

# Public Comment on the GLRC Information & Indicators Section

## **A. General Support for Section and Recommendations**

### **1. Support for thematic structure of I&I section**

Submitted by: Environmental groups (43 signatory organizations)

Comment: *The section poses a challenge to readers because it is highly technical and generally several steps removed from actually solving problems. This strategy section is a reduction of a much more detailed and informative appendix. We strongly support the section's comprehensive treatment of the many components of information needed by decisionmakers and the public in their efforts to protect and restore the functioning of the Great Lakes ecosystem: indicator determination, information gathering, information dissemination and analysis and research.*

### **2. Support for goals and recommendations**

Submitted by: Water Environment Federation

Comment: *WEF supports the following goals and recommendations:*

- *Reliable data and sound science are critical to making improvements in the Great Lakes Basin, and their importance must be widely recognized. Physical, biological, social, and economic research and scientific technology must be strongly supported*
- *Develop a Great Lakes Information Coordination Council to provide common direction among partnering Great Lakes organizations and coordinate information management, observations and monitoring, and research and communications.*
- *Establish a widespread network of observing and monitoring stations to provide a steady stream of data and scientific information that can be translated into practical information for decision makers, educators and the public*
- *Develop and implement a scientifically validated set of indicators for the Great Lakes ecosystem that meets the needs of all user groups for accuracy, resolution, and relevance to key concerns.*

### **3. Support for I&I recommendations**

Submitted by: Great Lakes Sea Grant Network

Comment: *The needs for increased collection, standardization, and sharing of information regarding the Great Lakes were common themes during the workshops. Many comments noted frequent incompatibility among data sets and difficulties in accessing information that prevent informational tools from realizing their full potential in resource management. The Draft Action Plan recognizes these barriers and proposes the development of collaborative and technological solutions to address them. Many workshop participants voiced need for increases in decision-support capabilities based on improved programs for monitoring, research, and modeling. Similar needs are noted within many sections of the Draft Action Plan. The Information and Indicators section proposes actions that would greatly improve the abilities and mechanisms for decisionmaking regarding Great Lakes resources.*

### **4. Chapter addresses issues well**

Submitted by: Waste and Pesticides Division, U.S. EPA Region 5

Comment: *From an IT perspective, we compliment the issue team for a very thorough, thoughtful assessment of the existing IT problem and recommended actions. We are glad to see the specifications for data collection and exchanges, i.e. data standards, data quality requirements, metadata, and data exchanges, which are essential for data quality, partnerships, and other collaboration on research and assessment of the Great Lakes ecosystem. Regarding the funding for implementing the IT recommendations, some actions are interagency. Are the other partner agencies onboard with contributing to funding the particular action?*

## **B. Suggestion for Significant Revision**

### **5. Considered reorganization and re-writing to emphasize problem-solving**

Submitted by: Environmental groups (43 signatory organizations)

Comment: *We are concerned that, as written, the section does not effectively make the case to non-technical readers the critical importance of its recommendations to the success of the other elements of the strategy. To this end, we recommend that the section be rewritten to be problem oriented. The section's four-part structure could be fundamentally retained, but in distributed form, reproduced under each of several problem headings, such as "basin water supply," "nearshore conditions," "climate change effects," and so on. Readers are more likely to be persuaded of the need for an investment in glamour-challenged information, monitoring, and research if it is clearer what problems such an investment will help solve.*

### **6. Report is confusing and doesn't reflect strategy team deliberations**

Submitted by: Council of Great Lakes Industries

Comment: *The fortified and enhanced environmental data collection, storage, dissemination, and public communication efforts described in the Indicators and Information Team report are essential to the continued improvement of the Great Lakes ecosystem. However, the improvement of this important infrastructure element must incorporate the many monitoring, Lakewide Management (LaMP), and State of the Lakes Ecosystem Conference (SOLEC) programs currently in existence. It is not necessary or wise to start over as is inferred by the draft report. Frankly, we are very confused by the discussion presented in the indicators and information section, pages 40-44 on how to fill these needs. This report language does not reflect the discussions held between Indicators and Information Team members; nor do the recommendations reflect those proposed during team deliberations. This section needs to be rewritten to reflect the points listed below that were repeatedly made during the Collaboration discussions.*

### **7. Rewrite to integrate needs of other issue areas**

Submitted by: Waste and Pesticides Division, U.S. EPA Region 5

Comment: *The entire Indicators and Information chapter must be re-written using the indicator and information needs identified in the Aquatic Invasive Species, Habitat/Species, Coastal Health, AOC/Sediment, Nonpoint Source, Toxic Pollutants, and Sustainable Development chapters! Also, work already underway should be mentioned, such as the Great Lakes Information Network and GLNPO's GLENDA database. The Great Lakes Environmental Research Laboratory in Ann Arbor, Michigan performs some of the work included in this chapter.*

## **C. Use Existing Programs**

### **8. Use of existing programs rather than creating new entities**

Submitted by: CropLife America

Comment: *The fortified and enhanced environmental data collection, storage, dissemination, and public communication efforts described in the Indicators and Information Team report are essential to the continued improvement of the Great Lakes ecosystem. However, the improvement of this important infrastructure element must incorporate the many monitoring, Lakewide Management Plans (LaMP), and State of the Lakes Ecosystem Conference (SOLEC) programs currently in existence. It is not necessary or wise to start over as is inferred by the draft report in the indicators and information section, pages 40-44. We are concerned that the recommendations in this section would overlook those important existing programs, and recommend that the final action plan fully embrace existing programs.*

### **9. Utilize existing institutions wherever possible**

Submitted by: Great Lakes Sea Grant Network

Comment: *We note that several recommendations, particularly those within the Indicators and Information section, call for establishing and supporting new organizations and infrastructure (e.g., Great Lakes Communications Workgroup, Regional Information Management Infrastructure, Great Lakes Research Office, Great Lakes Information Coordination Council). The Great Lakes region already has well-established, basin-wide and/or international organizations that can be modified and/or charged to serve such purposes (e.g., IJC's Council of Great Lakes Research Managers, the Great Lakes Commission, the Great Lakes Fisheries Commissions, the Great Lakes Sea Grant Program Network, etc). As such, creation of such new entities should generally be discouraged and these recommendations should either be redirected to utilize existing institutions or substantially clarified as to why additional entities are needed.*

### **10. Consider using existing institutions rather than forming new ones**

Submitted by: Environmental groups (43 signatory organizations)

Comment: *Several Indicators and Information recommendations call for establishing and supporting new organizations, including a Great Lakes Communications Workgroup, a Regional Information Management Infrastructure, a Great Lakes Research Office, and a Great Lakes Information Coordination Council. The Great Lakes region has a number of well-established, basin-wide and international organizations that could possibly be charged or modified so that they could be charged to serve the intended purposes. Such institutions include, for example, the International Joint Commission's Council of Great Lakes Research Managers, the Great Lakes Commission, the Great Lakes Fisheries Commission, and the Great Lakes Sea Grant Program Network. It is a truism that creating new offices, easily tarred as "new bureaucracies," can become a political liability for a proposed new program. We understand that some of the proposed offices are assemblages of existing officials and that their purpose is to make existing programs more effective. Therefore we are recommending here only that the Information and Indicators drafting team very carefully review the draft report's proposed new offices to see where existing institutions could perform the needed tasks. The fewer new institutions proposed by the section, the better, practically speaking.*

## **D. Research Funding**

### **11. Must secure and defend funding for research activities**

Submitted by: David Lonsdale

*Comment: The need for an adequate, reliable funding base can not be stressed sufficiently. Situations like the line item veto of funding for operation and maintenance of the R/V Blue Heron a Lake Superior oceanographic research vessel by Minnesota's governor is unconscionable and should never be allowed to happen again under the watch of GLRC. In places like Minnesota there appears to be little priority given to enabling Great Lakes research. Much of this states research money is repeatedly earmarked for larger municipalities where the political power is concentrated but not necessarily the natural resources that need managing. Throughout the basin such political influence must be diffused under a Great Lakes Action Plan or status quo will prevail*

### **12. Research funding recommendation is appropriate**

Submitted by: Great Lakes Sea Grant Network

*Comment: We support the Draft Action Plan's recommendations for research funding. The report recognizes that research and monitoring are fundamental to sound decisions and that the current level of funding for research is not sufficient to guide best courses of action for the restoration. In particular, we strongly support the proposal to double federal Great Lakes research support over the next five years to better meet restoration needs. Additionally, we strongly endorse the proposal that, in addition, ten percent of all new research funds to support Great Lakes restoration should be dedicated to independent research. Historically, the independent academic community has made significant and important contributions to policy and management actions in the Great Lakes. However, declines in funding for competitive, peer reviewed research over the past decades has greatly diminished academic involvement. These researchers more easily adapt to new questions and ideas that lead to important advances in understanding and management support. It is imperative that these independent voices continue to be supported and heard, and that this support be delivered through independent, extramural research programs not subject to real or perceived manipulation by management agencies or government laboratories.*

### **13. Support for recommendations to strengthen research**

Submitted by: Environmental groups (43 signatory organizations)

*Comment: The report recognizes that research and monitoring are fundamental to sound decisions and that the current level of funding for research is not sufficient to guide best courses of action for the restoration. In particular, we strongly support the proposal to double federal Great Lakes research support over the next five years to better meet restoration needs. In addition, we strongly endorse the proposal that, in addition, 10 percent of all new research funds to support Great Lakes restoration should be dedicated to independent research. Historically, the independent academic community has made significant and important contributions to policy and management actions in the Great Lakes. However, declines in funding for competitive, peer-reviewed research over the past decades has greatly diminished academic involvement in understanding and protecting the functioning of the Great Lakes ecosystem. It is imperative that these independent voices to be supported and heard, and that this support be delivered through*

*independent, extramural programs not subject to real or perceived manipulation by management agencies or laboratories.*

#### **14. Support for research funding, direct it to address local needs**

Submitted by: New York State Tug Hill Commission

Comment: *Consider making at least 10% of increased funds directed to local research driven needs. We entirely agree with Item 4 – now we need the funding to back it up.*

#### **83. Increased research funding is needed**

Submitted by: State of Michigan

Comment: *Recommendation 3 proposes to double the federal research budget and establish a Great Lakes Research Office to coordinate research activities. Increased funding for Great Lakes research would improve our understanding of Great Lakes processes, and improve the effectiveness of indicator selection and monitoring efforts. There is need to develop a cost-effective coordinated effort to resolve this issue.*

### **E. Research Coordination**

#### **15. Research coordination recommendation is well founded**

Submitted by: Peggy B. Johnson

Comment: *“If you cannot measure it, you cannot manage it” is a lesson we’ve learned with attention to Lake St Clair. After sustained effort a significant new monitoring system has been funded and is being implemented following the 1994 crisis of beach closings. The call for “a comprehensive research coordination strategy across partnering institutions” is supported by our experience with the Lake Erie Millennium Project at the University of Windsor.*

#### **16. Pursue research coordination through GLICC**

Submitted by: Charlie Peters, USGS

Comment: *Page 43 – I agree that Great Lakes research should be better coordinated. I suggest that the proposed GLICC would be the appropriate group to discuss how to make this happen. All research entities must be appropriately represented in these discussions.*

#### **17. Research coordination is needed**

Submitted by: David Lonsdale

Comment: *If a science based research program is to be a useful decision making tool needs to be integrated and coordinated closely GLRC priorities throughout the basin. Today coordination is lacking, falling into the bailiwicks of a huge assortment of international secretariats, federal, state and local agencies, many who have neither the time nor the desire to make such information available. Under the GLRC action plan data gathering and analysis does not only need to be validated but needs to be centralized under one entity.*

#### **18. Specify agency to oversee Great Lakes Research Office and other actions**

Submitted by: ODNR

Comment: *It is unclear in some of the recommendations which agency is responsible for actions. For example, on page 43, recommendation 3 of Indicators and Information states that a Great Lakes Research Office should be funded although an agency is not referenced.*

#### **84. Research prioritization requires collaborative effort**

Submitted by: State of Michigan

*Comment: The setting of research priorities should be a collaborative effort with other federal, state, and tribal entities, academia and other interested parties regardless of who coordinates the research.*

#### **85. Review feasibility of timeframe for research strategy**

Submitted by: State of Michigan

*Comment: The interim milestone calling for the development and implementation of a Great Lakes research strategy by 2007 should be reviewed to ensure it can be accomplished in the time frame identified..*

### **F. Research Prioritization**

#### **19. Specification of priority research needs**

Submitted by: ODNR

*Comment: Priorities for research should be established as part of the goals and recommendations of this chapter. For example, the recommendation to double the research budget over the next five years should include consideration of priorities for the research needed.*

#### **20. Lack of a comprehensive science plan**

Submitted by: Great Lakes Sea Grant Network

*Comment: We also note that there lacks a clear and compelling science plan that supports this large-scale, complex, long term restoration and takes advantage of the wealth of expertise in the academic community. We strongly urge the Task Force to commission such a plan, led by the independent academic community, and to support projects selected through a process of competitive, peer review. The science community is ready to provide support for the broad range of natural, social, and economic issues confronting the restoration effort.*

#### **21. Research priorities for advancing I&I**

Submitted by: Jack Manno, Great Lakes Research Consortium

*Comment: [Proceedings of a March 2005 workshop on prioritizing research needs for New York Great Lakes Restoration were submitted, organized around the GLRC Issue Areas. In addition to specific research needs for the other teams, the following section summarized the high-priority I&I research priorities, in ranked order]*

- 1. Adaptive Management: Management goals should include an exploration of how adaptive management can be used effectively in restoration and how it might help or hinder restoration efforts.*
- 2. Information and technology transfer to multiple user groups. Much of the work to date has been done by "specialists," but wide-spread implementation will require ways to transfer the technology and information derived from the technology to a variety of "expert" and "non-expert" users.*

3. *Catalog existing models. The Great Lakes are one of the most-modeled ecosystems in the world, but there is no comprehensive listing of these models. Without such a catalog, it is difficult to examine the interactions between these areas.*
4. *Whole ecosystem models including embayment and open water. Many ecosystem models currently focus on either nearshore or open water environments, making it difficult to examine the interactions between these areas.*
5. *Create a data clearinghouse. Great Lakes researchers should cooperate to build a data clearinghouse, including developing standards for metadata that describe the data sets. Such a clearinghouse would also allow researchers to access a wider variety of data sets for comparison, verification, and validation of their studies.*

## **22. Omission of chemical research**

Submitted by: Waste and Pesticides Division, U.S. EPA Region 5

Comment: *Significantly, the first bullet on page 41 omits ‘chemical’ and adds social and economic research and technology.*

## **G. Open Water vs. Coastal and Nearshore**

### **23. Over-emphasis of open-water vs. coastal**

Submitted by: U.S. EPA

Comment: *This section overemphasizes open water observing systems. Most regulatory and management challenges and needs for information are in coastal watersheds, tributaries and harbors, coastal areas of concern, coastal ecosystems (including beaches and wetlands) and nearshore waters. The majority of Great Lakes environmental and ecosystem problems (including invasive species) are located in these coastal areas. The Strategy should recommend that monitoring and observing designs and diagnostic indicators should address management and restoration needs and recommend seeking ways to increase the data flow in efficient ways, perhaps through development of an information hub.*

### **24. Over-emphasis of open lake observations**

Submitted by: Charlie Peters, USGS

Comment: *Page 40 – I disagree with the sentence at the end of the 4<sup>th</sup> paragraph: “Additional observation and monitoring are particularly needed for the open lakes.” There are significant monitoring needs in the tributaries, GW, wetlands, etc. There is no validity to the statement.*

### **25. Importance of nearshore areas**

Submitted by: The Nature Conservancy

Comment: *In the Problem Statement’s last sentence of the 4<sup>th</sup> paragraph – it states that “additional observation and monitoring are particularly needed for the open lakes.” There must be complementary, if not more intensive, indicator development and monitoring for the nearshore waters of the Great Lakes. Although the nearshore areas are among the least understood and least studied zones of the Great Lakes, they are among the most important for biodiversity. An estimated 80% of all fish species in the Great Lakes use nearshore areas for at least part of the year. The diverse physical habitats, influenced by water levels, wave action, tributary inputs, and vegetation, provide spawning and nursery areas, and refugia. In addition to their ecological benefits, human interaction with the Lakes is greatest in the nearshore areas.*

## **H. Data / Information Management and Delivery**

### **26. Need for a data repository**

Submitted by: The Nature Conservancy

Comment: *Developing, maintaining and utilizing indicators would be much more effective if there was a centralized Great Lakes data repository that was easily accessible to researchers, natural resource managers, decision makers, and stakeholders.*

### **27. Need for a Great Lakes database**

Submitted by: David Lonsdale

Comment: *A comprehensive Great Lakes database needs to be developed. This product not only needs to be readily available but translatable in terms of understanding ecosystem processes within a lake and across all the Great Lakes. Selection of definitions, descriptors, physical and chemical parameters, indicator organisms, reporting and methods used need to be standardized and easily applied.*

### **28. Data Repository – Use of STORET**

Submitted By: U.S. EPA

Comment: *The document does not address the data management system needed to store the monitoring information gathered and allow it to be accessible to decision-makers and the public. The STORET database should be considered as a potential repository for Great Lakes monitoring information.*

### **29. Data and information delivery**

Submitted by: Charlie Peters, USGS

Comment: *Page 44 – It is vital to provide data and information in a useful way to all stakeholders. How best to do this will require a great deal of thought and discussion and should be another priority of the proposed GLICC. While GLIN may certainly become a major part of this data and information network, there are many other equally, or perhaps more integral existing networks and databases (such as STORET and NWIS), that must be considered. There are multiple efforts nationally and internationally to provide multiple data sets. They should be bench marked.*

### **30. Need to address withholding of data**

Submitted by: Waste and Pesticides Division, U.S. EPA Region 5

Comment: *On page 41, the second paragraph addresses 'information,' but it addresses data. Data is not information until the data is analyzed. While strong, formal data exchange partnerships among Great Lakes organizations underlies many of the constraints, I think the biggest constrain is holding the data until the grantee-principal investigator publishes it.*

### **81. The key is to make sure data are available**

Submitted by: State of Michigan

Comment: *Different agencies monitor for different purposes/goals, so there can be perfectly legitimate reasons why some monitoring activities are not coordinated. The key is to make sure data are available to all interested stakeholders (a later recommendation).*

## **86. Information management goals need more short-term milestones**

Submitted by: State of Michigan

*Comment: Additional short-term goals/benchmarks would be useful for Recommendation 4, which seeks to establish a regional information management structure to facilitate information exchange and inform decision-making. For example, national monitoring data standards have already been proposed, and one milestone might be to get all monitoring parties in the Great Lakes region to adopt these standards. Another could be to convene an annual Great Lakes “Monitoring Conference” that would provide a forum to learn about ongoing monitoring activities in the basin and improve communication among technical staff. It also seems that STORET could serve as the source of an overall data management system, since EPA and all states already enter most of their data in this system.*

## **88. Communication tools to share data would be useful**

Submitted by: State of Michigan

*Comment: Targets established for this issue include evaluation of improved communication tools. MDOT funds environmental studies that may generate relevant data for other agencies. Streamlining a means for sharing information would be useful.*

## **I. Indicators Coordination and Use of SOLEC**

### **31. Support for using established SOLEC process to achieve indicator progress rapidly**

Submitted by: Great Lakes Sea Grant Network

*Comment: A major theme raised by workshop participants regarding implementation of restoration activities is the need to set discrete and measurable goals at the outset, and to track the progress toward these goals throughout the process. By including an emphasis on indicators and their role in the restoration process, the GLRC has recognized this need as well. The emphasis on concrete and measurable goal-setting throughout the GLRC process has helped achieve broadly agreed-upon goals for each of the Issue Areas. However, in many cases significant additional work remains to shape these goals into operational indicators that can be used to track progress over time and across the basin. Although established indicators are needed from the outset of the restoration effort, their development should not delay progress on restoration action that—according to our workshop outcomes and the GLRC Action Plan—must be acted upon urgently. In this regard, the Draft Action Plan’s emphasis on supporting and strengthening existing activities, such as the State of the Lakes Ecosystem Conference (SOLEC) program, is appropriate and should ensure that the process of establishing indicators, metrics, goals, and a process for tracking them, moves forward quickly, as is needed to ensure restoration efforts are carried out in a timely and effective manner.*

### **32. Acknowledge prior and current indicator efforts**

Submitted by: The Nature Conservancy

*Comment: A lot of great work on Great Lakes indicators has already been done and a lot has already been collected. The report should better acknowledge this and promote building on*

existing groups and expertise, such as U.S. EPA and Environment Canada's State of the Lakes Ecosystem Conference (SOLEC)

### **33. Approach to indicators**

Submitted by: CropLife America

Comment: *CGLI believes that maintaining a coordinated monitoring and assessment program based on a scientifically derived set of indicators is essential to assuring success in Great Lakes Protection and Restoration efforts. We agree, but also envision such a program to include:*

- *Coordination of data gathering efforts carried out by U.S. Great Lakes states, the Canadian federal agencies, and private sector organizations.*
- *A central reporting and storage home for this data.*
- *Maintenance of a key set of indicators, such as those developed through SOLEC, which will use the data to track ecosystem status and progress.*
- *A SOLEC style biennial review of the indicators to receive, peer review, and disseminate ecosystem status information.*
- *A communications element to broadcast the results of this coordinated monitoring effort to the public at large.*

*These efforts should be done as efficiently as possible, utilizing the infrastructure that already exists, and augmenting it only where needed to enhance monitoring, data housing, and coordination elements.*

### **72. Indicators needs may differ among lakes**

Submitted by: Minnesota Pollution Control Agency

Comment: *Page 40, last paragraph: There should be an acknowledgement that the indicator suite may need to be tailored for the different Great Lakes. For example, the health of the perch fishery might be a great indicator for Lake Michigan and a really poor indicator for Lake Superior. We suggest changing the following sentence after the third sentence in the paragraph: In addition, indicators are needed for the unique conditions of each Great Lake, since there are significant differences in temperature, trophic status, native fish communities, and so on.*

### **82. Progress on indicators could be made much sooner**

Submitted by: State of Michigan

Comment: *The interim milestone calls for development and implementation of indicators (building off of SOLEC) by 2011. This task could be initiated, and probably completed much sooner than that. It also could be accomplished with minimal costs. More short-term milestones should be included here. For example, within a year or two the various monitoring agencies (federal, tribal, state) could agree on a small number of common indicators. Even getting agreement on a few indicators would show it could be done and probably would provide momentum and a model for adding more indicators in the future. It would also start the process of improving monitoring coordination.*

## **J. Indicator Selection and Prioritization**

### **34. Indicator selection**

Submitted By: U.S. EPA

Comment: *Selecting a suite of indicators may require more effort than is described in the strategy. It is noted that for existing indicators, “there are multiple explanations for observed changes.” This situation may be improved by careful consideration of indicator suite selection.*

### **35. Identify priority indicators**

Submitted by: The Nature Conservancy

Comment: *Commit to a systematic approach for identifying and regularly monitoring indicators of ecosystem integrity in areas where threat are greatest (e.g., Great Lakes coastal and nearshore areas). The region should collect, analyze, and share the indicator data so that adaptive management can be applied as appropriate in these areas. The indicator data should be compiled in a centralized location where it is readily accessible to decision makers, stakeholders and the public.*

### **73. Indicators should reflect both protection and restoration**

Submitted by: Minnesota Pollution Control Agency

Comment: *Page 43, Recommendation 3: We recommend rewording item d) as follows: “d) evaluate progress in achieving management goals and expectations.” This allows for source indicators and for measuring protection as well as restoration.*

## **K. Observing and Monitoring**

### **36. Highlight need for observing and monitoring**

Submitted by: David Lonsdale

Comment: *Similarly the plan notes the need for observing and monitoring systems across the basin. This to me is a particularly urgent request and the importance of establishing such a program needs to be highlighted in NEON letters. For without this capability how are changes going to be documented, how is variation going to be discriminated from an impact, and how will restoration programs be evaluated and modified to achieve an improved environment.*

### **37. Observing systems are not the primary information source**

Submitted by: Waste and Pesticides Division, U.S. EPA Region 5

Comment: *The fourth paragraph of the problem statement is factually incorrect. Observing systems, including sensors, stations, and networks are not the primary means for gathering information on the chemical characteristics of the Great Lakes. For Lake Michigan’s open waters, the only monitoring data is fish tissue. All other chemical data is from short-term projects. Furthermore, the described tools do not assess the progress of chemical restoration. In fact, GEOSS Task 5, EPA Water Pollution & Earth Observation isn’t scheduled to occur until October 2005, and Task 8 planning a weeklong workshop on human health and the environment and earth observation is well into the future. I visited the Illinois, Indiana, Michigan, and Wisconsin linked shores, with Lake Michigan in mind, and saw the uses described as follows: in Wisconsin, ‘water quality monitoring’; in Michigan, oil spills and algal blooms; in Indiana, water quality monitoring, storms, and nonpoint source pollution; and in Illinois, protect watersheds through water quality monitoring. These activities don’t help us tell whether it’s okay to eat the fish, drink the water, or recreate in it.*

### **38. Monitoring data are needed for a TMDL on the Maumee River**

Submitted by: Kenneth Fallows, TMACOG

Comment: *Water quality monitoring to direct nonpoint source projects is a problem for the Maumee River basin . . . . Lack of current data is a potential roadblock for funding from current programs. At the same time, the Great Lakes Regional Collaboration Strategy specifically cites Maumee as a critical area for sediment loading. We all know the Maumee is a major source of sediment and nutrient loading to the Great Lakes, but it appears that lack of current monitoring data could prevent us from implementing projects to solve the problems. Either funding for TMDL monitoring should be significantly increased, or EPA should re-think data requirements for implementation.*

### **39. Additional monitoring programs**

Submitted by: Charlie Peters, USGS

Comment: *Page 42 – While I agree that implementation of IOOS and NEON may be appropriate, it should not be at the expense of fully (or more fully) funding the NSIP, NAWQA, NASQAN, 319, 305, 303 and other ongoing monitoring programs. Additionally, a National Monitoring Network is being designed in response to the Oceans report and should be a high priority item as well. The GLICC that is proposed in recommendation I should spend the time to propose an appropriate all encompassing network and then make it's recommendation, which may well include all of the programs described above and others. Reliance just on GLOS or IOOS will not be sufficient. This discussion should include the recommendations of all of the Great Lakes Regional Collaboration Strategy teams. Let's spend the time to do this right and then make the recommendation.*

### **76. Note Michigan CMP participation on GLOS Steering Committee**

Submitted by: State of Michigan

Comment: *The report should note that the Michigan Coastal Management Program is an active member of the Great Lakes Observing System Steering Committee*

### **80. Indicators must be established prior to implementing observing systems**

Submitted by: State of Michigan

Comment: *Recommendation 2 proposes implementation of the Global Earth Observation System (GEOS) and the Integrated Ocean Observation System (IOOS) to promote monitoring coordination and development and implement science-based indicators. We are not familiar with these systems, so cannot comment on whether they are adequate vehicles to improve monitoring coordination and indicator development. The best way to ensure coordinated monitoring is to get broad agreement on selected, core indicators, which would then lead to monitoring efforts to collect the necessary data for these indicators. Without such agreement on indicators, improved monitoring coordination seems unlikely. However, the interim milestones indicate that the GEOS and IOOS be implemented (2008) before the indicators are selected and implemented (2011). This is backwards.*

## **L. Use of Science in Decision Making**

### **40. Need to defend use of science in decision making**

Submitted by: David Lonsdale

Comment: *The need for an expanded science research program echoes throughout the draft action plan and so it should. Science based decision making will result in steady progress. However, the powers-to-be must be resolute in maintaining a course of science based decision making. Science methods are not understood or highly valued by a surprising number of the public. All too often good science becomes de-railed and discarded because of the power of promising economic riches for a favorite passionate cause. Those charged with implementing the Great Lakes Action Plan must be prepared to constantly stand-up to these types of challenges and be prepared to defend decisions and the science behind them, often to passionate disbelievers.*

#### **41. Support for emphasis on science-based decision making**

Submitted by: Great Lakes Sea Grant Network

Comment: *The participants at the public workshops placed an emphasis on the need for sound decisionmaking, based on the best available scientific information. The Draft Action Plan places an emphasis on the promotion of scientific and informational tools that can help deliver Great Lakes information to decision makers. In particular, the recommendation to double current Great Lakes research expenditures will do much to advance decision-making capabilities in the region and is in line with the comments received during our workshops. In addition, the recommendations dealing with information collection, management, predictive modeling, and distribution will bolster the abilities of regional leaders to make decisions through a defensible and transparent process. The outcomes of the workshop series support the conclusions of the Draft Action Plan regarding the needs for research and informational tools to support decision making.*

#### **42. Use of the term “sound science”**

Submitted by: Steve Hoin

Comment: *I was dismayed to see the term sound science in the section for the Indicators and Information. I did not thoroughly search the document to see how pervasive this term and concept might be, but its presence in the first item in the goals section apparently suggests that it is considered an important issue. I have been following the recent Sound Science debate and it is clear to me that it has been injected into the regulatory system by institutions and parties with objectives that are biased. I think it is inappropriate to inject such a politically charged and hotly debated term into a document such as this. It diminished the integrity of the project.*

### **M. Education**

#### **43. Public education is needed**

Submitted by: David Lonsdale

Comment: *A heightened public Great Lakes Science education effort is required. Knowing the science behind decision making and management programs (they often are perceived to appear out of the blue to residents) will help familiarize and sensitize basin residents to challenges and responsibilities of living in the basin. These people are an audience to often forgotten or dismissed as not being interested or not being able to understand such complicated matters. A successful public education program will get residents to identify with the basin’s needs, provide a cadre of volunteers at the local and regional level and provide a powerful lobbying force when some issue must be solved through legislation.*

#### **44. Need expanded focus on education**

Submitted by: George Roumbanis

Comment: *In your information section for the first time you mention education, “education and outreach that incorporates this material and reaches the broadest possible set of audiences – this includes education and training resources for all levels from elementary school through college and outreach material to encourage its use.” As a science teacher I think this is a most crucial component. Indeed the young people who are going through our schools right now are the ones who would face the consequences of our past actions and inactions as they relate to the Great Lakes. With that in mind, I plead that you expand your planning to incorporate education as a distinct strategy, and that you allocate the resources necessary to develop Great Lakes curricula. Moreover, I urge that you foster collaborations between agencies, schools and universities that will empower our students to become part of the team of problem solvers that will manage this great resource, the Great Lakes. I urge all or any of you to contact me and as many teachers as possible as soon as possible to start working on this issue.*

#### **45. Educational kiosks and workshops in local communities**

Submitted by: Cities of Waukegan and Highland Park, Wisconsin

Comment: *We request inclusion of education kiosks and workshops, held at the local level, in the federal funding amount. These items would encourage reduced littering, improved stormwater management and more sustainable land use practices.*

#### **46. Need for educational materials**

Submitted by: Izaak Walton League

Comment: *We strongly encourage development of educational materials for the general public and decision-makers on all of these issues. Doing so will enable them to support programs and develop new ones within the context of the Collaboration Report. We suggest the many existing conservation and environmental groups serving the Great Lakes region be charged with becoming the information sources for the Great Lakes. We would not recommend the creation of a new Federal office to serve that purpose.*

### **N. Public / Community Involvement in Data Collection and Research**

#### **47. Use of citizen-collected data and information**

Submitted by: David Lonsdale

Comment: *Hopefully room will be made to train and incorporate data gathered by lay persons/citizen scientist who use the lake on a regular basis. A model exists with commercial weather reporting companies who collect data electronically from members with an interest in weather. Such a system would increase awareness of the Great Lakes and also provide an early warning system for environmental perturbances that normally are not observed.*

#### **48. Involve public in research**

Submitted by: Sharon Duerkop

Comment: *Don't forget about the public in assisting in research opportunities. Citizen science can stretch tight dollars as well as get public ownership of the shared problems in the basin. Likewise at the other end of the data collection is a need for flexible public access to the learnings of the research—learning from what our tax dollars produced.*

#### **49. Consideration of Coastal Conservation Plan and involvement of local NGOs**

Submitted by: Michigan Dune Alliance

Comment: *The Michigan Dune Alliance would like to submit for the GLRC record our 2005 Eastern Lake Michigan Coastal Conservation Plan which provides a synthesis and review of coastal dune and wetland sites along the Eastern shore of Lake Michigan from the Indiana state line to the Mackinac Bridge. We feel this report has pertinent information for the GLRC, particularly as it relates to . . . Indicators & Information . . . We would also encourage the GLRC to recognize the special potential of non-government organizations (NGOs) in carrying out Great Lakes restoration and conservation goals, which is not significantly addressed in the draft. The role of private land conservation is particularly important. Non-profit land conservancies throughout the basin have already protected approximately 110,000 acres using conservation easements and subsequent land management practices. Land conservancies, precisely because they are not government agencies are often perceived by land owners as the best partners for voluntary land conservation. Their efforts will directly and indirectly impact restoration of the Great Lakes because of their unique relationship with private land owners. The report should consider allowing any funding to flow directly toward such private land conservation efforts for greater efficiency.*

#### **50. Involvement of local communities and municipalities**

Submitted by: Cities of Waukegan and Highland Park, Wisconsin

Comment: *We believe that education and communication at the local and community level are critical to the success of several elements of the action plan. In addition, many of the recommendations involve data collection, which could be carried out by local municipalities, communities, and schools. We recommend integrating data collection, education, and communication throughout local communities and schools by establishing infrastructure and providing support for local citizens to obtain data, learn about the Great Lakes and their health, as well as obtain a closer connection and vested interest in their protection.*

#### **51. Use of coastal communities as data collectors along shoreline**

Submitted by: Cities of Waukegan and Highland Park, Wisconsin

Comment: *There is a lack of integrated information. We recommend incorporating coastal communities as data samplers of shoreline and near shore conditions as a way to become more involved in the restoration effort and as a way to defray costs. Our NSLMCI communities have access to GIS data technology and would be willing to discuss data sharing agreements with federal and state governments.*

#### **52. Direct information to assist local decision makers**

Submitted by: New York State Tug Hill Commission

Comment: *Need a clear recognition that many of the decision-makers are local officials and indicators and information need to be driven from their need and not federal and state bureaucrats and scientists.*

### **O. Geo-spatial information / Remote Sensing**

#### **53. Information as graphics and maps**

Submitted by: U.S. EPA

Comment: *This section should include a recommendation for collating natural resources and environmental information in graphic (including maps) forms that the public and managers can understand and provide information on trends in ecosystem health. Since most problems and concerns by stakeholders (municipalities, cities, counties, states, provinces) are at the scale of tributary and harbor, coastal watershed, and nearshore waters, an emphasis should be placed on those waters and those scales.*

#### **54. Use of remote sensing and web mapping technologies**

Submitted by: Rolando Roqueno, Rochester Institute of Technology

Comment: *I work at the Digital Imaging and Remote Sensing Laboratory at RIT and I would like to see a stronger emphasis on mapping and remote sensing in the main report. While it is covered to some extent in the Appendices, it is the collaborative opinion of our group that this be explicitly showcased as a vital part of indicators developed. In particular, the technology to develop maps that show and predict the spatial distribution of these indicators fused with field measurements and remote sensing imagery needs to be emphasized as a major objective. While maps and GIS systems were not extensively discussed in the report, these information tools are absolutely crucial in any monitoring and restoration effort of this magnitude. These information products are the key elements that will convey the necessary information to decision makers to gauge progress and adaptively prioritize funds to the areas of concern that either are not improving or have not been identified prior to the restoration effort. I am aware that the authors of the report are aware fo the power of these technologies in environmental monitoring efforts. I merely want the report to emphasize these more clearly so that both the environmental professionals and the public can easily interpret through the presentation of images the concise impact of both natural and anthropogenic effects. To put this concern into perspective, I am amazed at how pervasive the impact of Google Maps has been on the public even a few weeks after its introduction. While I did not find the technology particularly novel, I was reminded of my complacency in the technology and its power to convey actionable information to the public. I hope that the report espouses these tools with more than the passing mention of the Web map technologies.*

#### **55. Support for Remote Sensing**

Submitted by: Brian Huberty, ASPRS

Comment: *Add 6) Comprehensive Seasonal Remote Sensing of the Great Lakes to aid in the management of the Great Lakes by all agencies. \$20 million annually. For example, the Great Lakes coastline has never been synoptically imaged with airborne sensors or even aerial film cameras. This type of monitoring is needed to document change and to prevent future mismanagement of the Great Lakes.*

#### **56. Restoration won't use remote sensing**

Submitted by: Waste and Pesticides Division, U.S. EPA Region 5

Comment: *On page 41, the statement "Any new restoration efforts will require coupled research and observation programs" is correct, but the research and observation programs won't be based on remote sensing technology*

## **P. Additional Thematic Topics to be Addressed**

### **57. Additional areas of information needs – synergistic interactions and flow regimes**

Submitted by: Environmental groups (43 signatory organizations)

Comment: *We also strongly support the section’s awareness of an attempt to address the major broad areas of information need, particularly nearshore conditions and climate change effects. We recommend adding two important items to that list: 1) information and indicators dealing with potential synergistic, catastrophic developments, as outlined referenced in our opening “overarching” comments on the strategy as a whole, and 2) the determination of target flow regimes for the major Great Lakes tributaries. We currently do not have methods in place for characterizing or classifying watersheds based upon degree of altered hydrology. We suggest that the section include support for the development of credible protocols for measuring ecological impact based upon degree of altered hydrology*

### **58. Methods for hydrology-based wetlands classification**

Submitted by: Ohio Environmental Council

Comment: *Need methods to characterize or classify wetlands based on altered hydrology; plan should include support for the development of credible protocols for measuring impact based on degree of altered hydrology*

### **59. Add consideration of socio-economic information**

Submitted by: Great Lakes Sea Grant Network

Comment: *An additional consideration raised during the workshops is the need for enhanced research and modeling activities relating to social and economic aspects of the Great Lakes. The Draft Action Plan recognizes the significant interactions of the Great Lakes environment with its economic and social systems, but this link is not well-developed in the Information and Indicators section. Minor modifications to this section would be sufficient to emphasize the added need for research and information tools regarding the socio-economic components of the region, particularly as they relate to the basin’s natural resources and ecological systems.*

### **60. Global warming is not explicitly considered under “predictive modeling”**

Submitted by: David Lonsdale

Comment: *I was surprised that the potential impacts of global warming on the Great Lakes were not mentioned in the draft plan. However, there is recognition of the need for focusing on an ecosystem approach to research that will emphasize ‘predictive modeling and adaptive management’ thus impacts like those of global warming and major human population shifts would fall under the purview of predictive/forecasting models. Such programs are urgently needed to help identify the changes we face and help us manage our reaction to those changes.*

### **61. Repeat biodiversity indicator principles in Goals and Milestones**

Submitted by: The Nature Conservancy

Comment: *The report’s Problem Statement accurately captures the importance of: having indicators focused on biodiversity, threats to biodiversity and adaptive management; and having a small set of indicators useful for management and the public (i.e., as small as possible and still meeting monitoring objectives). However, these important points have not been incorporated into the report’s goals and milestones.*

## **71. Inventories of pollution sources**

Submitted by: Minnesota Pollution Control Agency

Comment: *Page 40, fourth paragraph: Another challenge should be added to the list: “incomplete inventories of ongoing sources of pollutants from within the Great Lakes basin.” The purpose of this addition is to remind the reader of the need for accurate inventories, not just of legacy pollution, but ongoing pollution from discharges and emissions and other waste streams such as products that will release pollutants when they are disposed of (i.e., mercury bearing devices or equipment that contains PCBs.)*

## **Q. Overarching or Miscellaneous Comments**

### **62. Strategy must emphasize binational efforts**

Submitted by: Environmental groups (43 signatory organizations)

Comment: *First is the need for the strategy to address the fact that any comprehensive restoration of the Great Lakes must be a binational effort. Throughout the plan there should be references to, and requested support for, binational information sharing and, most importantly, decisionmaking.*

### **63. Address needs specified by other issue areas**

Submitted by: Waste and Pesticides Division, U.S. EPA Region 5

Comment: *. . . Revision is most clearly needed in the indicators and information chapter, which gives too little weight to the collaborators’ data analysis and indicator needs. Each of the other issue teams identifies needs for indicators and information. The information and indicators chapter should consider these needs.*

### **64. Institutionalize reporting on GLRC progress**

Submitted by: Peggy B. Johnson

Comment: *I would suggest adding the requirement for a Biennial Report to the public on progress under the Great Lakes Regional Collaboration and status of the Great Lakes ecosystem components, i.e., the extent to which implementation is occurring and conditions improving or worsening.*

### **65. Indicators and Information actions shouldn’t delay progress in other areas**

Submitted by: Wayne Howard, Sierra Club Rochester Regional Group

Comment: *We are impressed with the comprehensive ecosystem-based management approach to remediating the Great Lakes. However, we should not wait until an indicators and information system is fully implemented, if it delays the overall collaborative action plan. Science is often not as exact as this section indicates that it should be.*

### **67. Needs of state, federal and tribal governments for coordination, monitoring, research, information management and communications**

Submitted by: U.S. EPA

Comment: *The recommendations should build upon existing efforts at coordinating monitoring and research at the federal-state-tribal level and among U.S. and Canadian agencies. The recommendations need to be broadened to include the research and monitoring needs of State,*

*Tribal and Federal partners, perhaps through 1)an integration of the recommendations and needs for monitoring and research incorporated in the seven other Strategy Team reports, and 2) a needs assessment of monitoring and research priorities of the States, Tribes and Federal partners which will support environmental management decisions. We also believe that a greater focus must be placed on information management and communications plans based on the needs of State, Tribal and Federal groups, and the public.*

#### **68. Needed components of monitoring and assessment programs**

Submitted by: Council of Great Lakes Industries

Comment: *A coordinated Basin derived monitoring and assessment program is essential to assuring success in Great Lakes Protection and Restoration efforts. Such programs should include:*

- *Coordination of data gathering efforts carried out by U.S. Great Lakes States, the Canadian Provinces, U.S. and Canadian Federal agencies, and private sector organizations.*
- *A central reporting and storage home for this data.*
- *Maintenance of a key set of indicators, such as those developed through SOLEC, which will use the data to track ecosystem status and progress.*
- *A SOLEC style biennial review of the indicators to receive peer review and disseminate ecosystem status information.*
- *A communications element to broadcast the results of this coordinated monitoring effort to the public at large.*
- *All of the above need to be provided through better coordination of the many existing efforts rather than starting from scratch and building entirely new programs.*

#### **69. Move material from Toxic Pollutants to I&I chapter**

Submitted by: Minnesota Pollution Control Agency

Comment: *Page 4, Item 7: As mentioned above, the third bullet from the previous item should be included in this item relating to Indicators and Information. [The third bullet under item 6, on toxic pollutants, reads “institute a comprehensive research, surveillance and forecasting capability”]*

#### **75. Move recommendation from Toxic Pollutants to I&I**

Submitted by: Minnesota Pollution Control Agency

Comment: *Pages 41, 42 and 44: Per the discussion above on Toxic Chemicals, we would suggest adding Recommendation 3 on page 38 to page 44 of this section on Indicators and Information. This would require the following additional changes:*

- *Move Goal 7 from page 36 to the goals bullets on pages 41 and 42.*
- *Blend the Interim Milestones for Goal 7 from page 36 to the Interim Milestones on page 42.*
- *Move footnotes 32 and 33 to appropriate page and renumber*

#### **70. Clarify roles of proposed groups and involve LaMPs**

Submitted by: Minnesota Pollution Control Agency

Comment: *In general: The Indicators chapter advocates that five different groups do a mix of more research and/or coordination at a total cost of eight million dollars per year. We agree*

*that the current research and data handling is piece-meal and needs some coordination, but it is difficult to distinguish between the different groups as the recommendations are written. The role and geographical scale of each group should be made clearer. If their roles really do overlap as much as it appears, then some thought should be made to consolidate the effort into one coordinating body to free up funds to actually do the research. Scale is also not addressed. There is a benefit to coordinate on a lake by lake level, perhaps at the LaMP level, and across all the lakes. Some of the eight million dollars recommended for funding could go to support a lake specific research/monitoring coordinator under the LaMP program.*

#### **77. Include short-term goals, core indicators, and cost-neutral actions**

Submitted by: State of Michigan

*Comment: Because of mandated constraints on the length of each team's submission, specific details are necessarily lacking and most of the document is therefore quite general. As such, it is easy to agree with general statements about the need for improved communication and coordination, as well as increased funding, which permeate the document. However, it seems that the recommendations could include short-term goals in addition to long-term goals, especially as related to development of, and agreement on, core indicators. While additional funding certainly is needed to accomplish many of the recommendations, the document could identify types of projects/activities that could be carried out with no/minimal additional funding. By emphasizing only broad, general recommendations that require substantial additional funding, the document seems to present an all or nothing scenario.*

#### **78. Clarify rationale for cost estimates**

Submitted by: State of Michigan

*Comment: The basis for recommended costs is not clear, making it difficult to comment as to whether they are reasonable.*

#### **79. Role of GLICC should be better explained**

Submitted by: State of Michigan

*Comment: Recommendation 1 calls for a new coordinating body to integrate technical experts with senior-level management. There are existing committees (e.g., Binational Executive Committee) that could serve this function. The core issue is better integration of technical issues with management decisions. Without details about how the new council would function and who would participate, it is not clear that another council will magically improve technical and policy integration.*

### **R. Communications**

#### **66. Communications involvement in GLICC**

Submitted by: Charlie Peters, USGS

*Comment: Page 45 – I think it would be appropriate to include the proposed communication workgroup as a component of the proposed GLICC. It is vital that the communication effort is directly tied to the indicator, information and monitoring aspects of the effort. Efforts of environmental monitoring and research coordination entities such as the National Water Quality Monitoring Council, Methods and Data Compatibility Board, Chesapeake Bay Commission,*

*Lake Michigan Monitoring Coordination Council, and others should be used as benchmarks when formulating and putting together the proposed GLICC*

**74. Clarify role of Communications Workgroup**

Submitted by: Minnesota Pollution Control Agency

Comment: *Page 44, Recommendation 5: We feel the role of the Communications Workgroup needs to be clarified. Will this Communications Workgroup be in a position to approve or disapprove of Great Lakes outreach efforts? With a group this disparate, will there be much value added or will there be a “least common denominator” effect in their advice?*

**87. Great Lakes Communication Workgroup is reasonable**

Submitted by: State of Michigan

Comment: *Establishing a permanent Great Lakes Communication Workgroup to coordinate and manage communication of information seems to be a reasonable recommendation (Recommendation 5). In the past, EPA and/or some Lakewide Management Plan teams developed communication strategies for Great Lakes activities. These could serve as models for a similar Great Lakes-wide effort.*