GLASS – Great Lakes Association of Science Ships

30th Annual Science Vessel Coordination Workshop Notes

Thursday, January 8, 2026

Updates from the 2025 Science Vessel Workshop and Science Support and Fleet Assessment Webinar (Mary Sabuda & Amanda Grimm)

- Exploring interagency mutual aid/technical assistance agreements to assist with engineering, personnel, and operational issues, funding, and associated training needs.
    - Review and evaluate existing models like existing agreements between EPA and USGS, etc.
- Need for a sustainable model for crew and development
- Continuing to improve the GLASS website as an information sharing tool
    - Communication of transient dockage information, costs, availability, problems, and options.
- One-pager on the importance of the Great Lakes Fleet as a resource for discussions with lawmakers.
- Continue building/expanding partnerships
    - With Coast Guard re: their developing AUV rules and regulations
    - Cooperation opportunities with UNOLS
    - Pursue greater Canadian involvement in GLASS

Coordination on large interagency projects

- NOAA Lake Ontario Sanctuary Shipwreck Mapping Survey aboard EPA R/V Lake Guardian (Jeff Gray – Thunder Bay National Marine Sanctuary, Eric Osantowski – EPA)
    - Exploring deep water Shipwrecks of Lake Ontario NMS
- Lake Ontario Sanctuary was recently designated
- Find shipwrecks through mapping or sending R/V
    - Journey to the Bottom of Lake Ontario (Eric Osantowski)
    - First contact from Jason Fahy (URI-OECI) and discussed RVLG Capabilities and Schedule
        - Discussed Concept of a Survey (May 2024)
        - Objective – Shipwreck exploration, photogrammetry, public engagement

        - Duration – 14 days, 24/7: 12 hours ROV
        - Collaborators – NOAA Office of National Marine Sanctuaries, University of Rhode Island, Ocean Exploration Cooperative Institute (OECI), NOAA Marine Activities, Resources, and Education NOAA Ocean Exploration
    - Planning period took about 12 months
    - Lake Guardian does not pay a daily rate
    - 14-day expedition (operations May 17-30) Use ROV to collect high resolution imagery of shipwrecks in the sanctuary
    - Rhody: Remotely Operated Vehicle – HD3 ROV Highlights: Rated to 300m
    - A 3D model of a shipwreck is built in real time
    - Three-Masted Schooner – Queen of the Lakes – foundered in a storm while carrying 480 tons of coal from Charlotte to Kingston
    - Documented 17 sanctuary shipwreck sites at depths from 130-650 ft
        - 4 sites previously undocumented
        - 1 new shipwreck discovery
    - Community Engagement & Outreach
        - Live Ship to Shore Interactions (8)
        - Local Student Ship Tours
        - Public Livestreams (3)

Vision: A thriving sanctuary system that protects our nation's underwater treasures and inspires momentum for a healthy ocean
Learn more at sanctuaries.noaa.gov/lake

- <u>Benthic Mapping Project (Hayden Henderson - MTU)</u>
    - Only 13% of the US Great Lakes area has been mapped to modern standards
    - Project Overview
        - Administered by NOAA's Office for Coastal Management and funded by GLRI
        - Many partners – federal, private, academic
        - Campaign to address diverse emerging littoral management issues (invasive species, habitat degradation, coastal erosion)
        - Informs restoration priorities and resource management
    - Background
        - Goal is to collect new bathymetry and validation data to support benthic habitat mapping in the 0-80 meter water depths to help

inform habitat and species restoration and protection efforts under GLRI

- Why Benthic Habitat Mapping?
  - Our nearshore areas of the Great Lakes area are very dynamic
  - Characterization Framework – the first ever comprehensive federal standard for classifying and describing coastal and marine ecosystems
  - Water Column → Geoform
- Challenges in the Field
  - Manual metadata collection prone to typos, missing information, and inconsistent entries. Exacerbated by multiple field teams
    - Solution is using Survey 123
    - Modernized Data Pipelines
- Bathymetry & Backscatter
  - Essential to initial substrate information, helps to determine where to send ROVs
- Sampling Design
  - Challenges: using LIDAR, MBES, AUV, ROV, Ponar together
  - Solution: Apply set standards
  - For larger more complex regions, divided into regional and low/high complexity strata for optimal sire allocation and logistics
- Equipment
  - ROV – Super Blue
    - Key Features -dual frequency side-scan sonar, high resolution down looking camera, Doppler Velocity Log
  - Drop Camera
    - Effective for shallow sites
  - Video Annotation using Tator
  - Image classification using AI
- Predictive Modeling: Madeline Island
  - High resolution maps – 8m grid
  - Machine Learning predictive frameworks:
    - Substrate composition (% cover) with multivariate random forest model
    - CMECS categories
- Future Work
  - Looking to receive FY25 and FY26 GLRI Funding

- GLATOS (Tom Binder - GFLC)
    - Presence/Absence Telemetry
        - Solitary receiver or arrays of independent receivers
        - Stationary (passive) or mobile tracking
        - Tag is within detection range of the receiver
    - Fine Scale Positioning
        - Calculations precise tag location based on difference of arrival times of signal on three of more receivers
        - Returns precise location of the transmitter
        - Can use heat maps to locate where fish are spawning, and then go in and collect samples of embryos
    - What is GLATOS?
        - Multinational network of researchers who collaboratively use telemetry to understand fish behavior to address pressing management needs
        - 403 members
        - Provide coordination, Data Services, Technical Assistance, Research, Equipment Loans
    - 2025 Network Stats
        - 3,530 active receiver stations
        - More than 30,000 tagged fish
    - Collaborative effort to convert existing project-based receiver infrastructure into lake-wide grid that will serve multiple projects

Panel on Great Lakes R/V Science

- R/V Thomas Jefferson In-Depth Survey of Lake 2024 + 2025 (Capt. Greenaway – NOAA OPS)
    - Lake Erie and Ontario
    - Schedule and Estimates
    - 158 Planned DAS
    - April 4 to October 15, 2026
    - Mix of NOAA and Contractor Effort
    - Possibility of DriX Uncrewed System
    - Approximately 55,000 + LNM
- R/V Blue Heron Lake Superior Ecological Observatory Mooring Maintenance (Jay Austin – UMD)
    - Motivation

- Response to a GLOS RFP for improved winter observational capability
- Work is at western site at Lake Superior
- July 2024 – July 2025
- Measured things like Temperature at 60 depths, Pressure sensors, Multiparameter sonde, Sediment Trap, I hydrophone and more
- All of the work was done through the Blue Heron
- Successful design, deployment, and recovery of an unprecedented suite of gear

- <u>R/V Blue Heron Ship Goo (Cody Sheik – University of Minnesota Duluth)</u>
  - Mysterious Ship Goo
  - Story started with the R/V Blue Heron in dry dock in 2024
  - They found black goo coming off the shaft of the rudder
  - Brought the goo back to the lab and became a thick tar like substance after cooling with a metallic sulfur smell to it
  - Passed off goo to a graduate student to look for any traces of DNA
  - Relative abundance of ship goo with around 25% Novel Thermoplasmatales archaeon (ShipGoo001)
  - This is the equivalent of finding a new type of vertebrate animal
  - Many of the locations are associated with hydrocarbons
    - Tar pits
    - Oil wells
    - Soils impacted by hydrocarbons
    - Floating tar balls
  - What does ShipGoo001 eat?
    - Carbs and fats and releases CO_2, vinegar, and ethanol (fermentation)
    - No oxygen present! Oxygen is like kryptonite and will kill it.
  - Bigiw mookibil strain shipgoo001
    - Ojibwe for “pitch or tar”
  - How do these organisms survive?
    - The waters and boats travel in are laden with all sorts of microbes, plants, animals, and other organics (oils, spilled fuel, etc.)
    - The housing provides a relatively stable environment for these organisms
    - There can be pulled into the housing where the microbes are ready to eat, and for biofilms
  - Does ship goo still exist?

        - Hard to say! It was cleaned very thoroughly
        - We would have to put the ship back in the dry dock and pull the rudder again to find out if it still exists
        - Other ships may have their own ship goo! If they have similar designs that allow waters to enter and exit.

Discovery Pier & Freshwater Center Project Update (Matt McDonough – Freshwater Research and Innovation Center)

- Started redevelopment of the pier and transforming it into a base for education and recreation in 2002
- As soon as it was opened people were using it for recreation and education
- Active programming at the site includes Schoolship Program where students can come out on the ships, ROV Program where middle school students design ROVs, Discovering Careers in Marine Technology
- Education, Research & Development, Innovation, Economic Development
- Would it make sense to move the meeting here in future years? Possibly set up field trips?
- Facility is under construction on mark to be completed by March 2027

30 Years of GLASS: Strategic Planning Discussion (Mentimeter)
Panel Group: Chris Winslow – OSU, Brandon Bastar – WDNR, Joe Walters – USGS, Dennis Donahue – NOAA)

- History of GLASS – 30 Years of Communication
    - Great Lakes Research Vessel Inventory
    - Over the last 30 years there have been a number of decommissioned vessels but there have also been a number of new builds
    - Fleet Inventory – over the course of the past 30 years the average age of vessels has not changed (ranging from 29-36 years old)
    - Early Planning for:
        - EEGLE Project on Lake Michigan
        - KITES Project on Lake Superior
        - 16 Institutions
        - $10 Million from NSF/NOAA
    - Great Lakes Fishery Commission
        - Revised Strategic Plan

        - USGS included as lead agency
    - 1996 Workshop
        - International Joint Commission (IJC) and the Great Lakes Commission (GLC) convened the first Research Vessel Coordination Workshop
            - Demands for science-based decision making are increasing while funding resources are being reduced
            - Can capabilities be maximized through better communication of resources
            - Is there unnecessary duplication?
            - Are there unmet needs?
            - Can an institutional arrangement improve operational efficiency?
    - First Vessel Coordination Workshop
        - Research Managers/Administrators
        - Scientists/PI's
        - Operations Managers/Captains
    - Objectives
        - Create a strategic plan to promote more efficient use of Great Lakes research vessels – through enhanced communication and cooperation.
        - Produce a comprehensive inventory
    - Notional Approach
        - Pool vessel resources
        - Managed by Committees
        - Allocate vessels per science priorities decided by the committees
        - Share personnel and equipment
        - Advocate for funding

        [Of course the reality of this is determined by authority, responsibility, and priority following the funding]
    - Fleet Diversity
        - Mandates – Surveys, Monitoring, Mapping, Buoys
        - Emerging Issues – PI Focus, GLRI, CSMI, New Tech
        - Aspirational – Education, Exploration, Outreach
    - Early Years of GLASS
        - Meeting Locations rotate throughout the Basin
            - "Captains roundtable" proved beneficial
        - Captains/Operators embraced effort

            - Annual workshop focused on operation ussies/vendors
        - 2001 Web based inventory and resources
        - 2005 GLASS Workshop is aligned with GLCA
            - Co-sponsored training at GLMA
            - GLASS is a breakout session at Industry Days
        - 2007 Improved GLASS visibility
            - Brochure
            - IAGLR presence
        - 2011 GLASS Workshop follows Industry Days
        - 2019 Engagement with Fleet Managers
    - Future GLASS Initiatives
        - Revisit our strategy
        - Based on current realities
        - Advocate for balanced mutual success
        - Technical resources for science strategies
        - Highlight successes
        - Promote career opportunities
        - From partnerships for mutual benefit
        - Create mechanisms to transfer funds
        - Support resources
    - Could GLASS find a way for funds to be transferred between organizations more easily?
- <u>Open Panel Discussion</u>
    - Discussed
        - age of vessels in Great Lakes compared to other areas
        - inviting commercial researchers in Great Lakes
            - survey operators like NV5, GEO Dynamics, LimnoTech
            - as well as the autonomous platforms we are seeing like Sail Drone
        - value of GLASS in part is to learn about a bunch of things that we can be a part of that I didn't even know exist.
        - Funding for GLASS moving forward
        - Vessel design and construction process to website/discussions
            - a short talk on the steps, whether its just the basic design process etc
        - convening day-long workshop on different topics. Is there merit is that, or could we convene experts only on that.

        - people on the education and community engagement side can do a lot of the "highlighting successes" work. watch parties for livestreamed events from vessels. Working with the National Museum of the Great Lakes in Toledo's fall career day where hundreds of students come to learn about different maritime careers including research. Partner with museums to support engagement efforts.
        - subgroup of GLASS for education – for those vessels that offer educational programming as well as research, we could gather the educators who are managing these kinds of outreach programs. It could be exciting to gather around emerging topics in Great Lakes literacy/education
        - support information sharing – could share about dock information, like number of slips, currents etc. We could share ideas on mooring information, ports, shipyard deployment practices too

<u>Around the Lakes: Short updates and lessons learned regarding vessel operations, shipyard and drydock experiences and research coordination (Moderator: Brandon Bastar – WDNR)</u>

- Dennis Donahue
    - NOAA/GLERL Update
    - Black water tank on the Laurentian was completely rusted through when brought up for dry dock, two vents on the black water tank, captain plugged off the portside vent which stopped air from circulating through
- Mark Haffley (PA) – PA Fish and Boat Commission commissioned the building of a new research vessel to replace 1959 steel and aluminum construction vessel, the Perka. The Perka has served the Commission for a long time and it's been a wonderful piece of equipment and we've been very fortunate to have it. Everything's still original, still has the original 671 GM diesel in it, still has an original 12-inch head. So everything is still operational. It was just time to upgrade. So, we commissioned this vessel about five years ago working with Mark Pudlow at Seacraft Design.
- Captain Max Morgan (University of Wisconsin Milwaukee School of Freshwater Science – Captain of Neeskay)
    - Majority of trips are for research and sometimes educational purposes (Research, Classes, Outreach)
    - Busy times in spring and fall
    - 67 trips this year, but would love to see it up to 90-100
    - Project this winter with the USGS Bloater Mid Lake Reef Project

    - There are many challenges of operating in winter (ice!!)
    - Found bloater eggs in the stomachs of bloater predators which were sucked up from ROV
    - Started looking into Marine Tech Society Microcredentials, trying to get the program at the university, work with students as our deckhands, but would like to formalize this process with the students
    - Working on collecting funds for finalizing a new build
- Joe Walters (USGS) – additional projects and updates–
    - adding an emergency steering system
    - Shaft tack installed on the bridge
    - Replacing a bilge pump as a fire pump to be used as washdown
    - Replacing flush valves
    - Windows on the bridge will be re-gasketed
    - Deepwater program has now been funded through 2030
- Captain Mike Montenaro (Milwaukee Metropolitan Sewerage District)
    - captain of the research vessel Pelagos, but it's been down for the last year.
    - Received a qualifying bid from MetalShark, now awarded and going forward.
    - They proposed something based off their 45-foot defiant model.
    - Present more in detail next year?
    - Supposed to be delivered mid-October this year.
    - Fast turnaround that they were willing to meet, so hopefully we'll be able to tell you more as we go on.

<u>Workshop Wrap Up and Action Items (Mary Sabuda)</u>

- Collaboration Opportunities
- New Partnerships
- Recognized Mark Burrows for his work with GLASS