Great Lakes Association of Science Ships

Fleet Assessment & Science Support Webinar Notes

April 24, 2025 1:30 – 3:30 pm ET

Welcome and Introduction | Tom Crane, Amanda Grimm, Mary Sabuda

Summary of Outcomes from January 9, 2025 GLASS Workshop in Traverse City | Mark Burrows

- 29th year for the workshop
- 46 registered participants
- Goals included
    - Discussing strategic and sustainable training model that addresses the needs of a 21st century fleet
    - Continue dialogue on science vessel planning & opportunities for expanded role for GLASS through IJC's Science Advisory Board
    - Review & finalize the one-pager about the importance of the Great Lakes fleet
    - Learn about UNOLS and how UNOLS uses its committee structure to advance its work
    - Continue dialogue with the Smart Ships Coalition regarding ASVs, AUVs and challenges/opportunities regarding their deployment, use, and regulation
    - Hear from each other about successes/challenges over past year
- Outcomes included
    - Updated CanAmGLASS website contents & functionality
    - SAB-RCC discussing expanding GLASS initiative
    - Understanding the role of Science Vessels in a Great Lakes Binational Science Plan
        - Discussed aspects of the science plan and how it could advance vessel owner/operator goals, objectives, and science gaps.
    - University of Michigan R/V Carbon Footprint Project – marine emissions decision support tools; goals to reduce emissions & environmental impact
    - Collaborative benthic habitat mapping project update
    - Updates & lessons learned regarding vessel operations, shipyard & drydock experiences, and research coordination
- We welcome more participants for the GLASS steering committee

Update on Plans for CSMI (Lake Michigan 2025, Lake Superior 2026)

- Unfortunately, Beth Hinchey Malloy had a scheduling conflict at the last minute, but shared a couple updates with the group via email that were relayed to the webinar audience:
- The planned multi-US agency 2025 CSMI lower food web sampling for Lake Michigan is being postponed to 2026 due to budgeting delays; the same delays have also impacted the planning schedule for 2026 Lake Superior CSMI.
- For a GLNPO update for 2025 CSMI, the following Lake Guardian surveys are planned:
- **Lake Michigan**
    - April & August – 12 Lake Michigan nearshore phytoplankton/nutrient stations added to GLNPO Spring & Summer Survey (EPA, U Minn-Duluth)
    - June 19-13-Great Lakes Sediment Surveillance Program survey in Lake Michigan (EPA, USGS, U Minn-Duluth)
    - June 23-28- Great Lakes Fish Monitoring and Surveillance Program lower food web contaminants survey in Lake Michigan (EPA, Clarkson Univ)
    - July 7-13- Shipboard Immersion Survey for Educators in Lake Michigan (EPA, Center for Great Lakes Literacy)
    - July 16-27- Lake Michigan Benthic Survey (EPA, NOAA, USACE, SUNY Buffalo State)

Challenges for science vessel operations panel

Improving vessel operations, efficiency, and safety | Tyler Chapman, USGS

- Great Lakes Science Center mission is for deep water science & it's in support of fisheries management with objective science
    - Restoration + fish population protection
    - Science arm of DOI and support FWS, NPS, and provincial and state agencies
- Gave an overview of their fleet – 5 large R/Vs
    - Kiyi – Lake Superior
        - Bigger vessels on upper lakes, Kiyi is biggest
    - Arcticus, Sturgeon – Lk MI/ Huron
    - Muskie – Lake Erie
    - Kaho – Lake Ontario
        - Muskie & Kaho are sister ships
- Capabilities

    - Data collection techniques
        - All ties in to how they support the overall mission
        - All ships are outfitted with cranes, net reels, winches,
        - Conduct surveys, hydroacoustics, telemetry, water sampling, gill nets, trawls, etc.
        - Customize ships –
            - Muskie added ferry box – gives live water sample as going through an area
            - Arcticus, made net reel on back deck removable so more space to deploy other technology
        - Surveys are 1 week – 4 weeks at a time, usually use generator. Limiting factor is what tanks can hold
- Ships are on 5-year rotation for maintenance in Great Lakes shipyards
    - Sturgeon (2022)
    - Muskie (2023)
    - Arcticus (2024)
        - Brought it back from shipyard second week of January – would have had to leave it at shipyard if they didn't
    - Kiyi (this fall)
- Re-powers: Muskie / Sturgeon next on docket for '26/27 if receive funding, planning to discuss what might be used to repower them with.
- Maintenance:
    - Sturgeon has most fuel efficient
    - 8V MTU engine Muskie/Kahoe are less fuel efficient.
    - All ships have twin main drive engines generators
    - Arcticus – Cat C-12's, 200T
    - Kiyi – QS K19s, 525 & 800 HP
    - Crew is good, keeps up on maintenance
- Crew
    - Kiya/Sturgeon - 500 ton merchant master license
    - Arcticus - 200 ton minimum
    - Muskie/Kahoe- 100 ton minimum
    - Mate operator positions for upper lake ships – hold equivalent of what expect for the Master
    - Hire third person, Maritime machinery repair/ engineer. Doesn't require license but good to have MMC
    - Can hire deckhand on larger R/Vs
        - Deep water biologists/techs fill in as deckhands

- Safety
    - Large Safety Management System – bureau level guidance for safety requirements
    - Fire, man overboard, abandon ship, etc.
    - At least 1 training per quarter or with new crew, within 24 hours of arrival.
    - USGS SMS is based on voluntary substantial compliance with requirements of international safety management code, and 33 CFR 96
        - Vessels >26', <300 GT
        - Chapter 33 CFR 96 250 ISM Code + USGS policy used
        - They use exam checklists/ inspection/schedule verifications
        - Annual streamline inspection program for vessels & third-party condition assessments, oversight inspections in conjunction with shipyard periods
    - Benchmark after USCG SIP
    - Always trying to make things better & safer
        - Developed vessel seamanship program for captains to help train people new at the job – supplement to SMS

Observing systems gaps and Lakebed 2030 | Tim Kearns, GLOS

Operate somewhat binationally, have number of Canadian partners

Publish all data collected publicly – see on Seagull. Real time model & data for people to consume.

- Discussed Smart Great Lakes Initiative
    - Coalition of organizations, technology, people interested in seeing more of an interconnected tech ecosystem in the Great Lakes. Been moved around in terms of chairs of committee
        - tim@glos.org can share more info about that.
- LakeBed 2030
    - Region-wide initiative for comprehensive high res mapping in the Great Lakes
    - Strategic initiative -> execution now. Started in 2018, named from Seabed 2030 – global initiative to do something similar.
    - 2020/21 region-wide survey prioritization study w/ NOAA
    - Data analysis/Gap analyses completed, assessed where do they have what kinds of data – available now.
    - Infographic, super easy visual way for people to understand mapping in GL, surveying, why need to do it.

- Seagull
    - IT platform that underpins everything they do. App and more.
        - Data processing, storage, metadata, etc.

Costs & approaches

- Building the Great Map: Costs & Approaches. Put together plan to assess how much it'd really cost to do high resolution mapping
    - $200M
- Before this, only mapped in low resolution 1950s-70s. In late 70s, NOAA pulled out from doing continuous surveys in the Great Lakes
- R/V Thomas Jefferson came in last couple years, plan to come back.
- Big economic reasons to map the great lakes
    - Both in reasons to do this, and reasons not to.
- Why do this?
    - Understand underwater infra
    - Coastal erosion
    - Assess benthic habitat & mapping
    - Safely navigate
        - GLOS is not Office of Coastal Survey or Canadian hydrographic service but data would benefit for updating their charts
    - Measure effect of climate change
- Ways to map
    - Traditional mapping
    - Autonomous/ uncrewed tech
    - Aerial platforms
    - Swarm robotics
    - Resources required
- Crowdsourced bathymetry
- Indicators of success to Lakebed 2030
    - Data is last one remaining
        - Taken 40 million soundings so far.
        - Trusted node, GLOS #4
        - Single beam echosounders
        - Orange force marine + GLOS / pipelines for data
- Lakefloor.glos.org
- There is not a systematic effort in place to map the Great Lakes.

    - US is not doing it, neither is Canada.
    - Missing 85% of high-resolution data.
- To do
    - Enhance seagull lake floor
    - Expand crowd sourced bathymetry
    - Educate the public
    - Fund the project
- Commercial/recreational craft have depth sounders, can be used for this.
- If stakeholders have data they want to share from high resolution mapping performed, can email underwater@glos.org
- Have had some IIJA funding and other smaller grant funding to get things done
    - Data collection is biggest part, and no funding in place to get that done

Winter science operations and safety | Tracy Girard, USCG Sector Detroit

- USCG District 9
    - Operation Coal Shovel
        - Sector Detroit runs lower Lake Huron, St. Clair system, Lake Erie, Lake Ontario
        - Use CGC Neah Bay, Morro Bay, Bristol Bay, and Sequioa, plus CCGS Samuel Risley & Griffon
    - Operation Taconite
        - Lake Michigan, Superior, Straits of Mackinac, and northern part of Lake Huron
        - CGC Spar, Mobile Bay, Biscayne Bay, Katmai Bay, Mackinaw
- Canadian Great Lakes Icebreaking supports both
- USCGC Capabilities
    - 140’ WTGB tugboats
        - Neah Bay, Bristol Bay, Morro Bay, Katmai Bay, Mobile Bay, Biscayne Bay
        - Break 20” ice at 3 kts
    - 225’ WLB
        - Spar and Sequoia
        - 14” ice at 3 kts
    - 240’ WLBB
        - Mackinaw
        - 36” ice at 3 kts
- Canadian Risley & Griffon

    - In sector Detroit region the entire winter, departed and shifted to aton a few days ago
- Ice Season
    - On 2/22 had 52% ice cover, considered average winter
    - Op Coal Shovel 1/6 - 4/14
        - 900 icebreaking hours just for US hours
        - Almost 2000 hours of Canadian icebreakers
    - Operation coal shovel US side
        - 141 vessel transits assisted
        - 26 ice recon flights conducted
        - 2 ice jam responses
        - 100 days of operation almost
- Challenges
    - Livingston Channel
        - Last winter had SE wind, pushed ice into channel, resulted in a jam.
        - Had to break the area out
    - St. Clair River
        - If natural ice dam/bridge does not form on Lake Huron, causes Lake Huron ice to flow down St. Clair River, cause jams where St. Clair River meets Lake St. Clair
        - M/V Manitoulin 664' Canadian flagged laker Buffalo-departed, Sarnia-bound for layup. Beset 15 yards from Buffalo's break wall in about 2' ice. It took 4 icebreakers and 3 days to get them free.
            - Cutter Bristol Bay, Samuel Risley cut relief tracks
            - Cutter Neah Bay
            - CGC Mackinaw on the way to help
            - Tugboat assist
        - M/V American Mariner
            - In Buffalo as well, departing there.
            - Wind shift can change things quickly
            - Fairport harbor ice jam. 2/27 on Grand River, flooded coastal communities.
            - Packed entire harbor with ice, when American Mariner was leaving, thought it was ice free, but it wasn't the case. Tug Oklahoma was unable to clear the path, CGC Griffon was unable to assist due to limitations but was waiting outside the

harbor. Couldn't get close to the ship like a small tugboat could.
        - 24h later, had wind shift and the ship was able to free itself.
        - USCG coordinated with Army Corps and local emergency managers
        - Supported multiple overflights from AIRSTA Detroit to gather imagery
        - 5/6 ice jam cleared itself
        - Cutters couldn't help because of the depth
    - New GLIB is in procurement stages now
        - Definitely going to be funded but the timeline is less clear
        - Timeline to completeness is 5-6 years at least

GLASS Vision for the Future | Tom Crane

GLASS effort has been under-publicized

Power of GLASS and opportunity for GLASS to do more going forward can be valuable

1997 funding challenge for agencies, universities operating vessels, particularly on Canadian side, not a lot of coordination going on between agencies, states/federal government, states/provinces, etc. Brought people together for a first workshop

Spent a lot of time talking about needs and challenges, came out with Action Plan in 1999

Tom focused on the Action Plan, which is due for an update.

- Spent a lot of time talking about how to modernize for the 21st century
    - Updated action plan should be documenting changes in the region & fleet
- Part of that is:
- Review fleet assessments & fleet recapitalization efforts
    - Tom has been spending time reviewing these – quite a few of them. Compiling them, may want to include as annotated bibliography
- Reporting progress/success stories over 25 years
    - Should promote those & document them
- Role of the fleet in advancing science planning efforts
    - USGS open file report
        - Presented a couple years ago at a spring webinar
    - IJC 2022 decadal science strategy released, has been helpful in reshaping thinking about science vessel action plan.
- 1999 Categories

    - Lot of these centered on need for coordination & networking among different agencies/universities/institutes operating science vessels in Great Lakes.
        - Comms/info sharing – website.
        - Institutional / Admin Requirements
        - Program Development/ Coordination
        - Funding
            - Opportunities for modernizing the fleet
            - New builds & retrofits
            - Needs for reliable funding for O&M of vessels
        - Advocacy & Coalition building
            - Designed to say how do we promote GL science vessel fleet and how to communicate value of fleet to Members of Congress and Parliament
        - Training / recruitment of captains, crew
- Realign categories with decadal science strategy priorities – need to do
    - Basic research needs
        - Cold weather research/winter limnology
    - Data collection, monitoring, and forecasting
        - GLOS?
        - Define role of the fleet in fulfilling this mission
    - Human capital
        - Workforce development
        - Crew recruitment & Retention
    - Research infrastructure / Centers of Expertise in science strategy
        - Shore-based infrastructure – dockage, piers, navigation aids etc.
        - Research infrastructure / labs, new technology
        - Fleet modernization & recapitalization
        - AUV regulations & use
        - Educating public
        - Binational coordination challenges & opportunities – better define science plan
    - Tom has taken some time to start reworking action plan
        - Weave in some of the work GLASS has been doing over the past decade to address some of the things in the decadal science strategy
        - Good time to do this work
- Chicken & egg – science vessels are out on the lakes to tackle science missions
    - Challenge - lack of long-term science plan so vessel operators can react to those needs and plan accordingly

        - 5- year timeline between map requirements for a new vessel and having it out on the water
        - Decadal science plan is key to this
        - For vessel operators to reinvest in their platforms, dependent on long-term vision on the science requirements and some level of clarity on where they think the science is going 5-10 years from now.
        - Support work to defining plan and secure funds so vessel operators can plan accordingly
- Opportunity for private sector contributions and others too
        - Orange Force Marine could be leveraged
            - Industry vessel chartering as options for research vessels
            - Help increase cost efficiencies, adjust the schedule, incorporate alternate service delivery

Workshop Wrap Up

- Planning for Jan 26 workshop, location & agenda topics
    - Like Sault Ste Marie and Traverse City as the venue, often co-locate with Great Lakes Captains' meeting because attendees often go to both. Will coordinate with them on venue.
- Last reflections on any discussion topics

Workshop Adjournment