Restore the Greatness!

Developing Restoration Priorities for the Great Lakes

Workshop Proceedings

Ann Arbor, Michigan
September 17, 2003

Preface

This proceedings document presents the outcome of a workshop held in Ann Arbor, MI on September 17, 2003. Titled, *"Restore the Greatness! Developing Restoration Priorities for the Great Lakes,"* the workshop was a cooperative effort of the Great Lakes Commission, Michigan Sea Grant College Program, and the Michigan Office of the Great Lakes. Funding was provided by the National Sea Grant College Program and the University of Michigan. The event brought together an array of participants representing various Great Lakes constituencies within the state of Michigan, all of whom shared their thoughts on ecosystem restoration priorities and on the coordination processes needed to advance them.

The workshop was the first in a series of such events to be conducted throughout the Great Lakes region. The intent is to help inform and advance the development and implementation of priority actions to restore the Great Lakes basin ecosystem. Each workshop will feature a collaborative arrangement between the Great Lakes Commission, the relevant Sea Grant Program, and representatives of the governor in the host jurisdiction. Workshop outcomes will be shared with the region's governors, premiers, other public officials, workshop participants and the larger Great Lakes community. A primary objective is to inform and advance the restoration efforts of the region's leadership.

The Council of Great Lakes Governors has assembled a Priorities Task Force that has identified a number of broad themes for restoring and protecting the Great Lakes. The workshop series, supported by the National Sea Grant College Program, will also provide an opportunity for Great Lakes constituents to review these restoration themes and inform their further development and implementation.

Acknowledgements

The Great Lakes Commission thanks Michigan Sea Grant and the Michigan Office of the Great Lakes for their valued role as partners in the design and conduct of this initial restoration priorities workshop. Through their sound advice and leadership, Drs. George Carignan and Jennifer Read (Michigan Sea Grant) helped ensure a successful event and coordinated the considerable resources of the University of Michigan and its School of Natural Resources. Ken DeBeaussaert, Michigan Office of the Great Lakes, carried Governor Granholm's message of interest in and support for the event, and assured participants that outcomes would enjoy careful consideration at the state and regional levels. David Naftzger, Council of Great Lakes Governors, is acknowledged for his support as well, and for ensuring that the workshop series is of maximum relevance to the Council's needs.

Special thanks are in order for Jon Dettling, Great Lakes Commission- Sea Grant Fellow, and Heather Kirshman, research assistant at Michigan Sea Grant. Jon is the primary author of the proceedings and received significant support from Heather, who also assisted in workshop organization and conduct. Recognition is also extended to the many individuals who assisted by serving as breakout group facilitators and recorders. (See Appendix A.)

Dr. Ron Baird, director of the National Sea Grant College Program, warrants special recognition for his personal support of this initiative and for facilitating his office's financial support for the workshop series.

Finally, thanks to all the dedicated individuals – almost a hundred in total – that joined us for a day of creative thinking and strategizing as we work to restore and protect the Great Lakes- the greatest system of freshwater on the face of the earth!

Sincerely,

Michael J. Donahue, Ph.D.
President/Chief Executive Officer
Great Lakes Commission

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I. Background

This workshop was the first in a series of similar events to be held throughout the Great Lakes basin as part of a collaborative project between the Great Lakes Commission and the Sea Grant Programs in the Great Lakes region. The project, funded by the National Sea Grant Program is directed at advancing the Great Lakes ecosystem restoration efforts through the development of restoration priorities and ideas on how to implement them through a regional process.

In so doing, the project is providing the scientific and technical basis for the region's governors, in collaboration with the larger Great Lakes community, to develop a shared vision and the principles, goals, objectives and strategic actions needed to achieve that vision.

Project collaborators recognize that development of a Great Lakes restoration strategy must be based upon sound science, and proceed with a clear understanding of ecosystem conditions and objectives, relevant research activity, and the science/policy/management linkages needed to achieve the strategy's vision. This workshop, along with upcoming workshops in other Great Lakes jurisdictions and a companion project by the Northeast Midwest Institute, will provide the Great Lakes governors with detailed, science-based information needed to formulate, refine and advocate restoration priorities.

The workshop was organized into three sessions. In the first session, a number of presenters offered background information on the state of the Great Lakes ecosystem, highlighting issues ranging from ecosystem health to socio-economic considerations. Following this, the workshop was divided into six breakout groups, each of which was tasked with discussing the following two questions:

- What are your priorities for Great Lakes restoration you wish to share with the Great Lakes governors?
- What advice do you have on the design and implementation of a large scale restoration plan to advance the governors' priorities for the Great Lakes ecosystem?

At the conclusion of the breakout sessions, these groups were asked to identify the five most salient items that arose from their discussion of each of these two questions. In the final session of the workshop, the groups reported back in plenary on the outcome of their discussions.

In addition, participants were invited to present their thoughts on these two questions on response sheets. These responses (57 in total) were collected at the end of the workshop. This represented 243 distinct comments on the first question and 169 on the second. In addition, the minutes of the breakout sessions were recorded by each group on newsprint. These comments, along with the outcomes of the breakout group discussions, provide the basis for the proceedings document.

Participation in the workshop was excellent. Almost 100 individuals attended, representing a diversity of disciplines and interests as noted in Appendix A. The objective was not necessarily to reach consensus, but to capture the diversity of thoughts throughout the state on Great Lakes restoration needs and approaches. Section II of this

document summarizes the presentations from the first portion of the workshop. Section III summarizes the collective thinking of participants, while Section IV presents outcomes of individual breakout groups. A summary statement and conclusion are offered in Section V. The appendices contain a list of participants, a compilation of the individual responses to the questions, and summaries of each of the breakout groups.

II. Presentations

The workshop began with a number of presentations to provide background on the state of the Great Lakes and to stimulate thought among participants as they prepared to discuss ecosystem restoration priorities and associated planning approaches. Dr. George Carignan, director of Michigan Sea Grant, welcomed attendees and provided an overview of, and context for the workshop. He explained that Governor Granholm and the other Great Lakes governors are leading a region-wide effort to establish restoration priorities. These priorities are intended to guide effective and efficient resource allocation. Congressional legislative proposals are currently being debated in both the House and the Senate, and focus on Great Lakes restoration. The goal of this workshop is to gain broad public input into the priority setting process. A partner project is being conducted by the Northeast-Midwest Institute to analyze restoration plans in other regions and explore their applicability to Great Lakes restoration efforts.

The group was welcomed by Dr. Fawaz Ulaby, Vice President for Research at the University of Michigan, and Dr. Robert Huggett, Vice President for Research at Michigan State University. They both stressed the importance of the workshop and urged participants to develop a meaningful set of priorities and a system for successfully implementing them.

Dr. Michael J. Donahue, President/CEO of the Great Lakes Commission, briefed the group on the agenda for the workshop and the specific charge to the participants. This workshop is the first step in a large, multi-year effort. This effort will collect input from stakeholders in the Great Lakes region concerning restoration needs. The charge to the workshop participants is to provide input regarding the two major questions posed to them: what priorities for Great Lakes restoration should be established, and how might an associated plan be designed and implemented to advance them? He noted that event organizers are committed to capturing all ideas presented throughout the day. The speakers will not be offering a comprehensive overview of the state of the Great Lakes or their restoration, but will stimulate thought and help provide a uniform knowledge base for participants.

Ken DeBeaussaert, director of the Michigan Office of the Great Lakes, thanked the sponsors for hosting the event and participants for their attendance. He emphasized that the idea of developing a Great Lakes restoration plan is not new. There are numerous Great Lakes plans in existence. Missing is a comprehensive, overarching strategy to integrate these plans. That is the goal of today's workshop and the upcoming workshops. The Great Lakes restoration legislation presents a great opportunity. This workshop will be critical in informing Governor Granholm on these issues and on prospective state priorities. He concluded by noting that Michigan voters and politicians have repeatedly shown that Great Lakes protection is a major priority for the state.

Dave Naftzger, acting executive director of the Council of Great Lakes Governors, emphasized the interest of the governors in this process. The governors have assembled a Priorities Task Force which will develop an approach to guide Great Lakes restoration. Coordination is needed to make good use of limited resources. It is important to build on

efforts to date, incorporate broad public participation, foster sound public policy and sustainable behavior, and address the environmental issues of the present while anticipating the issues of tomorrow. He noted that Great Lakes jurisdictions have many new leaders with an opportunity to take important steps forward. Preliminary themes of the governors' priorities are:

- Ensure sustainable use of water resources while assuring that the states retain authority over water use and diversion
- Promote programs to protect human health against adverse effects of pollution
- Control pollution from diffuse sources, including land, water and air
- Continue to reduce the introduction of persistent toxic substances
- Stop introduction and spread of aquatic invasive species
- Enhance fish and wildlife by restoring and protecting coastal wetlands and fish and wildlife habitats
- Restore the environmental health of the Areas of Concern
- Standardize and enhance methods for collecting, storing and sharing information
- Adopt sustainable use practices that protect environmental resources and enhance the recreational and commercial value of the Great Lakes

Naftzger added that the region's governors are committed to devoting resources to restoration projects, and value the input these workshops will provide.

The first presenter was Dr. William Taylor, Chair of Michigan State University's Department of Fisheries and Wildlife, and associate director of Michigan Sea Grant. Dr. Taylor spoke about fisheries, invasive species and habitat. He stated that it is important to view the Great Lakes from a vantage point of ecosystem goods and services, using business concepts to evaluate the functioning of the system and its value to society. The fishing industry has a large economic value nationwide, for example, including $4 billion annually in the Great Lakes region. There are numerous other values that can be assigned to the resource, including shipping, aesthetic values, health, and many others. All these values interrelate. When we think about what it costs to restore, we need to ask "What is the cost of not restoring? What is the cost to future generations?"

Dr. Taylor suggested the following as important actions to restore Great Lakes fisheries:

- Embrace an ecosystem perspective, and provide for assessment and monitoring programs
- Enhance research and outreach programs
- Fully appropriate funds for the Fish and Wildlife Restoration Act
- Stop introductions of invasive species
    - Authorize National Aquatic Invasive Species Act
    - Use ecologically sound controls
    - Initiate ballast water management practices
- Address habitat alteration and degradation
- Improve water quality and reduce sedimentation
- Initiate land use planning and address watershed level effects
- Recognize connections between tributaries and lakes
- Initiate soft engineering practices
- Improve forage fish abundance and nutrient value
- Share databases
- Work with partners (Habitat Advisory Board of the Great Lakes Fishery Commission, NGOs, etc.).

In addition, Taylor stated that the following points should be considered when addressing all aspects of Great Lakes restoration:

- Monitor and track progress
- Encourage transparent decision making
- Align institutional and ecosystem processes
- Appropriate legislation at full authorized levels
- Enhance cross-jurisdictional collaboration

Dr. James Diana, Associate Dean of the University of Michigan's School of Natural Resources and the Environment, discussed the state of toxic cleanup and prevention in the Great Lakes. The Great Lakes basin has a long history of addressing water quality issues. Cholera epidemics were rampant in Chicago in the 1800s. Effluents from tanneries and sawmills were prevalent problems in the early 1900s. Today, issues such as atmospheric deposition and contaminated sediment are major concerns.

Dr. Diana described numerous ways that pollution of the Great Lakes affects the region's economy. Two major economic sectors to consider are tourism and industry. Major tourism components dependant on water quality are fishing, swimming and boating. Industries with strong ties to water quality are food processing, metals, and the chemical and pharmaceutical industries, among others. In addition, invasive species, or "biological pollution," costs regional industries millions of dollars per year. There are currently three main areas of focus for pollution cleanup and prevention efforts in the Great Lakes:

- Cleaning up Areas of Concern and other incidences of "legacy pollution"
- Reducing non-point source pollution, such as from urban runoff, agriculture and sewerage systems
- Reducing deposition of airborne pollutants, particularly persistent bioaccumulative toxics

Dr. Donahue spoke on sustainability and sustainable use of the Great Lakes. He began by stating that ecosystem restoration has multiple dimensions, including environmental, economic, social and cultural. All these dimensions need to be accommodated to achieve successful restoration. It is also essential to address the relationship between ecosystem restoration and sustainable use, as these are mutually interdependent. Restoration efforts will be futile if they do not include provisions for sustainable use. Dr. Donahue offered a provisional definition for sustainability, "a state of resource use that meets the needs of the present without compromising the ability of future generations to meet their needs." His definition of restoration was presented as, "a reinstatement of beneficial uses in an ecosystem through projects and activities that improve environmental quality and ensure environmentally sound and sustainable resource use."

Dr. Donahue explained that there are numerous socio-economic components of water resources. The Great Lakes waters are an important mode of transport; factor of production (e.g., manufacturing, agriculture); a supporting resource (e.g. fisheries, waterfowl, wetlands); and a marketable amenity (e.g. including recreational and aesthetic value).

Donahue suggested a range of considerations when developing plans and priorities to ensure sustainability of the basin ecosystem:

- A strong infrastructure for science, research and monitoring
- Methodologies to bring data and information, monitoring, modeling, and sound science to bear on sound public policy decisions
- Reliable long term funding for research institutions, both within and outside government
- Sustainable use laws, policies and programs, such as for water quantity management, air and water quality, land use policy and fisheries
- Inclusion of economic dimensions to ensure that businesses can thrive
- Gubernatorial leadership
- An inclusive process that involves all stakeholders
- Need to fully exploit existing laws, institutions, policies, programs and restoration plans as a basis for future activity
- A clear set of priorities to ensure efficient and effective allocation of resources
- Benchmarking and monitoring of goals and indicators
- A sustainable source of adequate funding

He concluded by noting that sustainability must be a critical consideration for restoration planning. Any plan must withstand the test of time, remain relevant as beacon for the future, represent a collective vision, and light the way to achieving that vision.

III. Responses to Questions

The breakout groups were tasked with providing feedback on the two questions below. These questions were posed to the workshop participants during the introductory comments. Individual responses to these questions were also solicited through worksheets that were collected at the conclusion of the workshop. This section of the proceedings presents a summary of themes that emerged from the responses to these questions.

Question 1: What are your priorities for Great Lakes restoration you wish to share with the Great Lakes governors?

A. Water Resource Management, Withdrawals and Diversions

A major restoration priority for the Great Lakes is managing the basin's water resources, including regulation of withdrawals and diversions. In addition to a handful of calls to ban water diversions outright, there were several requests for an improved diversion and withdrawal regulatory system. Some participants suggested expanding on the Great Lakes Charter Annex 2001 and on the riparian doctrine to achieve this. Another priority cited in this area is to gain an improved understanding on how the Great Lakes basin's surface water interacts with its groundwater and how changes in these can affect hydrologic functions. Programs that encourage water conservation were also supported by numerous participants.

B. Aquatic Nuisance Species

Among the most common responses was the prevention and control of aquatic nuisance species (ANS). A major focus in this area is the prevention of new ANS entering the system, as little can usually be done once they have entered and spread. Major control actions include ballast water policies, on-vessel technologies and dispersal barriers. Looking at other human activities that can result in introductions was also mentioned. Once introductions have occurred, a need was cited to identify what roles ANS are playing in the altered ecosystem and to adapt management policies accordingly. All of these measures were cited as necessary in protecting the ecological integrity of the Great Lakes.

C. Wildlife and Habitat

Wildlife protection and habitat restoration emerged from the workshop as frequently mentioned priorities. The protection of native species, particularly threatened or endangered species, was a recurrent theme. The status of these species can serve as indicators of ecosystem stability and function. An essential component of wildlife protection is habitat restoration. A wide array of habitat types were specified, including nearshore, offshore, coastal, inland, forested, dunes, beaches, islands and rivers. In addition to their wildlife benefits, these habitat types need to be preserved for the other functions they serve, such as water quality improvement and groundwater recharge. Some participants suggested developing regional inventories of habitats and species.

These inventories could be used to track habitat losses, threatened areas, and strategic locations for habitat restoration. Establishment of stopover sites for migratory flyways was also mentioned as a habitat priority.

Among the specific types of habitat, the coastal zone was mentioned most often. A need was identified to restore, stabilize and maintain shoreline. Development pressures and non-point source pollution pose threats to these areas. Preserving a portion of the coastline as wilderness was advocated. In addition to their inherent ecosystem values, coastal areas are important to tourism and other economic sectors.

Wetlands also were mentioned repeatedly as being major restoration targets. Easing the development pressures on these areas and reclaiming some that have already been developed are important. Wetlands serve valuable functions in providing habitat for waterfowl and other wildlife and by improving water quality. Coastal wetlands were cited as being particularly threatened.

Several participants raised fishery restoration as a high priority. Enhancing fisheries through habitat restoration, particularly nearshore habitat, and protecting food web dynamics were raised as key needs. For many species, traditional predator-prey relationships need to be reestablished. In addition, improving tributary habitat, such as by removing non-essential dams, was mentioned in several comments. The ultimate goal for fishery restoration is balanced and self sustaining fish populations.

D. Toxic Contaminants

Reducing the input of toxic contaminants to the lakes is a high priority issue. Continuation and strengthening of programs in this area, such as the Binational Toxics Strategy, was strongly supported. Decreasing emissions of air toxics in the region was a commonly mentioned priority, reflecting the fact that the major input to the lakes for many of the highest priority toxics is air deposition. Strengthening regulatory schemes in this area was advocated by several participants, as was determining how to account for and control long-range atmospheric transport of toxic substances. Mercury, in particular, was frequently mentioned. In addition, continuing research into emerging toxic pollutants was emphasized.

A major concern surrounding toxic contaminants is fish consumption advisories. Achieving fish that are safe to consume across the basin was a frequently raised priority. Consistency and validity of the fish advisory process was also a concern, and multiple people advocated a thorough study of this issue by the National Academy of Sciences.

E. Areas of Concern and Other Toxic "Hot Spots"

The remediation of historically polluted areas throughout the Great Lakes was a frequently mentioned priority at the workshop. Cleaning up Areas of Concern (AOCs) and reducing pollutant inputs to these areas were cited as essential actions for a restoration strategy. Lack of funding for Remedial Action Plans (RAPs) was cited as a major impediment. In addition, cleaning up contaminated "hot spots" which are not currently listed as AOCs was raised as a priority. Increasing the use of risk-based

decision making was emphasized as an important consideration in implementing these efforts.

F. Nonpoint Source Pollution

Nonpoint source pollution was cited as a priority by a large number of participants. Sewerage issues, including combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs), were a common theme. In addition, agricultural pollution runoff and fertilizer use are priorities. Phosphorous and oxygen demand were specifically mentioned. The impact that land use decisions have on nonpoint source pollution should also be targeted. Soil and erosion control in both the Great Lakes and their tributaries was mentioned as an additional priority.

G. Land Use Planning

Many participants recognized the substantial impact land use planning decisions have on Great Lakes water quality and quantity. Slowing development pressures, both industrial and residential, on undeveloped areas is an important ingredient of a Great Lakes restoration strategy. Both coastal and inland areas are in need of such protection. Increased support for brownfield development and urban infill programs was supported, as were incentives that encourage responsible land use. Improving the understanding of how future population growth and land use patterns will affect resource use and environmental quality is seen as critical. Transforming this information into effective land use planning policies is a strongly needed area of focus for preserving the environmental quality of the Great Lakes basin. Multiple participants called for a state-wide or region-wide land use initiative to address this issue.

H. Sustainability

Sustainability issues were discussed in detail at the workshop. Achieving regional economic prosperity that is closely tied to the region's environmental quality is a major goal. Strengthening knowledge of the region's economy-environment link was cited as a method to help achieve economic support for restoration. Resource conservation and infrastructure development are also vital to the restoration effort. Programs supporting recycling, and environmentally friendly industries and transportation systems were advocated. Taking a life cycle approach to regional decisions was recommended. Additionally, the involvement of the Great Lakes basin's numerous cities as focal points of restoration efforts was suggested to improve the urban-natural interface.

I. Commercial and Recreational Maritime Transportation

A number of responses focused on Great Lakes navigation, both commercial and recreational. Improved infrastructure for shipping and recreation is an important way to ensure these activities continue in a way that is beneficial to the region's economy and environment. Concern was expressed that recreational boating facilities are too few, too crowded and of poor quality. Management of dredged material was also raised in several comments. There were calls to ban open-water discharges of dredged material and to purchase and retain adequate dredged material disposal sites. In addition, environmental dredging activities were recommended as an important means of restoring some

beneficial uses to AOCs. Some respondents called for expansion of the Great Lakes-St. Lawrence Seaway System, while others advocated eliminating ocean-going vessels from Great Lakes trade.

J. Water-based Recreation and Beaches

Many participants mentioned enhancing water-based recreational opportunities as a priority. In addition to recreational boating, use of beaches was a recurring concern. Cleaning up beaches, reducing the number of beach closings and preventing beach erosion are needed to maintain the lakefront as a valuable recreational resource. In addition, creating and maintaining opportunities for public access to the lakes, such as through public ownership of shoreline, was cited by several participants. As one participant noted, a restored Great Lakes will "provide for ecologically sound levels of public use, economic benefits, and the enjoyment of natural resources." In addition, there were calls to take account of the aesthetic value of the lakes and their related natural systems.

Question 2: What advice do you have on the design and implementation of a large scale restoration plan to advance the Governor's priorities for the Great Lakes ecosystem?

A. Public Education, Outreach and Participation

One very common response regarding the design and implementation of a Great Lakes restoration strategy is that it should provide for significant public engagement. An informed and active citizenry was repeatedly described as not only desirable, but necessary to the success and viability of any strategy. Outreach and communication efforts should be a significant component of all stages of the plan. The public has a strong interest and stake in this process and, if engaged, can be a valuable partner.

Without public support and involvement, successful restoration will be difficult. As one participant stressed, the public, as landowners, are the stewards of much of the land in the basin. In addition, they hold the responsibility for management of public lands and resources. Building political support for restoration actions was repeatedly mentioned as a benefit of a strong public outreach campaign. In one person's words, "Only strong public sentiment will carry us forward."

Education was also identified as a key component to plan design and implementation. The need for both child and adult education was repeatedly stressed. Great Lakes issues should be made a stronger part of the standard educational curriculum in the region. In many cases, children can be a good conduit for educating their parents. In addition, these issues should be continually raised in newspapers, television, and other regional media to ensure an informed and updated adult population. One participant emphasized the need to "make education a cornerstone so that future generations understand the value of the Great Lakes."

A number of comments focused on the content of education and outreach efforts. A need was identified to make information available to the public in understandable formats and vocabulary. Having easy access to information, such as through a centralized website, is desirable. Informing people about what they can do to help the restoration effort and who they can contact is important. People can be made more aware of what actions they can take to benefit the ecosystem and prevent pollution. The public needs to know what restoration of the Great Lakes means, what it involves and why it's imperative for each individual. Connections should be made to economics, social values and public health. In addition, outreach to those outside the region is important in raising awareness about the uniqueness and value of the Great Lakes ecosystem.

Education of professionals and development of the region's "human resources" were also mentioned as crucial educational goals. Where possible, university students should be involved in coordination and implementation to help cultivate informed regional leadership in the future.

B. Science, Monitoring and Data Access

A recurrent theme in the comments was the need for a robust and centralized system for environmental monitoring, scientific research, forecasting, and easy access to the resulting data. There was overwhelming support for a centralized, regionally coordinated information management and decision support system.

Perhaps the most strongly desired component of this system is improved monitoring programs throughout the basin. Needs were raised for improved monitoring of physical and biological parameters, ecosystem status, water quality and quantity, habitat and species indicators, and contamination. High quality monitoring is needed to establish baseline conditions, identify critical needs, and measure progress toward goals. Numerous participants noted the desirability of a centralized, comprehensive, real-time, online monitoring system. Compatibility of data collection and reporting methods across and within disciplines is also an important concern. Basin-wide standards for ecosystem monitoring, such as State of the Lakes Ecosystem Conference (SOLEC) indicators, could be more broadly implemented.

Closely tied to comments about monitoring was the need to ensure that actions are thoroughly grounded in science. There were several calls to strengthen the scientific basis for policy decisions and regional Great Lakes research institutions. Monitoring and scientific analysis were seen as important components of a system that would be able to forecast the impacts of ecosystem management decisions.

A large number of participants referred to a comprehensive decision support system that could integrate Great Lakes related data and information, make it broadly available, and provide value-added interpretations. Use of Geographic Information Systems (GIS) will be a central component of such as system. One participant summarized this sentiment, citing a need to "develop a multi-scale, interactive, understandable, easily accessible, visually oriented spatial decision support system that informs on present and past conditions and predicts implications of proposed actions." There were many comments calling for easy public access for such a "database of databases."

C. Funding

Workshop participants recognized that Great Lakes restoration will require a large amount of funding and offered a range of suggestions about how and where these funds should be directed. A large number of people mentioned the need to establish a long-term, stable funding source. Achieving a sustainable Great Lakes is seen as a multi-generational commitment and requires a restoration plan that is itself sustainable on this time frame. A large number of current programs were identified that were in need of enhanced funding. Some examples among these were the RAPs, water quality monitoring and enforcement, research programs, and outreach efforts. There was a realization that a large-scale, well researched plan will be highly efficient and therefore more cost effective than smaller, disjointed plans. Some potential sources of funds were also identified, including cleanup settlements and North American Waterfowl Management Plans. Different grant funding mechanisms were discussed including block grants and competitive grants.

D. Institutional Arrangements

The roles of existing institutions and laws and the potential for new ones was a large area of focus for the comments. The majority of responses on this topic advocated an elevated role for existing institutions and mechanisms. Several people noted that fully funding and strengthening current programs should take priority over establishing new ones. Among the programs and institutions that were cited as needing an elevated or strengthened role were the International Joint Commission (IJC), Lakewide Management Plans (LaMPs), and the Great Lakes Water Quality Agreement (GLWQA). One participant suggested replacing the GLWQA, while several others recommended improving its implementation and updating its content.

Many participants called for better coordination among existing Great Lakes institutions. The handful of comments that referred to creation of a new institution referred to a multi-agency "task force" that would oversee and coordinate restoration planning and implementation. This sentiment was echoed in a large number of comments stressing the need to use current structures in a more coordinated fashion. A common theme was the need to "utilize existing mechanisms and organizations under a new, single, inclusive structure." This structure should include input from all relevant agencies and stakeholders. There were many calls to improve communication and coordination among existing agencies to increase efficiency and avoid overlap. In addition, partners in Canada need to be closely engaged and involved in all stages. A binational plan was seen by many as essential. In addition, involvement of tribal authorities / First Nations was repeatedly called for. There were recommendations to work with other regions, where appropriate, on shared priorities. The experience of regions such as the Chesapeake Bay could provide valuable guidance.

E. Accountability and Enforcement

Two common and closely linked themes emerging from the workshop were the needs for the plan to have clear mechanisms for enforcement and accountability. In addition to improved enforcement of current requirements, such as air and water pollution control laws, some participants cited the need for new efforts to have clear enforcement components. There were a few suggestions to vest enforcement authority in a regional agency. Enforcement mechanisms were seen as one component of accountability. Accountability requires clear planning, setting of goals with measurable outcomes, and establishing deadlines. A system of enforcement with penalties and rewards was repeatedly cited as necessary in ensuring accountability for achieving restoration goals. As one response stated, "Vest authority in a group so there is responsibility and accountability for implementation." Improving enforcement and accountability was mentioned both in the context of strengthening existing institutions and in creating a new regional agency or task force.

F. Priority Setting

A substantial number of participants described the initial planning process as being critical to the success of any strategy. People stressed a need to identify and prioritize areas of focus, develop indicators, and set goals. Several people described the importance of establishing common basin-wide standards and targets. Benchmarks for improvement

need to be set and actions formulated to achieve those benchmarks. In addition, many participants recognized the need to establish priorities among the various goals and programs of the restoration plan. This is needed so that the number and complexity of the issues involved does not impede progress toward the most vital restoration goals. One possibility is to develop a tiered priority list, with the most immediate restoration priorities receiving increased funding for immediate action. Keeping the priority list flexible to account for emerging opportunities and improved science was also mentioned. Several people voiced a concern about setting goals reasonably, noting that pre-European settlement conditions are in many ways unachievable.

Numerous participants called for establishment of quantifiable benchmarks to allow progress toward goals to be tracked over time. This will facilitate assessment, evaluation and enforcement. Establishment of benchmarks (including timelines) was encouraged for wetland restoration, fish contamination, mercury emissions, AOC delisting, and beach closings, among other priority areas.

G. Policy Review and Research

Another important activity in the early stage of strategy development is to review the effectiveness of past and current restoration policies and actions in both the Great Lakes basin and other ecosystems. Seeing what has worked well in the past and what has failed is an important process in designing a restoration strategy. Understanding why some measures succeed and why others fail will inform better policy planning in the future. Recognizing the similarities and differences between the Great Lakes and other ecosystem restoration activities (such as the Chesapeake Bay and Everglades) is important when adapting aspects of these programs. In addition, some participants identified policy areas where creativity is needed due to the uniqueness of the Great Lakes system. Examples are water use policies, such as expansion of the riparian doctrine and further development of Great Lakes Charter Annex 2001, and policies for achieving sustainability and preservation of a system as expansive as the Great Lakes, such as designating it a National Priority Area or "permanent protected area."

H. Scale and Focus

Workshop participants had various perspectives on the scale and focus of a prospective plan or strategy; some recommended a broad ecosystem-wide approach while others preferred a local approach. As one participant commented, "A large scale success must be based on layers of small scale successes." Another reminded us not to "forget the power of small scale programs and partnerships to inspire bigger successes." A multi-scale restoration project would pair the necessity of working toward restoration on the local level, where many critical decisions are made, with the synergies achieved by ecosystem-wide coordination. The basin-wide efforts must make informing and empowering local decision makers a priority.

Many participants emphasized the importance of achieving consensus and support for Great Lakes restoration. This should involve the input and involvement of all relevent states, provinces, nations, tribes, and other interests.

I. Action Orientation

Another shared sentiment at the workshop was the need to begin restoration actions in the near future. Although there may be benefits to further planning, critical actions should not be postponed by further research and deliberation. There were many comments concerning the need to avoid "terminal planning" and "waiting for the perfect plan." Participants expressed a sense of urgency in initiating a restoration plan or strategy and were eager to assist in the process.

IV. Group Breakout Summary

Workshop participants had an opportunity to discuss their priorities and recommendations for Great Lakes restoration in a group setting. The groups were organized to achieve a diversity of backgrounds in each. The groups were asked to identify the five most salient themes from each of the two questions posed to participants. These themes identified by the groups are presented here in no prioritized order. Detailed summaries of the discussions from each breakout session can be found in Appendix C.

Restoration Priorities	Implementation Advice
• Invasive species control, prevention, and elimination, including a binational ballast water treaty. Improved understanding of altered ecosystems and adaptive management • Fish and wildlife restoration, including coastal, nearshore and wetland habitat • Land use planning, including coastal preservation, brownfield development and urban infill • Water use, withdrawals and diversions, and interactions of ground and surface water • Habitat inventory • Addressing legacy/historical pollution in AOCs and other "hot spots", including contaminant cleanup and remediation of contaminated sediments • Watershed health and management • Air pollutant control, especially mercury and long range transport • Education, awareness and marketing of the Great Lakes • Elimination of persistent bioaccumulative toxics • Balanced and self-sustaining fish populations • Consistent data collection and reporting methods • Nonpoint pollution, including CSOs and SSOs • Decision support system for the Great Lakes with continuous monitoring and assessment • Measurable goals for pollution prevention and cleanup, such as for delisting of AOCs, toxic emission reduction and polluted sediments	• Develop better basin wide management for restoration efforts, including adaptive management principles • Build on existing actions, capabilities and knowledge • Be inclusive in process planning and implementation, diverse stakeholders • Educate and involve citizens across all interest sectors • Enforcement of regulations and accountability for results • Ensure an economic base sufficient to support plan • Develop short-term priorities in addition to large-scale, long-term plan. • Develop multi-agency coordination among tribal, state, national and international entities • Couple research, monitoring and assessment with restoration. Set restoration benchmarks and monitor scientifically for long-term trends • Adequately fund science and research infrastructure • Define "restoration" or desired future • Streamline and improve accountability of governmental processes • Look to other models of successful restoration projects • Develop accessible and comprehensive databases • Consider use of sanctions and incentives • Recognize the Great Lakes basin as a National Priority Area • Use risk based decision making for sediment clean-up • Increase public access to information • Allow the priority list to be flexible to capitalize on opportunities • Enforce existing laws uniformly across the basin and evaluate their effectiveness • Apply any new laws uniformly across the basin • Revise the Great Lakes Water Quality Agreement

V. Summary and Conclusions

Workshop participants offered a substantial number of suggestions concerning the identification of Great Lakes restoration priorities and their inclusion in a plan or strategy that would advance and guide efforts to address them. Significantly, a relatively small number of recurrent themes emerged. One major theme was protection of the basin's wildlife and ecological integrity through actions such as habitat restoration, invasive species prevention, and coastal zone and wetland restoration and conservation. Strengthening the region's capability to manage its water resources was a dominant theme, especially concerning withdrawals and diversions. Addressing pollution issues in the lakes was also a major focus of responses. Remediation of sites of historical pollution (e.g., AOCs) was a common theme, as was preventing toxic pollution, especially through airborne routes, and addressing non-point source pollution from sources such as agricultural operations and sewerage systems. Other frequently mentioned items were regional land use planning, sustainability in the Great Lakes region, maritime transportation and recreational boating issues, and other recreational uses of the lakes.

The fact that such a large and diverse group of stakeholders identified a relatively small number of themes is an indication of a large degree of unity throughout the state concerning what issues need to be addressed most forcefully in coordinating restoration of the Great Lakes basin ecosystem. There were few contradictory comments concerning what regional priorities should be.

Workshop participants provided recommendations for designing and implementing a Great Lakes restoration plan or strategy. Several themes were consistent across the large majority of participants. A substantial focus on public education and outreach is essential. The public and a wide range of stakeholders must be engaged in decision making and implementation processes. The array of existing Great Lakes programs and institutions must be the foundation for any coordination activity, and the focus should be on fully funding, coordinating and strengthening this current institutional infrastructure. Recommendations for improving the operation of current programs included establishing an overarching regional "task force" and improving the enforcement and accountability of the current mechanisms. There were many calls to ensure that Great Lakes restoration be organized under a single unified plan or strategy that is informed and supported by all interests, including both nations, all states, provinces, tribal authorities, First Nations, and the public. In addition, actions at the regional scale must be integrated with those at the local scale.

The first stage in the restoration process should be the establishment of priorities and development of measurable benchmarks for achieving them. There was large support for a comprehensive, regionally coordinated data storage and decision support system that integrates monitoring, analysis and forecasting of Great Lakes conditions and allows public access to such information. Strengthening Great Lakes science institutions was also strongly advocated. One final theme that emerged from the workshop was the need to act quickly. An overarching plan or strategy is important, but there are sufficiently articulated priorities that demand action now.

Workshop participants agreed that the structure of the restoration plan or strategy will largely determine its effectiveness. It is clear from the enthusiastic participation at the workshop and the quality of the comments received that Michigan has a large body of interested participants eager to contribute their ideas, time and effort to coordinating and executing the actions needed to achieve a restored Great Lakes basin. Michigan workshop participants made it clear that they recognize the necessity to coordinate a single restoration effort that incorporates the needs and abilities of stakeholders and jurisdictions throughout the basin. Participants look forward to hearing the priorities and recommendations of the other Great Lakes jurisdictions, and encourage the Great Lakes governors and premiers, as well as other policy leaders and decisionmakers, to consider them.

Appendix A: Workshop Participants*

•Adlerstein, Sara, University of Michigan – School of Natural Resources and the Environment (3)
•*Adriaens, Peter, University of Michigan (4)
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•Basiji, Alex, Environment Canada (5)
•Batie, Sandra, Michigan State University
•Becker, Mary Lynn, Canadian Consulate General (3)
•Beeton, Alfred, Great Lakes Environmental Research Laboratory(6)
•Bennett , Julie Metty, Great Lakes Fishery Trust(6)
•Boik, Bill, Michigan Department of Natural Resources (5)
•Bondy, Doug, International Joint Commission
•Brandt, Stephen, Great Lakes Environmental Research Laboratory (2)
•Bratzel, Marty, International Joint Commission (1)
•*Breederland, Mark, Michigan Sea Grant (6)
•Burrows, Mark, International Joint Commission (2)
•Carignan, George, Michigan Sea Grant
•Chu, Xuefeng, Annis Water Resources Institute, Grand Valley State Univerity (1)
•Coon, Tom, Michigan State University
•Corgan, Christine, Clinton County Conservation District (1)
•Coscarelli, Mark, Public Sector Consultants Inc. (5)
•Czarnecki, Craig, U.S. Fish and Wildlife Service (1)
•DePinto, Joseph V., Limo-Tech, Inc. (2)
•Dettling, Jon, Great Lakes Commission (5)
•Diana, James, University of Michigan
•Dobson, Tracy, Michigan State University (3)
•Donahue, Michael J., Great Lakes Commission
•Elbing, Lauri - University of Michigan – School of Natural Resources and the Environment (3)
•English, Frank, Michigan Charter Boat Association (4)
•Eshenroder, Randy, Great Lakes Fishery Commission (5)
•Fang, Andrew, Kieser and Associates (6)
•Fetterolf, Carlos, Sea Grant (4)
•Francis, Anthony, University of Michigan (6)
•Gannon, John E., International Joint Commission (3)
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•Glassner-Shwayder, Kathe, Great Lakes Commission (6)
•Gustafson, David, Dow Chemical Co. (3)
•Habib, Bahi, City of Detroit Water and Sewage Dept.
•Hamilton, David A., Michigan Department of Natural Resources (4)
•Hartingh, Vicky, Macomb County Health Dept (6)
•Huggett, Robert, Michigan State University (4)
•Iversen, Christine M., Weston Solutions of Michigan Inc. (1)
•*Jadd, Christopher, University of Michigan – School of Natural Resources and the Environment (1)
•Johengen, Tom, University of Michigan - Cooperative Institute for Limnology and Ecosystems Research
•*Kasat, Rahki, University of Michigan – School of Natural Resources and the Environment (6)
•Kautz, Joe, Conservation District - Sanilac County (2)
•Kautz, Stacey, Conservation District - St. Clair County (3)
•Kavetsky, Bob, U.S. Fish and Wildlife Service (2)
•Kelly, Thomas M., Inland Seas Education Association (3)
•Kerfoot, W. Charles, Michigan Technological University (5)
•Kivikko, Renee, Land Trust Alliance, Midwest Program (5)
•Kozubal, Krioti, City of Bay City (5)
•Krantzberg, Gail, International Joint Commission (4)
•Kuper, George H., Council of Great Lakes Industries (2)
•Lake, Mary Beth, Michigan Groundwater Stewardship Program (1)
•Lee, Taehwan, University of Michigan - Museum of Zoology (1)
•Lewis, Brent, Kettering University
•MacDonagh-Dumler, Jon, Great Lakes Commission (5)
•Madigan, Kate, Public Interest Research Group In Michigan (6)
•Madsen, Barbara, University of Michigan (1)
•Marks, Douglas, Macomb County Water Quality Board (1)
•McCarthy, Terri, Wege Foundation (6)
•Merckel, Kenneth E., Michigan Steelhead and Salmon Fishermen's Association
•*Meyers, Philip A., University of Michigan (2)
•Morrissey, Lewis A., University of Michigan
•Myers, Philip , University of Michigan

* An asterisk identifies participants serving as breakout group facilitators or recorders.

Numbers indicate breakout group assignments

•*Norton, Dick, University of Michigan (3)
•O'Donnell, Patty, Great Traverse Band of Ottawa and Chippewa Indians
•O'Foighil, Diarmaid, University of Michigan (3)
•O'Keefe, Gary, U.S. Army Corps of Engineers (5)
•Pearsall, Douglas R., The Nature Conservancy (1)
•Peter, Adriaens, University of Michigan
•Petry, Donna, Conservation District - Wayne County
•Phenicie, Dale, Council of Great Lakes Industries
•Pistis, Charles, Michigan Sea Grant (2)
•Read, Jennifer, Michigan Sea Grant
•Ryan, Jill, Tip of the Mitt Watershed Council
•Schwartz, John E., Michigan Sea Grant (3)
•Sellinger, Cynthia, Great Lakes Environmental Research Laboratory (1)
•Shaffer, Ruth, United States Department of Agriculture Natural Resource Conservation Service (4)
•*Short, Joe, University of Michigan – School of Natural Resources and the Environment (5)
•Sinha, Sanjiv K., Environmental Consulting and Technology, Inc. (4)
•Smith, William E., Clinton River Area of Concern Public Advisory Committee (5)
•Snider,Van W. Jr., Michigan Boating Industries Assoc. (3)
•Song, Gang, City of Detroit Water and Sewage Dept. (6)
•Stoermer, E.F., University of Michigan – School of Natural Resources and the Environment (2)
•Sullivan, Vera, Conservation District - Wayne County (5)
•Swan, Dick, Lake Michigan Fishery Advisory Committee (4)
•Talbot, Brian, University of Michigan Business School(4)
•Terry, Russell, Ducks Unlimited (6)
•Thomas , Vicki, U.S. Environmental Protection Agency (6)
•Todd, Thomas, U.S. Geological Survey Great Lakes Science Center (3)
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•Wieting, Scott, Hannahville Indian Community
•Woods, Michael, Green Peace (2)
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•*Yaffee, Steven, University of Michigan (5)
•Zavislak, James, Thunder Bay Watershed Council (2)

Appendix B: Individual Responses

This listing presents the verbatim comments of workshop participants as submitted on the comment sheets.

Question 1: What are your priorities for Great Lakes restoration you wish to share with the Great Lakes governors?

Water Resource Management, Withdrawals and Diversions

•Insure water usage/withdrawal for individual and industry use
•Regulate water use, withdrawal, and diversion
•Ban water diversion
•Establish stable water levels
•Groundwater/surface water interactions and protection
•Adequate consideration for how changes in water resource statutes impact the hydrologic functions and provide protection for the functions.
•Evolution of riparian doctrine
•Sustainable water use, better water resource management and water conservation
•Theft of Great Lakes Waters (illegal diversion, ballast tanks).
•Protection of water quality and quantity
•Water quantity issues - communication and cooperation between users
•Need for a more regional approach to water management in the State and other Great Lakes
•Develop use standards per Annex 2001

Aquatic Nuisance Species

•Preventing new ANS / controlling existing ANS
•Stability in aquatic ecosystems - restoring native species complexes
•Stop the spread of exotic species through ballast water policies and canal policies
•Ecological integrity
•Treat ballast water discharges to destroy microorganisms.
•Changing biodiversity of the Great Lakes, interference in the food web
•Address human activities that facilitate the introduction of invasive species
•Identify roles of invasive species in altered ecosystems
•Keep international ships out of the Great Lakes
•Zebra Mussel

Wildlife and Habitat

•Habitat restoration and protection
•Reestablish nearshore habitats
•Offshore habitat restoration
•Inland habitat restoration and continued protection
•Watershed habitat restoration
•Forested watershed conservation
•Protection of natural areas
•Protecting sand dunes from mining
•Protection and restoration of barriers beaches, islands, and dunes
•Dam removal
•Fish and wildlife health/contamination
•Migratory flyway - stopover sites: protection and restoration
•Biodiversity and native species
    •biodiversity
    •inventory and monitoring of biodiversity
    •promote natural, self-sustaining populations for native species within their historic
•Endangered species
    •habitat sustainability of biota - threatened and endangered species
    •restoring/rehabilitating habitats necessary to support state an federally listed species
    •recognize state and federally listed species as “canary in the coal mine”
•Emphasis should be on habitat with the understanding not all habitats can be restored to some perceived original state; rather they can be rehabilitated
•Provide for stewardship (appropriate management) and monitoring of “protected” and restored (habitats) - funding and accountability
    •coastal zone issues
    •coastal zone ecosystem protection
    •restore, stabilize and maintain shoreline
    •development pressures on coastal zones

- •habitat loss in coastal zones
- •non-point source pollution in coastal zones
- •the condition of our coastlines directly impacts the tourism industry and other sectors.
- •maintain natural coastal ecosystem diversity functions and productivity (coastline leads basin restoration)
- •maintain wilderness shoreline

•Wetlands

- •wetlands - restoration and maintenance
- •development pressures on wetlands
- •restore coastal wetlands
- •by 2010 restore or enhance 100,000 acres of wetlands
- •restoration of wetlands and associated uplands to provide habitat for waterfowl and other wildlife

•Fisheries

- •establish balanced and self sustaining fish populations
- •enhance fisheries
- •restoration/creation of fishery habitat
- •improve near-shore fisheries habitat
- •restore whitefish populations and other fish populations

Toxics Contaminants

- Mercury
- Phase out of mercury emissions by 2020 and meaningful timeline and benchmarks to achieve this
- By 2007 reduce conc. of PCB's in lake and walleye by 25%
- Major review by National Academy of Sciences on the Fish consumption advisories
- Study emerging chemicals
- Eliminate / reduce toxic substances
- Edible fish
- Control air emissions and air deposition of toxics
- Fish consumption advisory coal fired power plants (Mercury Reduction)
- Environmental contaminant clean-up with emphasis on NRDA, take, into account the damages incurred by fish and wildlife resources subjected to these pollutants
- Stronger policies for airborne pollutants/enforcement
- Continue to abate impacts of pollutants and contaminants
- Pollution prevention

Areas of Concern and Other Toxic "Hot Spots"

- Clean up AOCs (delist)
- Clean up of polluted hot spots / contaminated sediments
- Clean up and delist 3 AOCs with a total of 10 by 2010. Clean up all sites by 2025
- contaminated sediment remediation, especially in-land rivers and streams
- How to deal with contaminated systems connected to the Great Lakes that are not classified as AOCs (Mona Lake, Lake Macatawa, etc.)
- More funding appropriated to clean up AOC (implement RAPs)

Nonpoint Source Pollution

- Reduce/eliminate loading from nonpoint sources
- Sewage / CSO / SSO
- Agricultural pollution
- Fertilizer
- The influence of land use change on nonpoint source pollution
- The role of internal loading of phosphorus in drowned river mouth systems
- Point source pollution
- Sedimentation and erosion control not only in the Great Lakes but also the tributaries leading to them as those tributaries greatly affect the water quality at the lakes

Land Use Planning

- Offer tax breaks for those that follow sustainable planning efforts
- Development pressures, industrial and residential
- Establish 300,000 acres of buffer strips in agricultural lands
- Shoreline development - upland development impacts
- Protection of ecologically - sensitive GL coastal areas and wetlands through coordinated, effective land use planning (that values natural habitats and ecosystems an the benefits they provide)
- Engage municipal and land use decision makers in planning that accounts for water/ecosystem quality protection
- Support watershed and land use planning throughout Great Lakes
- Support and promote Brownfields Redevelopment and Urban Infill
- Low impact Development incentives
- Support land use as an alternative to run-off management

- Minimize land use impact from ecological standpoint
- Improved planning to prevent sprawl which directly effects water quality
- Better land use laws and policies, and effective enforcement

Sustainability

- Work toward a sustainable economy within a sustainable ecosystem
- Economic sustainability (tourism, industry, agriculture)
- Focus on sustainable development needs of the basin over the next 5-6 decades including: 1) infrastructure - sewage treatment, power generation, transportation, 2) economic base - manufacturing, energy management 3) husbanding natural resources - water, raw materials, 4) human resource development - education.
- Regional, multi-state recycling efforts
- Maintain sustainable use of resources
- Sustainability
- Green industry/transportation
- Biodiversity and cultural diversity and tradition (i.e. holistic life cycle approach)
- Sustainable practices/activities even everyday choices

Water-based Recreation and Beaches

•Beaches :
  - swimable beaches
  - beach cleanups- much debris, animal waste etc. if affecting the quality of our water and our lives as we try to enjoy the lakes. public awareness is a key factor in controlling this issue
  - making the Great Lakes somewhere where you can swim and enjoy the beach
  - by 2010, 90% of Great Lakes beaches well be open 95% of the time

•Enhance recreation
•Public access
•Provide for ecologically sound levels of public use, economic benefits, and the enjoyment of natural resources

Commercial and Recreational Maritime Transportation

- Ban all open water dredging spoils disposal.
- Designate dredging spoils disposal sites (purchase and retain)
- Environmental dredging
- Great Lakes-St. Lawrence Seaway expansion
- Boating facilities are too crowded, of poor quality

Miscellaneous

- Reconnect natural tributary and lake systems
- Connections between nearshore and offshore
- Co-management of natural resources
- Provide/upgrade infrastructures to meet clean-/treatment needs.
- Aesthetic value - difficult for economy ecological models
- The use of "soft" engineering practices in areas of need
- Integration of ecology and economics
- Improve understanding and prediction of impacts of tributary inputs to food-web dynamics and water quality
- "1000" more ecologically informed decision by state and mainly local leaders and citizens to wisely maintain and improve the environment for both business and ecologically.
- Restore chemical physical and biological integrity of the Great Lakes basin ecosystem
- Research for new technology for remediation and field testing of technology (promotion of environ. technology)
- Need to catch up on deficiencies of the past - almost total ignorance of many parts of Biota
- Continuous funding for "real" research
- Awareness of what's "natural" (Great Lakes water cycle/level) and adaptability
- Infrastructure coordination - delivery mechanism/framework/someone in charge to deliver
- Headwaters management – to be defined and included as a restoration goal

Question 2: What advice do you have on the design and implementation of a large scale restoration plan to advance the Governor's priorities for the Great Lakes ecosystem?

Public Education, Outreach and Participation

•Restoration efforts must include strong public education component to build public awareness and understanding
  - outreach and communication as significant part of each project, including research

- public awareness/education/ communication must be a key component of any initiative undertaken. Only strong public sentiment will carry us forward.
- massive education and promotion so that everyone, even the public is on the same page to restore, protect, and creating and following land use laws/ordinances
- make education a cornerstone so that next generations understand the value of the Great Lakes - any progress here should result in activities that suffer no backslide in future decades

•Education efforts should target both kids and adults
- work on outreach to adults, K-12 schools, get "freshwater ecosystems" far more integrated into the K-12 curriculum, so students get facts, ways of thinking, value, and they tell their parents.
- build a base of "watchful" and "helpful" kids and adults - get them involved with data collection, monitoring, finding answers.
- grass roots and multi-level education

•Use simple language in educational efforts
- use understandable, straight forward language to identify objectives and goals to gain public understanding and support of process
- avoid overly "techie" advocacy tendencies (they hinder public support)
- market the plan to a broad audience and in lay terms wherever possible

•Educate landowners to promote stewardship

•Education to build political support
- create awareness of importance of issues and concerns; ownership of issues and commitment to participation and action to effect solutions (i.e. political will to act)
- create political will to act and take ownership
- support Lake friendly politicians

•Content of educational materials
- start with public education - develop ongoing communication/information campaign covering what we need to do, how we will do it, how you can help, and who you can contact
- educate public as to importance of ecological issues to each person
- educate the public about what restoration means: broadcast- print-web - schools - libraries - nature centers- tourism publications
- education on the values of wetlands and the role they play in the Great Lakes ecosystem and in society and economy
- publicize successes
- public outreach – storm water permitting issues - make more efficient and realistic for LUB's, educate public officials and market the urgency of the issue to the public
- public education of issues and roles in pollution and protection
- once again "soft" engineering practices and making people aware of the impact that they have on the lakes when they don't use these practices
- education - tell how great the lakes are

•A central web site to list restoration work plans (not enough time fore us to prepare if we hear only from newspapers, radio and TV)
•Include events, illustrations, problems, and successes in local TV News coverage
•Changing the image of the Great Lakes both in Michigan and the world. This would be good for business (economy in general)
•Let affected entities know who is doing restoration work and why types of work will be done. For example, when dredging sediment from Lake St. Clair, let us know. Monitoring research by Wayne State U. was only known to us by newspaper.
•Open, inclusive process - all stakeholders present from initiation point
•Increase public participation in Michigan Department of Environmental Quality oversight
•Make sure all interests are actively involved
•frequent and on-going public participation
•Convene representative of all sectors to identify sustainable development issues they anticipate and build an agenda accordingly
•Be open to suggestion!
•Be certain to include all interested parties in deliberation and decision-making (based on water use/non-use values)
•Avoid alienating water user groups
•Balance of interests - recreational, wildlife/ecosystems, commercial
•Public-private partnerships are used and fostered
•Getting industry support, engagement
•Get sportsmen engaged in data collection, interpretation
•A framework that includes: a) corporate social responsibility; b) governance that includes a mix of command and control , voluntary interests, and economic instruments; c)basic eco-efficiency (also pollution prevention); d) facilitate change; e) dialogues and partnerships; f) informed consumers; and g) innovation

Science, Monitoring, and Data Access

•Must include monitoring component
- it must include science-based, long-term monitoring/observations to measure effectiveness of restoration efforts in the context of large-scale natural variability
- monitoring and assessment of physical and biological parameters
- monitoring to develop knowledge base for work - rec'd more data and evaluation of progress
- adequately monitor Great Lakes ecosystem to provide benchmark and document changes and establish goals
- institutionalize large scale measurement and monitoring, to enable ecological forecasting and policy response
- couple monitoring with restoration efforts
- monitor and evaluate progress toward goals (closed circle)
- require that all funded projects incorporate monitoring

- fund planning, implementation, and monitoring
- comprehensive monitoring and assessment
- expand the program for monitoring water, habitat and species to track changes, identify problems, and verify progress
- institutionalize continual monitoring and testing
- ecosystem monitoring
- monitoring, a comprehensive real time online monitoring system that works from the premise "If you can't measure it you can't manage it" trend analysis and spot checks do not protect drinking water intakes from terrorists, mistakes, and illegal dumping. Water is the basic effect level, which the currently monitoring actions are not effectively detecting
- assessing and monitoring status of the system
- monitoring/data – need to track progress and define NQT steps
- institutionalize continuing program of monitoring and assessment. It is a disaster we have no real estimates of phosphorus loading to the lakes beyond the 1980s!!
- funding for consistent water quality testing
- need to set targets, establish and track indicators so we can know how well we're doing.
- monitoring of ecosystem health status (and reporting)
- closer watershed monitoring - this is what directly effects our lakes so we need to correct those problems first

•It must be science-based
•System for forecasting changes and implications of management decision

- develop a multi-scale (spatial) interactive, understandable, early accessible, visually oriented Spatial Decision support system that informs on present and past conditions and predicts implications of proposed actions. (include optimization and risk components)
- Great Lakes observation and ecosystem forecasting system

•Couple research with restoration efforts

- •invest some of restoration funds in rebuilding Great Lakes science and research infrastructure
- •establish a strong independent research unit - "Woods Hole of the Midwest"

•Need for a centralized region-wide information base

- Great Lakes basin-wide GIS-based data base - contain geographic state indicator, pressure indicator, and response indicator data.
- develop a means to coordinate the various efforts and information that already exists within the Basin. The issues have been researched and information obtained for many years.
- environmental data (e.g. water quality monitoring data, GIS data, sharing among states; and their accessibility by the public and researchers)
- integrate information across ecosystems

•Harmonize indicator development, measurement, reporting, data, endpoints
•Strong support/cooperative effort with observation network
•Pick an agency – mandate delivery system which reaches to the local level using
-design mechanism to plan and implement and communication
-who's in charge
-assessment
-monitoring
-feedback loop

Funding

•Adequate, long term, sustainable funding

- long term commitment-invest for long term, even at short term expense
- take a multi-generational view
- create a design that could be self sustaining not requiring maintenance and constant upkeep in money, through the state. (Example: start a buffer strip program that the grasses could be harvested once a year and be sold by the land owner).

- Fund cleanup of AOCs
- Look at division of funding - percentages based on 4-5 main priorities: 1) research 2) outreach/education/communication/ legislative education 3) restoration projects 4) project evaluation and reports
- Faster process for recovering funds from court cleanup decisions
- Dedicate funding to accomplish the enforcement agency and task force goals
- Fully fund current authority
- Fund more research/outreach
- Significant resources are required for long-term, focused research so that a) restoration efforts can be science based and effective; b) changes can be forecast in the context of natural variability and c) restoration can be cost-effective and prioritized on the basis of sound scientific advice.
- Adequate funding of Michigan Department of Environmental Quality and agencies to enforce clean water laws
- Funding for water quality monitoring
- Availability of financial resources for restoration projects
- Commitment of intellectual and financial support
- We don't need a large scale restoration plan; we need adequate funding for each individual watershed to solve their own most important environmental issues; and modification or creation laws and institution to facilitate this
- GAO missed or skimmed over significant funding sources for Great Lakes restoration that must be tapped into

Institutional Arrangements

- Create a "task force" to oversee restoration
- Design a task force that includes representative from all states and Canada to formulate the regulatory laws necessary to accomplish the goals established by the Task Force.
- Establish federal/state/tribal task force to establish goals and priorities (binational)
- Multi-disciplinary, multi-agency task force to oversee implementation organized around functions much like an emergency pollution response - planning -finance - logistics - operations. Cut through bureaucracy and focus on operational efficiency. Its done that way in emergency clean-up operations and the lessons learned can be extended to long term clean up
- Perhaps a joint agency accepted by all to implement restoration based upon information collected
- Establish Great Lakes as permanent protected area
- Consider a new (replace the GLWQA) bi-national sustainable development agreement that embraces restoration priorities
- Use existing plans and institutions
    - focus on executing existing plans - implementation - not more planning
    - involve <u>many</u> groups that are already in place-each with their own expertise. They could include many great environmental groups now existing.
    - build on existing plans
    - consider and utilize existing Great Lakes plans
    - improve on existing co-operation/organizations
    - do not reinvent the wheel - take advantage of previous plans as much as possible - avoid duplication of effort and starting an isolated process
    - use existing plans (conservation, restoration) to guide priorities
    - don't reinvent the progress. Continue the progress – we've made much and need to build on it.
    - should utilize existing mechanisms and organizations under new, single, inclusive structure
- Give oversight responsibilities and authority to well-defined existing organizations
- Strengthening the IJC? (advisory/should they be given power?)
- Our primary venue for binational cooperation is the Water Quality Agreement. The substance of the Agreement maybe out-of-date but its structure and governance mechanisms remain sound. We should continue to build on this structure and initiate the process of updating the substance. We don't want to create a new - duplicate institutional structure.
- Implement Annex II of the Great Lakes Water Quality Agreement and add enforcement. Annex II needs to reviewed, updated with 21st century technologies to prioritize what has the biggest benefit.
- Coordination of existing programs, research a la Chesapeake Bay
- Reduce and streamline federal and state efforts, make these more "continuous mission"
- MI Dept of health should have implementation policy
- Build on lake basin-oriented - LaMPs (SOLEC)
- Encourage/explore means of restoration other than legislation as well as new technologies and ideas for clean up and prevention.
- Integrated multi-agency management and research
- Establish an on-live collaboration process with in the professional community and with a section for public involvement
- Need a coordinated effort entire watershed, currently very disjointed.
- Realize that habitat conservation and H_2O quality are directly linked – lots of initiatives / programs are available benefiting both.
- Tribes/states/U.S./ Canada
- Work with coalitions (across states, provinces, both national governments.)
- Improved coordination of state, federal, local and tribal programs
- Encourage/foster partnerships at all levels of government, private sector and public and across boundaries
- multi-state, regional networking needs full development
- Require cross-jurisdictional cooperation
- Create strong alliance with all entities working together for Great Lakes restoration
- Increase cooperation; delegate; avoid overlap
- An agreement on institutional arrangements to formalize validate existing network and collaborative efforts, and create cooperative arrangements.
- Create partnerships and appropriate scale of pieces/programs that will comprise action
- Work with other regions where appropriate, on shared priorities
    - avoid distraction of jurisdictional conflict; join with other regions when priorities are shared. For example, if storm water management represents a critical priority for Great Lakes and Chesapeake. Bay, work together on this issue
    - work with other basins (Chesapeake) on common priorities

•The effort must be binational
•Binational cooperation is very critical for Great Lakes restoration to succeed

Accountability and Enforcement

•Create mechanisms for accountability through measurable outcomes
•Concrete deadlines, goals, penalties/rewards
•Form an accountable delivery system
•Vest authority, accountability for planning and implementation in a respected entity
•Vest authority in a group so there is responsibility and accountability for implementation/getting things done.
•Enforcement of current pollution laws and control measures
    •enforcement of current **air** pollution laws
        - stronger policies for airborne pollutants/enforcement
        - close gap in Clean Air Act for old coal burning power plants, enforce new source review (Not Clear Skies), increase standards for all four (NO_x, SO_x, CO_2, Hg) pollutants.

- •enforcement of current **water** pollution laws
  - enforcement of Clean Water Act and pollution reductions
  - adequate funding for Michigan Department of Environmental Quality water enforcement

•Uniform state laws and commitment to enforcement among the Great Lakes states and provinces
•Authorize an enforcement agency with watershed-wide authority to enforce the laws

Priority Setting

•Define the goal, vision and acquire consensus on the priorities
- •the goals should be ecosystem-based and have a defined timeframe

•Establish common basin-wide standards and targets
- •set benchmarks of improvement and set in place steps to reach those benchmarks
- •develop system to prioritize and follow priorities in restoration.

•Concentrate on addressing a few priority issues
- •avoid the "squeaky wheels"; stay focused on the big picture
- •focus on the key issues which are of mutual concern to all involved.

•Establish restoration as the major goal
•Deal with source of problems first
•Be realistic about goals – it does not necessarily have to be pre-settlement conditions.
•Use available indicators (air, water, wildlife)

Policy Review and Research

- Review policy for sustainable usage
- Develop use standards per Annex 2001
- Rehabilitation of the Great Lakes commenced in the 1970s. Actually much was accomplished when one realizes the degradation of the lakes in the 1950s to 1960s. It would be useful to understand the successes we have had. What has worked and what have been our failures? Those who ignore history are subject to repeat failures. Need to evaluate present legislation and laws, federal and state, to determine if gaps occur, what can do to strengthened, sources of funds.
- Research and quantify economic benefits of Great Lakes remediation
- Review successes and failures

Scale and Focus

- It must be an ecosystem plan
- More biologists working on the total ecosystem
- Work watershed wide and not just coastal areas
- Revamp institutions to enable their operation on an ecosystem basis
- Define "ecosystem approach" and implement all restoration within that context
- Consider restoration in the context of the system as a whole
- Involve local communities
- Funding for smaller entities for restoration efforts of tributaries and coastal shoreline.
- A large scale success must be based on layers of small-scale successes. Don't forget small (520k) project programs like the U.S. Fish and Wildlife Service's Coastal Program. Small, nimble project programs like these get the citizen busy in through participation and marshal seed money to make successes that can be exported to other areas within the Great Lakes basin
- Don't forget power of small scale programs/partnerships and the use of volunteers to inspire bigger successes
- We <u>don't</u> need a large scale restoration plan. We need adequate funding for each individual watershed to solve their own most important environmental issues; and modification or creation laws and institution to facilitate this.

•Single Plan
- well-coordinated "single voice."
- development of a Great Lakes Master Plan
- the large number of players and the size of the area under consideration lends itself well to addressing large-scale pollutant inputs and problems in a coordinated fashion.
- must have one plan for all states, provinces, nations and interests.

Take Action

•Action is needed now; cannot wait for further research / planning
- much planning has already been completed. It's time to focus on implementation. NAWMP is a proven model that could be followed.
- work on the things you know about now, do not wait for a perfect plan
- get it done! (1 yr max timeline) and don't let it sit on a shelf – no terminal planning
- make the commitment to go ahead
- we know what needs to be done; we don't need further research on minute details
- focus on executing existing plans: implementation; not more planning
- actions are needed - have been talking, studying these for years. Cannot make any of these above another – all connected

Specific Actions

- Credit new incentive for private land conservation; local, state, provincial, federal incentives and program (e.g. tax incentives, purchase programs, cost shares)

- Involve university departments and undergrad/grad students with design and implementation. Those in school now will be left with task of implementing in future - involve students now in process.
- Close gap in Clean Air Act for old coal burning power plants, enforce new source review (Not Clear Skies), increase standards for all four (NO_x, SO_x, CO_2, Hg) pollutants.
- Implementation of state wide land use initiative
- Naming of Great Lakes basin as a federally-recognized National Priority Area by both U.S. and Canada. (Like Chesapeake Bay or Everglades)
- Develop safe treatment for ballast water

Miscellaneous

•Employ true environmental adaptive management principles
•Accept inevitability and prepare to adapt to future ecosystem changes (e.g., lake levels, invasive species)
•Manage use of shorelines but avoid artificial protection
•Accept that cleanup of historical pollution is hazardous in itself, is often unwise, and is unlikely to be cost-effective
•Recognize/focus on urban interface - Detroit, Chicago, Cleveland, Duluth, etc. represent areas of restoration utility
•To create infrastructure - use a variety of drivers - economic, human, health, societal.
•Hydrologic system/natural systems how to evaluate models/lake and transport
•Watershed management - U.S. geopolitical lines
•Design for success implementation - lake committees

Appendix C: Group Breakout Summaries

Group One

The group had several priorities to share with the Great Lakes governors. There is a need for clearly articulated restoration goals that are mutually accepted. Shoreline stabilization and development is of concern, particularly northern Lake Michigan. Land is of importance in maintaining water quality. Inland lakes often get neglected. It is important to think of the Great Lakes as an integrated ecosystem – all water is connected (not just open water). Migratory fly-way and stopover sites need to be addressed. The known stopover sites are threatened by development and degradation.

Headwater management of watersheds is top priority, which includes stream bank stabilization. The Green Code needs to be updated and re-written. We need continued assessment and monitoring of restoration goals, more coordination of the Great Lakes groups, and greater knowledge of the impacts of water quantity and quality.

There is need to examine the economics of the restoration situation. The plan can be mutually beneficial to all involved. There should be emphasis on relationship of economic and environmental stability. With regard to education, it is not just higher education and research education, but also elementary education that should be a focal point. Invasive species prevention and control are very pressing threats. Prevention as a priority will potentially avoid future costs. Awareness of these issues should be created so people take ownership of the issues and commit themselves to act. Watersheds should be used as political boundaries.

Outreach to non-environmental groups is important. Diversity is not just important in relation to species (biodiversity), but also includes human cultures, and groups. Traditional knowledge should be drawn upon in addition to western science. Non-traditional partners should be involved to capture cultural diversity in addressing basin issues. The region should take a holistic, life-cycle approach to these issues. The sustainability of Great Lakes ecosystems (overarching theme of Great Lakes restoration) should include four broad categories: biota/biological, physical, chemical, and people.

The governors need to coordinate with interstate agreements to see what has been done and what is being done. A database and monitoring system is needed for restoration management. Authority and accountability need to be vested in an entity that they can deal with these issues (i.e., Great Lakes Commission, International Joint Commission). There are 1800 units with planning authority within Michigan. Restoring is one side of the coin; the other side is to protect.

Group Two

The group's five recommendations for actions toward restoration are:

1. Decrease delivery of point source contaminants;
2. Decrease delivery of non-point source contaminants;
3. Separate storm and municipal sanitary sewage systems;
4. Restore shoreline to "natural" conditions; and
5. Identify roles of invasive species in altered systems.

Restoration should focus on the chemical, biological and physical integrity of Great Lakes basin. Land use planning needs to engage municipal land use decision makers to account for ecosystem protection.

Restoration needs to be a regional effort, maintaining natural coastal ecosystem diversity, functions and productivity. It should promote natural, self-sustaining populations of native species within their historic ranges. The goal should be to achieve ecologically sound levels of public use, economic benefits and the enjoyment of natural resources. Small-scale programs and partnerships and the use of volunteers have the power to inspire bigger successes. There is a need for some type of continuous funding for small scale research. The Great Lakes needs a basin-wide observation and ecosystem forecasting system. The region also needs agreements on institutional arrangements; there are a lot of existing networks that aren't formalized.

Infrastructure, sewage treatment, power generation, and transportation systems are all sources of contamination. It is important to recognize the economic base itself, including the manufacturing base on both sides of the border. Human resource development plays a large role in how this restoration effort will succeed. Education systems need to be re-evaluated, including methods and content. The focus should be on the entire watershed, not just "hot-spots". An economic base is needed that is sufficient to support environmental health and develop a short-term agenda to address acute needs.

Group Three

There are seven recommendations that the group found equally important:

- Clearly defined desired future;
- Education at all levels with media;
- Streamline accountability of government;
- Look for successful model;
- Substantial and stable funding;
- Explore use of sanctions and;
- Comprehensive and accessible database.

More specifically, a clear definition is needed of the desired outcome of Great Lakes restoration. The group developed focus areas for several broad restoration topics. Habitat alteration should look at wetlands, water loss and invasive species. Coastal land use should focus on shoreline access, dependent versus non-dependent uses, aesthetics and development. Habitat alteration should include wetland and water loss, and invasive species. Watershed health and management must involve watershed-based land use planning and improved government collaboration. Contaminant cleanup and pollution control needs to include fish issues, toxic sediments, and beach closing/containment advisories. There is also a strong need for public awareness and stewardship.

Group Four

Five top priorities were selected:

- An invasive species-ballast water bi-national treatment program needs to be established. This requires a stronger, better-organized voice from the environmental side.

- There is a need to recognize the global nature of the air emissions problem and develop regional control. This should start by building a regional support base, and then expand to a national and, finally, an international level. Initially, the focus should be on continuing sources of emissions. How pollutants get to the lakes needs to be better understood.
- Cleanup should be prioritized by determining what the continuing sources of contaminated sediments are. Areas of Concern need to be priorities. More funding and research is needed to determine whether it is safer to leave sediments in place or to remove/treat them.
- Education and marketing are needed for image improvement. We should focus on tourism, fisheries, size, physical attributes, aesthetics, and more to promote Great Lakes education and to show how GREAT they are! Educating both Congress and the public will help. Get message out to boaters and homeowners on lakes. Starting in schools, get the masses interested by targeting young audiences. Include Sea Grant in educational program to get information disseminated.
- Water usage and diversion may be inevitable. It is necessary to have a plan of protection and of action for when it happens.

The following is advice on the design and implementation of a large-scale restoration plan to advance the governors' priorities for the Great Lakes ecosystem:

- Establish the Great Lakes as a National Priority Region. This influences nearly every other issue. Organizations will allow for more funds to flow to the Great Lakes region. Cooperation and organization between groups will have many benefits and make other issues more readily achievable. Coalition building between state, federal, and binational cooperation is required. One cannot manage part of a basin effectively; it must be the whole basin. Tribal considerations are also an important group to include.
- It is necessary to define what restoration means in the Great Lakes context. Where are we going, what is the goal? How clean is clean? Developing criteria and metrics to achieve goals is critical. Long-term monitoring is required to track progress. Prioritizing what sites to cleanup first is important. What sites are continuing sources of pollution? Using cost-benefit type analysis to allocate efforts could improve efficiency of actions. It is important to get the most out of an investment.
- Stable funding sources are critical to long-term stability. In is necessary to upgrade infrastructure using new funds, which may come from establishing the Great Lakes region as a federally recognized national priority.

Group Five

The goal of Great Lakes restoration should be to achieve beneficial uses of the Great Lakes ecosystem that are socially and ecologically sustainable. This needs to be a unique arrangement of institutions with accountability and authority. Prioritization cannot be a one-time thing—it must be revisited. Long term planning and adaptive management are essential.

The group has numerous recommendations for this process:

- Continue the clean water and clear air acts that are already in effect;
- Support existing brownfield redevelopment and urban infill programs and promote additional urban infill;
- Eliminate and prevent invasive organisms;
- Establish balanced and self-sustaining fish populations;
- Data gathering is of utmost importance, not just gathering, but international compatibility;

- Encourage sustainable use of water;
- We need a monitoring program to assess and evaluate the data we gather;
- Ban all open water dredge disposal;
- Acquire upland lands for disposal locations;
- Educate public officials and market the urgency of these issues to the public;
- Create a Great Lakes interstate institution empowered to implement the restoration plan;
- Persistent toxic substances should be eliminated and reduced at their source;
- Reduce or eliminate loading from non-point sources (different from persistent toxics).
- Stress implementation of Annex 11 of GLWQA;
- Establish lake water levels for the purpose of banning or regulating any diversions;
- Restore predator-prey relationships in the lakes system;
- Maintain or establish wilderness shoreline;
- Address urban and suburban issues such as runoff and stormwater;
- Establish permanent research and study centers looking at the relationship of Great Lakes resources to basin institutions—economic, social, and political; and
- Ensure stringent accountability for plan execution.

Group Six

The restoration strategy should include plans for ridding the Great Lakes of aquatic and terrestrial nuisance species. It should institutionalize continuous programs of modeling and assessment with stable funding. Habitat protection and rehabilitation should include a watershed-wide focus on wetlands and grassland buffers and other valuable ecosystems components. *Measurable* pollution prevention and clean-up goals (very specific) should be in place. It is essential to protect Great Lakes water as a *regional* resource. Constant, sustainable funding is needed before implement a plan can be developed. Diverse stakeholders need to be included in creating the plan such as: scientists, business, economists, and the private sector. A coordinated effort across the entire watershed is critical. A key issue or rallying point would help to get people coordinated on a regional basis. Public involvement and education are instrumental. The public and other stakeholders need to be made aware of what measures are being taken. Specific programs for each targeted group (professional, general public, and children) would be ideal. The priority list should be flexible so it capitalizes on what is politically relevant at the time. The priorities should include everyone that can contribute and keep them at the table with some sort of incentive. A lot of plans are already done; there is a need to start implementing existing plans and find funding. All states/provinces should have an equal share in the outcome, but different monetary commitments are needed from different sources.