools to support decision-making, and better manage data and information in these areas. Additionally, the Commission’s advocacy program continues to promote federal programs, policies and funding to help states, provinces and local communities
manage water infrastructure. As water quantity and quality issues are inextricably linked, the Commission’s work in this area complements efforts under the water quality program area.

**Objective:** Ensure that the waters of the Great Lakes and St. Lawrence River basin continue to support the needs of communities, businesses, industries and ecology; are protected from development impacts, pollution, climate change and other stressors; and are managed in a balanced and sustainable manner for the use, benefit and enjoyment of people today and future generations.

**Strategic Actions:**

- In partnership with the Conference of Great Lakes and St. Lawrence Governors and Premiers, support decision-making and measure progress under the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement and Water Resources Compact by compiling, interpreting and disseminating consistent water withdrawal, diversion and consumptive use information; supporting the cumulative impact assessment called for under the Compact and the Agreement; and providing information on regional trends and state and provincial programs, practices and policies related to water use and conservation.

- Lead and engage in the development and dissemination of data and information necessary for implementing drinking, storm and wastewater management programs that identify critical needs and advance solutions to the benefit of public health and safety, water infrastructure and delivery, ecosystem health and water quality.

- Identify and advance solutions to water management and infrastructure challenges by facilitating forums, initiatives and partnerships including the Commission’s working group on water infrastructure.

- Raise awareness of the fundamental value of water and the need for infrastructure improvements by advocating for federal legislation and funding to support and accelerate drinking, storm and wastewater infrastructure improvements through the Clean Water and Drinking Water State Revolving Fund programs and other water management programs and by promoting the benefits of integrating water delivery and wastewater management services to the states, provinces and municipalities in the region.

3. **Commercial Navigation**

**Challenges and Opportunities:**

The Great Lakes and St. Lawrence River maritime transportation system is vital to the economies of the United States and Canada. The system facilitates domestic and international trade through the movement of goods and commodities, while creating jobs in port communities and supporting industries such as manufacturing, steel production, agribusiness and power generation. Ensuring the continued viability of commercial navigation requires maintaining and investing in harbors, ports, shipping channels, locks and related infrastructure throughout the Great Lakes-St. Lawrence River system, including regular dredging. These activities require close regional and binational coordination, given the interdependent nature of the system and the critical role played by key infrastructure like the Soo Locks and the St. Lawrence Seaway. The Conference of Great Lakes and St. Lawrence Governors and Premiers recently completed a comprehensive strategy for the navigation system that aims to double maritime trade, improve environmental performance and support the region’s industrial core. The strategy recommends actions to maintain and expand the maritime transportation system and establishes a Regional Maritime Entity to coordinate state and provincial actions. With its dual mandate for both economic development and environmental protection, and its longstanding role as an advocate for Great Lakes-St. Lawrence River maritime transportation, the Great Lakes Commission is uniquely qualified to support the objectives of the governors’ and premiers’ new maritime strategy.

**Objective:** Improve the efficiency, competitiveness, security and sustainability of the Great Lakes-St. Lawrence River maritime transportation system to support the regional and national economies of the United States and Canada.
Strategic Actions:

- Collaborate with the Regional Maritime Entity and other stakeholders to support implementation of the governors’ and premiers’ *Strategy for the Great Lakes-St. Lawrence River Maritime Transportation System*, with a focus on establishing a maritime careers portal, maintaining the maritime asset inventory, managing data and information to track progress in implementing the strategy and aligning data collection and reporting with the Blue Accounting initiative.

- In collaboration with the Regional Maritime Entity and other stakeholders, identify and advocate for priorities to maintain and strengthen the Great Lakes-St. Lawrence River maritime transportation system, including allocating funds from the Harbor Maintenance Trust Fund; constructing a new large lock at the Soo Locks; dredging to maintain authorized depths of channels and harbors and additional depth needed in critical areas; repairing and investing in aging navigation infrastructure; ensuring adequate icebreaking capacity; developing sustainable strategies for managing dredged material; and supporting the development of technologies to improve the system’s environmental performance.

- Convene or participate in regional partnerships, forums and initiatives related to the Great Lakes-St. Lawrence River maritime transportation system, including the Regional Maritime Entity, Great Lakes Dredging Team, Great Ships Initiative, and the Great Lakes Small Harbors Coalition.

4. Economic Development and Waterfront Community Revitalization

Challenges and Opportunities:

The unique freshwater resources of the Great Lakes fueled the region’s early development, with waterfront areas historically serving as centers of economic activity. Currently, many Great Lakes coastal communities are working to restore and reclaim degraded or under-utilized waterfronts and leverage them to support economic development, recreation and other purposes. The GLRI is accelerating this process, particularly in the Areas of Concern. Recreational boating and other water-based activities drive a vibrant tourism and outdoor recreation sector centered on the Great Lakes and their tributaries. Regional leaders have recognized the potential of fresh water and the “Blue Economy” to promote economic growth, attract and retain talent, support water-dependent industries, and sustain a high quality of life in the Great Lakes region. The Great Lakes Commission is well suited to develop tools and support strategies to advance waterfront community revitalization through research, policy development, information exchange and technology transfer, and stakeholder collaboration. The Commission is also uniquely positioned to advocate for federal, state and provincial policies, programs and funding to support efforts to restore and revitalize waterfront areas, ensure resiliency to impacts from climate change, and balance environmental and economic benefits from water resources. Finally, the Commission can collaborate with regional leaders to strengthen the economy and promote the Great Lakes region as a global center for research and development of technologies to utilize and manage freshwater resources.

Objective: Support the efforts of the states and provinces – in collaboration with federal agencies, local communities, and nongovernmental stakeholders – to restore and revitalize waterfront areas and advance policies, programs and funding to leverage water resources to support a strong regional economy and high quality of life.

Strategic Actions:

- Support research, disseminate information, and collaborate with regional leaders to quantify the economic value of Great Lakes water resources, the return on investments in environmental restoration and water-related infrastructure, and the ecosystem benefits and services generated by the Great Lakes, and facilitate a cooperative, regional approach to advancing the “Blue Economy.”

- Support the work of the Conference of Great Lakes and St. Lawrence Governors and Premiers’ regional economic task force, and collaborate with other partners such as the Council of Great Lakes Industries and the Great Lakes Metro Chambers Coalition, to strengthen water-related infrastructure, industries and
commerce and facilitate a cooperative approach to improve regional economic performance and competitiveness.

- Support implementation of the GLRI and other regional programs to clean up and restore waterfront areas, and advance policies, funding and information exchange to assist the states, provinces and local communities in strategically leveraging water resources to strengthen local economies and provide benefits for residents and visitors.

- Advocate with Congress and federal agencies for programs, policies and funding that support state and local efforts to clean up and revitalize waterfront areas, including the GLRI, Coastal Zone Management Act, National Sea Grant College Program, and brownfields redevelopment programs, and assist in effectively implementing these programs and linking them with state and provincial priorities.

- Collaborate with other water-related commissions in the U.S., Canada, and abroad to share information, exchange strategies, and advance common goals directed at solving problems affecting water resources and leveraging them as vital regional assets.

5. Coastal Conservation and Habitat Restoration

Challenges and Opportunities:

The Great Lakes and St. Lawrence River basin includes more than 10,000 miles of coastline, with the majority of the region’s population and economic activities located in coastal areas. These areas support both rich and diverse ecosystems and valuable industrial, recreational and tourism economies. However, in some areas extensive human activity has led to the loss of habitat for fish and wildlife and impacts to key ecosystem functions and values. The Commission is well positioned to assist the states, provinces and local partners in balancing the use and conservation of natural resources by restoring and protecting habitat for fish and wildlife; supporting the remediation of degraded areas; and ensuring resiliency to changing lake levels and impacts from climate change. The Commission is also developing and managing several collaborative partnerships to coordinate regional engagement, improve management, advance research, and facilitate communication and outreach to address coastal conservation challenges.

Objective: Conserve coastal ecosystem functions and values that contribute to the diversity, resilience and economy of the Great Lakes-St. Lawrence River basin by protecting natural communities that sustain populations of desirable fish and wildlife species; restoring degraded areas; and managing coastal resources to improve ecosystem services while supporting sustainable economic development.

Strategic Actions:

- Lead and support regional programs that restore, protect and manage valuable habitat and water resources through implementation of the NOAA-GLC Regional Partnership in Areas of Concern, and in coordination with U.S. EPA, NOAA, states and provinces, and local organizations.

- Elevate awareness of coastal conservation issues among decision-makers, managers, researchers and the public by convening meetings, coordinating action and developing communication products such as websites, webinars, and publications.

- Explore and develop data and information-sharing opportunities to support ongoing coastal wetland restoration prioritization, contribute to decision-making and measure progress on coastal conservation and habitat restoration across the region.

- Communicate with partners including U.S. EPA, NOAA, USGS, NRCS, Great Lakes Fishery Commission, Great Lakes Landscape Conservation Cooperative and the Great Lakes Water Quality Agreement Annex 7 Subcommittee, to ensure effective coordination and collaboration with state and provincial agencies,
agriculture producers, conservation groups and local partners in support of sound land management practices and strategically targeted fish and wildlife restoration and conservation actions.

- Advocate for legislation and funding for federal programs, policies and laws, such as the GLRI, the Great Lakes Fish and Wildlife Restoration Act and the Farm Bill, and support their effective implementation and alignment with state and provincial priorities.

6. Aquatic Invasive Species Prevention and Control

Challenges and Opportunities:

Aquatic invasive species (AIS) are recognized as one of the most significant threats to the environmental and economic health of the Great Lakes and St. Lawrence River region. Progress is being made to reduce threats of new invasions and the damage from those species already introduced. Yet, the region remains vulnerable to AIS introduction and spread from various pathways and AIS threats are likely to evolve under a changing climate. AIS do not respect political boundaries and states and provinces vary in their approaches and capacity for prevention and management. Preventing new AIS introductions and controlling those already present is a priority for regional leaders. The Commission is well-positioned to coordinate multijurisdictional approaches to AIS prevention and control. Commission staff is equipped with an in-depth knowledge of AIS issues and strong relationships with AIS practitioners from both the public and private sector. The Commission’s AIS expertise is founded in its historic relationship with the Great Lakes Panel on Aquatic Nuisance Species. The Commission will utilize its expertise and capacity to advance effective, regional solutions for AIS prevention and control.

Objective: Prevent the introduction and spread, and when necessary, advance the management and control of aquatic invasive species, that are or have the potential to negatively impact water resources or the economy of the Great Lakes-St. Lawrence River basin.

Strategic Actions:

- Develop and promote communication products and services, including websites, webinars, and publications (e.g., Great Lakes Aquatic Invasions) that provide AIS information and advance progress on AIS prevention and control.

- Develop and promote the use of adaptive management frameworks and data and information integration platforms in order to support decision making (including evaluating costs and benefits) and measure progress on AIS prevention and control across the region.

- Facilitate regional forums and collaboratives working to advance effective and coordinated approaches to AIS prevention and control, including the Great Lakes Panel on Aquatic Nuisance Species, the Chicago Area Waterway System Advisory Committee, and the Great Lakes Phragmites and Invasive Mussel collaboratives, among others.

- Collaborate with other partner groups engaged in AIS prevention and control to support and advance common AIS priorities, including the GLWQA Annex 6 Subcommittee, the Conference of Great Lakes Governors and Premiers AIS Task Force, the Great Lakes Fishery Commission, the International Joint Commission, the federal Aquatic Nuisance Species Task Force, and other regional ANS panels, among others.

- Advocate for legislation and funding to support effective implementation of federal programs, policies and laws, such as the National Invasive Species Act, Lacey Act, GLRI, and Asian Carp Action Plan.

- Lead regional projects that advance policies and solutions to reduce the risk of AIS introduction and spread through priority pathways including internet sales of organisms in trade, canals and waterways and ballast water.
7. Information Management and Blue Accounting

**Challenges and Opportunities:**

The Great Lakes Basin Compact charged the Commission to “collect, correlate, interpret, and report on data relating to the water resources and the use thereof in the Basin or any portion thereof.” Since its inception, the Commission has been a trusted source of information through many programs including the Great Lakes Information Network. Through this program area, the Commission develop the foundation for supporting all other program areas outlined in the Compact, and continue to assemble, curate, manage and deliver information to support the conservation and balanced use of the Great Lakes. A core component of this program area is the Blue Accounting initiative (http://BlueAccounting.org), a partnership between the Commission and The Nature Conservancy. Blue Accounting will provide Great Lakes leaders with information services that measure the progress being made across the region toward shared desired outcomes for the Great Lakes.

**Objective:** The Commission's member states and provinces have access to high-quality, curated information about Great Lakes issues from a neutral and authoritative source.

**Strategic Actions:**

- Deliver consistent, continuous and unbiased information to the Commission’s member states and provinces on issues and outcomes of mutual interest and concern including the support of other Commission Program Areas described in this Strategic Plan.

- Establish Blue Accounting as a leading information service to track the region’s progress towards shared goals and outcomes using consistent data, metrics and methods, working with The Nature Conservancy and other partners in both countries. Specifically, provide support to the Source Water Initiative and ErieStat, described in the Water Quality Program Area, as a Blue Accounting pilot projects.

- Develop and maintain mutually-beneficial relationships with agencies and entities across the region, in both nations, at federal, state, provincial, tribal/First Nations, local and municipal scales to coordinate information management and provide information to the Commission for use by its members.

- Support and enhance the efforts of Annex 10 of the GLWQA, the IJC’s Science Priority Committee and the Great Lakes Advisory Board’s Science and Information Subcommittee to improve information coordination and flow between entities and agencies in the Great Lakes region.

- Coordinate and provide information to support spill prevention and response programs, working with U.S. EPA across the Great Lakes basin and continuing current work with the Region 5 Regional Response Team to build intergovernmental relationships that improve planning and make response efforts more efficient.

- Provide facilitation and information management services to support development of strategies and policies to assure protection of the region’s water resources in the context of increases in North American oil production and associated oil transportation to and through the Great Lakes and St. Lawrence River region.

**Conclusion**

The Commission is committed to constantly improving its organizational processes and using the best metrics available to evaluate projects and services to its member jurisdictions. More specific plans to implement these actions and metrics to measure progress and allocate financial resources will be developed following completion of the plan. We will provide reports on progress to GLC Commissioners twice a year. We will assess progress and address emerging issues annually.
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