

Minutes - 2023 Great Lakes Association of Science Ships Vessel Management Workshop

Virtual Discussion held via Zoom on April 13, 2023 • 9:30 a.m. – 12:00 noon (EDT)

[Link to Zoom Recording](#)

Summary of outcomes from January 12, 2023 GLASS workshop in Traverse City – Mark Burrows

- 27th Annual Science Vessel Coordination Workshop was held January 12, 2023 at Great Wolf Lodge in Traverse City, MI
 - Great Lakes Captain Association met there earlier in the week so turnout was good for this meeting
- Hybrid workshop – 45 attendees in person, and up to 25 virtual participants/ 7:45 a.m. – 3:00 p.m.
- Northwest Michigan College offered a hands on training session offered in conjunction with the workshop on January 11th.
- Agenda, record of meeting and presentations available on www.CanAmGlass.org

Suggestions and comments:

- Inter-agency mutual aid agreements to assist with engineering, manning and operational issues; associated training needs.
- Crew retention & development – relief crews, need for berthing spaces on RVs conducting 24/7 surveys during field season.
- Communication of transient dockage information, costs, availability, problems, and options. Ships need places to tie up when docking, etc. Having a network to communicate that information would be helpful.
- Provide mechanisms to communicate with early adopters of new technology on RVs – this would be to help avoid any missteps.
- Share tech and engineering support expertise – library of resources.
- Partnership with Smart Ships Coalition – autonomous vessel operations.
- Create subcommittee for developing training programs in conjunction with annual workshop.

Some of these suggestions have come up in the past, Mark mentioned he would like to see some concrete action on these items by 2024.

Advancing science planning in the Great Lakes: Update on implementation of the IJC Decadal Science Plan and recommendations involving science vessels - Heather Stirratt, Great Lakes Regional Office Director, IJC

- The IJC has been focusing on water quality a long time. In 2022, celebrated 50 years under the Great Lakes Water Quality Agreement. Three objectives of the agreement: The IJC offers advice to the governments on implementation for meeting objectives, assess progress of the parties and governments, also conduct public engagement and outreach. There are 9 metrics under the plan that guide the IJC's work.

- Recently, the IJC completed their Science Strategy. Plan was first conceptualized in 2019 and focused on science gaps for each of the Great Lakes.
- Investment Priorities:
 1. Recruit and train new scientists and engineers from the technician to senior scientist levels
 2. Address critical gaps in the understanding of the ecosystem e.g., a Winter Research Initiative to understand what is happening during the least understood, most under sampled, and fastest changing time of the year
 3. Develop and implement the research and monitoring infrastructure including a backbone of long-term monitoring stations and programs, data management, and high resolution model forecasting systems.
 4. Establish Centers of Excellence to advance interdisciplinary science inquiry to support management, policy and economic decision-making.
- Strategy Objectives:
 1. Conduct baseline assessment of the current investment in Great Lakes research.
 2. Identify high level scientific questions and gaps to derive societal benefits and use driven management.
 3. Analyze research infrastructure required to fill the identified gaps.
 4. Assess human resource, education and workforce development needs and complexity.
 5. Introduce business case for required funds.
- Top Priorities:
 1. Climate change impacts on the Great Lakes (near and long-term)
 2. Winter dynamics
 3. Impacts of nutrients and resulting Harmful Algal Blooms, dead zones, nuisance algae
 4. Changing food web dynamics and chemical cycles as a consequence of invasive species, emerging contaminants, and external loadings.
 5. Applied modern scientific techniques in the Great Lakes ecosystem, e.g. remote sensing, and autonomous platforms and tools, advances in 'omics, AI and machine learning.
 6. Needs of underserved communities and groups related to the Great Lakes
 7. Ecosystem services identified and quantified, in order to restore, protect and manage the Great Lakes more effectively and sustainably.

The Science Strategy has been finalized and can now be reviewed at <https://ijc.org/en/sab/GL-Science-Strategy>. The IJC would like feedback on how to implement the strategy.

Next steps: Towards Implementation

Science Strategy → Science Plan

- More explicit/detailed description of gaps and needs
- Needed investments? Funding mechanisms?
- Governance – transnational system?

WHAT: Science Plan for a New Era

Patterned after ocean plans, linked to regional plans such as: science and technology for America's Oceans: A Decadal Vision, Ocean Science in Canada: Meeting the Challenge, Seizing the Opportunity by The Expert Panel on Canadian Ocean Science, the GLRI Action Plan III and the USGS Great Lakes Science Forum – Summary of Remaining Data and Science Needs and Next Steps.

This plan is different in that it is for planning ahead/early forecasting for challenges the Great Lakes will face in the future. It is more proactive versus reactive.

Why now?

The science strategy was well timed and the IJC wants to understand what the future may bring and how to prepare for it. IJC is advocating for funding now but will take time.

HOW: Plan for a new era...

IJC is looking to involve as many messengers as possible and build strong partnerships through the process of implementation of the strategy.

Feedback from GLASS, Vessel Operations and Crew: IJC looking for your input

- Help socialize the Strategy and need for the Science Plan
- **Provide IJC with information that will inform the plan:**
 - What are the **most pressing needs** for vessel operators and crews?
 - Where do **risks and gaps** exist from your vantage? What inventories/needs assessments exist that could help demonstrate these risks/gaps?
 - What **policies need attention** to ensure that collaboration is possible without additional liability?
 - What would you recommend for **governance of such a program** should one be funded for implementation?

Overview of the Smart Ships Initiative and summary of March stakeholders meeting – Travis White, Great Lakes Research Center

- In 2017, the State of Michigan, Great Lakes St. Lawrence Governors and Premiers and Michigan Tech created a memorandum for cooperation on autonomous shipping. The group is comprised of public stakeholders including state and federal agencies. International agencies from Canada, UK and Finland as well.
- Over 60 members with over 300 subscribers for the initiative
- Efforts from early on included testing of autonomous ships
 - Marine Autonomy Research Site (MARS) launched at Michigan Tech
 - Site helps researchers to understand how ships perform in various environmental conditions
- At GLASS workshop in January, practitioners got together to discuss deployment and operational strategies, understand some of the lessons learned and look ahead to challenges and barriers related to safety and tech readiness, as well as concerns that people may have.

- Who should be involved: Participants from GLASS and other Great Lakes practitioners (including commercial operators). Can contact admin@smartshipscoalition.org for more information on how to get involved.
- March 23 Practitioners Roundtable Discussion Recap:
 - There is a shortage of pilots, and it is difficult to be familiar with all the proprietary control systems for many different uncrewed platforms; there is an opportunity for a group like this to help our respective organizations leverage experienced people from other organizations to help plan and execute missions on the Great Lakes when specific needs arise or when missions are being planned in geographic locations
 - Challenging to communicate and coordinate uncrewed missions effectively across commercial and recreational channels; there's not a common practice for sharing or distributing float plans but this could be beneficial to establish
 - A Great Lakes region inventory of surface and subsurface vehicles and capabilities needs to be developed and made available with detailed descriptions using common technology; multiple participants in this group have started their own internal lists, which could be compiled and shared as a starting point
 - Uncrewed systems are generating massive amounts of data that needs applications; scientists need better methods for working with all available data
 - The group could work together on deployment guidance information for ASV/AUV missions; something simple like a 1-page checklist could be an excellent resource for this community
 - Data quality is sensitive to small operational differences, thus forming consensus around data collection and operating procedures and standards would be beneficial; this could also include guidance on identifying the right platform and sensors based on different mission needs and conditions
 - Feedback is inconsistent from USCG on the regulatory consequences of uncrewed system operations in the event of worst-case incidents; are captains ultimately responsible for UxS deployed from their vessel even when remotely piloted from shore
 - A pre/post season meeting of this group would be helpful to discuss mission planning and deployment strategies, document close calls, failures, lost equipment and share other feedback
 - This group might consider reaching out to the Lake Carriers Association to share information about science missions and inform commercial operators about the types of equipment being deployed
- Conclusions and Next Steps
 - Workgroup recording is available to anyone interested
 - A shared Great Lakes "inventory" of uncrewed science systems has been shared so others can contribute additional information
 - Proposed follow up meeting after the 2023 deployment season to debrief and work together on addressing some of the findings above
 - Document UxS deployment and operations best practices and distribute widely to stakeholders
 - Encourage greater collaboration between groups to share information, exchange services, and employ existing UxS assets in Great Lakes Region

Group discussion on coordinating science planning priorities and the safe use of autonomous vehicles (moderated by Joe Walters, USGS):

- inventory of autonomous equipment
 - Mark notes that the Science vessel website initially started out as a paper publication in the 1980's with inventory of science vessels. Now there is an online data portal that is operated by members of the Association. The manager of the association goes through the inventory list once a year and makes sure everything is up to date.
 - Mark suggests having a page and a map on the CanAm/GLASS website with vessels that are no longer operating.
- opportunities for mutual aid agreements
 - Warren recommends using several agreements that are already in place. CSMI committee through IJC.
 - There is already one mutual aid agreement in place; one signed by all the governors on response to AIS. Examples exist that GLASS could model.
- centers of expertise for autonomous technology
- other priorities

Developing a common language for fleet modernization and enhancement (Debbie Lee, NOAA's Great Lakes Environmental Research Lab)

Summary of efforts to recapitalize vessels to date:

- In 2017, the International Joint Commission, the Great Lakes Commission and the Great Lakes Fishery Commission requested that the Great Lakes Executive Committee under the Great Lakes Water Quality Agreement, undertake a Great Lakes science vessel fleet assessment as vessels across all agencies were aging
- In 2019, the NOAA OMAO Small Boat Recapitalization Plan was begun, involving all line offices, and was concluded in October of 2020
 - The plan recognized the SRV Laurentian as the highest priority for NOAA recapitalization
 - NOAA is preparing a vessel recapitalization plan for it's ocean going vessels and may include regional Class C vessels and small research vessels
- In 2019, Congressional direction to OSTP, via the 2019 Departments of Commerce and Justice, Science, and Related Agencies Appropriations Bill, resulted in OSTP undertaking a study on Great Lakes research infrastructure and small research vessels
 - A final report was completed and submitted to OSTP, having been cleared by NOAA, USGS, EPA and other agencies

- Due to the change in administrations, the report was never transmitted to Congress
- NOAA Chief Scientist followed up with OSTP in 2021; OSTP said the report was too dated to submit to Congress. Did not have additional Congressional direction so report was not transmitted
- In 2019, the International Joint Commission's Science Advisory Board began the Great Lakes Science Plan Work Group
 - A final report, Great Lakes Science Strategy for the Next Decade, was completed and submitted to the International Joint Commission and approved in Oct. 2022
 - "Updating the Great Lakes research fleet and associated platforms is a high priority and represents approximately one-third of this investment to provide for the additional of purpose built, interdisciplinary, all season state of the art platforms including ice-hardened and regional class research vessels capabilities."
 - In February, 2023 Commissioners approved the project Communication Engagement Plan
 - The SAB is now working on developing a work plan to create the science implementation plan.
- In 2022, following passage of the Bipartisan Infrastructure Law, the Great Lakes Fishery Commission and the International Joint Commission sent letters to DOC Secretary Raimondo and NOAA Administrator Dr. Spinrad supporting urgent recapitalization but no funds were allocated in the OMB approved spend plan.

Next steps:

- Can we develop a common language that we might use when talking about the importance of the Great Lakes science vessel fleet to members of Congress, high level agency officials and other audiences?
- How do we engage in the Great Lakes Science implementation plan?
- What are persuasive key talking points?