

# Coordination and Management of Science Vessels on the Great Lakes

## *An Action Plan to promote cooperation in the scheduling, operation, maintenance, research and monitoring activities of Great Lakes science vessels*

### **Introduction**

Science vessels play an integral role in the conduct and support of research and monitoring projects particularly in oceanic and large lakes environments. In the Great Lakes, the largest freshwater system in the world, science vessels are an important component of the binational research and monitoring efforts designed to protect the quality of the Great Lakes ecosystem.

Great Lakes science vessels are owned and maintained and operated by federal agencies, state and provincial agencies, municipalities, universities and private companies from the eight state, two province region. These vessels support a range of research and monitoring activities related to the physical, chemical and biological attributes of the Great Lakes.

Demands for science-based decision making in the binational Great Lakes Basin are increasing, while funding and related resources for research and monitoring activities are being reduced or otherwise constrained. Science and vessel managers alike have acknowledged the need to better manage the important research tools (i.e., our vessels) that are so critical to the mission of implementing an effective research and monitoring program for the Great Lakes.

Earlier attempts at Great Lakes research vessel coordination started but stalled. The former Great Lakes Basin Commission prepared a report in 1979 titled *Great Lakes Research Vessels: Information Directory* that briefly described the science vessel fleet, features and capabilities. In 1983, the Surveillance Work Group of the International Joint Commission's (IJC) Water Quality Board published the *Great Lakes Vessel Inventory* with a photograph of each vessel, a listing of research capabilities and specialized equipment and the 1983 vessel schedules. The intent was to update and distribute the schedules on an annual basis to facilitate sharing and avoid duplication of effort. There was reluctance by some agencies and institutions to publish in advance, their annual schedules and the project was accordingly canceled.

The recent downsizing of many research programs in the Great Lakes in both the U.S. and Canada has prompted renewed interest in Great Lakes science vessel coordination. A public forum on the future of Great Lakes science was held in Duluth, Minnesota in October 1995 in conjunction with the IJC's biennial meeting. The participants at the forum recommended, among other things, improvements in coordination and sharing among the fleet of Great Lakes science vessels.

On March 11-12, 1997, a Great Lakes science vessel coordination workshop was held in Detroit, Michigan. The workshop was attended by more than 70 individuals representing the scientific, management and operations side of science vessel use in the Great Lakes. The purpose of the workshop was to gain a better understanding of science vessel operations on the Great Lakes, to discuss opportunities to integrate scientific research and monitoring activities and to begin creating opportunities for effective cost sharing, coordination and collaboration of operations, maintenance and science activities associated with Great Lakes science vessels.

In addition to hearing a series of informational plenary presentations, workshop attendees were separated into smaller "breakout" groups for the purpose of generating ideas and recommendations related to the cost-effective management and coordination of Great Lakes science vessels and the scientific capabilities of vessel related research programs. Attendees were asked to participate in one of three breakout groups: Cooperation-Science; Cooperation-Management; or Cooperation-Marine Operations. A modified nominal group process was used in the breakout sessions to ensure consistency in approach and maximize the opportunity for participant input. Workshop participants were given background information and instructions on using the nominal group process and were asked a series of questions related to their issue area:

### Cooperation-Science

- How can schedules and research/monitoring programs be better coordinated?
- What are the individual and collective scientific capabilities of science vessels and where are the current needs?
- What features should an Internet-based communication system have for research vessel coordination?

### Cooperation-Management

- What type of institutional arrangements might be developed to ensure that coordination initiatives are pursued on an ongoing basis?
- Are there structural and functional alternatives that can improve the efficiency/cost effectiveness of science vessel fleet management?
- How can new coordination initiatives be funded on a sustainable basis?

### Cooperation-Marine Operations

- What instrumentation/equipment is presently available in the science vessel fleet, and what opportunities exist for transfer/sharing?
- What kinds of cost-sharing initiatives might be instituted (e.g., dockage, design, joint requisitions, shared training, safety standards, inspection protocols, standard operating procedures)?

Based on these questions, the breakout sessions generated scores of ideas for developing an action plan for the cost-effective management and coordination of Great Lakes science vessels and their related research and monitoring programs. The project steering committee has developed the following set of findings and recommendations from the ideas generated at the vessel coordination workshop.

Implementation of these recommendations will be a shared responsibility of all of the individuals, agencies, companies and organizations with an interest in or direct involvement with the management or operation of Great Lakes science vessels. The steering committee urges all readers to identify one or more of the recommendations in which they can assume a leadership or support role. The steering committee's commitment to and interest in the efficient management and coordination of Great Lakes science vessels will continue and readers are encouraged to share their progress in the implementation of the following recommendations.

## **Categories**

### **Communications/Information Sharing**

#### ***Background***

Communications and the need to share information about the scheduling, operation, maintenance, personnel and science requirements of Great Lakes science vessels was identified as an extremely important issue toward promoting cooperation and coordination of vessel-related resources. Providing federal, state, provincial and local agency personnel as well as interested parties from research, university, private and marine operations sectors with data and information about Great Lakes science vessel resources will create a more effective and efficient fleet and reduce any unnecessary duplication of effort. A formal mechanism (or combination of mechanisms) for communicating and sharing information that will help managers better coordinate the use of science vessels is imperative.

An multi-faceted communications program designed to provide access to and share information within the broad Great Lakes community of science vessel users should be developed.

The use of the internet and the world wide web has been identified as the most desirable and primary mechanism for communicating information on the Great Lakes science vessel fleet. Both a research/science vessel web page and an electronic database/inventory containing detailed science vessel information are viewed as two essential elements in the use of this communications technology.

An intranet component will also be an important element of the overall communications program. This will allow for restricted and confidential communications between and among vessel and science managers and might include things such as: certain financial information, some safety and personnel issues, some equipment/manufacturing/supplier information and other issues that may be considered inappropriate to share with the broader Great Lakes science vessel user community.

Information\education and advocacy materials and strategies will also be developed as a component of the communications program. This aspect of the program will inform, educate and articulate the importance and value of Great Lakes research and programs activities and the vital role that science vessels play in advancing these programs. Information on the efficiencies and benefits of vessel related research and monitoring and how these activities relate " to federal, state, provincial and private mandates will be highlighted.

## ***Recommendations***

1. An ad-hoc committee should be established to design, develop and implement the science vessel coordination communications program. This will include not only the internet component, but also the "intranet" component, the main forum for exchange of information among and between those working in marine operations. Membership of this group should include (at a minimum): the Great Lakes Commission, Great Lakes Environmental Research Laboratory, Great Lakes Fishery Commission, US EPA-Great Lakes National Program Office and USGS-Great Lakes Science Center.
2. A Research/Science Vessel Web Page should be established. This should include linkages to other web pages including local, regional, national and binational home pages; access to real time data (e.g., water levels and weather information); extensive information on the vessel fleet; information on the importance of science vessels in the conduct of Great Lakes research and monitoring programs; schedules and calendars; and other information to be identified. The Great Lakes Commission (with input from the ad-hoc committee identified in recommendation 1) should consider serving as the lead agency in web page development.
3. A forum for information exchange for vessel operators should be established covering such issues as vessel maintenance, safety, personnel and equipment requirements and costs of vessel operation. This forum might include several components such as electronic list-serves, intranet communications, newsletters and regularly scheduled meetings.
4. An electronic, interactive database to house extensive data on the Great Lakes science vessel fleet should be developed. This database (i.e., vessel inventory) should rely on the recent *Research Vessel Inventory* developed by NOAA's Great Lakes Environmental Research Laboratory. It should include (at a minimum): vessel capabilities; size and other parameters; cost of operation; crew information; on-board accommodations (e.g., sleeping berths); vessel operating restrictions; and training requirements. Rules and regulations for the proper operation, maintenance and safety requirements should be posted. The posting and sharing of vessel work and sailing schedules will be an over-arching component of the inventory/database. Use of the Great Lakes Information Network (GLIN) to house the database/inventory should be pursued.

5. Information/education materials and products should be developed to promote the importance of a science vessel coordination program and how the use of vessels supports Great Lakes research and monitoring activities. This approach should articulate the importance and value of Great Lakes research and monitoring programs and publicize the costs of these activities as compared to the value of Great Lakes air, land and water resources. This information should be tied to the mandates of state, provincial, federal and regional agencies and to the variety of international agreements such as the Great Lakes Water Quality Agreement.
6. An Information/Education work group should be formed, and charged with developing the information described in recommendation 4. This group should identify potential target audiences and users of the information and tailor the materials and products for each user group/target audience. A thorough inventory and survey of undertaken to identify user communities of Great Lakes research and monitoring information.

## **Institutional/Administrative Requirements**

### ***Background***

Historically, agencies, universities and other research groups have planned their research and monitoring activities and coordinated the use of science vessels to support those activities based on the needs of the individual agencies/universities/scientists involved. Coordination/cooperation has occurred on an "as needed" basis and many effective and ongoing partnerships and coalitions have been formed to maximize the use and efficiencies of science vessels. Many of these "informal" arrangements have worked quite well and those agencies, universities and groups that have experienced positive results from these relationships are encouraged to continue and expand them as necessary. However, a more formal approach to the management and coordination of Great Lakes science vessel resources may require the development of new institutional/administrative arrangements to help put these coordination activities into practice.

### ***Recommendations***

1. The vessel coordination project steering committee should be institutionalized. Membership of this group will include at a minimum: Great Lakes Environmental Research Laboratory (NOAA); Great Lakes Science Center (USGS); Great Lakes Commission; University of Wisconsin-Milwaukee, Center for Great Lakes Studies; Department of Fisheries and Oceans, Canada Centre for Inland Waters; One or more state agencies that operate science vessels; U.S. Environmental Protection Agency-Great Lakes National Program Office; U.S. Environmental Protection Agency-Duluth; and U.S. Fish and Wildlife Service.
2. A consortium (or consortiums) of agencies, universities, municipalities and private sector groups should be established to coordinate the planning, scheduling, operation and maintenance of Great Lakes science vessels. This association should be able to deal with all aspects of science/management and operational aspects of Great Lakes science vessels. Each participating group/agency should identify a contact person for the purpose of coordinating science vessel issues within his/her laboratory/university/center/agency, etc. One or more subcommittees of this group should be established for approving and streamlining international travel requests, establishing protocols for rapid response to meet research needs (e.g., introduction of new invasive species) and handling disputes/resolving conflicts over shared resources. This structure might work best on a lake-by-lake basis to avoid becoming too large and unresponsive.
3. Lake committees should be established to coordinate activities on a Lakes specific basis. These committees will coordinate their activities through the umbrella organization identified in recommendation 1. As part of this committee structure, a lead federal agency (in both the U.S. and Canada) and a lead vessel might be established to coordinate research and monitoring activities on each lake.
4. A cooperative or "brokerage" (with public and private partners) should be developed to provide a full range of vessel-related support and services. This should include sharing basic science vessel equipment (both scientific and safety), special equipment (e.g., deck gear, portable generators), on-board laboratory facilities and container labs. This approach might also serve with regard to sharing facilities, dockage, repair and maintenance resources, greater near shore support, ice-breaking or under ice capability, maneuverability (bow thrusters), personnel and expertise. A formal lobby might be established to address issues such as access to docking and other facilities.

5. A formal mechanism for sharing crew, training costs, licensing fees, safety classes, piloting classes and supply costs among and between agencies and institutions should be developed. A similar structure to recommendation 4 might be investigated to implement this recommendation.
6. Where needed, memorandums of understanding (MOUs), interagency agreements (IAGs), cooperative agreements and Joint Institutes should be established to formalize and promote ongoing collaboration within and between state, federal and provincial agencies, universities and private sector groups. This may also help maximize institutional efficiencies and minimize jurisdictional impediments. The Great Lakes Fishery Commission serves this function for fisheries related matters and should be consulted on the implementation of this recommendation.
7. An IJC committee to focus on research vessel coordination should be established. This committee might be formed under the Council of Great Lakes Research Managers.
8. The Great Lakes Fishery Commission should consider coordinating fisheries-related vessel research and monitoring programs and serving as a clearinghouse for fisheries research information and related activities.
9. Where appropriate, joint vessel management/operation plans should be entered into between agencies, universities and private sector groups.
10. An annual binational vessel coordination meeting should be institutionalized. Possible mechanisms for convening such a meeting include the International Association of Great Lakes Research (through its annual conference) or the Council of Great Lakes Research Managers. This meeting should include not only vessel coordination issues but also research and monitoring priorities. The annual vessel coordination meeting should be convened in late February/early March. The format should include a basinwide plenary session with specific lake basin meetings held directly prior.
11. In preparation for the annual vessel coordination meeting, the project steering committee should appoint members to the following four work groups:
  - Information/advocacy workgroup, to develop information on the importance and value of vessel-related research and monitoring activities;
  - Infrastructure work group, to address the sharing of vessels, dockage, maintenance and other facilities;
  - Program/science work group, to develop a comprehensive and integrated research, monitoring and science program and related strategy to market the product. The Great Lakes Fishery Commission, which provides this function for fisheries related research, will be consulted prior to the establishment of this work group.
  - Coordination work group, to develop a framework for sharing crew, training and equipment, etc.

## **Program Development/Coordination**

### ***Background***

The large and enthusiastic response to the announcement of the Great Lakes Science Vessel Coordination Workshop is a good indication of the interest and understanding of the need to communicate and share information about the programmatic direction of Great Lakes research and monitoring activities that are dependent on large science vessels operating on the Lakes for their successful implementation. As with the current institutional infrastructure, the science and operational aspects of Great Lakes science vessels has largely been determined by the individual agencies, universities and institutes involved with Great Lakes research. There is a need to begin coordinating these programs at a broader level and in some instances, develop new programs that are comprehensive in nature and that will meet the demands of the agencies and groups involved. To a large extent, the science needs will dictate the science vessel fleet requirements. Therefore, the challenge is to match the capabilities of vessels with the requirements of the science programs. Programs must be established with input from both science and vessel

managers for a comprehensive, coordinated program to be successful. There is a need for continuity between the science programs and vessel operations. Issues such as vessel capabilities (level of service provided by vessels), crew size, schedules, duration of operation, safety issues and operation costs must all be thoroughly assessed. Finally, there is a need for effective cost-sharing and collaboration on both the science and operational aspects of Great Lakes science vessels. Operators, scientists and managers all have a responsibility not only to get the job done, but to get the job done correctly by conserving and using resources wisely.

## ***Recommendations***

1. The consortium of agencies (see recommendation 2 under *Institutional/Administrative Requirements*) should develop a comprehensive, binational research and monitoring program for the Great Lakes. Input from the spectrum of user groups must be solicited and the research agenda should be made available to these user groups. The Lakewide Management Plans (LaMPs) coordinated by U.S. EPA might be a potential vehicle for implementing this recommendation although the linkages between fisheries issues and overall water quality concerns will need to be strengthened.
2. Agencies/universities should do a thorough science needs assessment to determine their research requirements. The assessment should identify key questions to be answered, should prioritize research needs to justify current (or expanded) vessel use (e.g., are current resources adequate to meet current needs? The assessment should answer what (list of programs), why (mission) and value (priority). U.S. EPA for instance, has indicated an interest in better fisheries research capability. This needs assessment should also try to match research needs with vessel requirements (e.g., developing more efficient sampling methodology).
3. A thorough assessment of the state of the research fleet should be undertaken. Fleet diversity, capability and flexibility must all be determined. This assessment must be done in preparation for the online science vessel inventory (see recommendation 3 under *Communications/Information Sharing*) and should separate vessels by size, type of research capable of being supported and vessel use. For example, the inventory should separate near shore vessels and use with offshore vessels and use. Near shore vessels must be available for short-term use, be trailerable and have a variety of uses (e.g., fish research, sediment, habitat creation). Offshore vessels must meet basic safety, liability, crew size, equipment and length of operation (e.g., day, weeks) requirements.
4. A detailed operation and maintenance plan to include both short-term (ongoing maintenance) and long-term (refurbishing) requirements must be developed. Year-round operating requirements of vessels must be determined. Priorities for vessel operations must be established. Hidden costs (e.g., electricity supply) must be factored in. Standard operating procedures for vessels should be established.
5. A formal program covering the use of older vessels must be developed. This program should have an evaluative component to help determine whether older, obsolete and more costly vessels should be eliminated (decommissioned) or retrofitted. The program should also describe how remaining vessels might be used more intensely to maximize effort and minimize downtime. Usage of some remaining vessels might also be reduced. The program should set up guidelines (or a framework) for determining the appropriate tradeoff analysis about refit versus decommissioning vessels. Soliciting the opinion of qualified marine surveyors and other professional resources must be part of the decision making process. The decision making body should never have the final word as to whether a specific boat should or should not be decommissioned or retrofitted. A standard schedule for retrofitting older vessels should also be established. As part of this process, vessels should also be evaluated to determine their capabilities to maximize their use according to their ability to perform required tasks.
6. A proactive approach to adding new vessels to the Great Lakes science fleet must be developed. Newer vessels must have flexibility (e.g., appropriate technology) and capability to perform multiple research and monitoring tasks. Any acquisitions of new vessels must be evaluated in lieu of how the addition affects the operation (viability) of the smaller and older vessels in the fleet.
7. A thorough evaluation of crew requirement for the Great Lakes science vessel fleet must be undertaken. The evaluations should look at the desirability of having permanent crew and skippers that can provide input and assist in program decisions versus seasonal, non-permanent crew.

8. A thorough assessment of research and monitoring needs as they relate to the use of Great Lakes science vessels must be undertaken. A subcommittee of the Great Lakes science "consortium" referred to in recommendation 1 might be established to perform this task. This assessment should cover issues related to planning, coordination and communication between research disciplines such as biological, environmental, limnological and fisheries research. The assessment should also address sampling technologies and methodologies and whether these need to be improved. This assessment should address not only the ability to improve on data collection and analysis capability (and compatibility), but should also address the flexibility of research and monitoring programs to determine whether different vessels or types of vessels can meet the needs of a particular research program. Recommendations regarding attention to seasonal assessments and long-term research and monitoring needs must also be made. Protocols for the coordination of data acquisition, methodology and QA/QC must be established to avoid duplication of effort and reduce costs.

## **Funding**

### ***Background***

Funding for all areas of Great Lakes research is limited and competition for research dollars is fierce. In current times of shrinking budgets for research and monitoring programs coupled with unavoidable increases in operating costs for Great Lakes science vessels there is a real need to protect, cultivate and expand (where possible) existing funding sources while at the same time developing an aggressive approach to identifying, exploring and securing new (and nontraditional) sources of funding to support the Great Lakes science vessel fleet. Funding is usually the number one constraint to implementing many of the items identified in this action plan. There is also a critical need to develop and nurture the public and political will necessary for decision makers to support and place greater priority on Great Lakes research and monitoring and the use of Great Lakes science vessels. This will be critical to ensure a base level of support even during times of budget restrictions and cutbacks, and to ensure the long-term viability of the Great Lakes science vessel fleet.

### ***Recommendations***

1. Long-term, dedicated funding for Great Lakes science vessel operation and maintenance must be secured. Attempts to secure this funding should be through both traditional (increasing agency and university budgets) and nontraditional. Examples of some nontraditional approaches might include: an endowment; dedicated tax revenues to support science vessels; user fees (to fund both vessel operations and the interactive database); license plate programs; and lottery proceeds.
2. Short-term funding to implement portions of this action plan should be sought through private foundations and the Great Lakes Protection Fund.
3. A variety of funding sources should be explored and evaluated to support the interactive database and the completion, update and maintenance of the Great Lakes science vessel inventory. Mechanisms such as membership dues, user fees and/or agency and foundation grants as structures/methods for supporting database operation and maintenance should be considered. The University-National Oceanographic Systems (UNOLS) located at the University of Rhode Island's Graduate School of Oceanography should be looked at a model.
4. Creative funding partnerships should be developed to pool resources and leverage funds to maintain priority vessel-related programs. Shared funding from several agencies, universities and institutes for the operation of a single vessel (or smaller number of vessels) as a way to maximize efficiency and promote full utilization of vessels should be explored.
5. A formal program to attract paying customers to use uncommitted vessel time should be developed and promoted.

6. For public agencies, vessel maintenance should be financed and managed under separate accounts within the "facilities" budget rather than under the research budget. This will help extend research dollars and allow them to be applied more directly to science-related activities.
7. Within and between agencies, administrative (or legislative) solutions should be sought to improve and streamline transfers of funds for vessel-related programs.
8. More financial support is needed to get currently decommissioned vessels back on the water working again. This is particularly important for Canada as many of their valuable science vessels have been decommissioned indefinitely.

## **Advocacy/Coalition Building**

### ***Background***

An aggressive and sustained Basinwide effort to promote and publicize the importance of Great Lakes science vessels to the conduct and implementation of Great Lakes research and monitoring programs is essential. Broad-based regional, national and binational interest in and support of the Great Lakes science vessel fleet will help elevate the status and awareness of the importance of Great Lakes research and monitoring activities to the protection and enhancement of the Great Lakes ecosystem. Although awareness of the importance of Great Lakes research has increased in recent years, agency and elected officials and the general public still know surprisingly little about our precious resources, the Great Lakes. These groups must be informed and educated about the importance of the Great Lakes science vessel fleet. Coalitions between agencies, universities, vessel operators, private institutes, businesses, municipalities and the spectrum of Great Lakes research user groups need to be established, broadened, and strengthened. Agencies and universities that own and operate science vessels must play a leadership role, acting as catalysts and providing the influence to form Great Lakes science vessel partnerships and to sustain an ongoing and comprehensive coalition of interests.

### ***Recommendations***

1. A comprehensive advocacy strategy should be developed to articulate the importance and value of Great Lakes research and monitoring activities and how the science vessel fleet supports these activities. Part of this strategy should include detailed information on costs of operating and maintaining the vessel fleet versus the value of Great Lakes land, water and air resources and the costs to society if these resources are not protected. This information should be packaged for a variety of audiences including: the general public; elected officials; senior management in agencies and universities; business and industry, scientists and marine operators. These activities must be coordinated with those groups preparing online information (recommendation 4, *Communications/Information Sharing*) and the Information/advocacy workgroup supporting the science vessel coordination annual meeting (recommendation 11, *Institutional/Administrative Requirements*). This advocacy strategy should also be able to address issues regarding the number of vessels in the fleet, their utilization, the costs associated with vessel use and whether there is duplication of effort.
2. Opportunities to build coalitions and establish partnerships with commercial, charter and other private vessels involved (or with potential to be involved) with science/research activities should be explored.
3. Expanded partnerships and new coalitions with business, industry and other private sector groups should be developed.
4. Partnerships, for the purpose of sharing information and resources, with non-research oriented agencies such as the U.S. and Canadian Coast Guards and state and provincial police agencies should be pursued.
5. An assessment should be made to determine whether some services currently provided by publicly owned and operated science vessels can be privatized.