Lake Michigan Monitoring Coordination Council

Meeting Summary

November 2, 2006
Hyatt Regency
Milwaukee, WI

Participants
Charlie Peters, U.S. Geological Survey (USGS) – *facilitator in place of John Hummer*
Erika Jensen, Great Lakes Commission *(recorder)*
Kate Barrett, Wisconsin Department of Natural Resources (WDNR)
Judy Beck, U.S. EPA – GLNPO
Harvey Bootsma, University of Wisconsin-Milwaukee
Sue Brauer, U.S. EPA Region 5
Mark Breederland, Michigan Sea Grant
Mark Burrows, International Joint Commission
Marsha Burzynski, WDNR
Gary Casper, Casper Consulting
Alex da Silva, Indiana Department of Environmental Management
Roger Gauthier, Great Lakes Commission
Norm Grannemann, USGS
Victoria Harris, Wisconsin Sea Grant
Bob Kavetsky, U.S. Fish and Wildlife Service
Phil Mankin, Illinois-Indiana Sea Grant
Tammy Mitchell, Illinois EPA
Cheryl Nenn, Friends of Milwaukee's Rivers
Mike Ripley, Chippewa-Ottawa Resource Authority
Dale Robertson, USGS
Bill Route, National Park Service
Julie Sims, Michigan Department of Environmental Quality
Rhonda Volz, WDNR
Glenn Warren, U.S. EPA – GLNPO

Called to order at 6:00 p.m.

Welcome and Introductions
Charlie Peters welcomed everyone to the meeting. Introductions followed.

Review of Agenda
Peters reviewed the agenda. No changes. He proceeded to the first presentation.

Lake Michigan Monitoring Coordination Council General Presentation – Background
Charlie Peters (for John Hummer)

Peters provided background information regarding the Lake Michigan Monitoring Coordination Council (LMMCC) by referring to the LMMCC brochure of which each of the meeting participants were provided a copy. He highlighted that the LMMCC was formed in 1999 as a way to help those who do monitoring to make their information more valuable. He explained that as a regional council, the LMMCC allows for groups and individuals to learn from each other and learn about the work of others. Peters described how in 2001, the LMMCC was reorganized around various resources by forming workgroups. He said the Council recognizes it is not the only group attempting to coordinate efforts in the region, for example, the Great Lakes Fishery Commission works to coordinate fisheries monitoring. Peters also referenced the coordinating bodies that would be making presentations at the meeting and indicated that the Council is attempting to create liaisons on the LMMCC from these organizations. He emphasized that it is important to work on how the group can knit different kinds of information together considering there are a variety of collection and analytical methods being used. Peters described the need to figure out how to become confident in the data so that it can be shared with others. He said that some seem to think monitoring is separate from research, however, he believes monitoring is just part of the continuum. Peters referenced the Council of Great Lakes Research Managers, chaired by Paul Horvatin, which the LMMCC hopes to discuss regarding how the Council might tie in with their research initiatives. Peters concluded and questions followed.

A meeting participant inquired about the organizational framework and funding of the Council as indicated in the LMMCC brochure. It was explained that the organizing body of the Council started with Charlie Peters, Judy Beck and other interested parties. Further, part of Beck's budget supports a small grant for an entity to coordinate the effort, which is the Great Lakes Commission. Peters' organization, USGS, has sponsored the LMMCC website, some of the printed materials and science interpretation. He indicated that an additional grant from U.S. EPA-GLNPO, with State of Michigan, USGS and other support has funded an intensive Lake Michigan Tributary Monitoring Project. Finally, it was mentioned that LMMCC welcomes any help others can provide.

Another participant pointed out that most monitoring councils are formed at the state level rather than around a resource and many are focused around surface and ground water quality. It was explained that LMMCC attempts to look at the entire ecosystem and because this can be difficult, has developed workgroups to help focus the work, but still keeps them connected to avoid missing important information. Beck indicated the LMMCC has been able to report out findings in the Lake Michigan Lakewide Management Plan (LaMP), which had a need for LMMCC and its monitoring coordination efforts.

Great Lakes Regional Research Information Network
Phil Mankin

Mankin provided background on a new project started under the National Oceanic and Atmospheric Administration (NOAA). He described how some years ago when they put together their regional marine research system, NOAA decided to look at 11 different regions, the Great Lakes being one of them. NOAA asked each of the regions to establish their regional needs and then come together as a network. Mankin explained that last January, NOAA issued

a Request for Proposals (RFP) to encourage the development of regional research and information plans for U.S. coastal, ocean and Great Lakes areas. NOAA decided the plans would be run through the state Sea Grant offices with the hope of using their university capabilities and bringing together a variety of stakeholders. Mankin further described how Sea Grant offices, seven in the Great Lakes, had to coordinate in regional groups to submit only one statement of need to NOAA and that each regional group had to establish a regional coordination body to accomplish several tasks. Those tasks include: oversee the planning and implementation of the research and information strategy; conduct a needs assessment; identify research and information gaps; develop a plan on how to create a network and transfer information to end users; and provide an ongoing platform for information and resource sharing.

Mankin then laid out the requirements for the regional research and information plan, which include: a clear statement of the issues; existing informational and scientific resources; analysis of information necessary to address critical issues; a prioritized list of actions to be taken; and observational data and decision-support tools. He also said that the plan should take into account existing plans and ongoing planning efforts by various regional and local organizations as the new plan was expected to add value to existing efforts.

With regard to establishing a regional coordination group, the Great Lakes region group was created to be binational in scope. Mankin described how conference calls were used to bring stakeholders to the table and make up the composition of the *Great Lakes Regional Research Information Network* (GLRRIN). He said an important challenge was organizing all the various stakeholders represented in the region and looking for an existing group after which they could model GLRRIN. The group decided that the most relevant existing organization was the Lake Erie Millennium Network which he said was a decent model, but the group recognized that each lake had different characteristics. Thus, GLRRIN, the regional network, was divided into five sub-teams, one for each lake. Mankin gave information on membership for each of the sub-teams, all of which have binational representation except for Lake Michigan which is U.S. represented, as the lake does not have a Canadian border. Once the sub-teams were established, the group decided on an overall team to tie everything together.

Mankin next described the process GLRRIN is using to gather information on research priorities and needs. He said they began by exploring websites of various organizations to find their priorities or a point of contact to obtain a needs assessment or list of priorities. He said that thus far, GLRRIN has been able to gather relevant information for about 11 to 12 organizations, which they have collected and sorted by topical area. Mankin explained that once all the information has been gathered, they will send out a comprehensive table listing all of the information for organizations to verify and correct. He said the list will be used to identify common goals and/or priorities of Great Lakes organizations. He described what NOAA is hoping to receive from the regional networks – a common set of needs or priorities for the region. Mankin emphasized that they are not looking just at federal agency priorities, but at a variety of organizations. He indicated that GLRRIN was also charged with compiling existing scientific and informational resources for which they were using Michigan and Illinois-Indiana Sea Grant as examples. Both Sea Grant offices have previously compiled lists of researchers to which they will send out RFPs when they have grants available. In regard to coordinating the transfer of information through education and outreach resources, Mankin said GLRRIN's intent is to combine the information they gather into a database that will become a resource for the needs and priorities of all five lakes. He indicated that a problem with this is that not every organization has a defined set of priorities or needs.

Mark Burrows, Secretary of GLRRIN, emphasized that GLRRIN is very regional in scope and attempts to combine information on a regional level while still allowing the lakes to be identifiable individually.

Mankin explained that the state and federal agencies have been moving towards an ecosystem approach to management and this effort is part of how NOAA is trying to develop their ecosystem approach thinking. He said the agency is looking for issues related to the entire region and is interested in funding those issues. Mankin indicated looking at "top five" issues for all the organizations from the compiled list and attempting to identify commonalities. There was a concern raised about limiting the analysis to only the top five. Mankin responded that NOAA only has limited resources and will want to know only the most important needs of the region which they should be funding.

A meeting participant voiced further concern over the possibility of overlap and double counting some needs or priorities as a result of organizations such as the Great Lakes Regional Collaboration, which is an organization of organizations. In addition, the participant pointed out that some will say there are not priorities, but recommendations which are all part of one piece and should not be broken apart and prioritized.

Another individual pointed out that there are people who would be thrilled to hear that there may be an attempt to create a "roadmap" of the research that is currently going on in the Great Lakes (a "who's doing what"). Further, Sea Grant has attempted this in the past for the research they support, however, they want to emphasize that there is a need for this effort – to avoid duplication and become "matchmakers" in the research field.

Burrows seconded this point by saying that he thought this was a critical piece of GLRRIN. For example, if research money becomes available unexpectedly, there is a network of researchers to reach out to that would be able to take advantage of the opportunity quickly. He indicated that the International Joint Commission (IJC) has begun a research inventory by using invasive species projects as the pilot. They are currently experimenting to bring existing databases into a central resource.

Mankin acknowledged that there are many stakeholders in the region and all are important, however, he maintained that the region will not be able to get funding without prioritization. He said that even though all the needs may be equally important, it will be difficult to obtain funding for all of them at once.

There was another question about the Lake Erie Millennium Network and if it only incorporated Ohio-based priorities. The response given was that the focus is "what are the Lake Erie priorities", no matter their jurisdiction and reference was made back to the sub-team membership which is meant to be representative of the lake and has a binational focus. It was emphasized the groups are issue-based and priorities have been revisited in the past year to make any necessary adjustments or adaptations.

There was a further point made that the purpose of the network was to focus on individual researchers, to draw in researchers so they are able to meet with each other and have an incentive to exchange information and ideas. It was acknowledged that the network was a bottom up effort, but there exists some prioritization amongst researchers. It was stated that the Council of Great Lakes Research Managers would like to have a single point of contact for a group of researchers, such as the Lake Erie Millennium Network. There was emphasis that the

network should include both academic and agency researchers and of which there was concern that this was not the case.

An attendee noted that the Lake Michigan LAMP is a collaborative effort and those involved have had discussions regarding what is research and what is monitoring and there is a need to identify where more monitoring is needed. In response, it was said that "data" is needed and you get that data through research and monitoring is one aspect of research.

There was a general question about the timeframe and flexibility for gathering regional priority information and the point was made that the "lake keeps changing so today's priorities are different from tomorrow's". Mankin responded that GLRRIN will be looking at common priorities for all five lakes, but also recognizes that there will be differences and are trying to build in a mechanism so the effort is dynamic. He restated the idea that the group does not want to lose lake individuality but needs to identify commonalities to recommend funding priorities for NOAA. Clarification on what would be done with the list was also asked and concern was raised over the priorities not matching with NOAA's agency directive. Mankin said the priorities will be passed on to NOAA and acknowledged that while they may not match, the mission of NOAA does include economic development in a sustainable responsible manner. It was then pointed out by someone that the effort sounds like the work of the Great Lakes Regional Collaboration which was formed to move away from agency focus and focus on the region. Mankin responded by saying this is what the NOAA RFP requested and GLRRIN was attempting to fulfill that request.

There was further concern raised regarding a conflict of interest if GLRRIN is claiming to represent the entire constituency of the region but will be advocating to Congress based on agency interest. Mankin responded that GLRRIN was not determining what NOAA would be interested in, but is instead determining regional needs and letting NOAA decide what they would like to fund. Further, he said that NOAA will likely pick priorities that are in line with their mission as an agency.

Concluding the discussion at the meeting, Burrows mentioned that there are other organizations involved in the effort and that their decided role so far is to get the information out and each lake sub-team will pull together a network of research. He emphasized the hope that the network would last longer than the grant and that they are looking to have some sort of responsive network in place before the grant money runs out. Finally, Burrows stressed that this was a communication network. It was noted that the dialogue would be continued another time.

National Monitoring Network Update

Chuck Spooner

Spooner joined the meeting via conference call to provide a status report on the National Monitoring Network (NMN). He gave a brief history of the network which was formed as a charge from the Council on Environmental Quality (CEQ) and the National Science and Technology Council (NSTC) in February, 2005. NMN had its design report formally accepted in 2006, although two new recommendations have been requested of them which include a small interagency staff to coordinate next steps and one or more pilot studies to test concepts and further develop the design plan. In 2006, the National Water Quality Monitoring Conference included four working sessions which noted the role of NMN in various settings including the Great Lakes. Spooner noted that there was good dialogue during these sessions, however there has never been any public discussion or outreach related to the network besides the

conference. He described the current status of interagency coordination as having received encouragement and recognition of importance from all agencies the network as spoken with; however, there is a fear that money may not be available.

Spooner said a small staff has been established that are preparing a draft tasking statement which will (1) describe context for pilot projects and how they will be selected; (2) describe how pilot projects and subsequent demonstrations will serve as templates; and (3) coordinate preparation of technical specifications for some elements of the NMN design. He expects that it will set a course of action over the next year that will move the Network to a demonstration phase for the project starting sometime in 2008. He said that the current design plan has a series of objectives that are linked with ocean observing systems and regional systems, is flexible over time, includes metadata, quality assurance, and a data management system that provides accessible data, and coordinated monitoring of resources in upland, coastal, and ocean areas. Spooner described how the design is structured around nine research components (the Great Lakes are one of the resources) and that it is intended to be on a large scale. He said the design will not provide data on all water resources (such as small rivers, lakes and reservoirs, and local aquifers). It will not replace state Clean Water Act use attainment monitoring as laid out in Sections 305 (b) and 303 (d). Finally, the design will not deal with compliance monitoring.

Spooner described the design as a large-scale undertaking with four different phases. Phase 1 is the Network design which is completed. Phase 2 is to develop and carry out pilot studies and the process of choosing pilots and estimating costs is underway. He said pilots will be announced and confirm their acceptance in early 2007 and should be completed by January 2008, with progress reports in the interim. Spooner explained that this Phase will not involve monitoring but will provide implementable specifications for how monitoring will be conducted and will provide an estimate of cost for the whole system. Phase 3 will be the demonstration projects which can not be undertaken without new money and will begin sometime in 2008. Spooner indicated that there is a great deal of discussion going on about how the agencies will get the money to complete Phase 3. Phase 4 is not yet well defined but will involve further implementation and integration of the network on a national scale.

Spooner explained that the pilot studies will feature two pilot inventories and the idea will be to overlay the design so that it will have both fixed features and features locally tailored to the sites. He said they will be devoting most of 2007 to this activity. Further, while they have not selected the pilots yet, it is thought there will likely be two or more pilots to bracket implementation challenges, such as data rich and data poor. He said they are about to agree on selection criteria which they will share with interested parties in the near future. Spooner indicated that one of the important criteria will be that the local/regional partners for the pilot studies will have to participate without additional funding as NMN does not have the money for that phase. He said they will be coordinating with the Integrated Ocean Observing System (IOOS) needs, deciding whether each resource funded for monitoring is necessary. For example, he said, there is a placeholder for wetland monitoring, but currently it does not know what would actually take place in terms of wetland monitoring. Spooner concluded by highlighting next steps, which are to announce plans to potential regional partners, select partners and confirm cost. He explained that the EPA has announced its unwillingness to go forward until costs of pilot programs have been delineated to avoid getting immersed in unknown costs. He indicated that if a project is not selected as a pilot, they want to make sure it is still part of process. Spooner emphasized that the goal was to create a nationwide system, not to pick favorite organizations, and he said there will be a communications plan to help in this regard.

A clarifying question was asked about the ability of any group to take the plan and move forward with implementation since there is currently no money, thus putting them in line for money when resources become available. Spooner replied that there are two opposing views on this: (1) it is not a good idea; and (2) it will create “clutter” and a more rigid approach is better. He went on to say, however, that a good entrepreneurial push to show the merits of a project is never a bad idea.

An attendee asked if the Great Lakes region is at a disadvantage for this project because it does not contain any major rivers. Spooner explained that the positive aspects of the region will not be a disadvantage over the whole of the project, but it will diminish some of the allure of the system. He said there are many other variables and the Great Lakes are not out of the running, adding that many potential applicants will give up when they realize there is no money available for the pilot studies.

It was then asked if a decision was made to move forward, would the best place to start be the NMN website where the effort is laid out in more detail. Spooner said, yes, the website can provide access to members of the design team, especially if technical issues are being considered.

Final questions concerned the inventory of monitoring programs and included, "Will the Great Lakes Commission monitoring inventory completed last year be incorporated into the NMN inventory, and what is the format they have in mind for the monitoring inventories?" Spooner replied that they will hopefully be able to incorporate other monitoring inventory efforts; however, it may be difficult because inventories are not completed in the same manner. He said NMN would like to standardize this process and the Commission inventory is a good place to start. Further, he said that there is a widely used and established format for describing metadata of a project, used by the USGS, and also a format used by NASA, the Global Change Master Directory, which can be accessed online and is the format they have in mind. He also indicated that the Ocean Data Partnership is a binational effort and some Canadian programs will be described in the inventory.

Great Lakes Observing System

Roger Gauthier

Gauthier began his presentation by explaining that there are eleven regional associations that make up IOOS, and the Great Lakes Observing System (GLOS) is one of those eleven regional associations. He clarified that the various regional associations are at different stages of their development, some being more “embryonic” than others. Gauthier said GLOS is fortunate to have a regional organizational background to get started and that the Gulf of Maine regional association is probably the most advanced of the eleven. GLOS has undergone three years of development as a result of planning grants and have been developing a vision based on the Indicators & Information Strategy team recommendations of the GLRC. He explained that the regional associations have been focused on creating governance structures so they may obtain a membership and become functional. Gauthier noted that while GLOS is incorporated as a nonprofit organization in the state of Michigan, it is has not yet gone after membership. He said that identifying needs has been much of the exercise so far and that there have been no data collection efforts, but there are some on the horizon. He emphasized that the focus of the Ocean Action Plan was for a regional presence to work on integration of information and provide easier access to real time and historical data. The main challenge, he said, is advocating for necessary resources.

Gauthier described GLOS as an organization of organizations, a system of systems, and a network of networks. GLOS does not own any assets except for a couple of servers and doesn't attempt to compete with anything else out there. GLOS is focused on trying to be the layer above the stakeholder population at large. He next laid out the seven societal objects of GLOS, of which he said four or five affect the LMMCC. He said they are working on an initiative to conduct hydro-dynamic modeling of interconnecting waterways for contamination in the hopes that it will pique interests that will lead to funding for GLOS. He also discussed observations vs. monitoring, saying GLOS is trying to focus as much as possible on individual sensors and their observations, and not as much on the analysis or monitoring programs.

Gauthier emphasized that there is a nationwide frame and a regional frame of which the national frame provides the backbone and the regional frame is more academic in nature. He also highlighted the important concept of regional data flowing into a global domain in which research is driving the operational system. A clarifying question was asked about the definition of research, to which Gauthier responded "I have none". Another attendee suggested that research indicates specific design, with a specific question or hypothesis in mind, but that monitoring looks for trends and patterns. Gauthier again emphasized that the focus of GLOS is the sensors, stations, and networks of observations. There was a question concerning the GLOS Board of Directors and any possible conflict of interest they may have and Gauthier responded that they were chosen so that there would be no conflict of interest.

Gauthier pointed out that the focus of GLOS is broad, making observations in lakes with interconnecting waterways and identifying associated needs, while most of the other regional associations are more mooring and buoy-based. He said GLOS works to promote and facilitate data integration as well as education and outreach. He said that one of the driving forces is the ability to link information holdings from members through universal web delivery systems such as the Great Lakes Information Network (GLIN), which will be a likely connection for GLOS as GLIN already has an established mechanism for information delivery. Gauthier noted that there has been a commitment established to put 15 percent of the income stream into education and outreach to assure the user base is involved in the decision process and to promote education of the changing system. Some of that money will also be going to the Sea Grant network for outreach activities.

There was a question about whether GLOS was promoting enhanced observation, to which Gauthier provided several examples as a response. One example was Lake Michigan Observation Stations, which consist of National Data Buoy Center (NDBC) buoys and a series of temporary NDBC/GLERL (Great Lakes Environmental Research Laboratory) sites. Of the NDBC buoys, only two currently exist in the middle of Lake Michigan and they are far a part, limited in what they are able to monitor and get pulled in the early fall and set up in early spring. The NDBC/GLERL sites serve only as temporary research gauges, although there are efforts to make them permanent. Gauthier said they made requests for additional observations along the shore and in the middle part of the lake and while there is a "quasi-commitment" to put additional sensors on existing moorings, there is no word on new moorings. The second example of promoting enhanced observations was for over-lake precipitation, which there has never been an ability to measure. Gauthier said it is gaps like these GLOS would like to see filled and is part of their support of enhanced observing.

Gauthier emphasized that there are efforts and have been accomplishments. He highlighted the fact that 52 water level gauges in the lakes have been enhanced and there are ongoing investments to improve the capacity of government-owned facilities. He stressed that GLOS

provides a unified voice in identifying network and observing needs. They are currently pushing an earmark for FY07, which will aid in 3-D model development in the St. Clair River, but also will aid with system-wide efforts such as verification and testing for current products. Gauthier said they may need to exert some influence over NOAA's budget so the Coastal Change Analysis Program (CCAP) is updated on a five-year plan which currently does not happen due to budget constrains. He said the GLOS Board will be deliberating over where they will get the "biggest bang for their buck" in the region.

An attendee supported the statement on getting CCAP updated regularly and asked about GLOS promoting or facilitating data gathering for SOLEC indicators, such as ice cover in the lakes. Gauthier responded that they are too embryonic at this stage, and there is no sure funding, so he could not say what will happen in the future. The attendee pointed out that since 15 percent of the income is intended for education and outreach, SOLEC indicators may provide an opportunity.

Another meeting participant commented that they were struck by the frequency of metrological data, but not contaminant observation. Someone else mentioned that satellite imagery might be a selling point for GLOS and Gauthier affirmed this by again mentioning the CCAP program and that the near-term needs for new operation products will include an emphasis on high resolution airborne coastal observations in the nearshore zone. Another person mentioned the USGS effort to map the nation on a three-year basis, but no one was able to confirm this effort and Gauthier mentioned he would like the information if this project was indeed going forward.

A participant suggested comparing the Lake Michigan monitoring survey and the GLC inventory with the Gulf of Maine inventory. Someone then said there should be a comparison of the NMN design and the Gulf of Maine's efforts in order to make recommendations on how the LMMCC might become a player in the initiative. It was further suggested that LMMCC might be in a better position for NMN since it is all in the U.S. and therefore better positioned to receive funding. It was pointed out that there may be a possibility for Lake Michigan to be a pilot project for NMN/IOOS, but if they already have pilots chosen, people who can may still want to move in that direction.

Nuisance Cladophora Blooms

Harvey Bootsma

Bootsma gave a presentation on nuisance Cladophora blooms which he said were not only a problem in Lake Michigan, but in other lakes as well. In Lake Michigan, the problem areas occur mostly on the Wisconsin side of the lake, but are also emerging on the Michigan side. Bootsma explained there are a number of problems caused by Cladophora including aesthetic impairment (sight and smell) and the coliforms which can be associated with it. He also acknowledged that there is a need for public education regarding Cladophora as there seems to be an incorrect public perception that it is a sewage problem due to its appearance and smell. He said there isn't a good understanding of the cause of the problem because it only appears on the beach, but that it actually grows under the surface of the lake and late in the season breaks apart to wash up on the beach.

Bootsma then began to explain the basic needs for Cladophora growth which are water, a hard substrate, nutrients (particularly phosphorus), light, and a temperature optimum of 13-17 degrees Celsius. He said they have been conducting sampling in the lake to determine what conditions are controlling Cladophora growth. Part of the reason for this is to determine whether

models predicting growth that were developed in the 1980s when Cladophora was also a problem, are applicable to the current situation.

Beginning with temperature, Bootsma explained that for most of the year, the temperature in the lake was well below the optimum temperature for Cladophora growth. However, there is a relatively short time in the summer when the temperature is within that optimum range. He also described how in the last 25–30 years there has been an increase in near-shore temperatures during the June to August time period and that this increase was more than you could explain through global warming. Bootsma said they have hypothesized that the increase in temperature in the nearshore area is likely due to the changing directions of prevailing winds from west to southeast, which in turn has decreased upwelling on the Wisconsin side of the lake. As a result, the average summer temperature in the lake has been getting closer to the optimum range for Cladophora growth.

Next, Bootsma described how light conditions have affected Cladophora growth. He said that not until July through September will the amount of light reach the amount of light necessary for Cladophora growth at a depth of 10 meters. He indicated that there has been a dramatic change in water clarity in the lake(s) as a result of the introduction of zebra and quagga mussels. It used to be that light conditions would have been below the optimum light level at a depth of 10 meters and Cladophora was less likely to be found at those depths. It is now the case that you can find Cladophora growing between 12–15 meters, after which it will drop off very quickly.

In his discussion of Cladophora growth limiting nutrients, Bootsma focused on phosphorus content in the nearshore area. He showed a graph produced in the 1980s which illustrated that at low concentrations of phosphorus, small increases of phosphorus will produce large increases in Cladophora growth. He also illustrated that phosphorus concentrations are low north of the Milwaukee, Wisconsin area, but very high around the area, with a decrease south of the area. He attributed the high concentration area to Milwaukee River and harbor outputs of phosphorus. He said that phosphorus content in the area had decreased from the 1980s to 1990s, but has since increased, possibly due to increased loading in the Milwaukee River. Bootsma suggested that the increase in phosphorus to the river could be contributing to the increasing growth of Cladophora in the nearshore area of Milwaukee. He said that while the river might be a major source of external phosphorus, the mussels may also be contributing to the increase in phosphorus as they recycle the nutrient in large amounts. In attempt to model the phosphorus dynamics of that area, Bootsma described how they had estimated, individually, the phosphorus demand of Cladophora to be 2,000 kg/day, the river load of phosphorus to be 250 kg/day, and mussel recycling to be 1,700 kg/day. He emphasized that the estimates were calculated individually, but pointed out that the river load and mussel recycling estimates did add up to the estimated demand for Cladophora growth. He indicated that while the mussels appeared to be contributing greatly to phosphorus concentrations, there is indirect evidence that managing the loading of phosphorus into the river may help limit the growth of Cladophora in that area.

Bootsma concluded his presentation by summarizing the conceptual model he had just described. He emphasized that there has been changes in phosphorus content, light, temperature, and Cladophora growth of the nearshore area from 1990 to 2005. He indicated that mussels may be keeping phosphorus concentrations high in the nearshore area and improving water clarity allowing more light to reach greater depths. He said that Cladophora used to not be found at depths of greater than five meters, but today you can find it in the 10–12 meter range. Lastly, Bootsma explained that their conceptual model is focused on qualitative data but they are working towards creating a functional model that will describe the relationships

quantitatively. He said they are still within the range of being able to manage phosphorus content so that small reductions in phosphorus will contribute to large reductions in Cladophora growth.

A question was asked regarding the fact that the lake is already supposed to be meeting its phosphorus targets for loading and concentration, and so if phosphorus were reduced, what impact would that have on the fisheries and the open lake target? Bootsma indicated that this question was really getting at figuring out how to reconcile nearshore phosphorus with off-shore concentrations. He said that even though he did not know the answer, there needs to be a better understanding of those dynamics and this will be an important question when it comes time to make management decisions.

Another person asked if there was any species that eats or grazes on Cladophora to keep growth down. Bootsma indicated that it was a good thought to look at the ecological implications of Cladophora. He said there is ultimately some getting into the food web in nearshore and some off-shore fishes, but he doesn't know the rates of that supply. He also said that gobies like the habitat Cladophora creates. Someone then asked if mussels were providing a hard substrate for the Cladophora to grow and Bootsma said that they did not.

A participant asked where the 1,700 kg/day of phosphorus the mussels are recycling comes from. Bootsma said he didn't know and that it could come from the river or the lake itself. He indicated that there is a huge store of phosphorus in the open lake that mussels could be pulling in and pumping into the nearshore area.

A question was asked about how the mats of Cladophora form and when they are released to wash up on the beach. Bootsma explained that the peak biomass is in July–August, and then the mats will break off and, dependent on wind and current conditions, will wash up on beaches in August and September. He also indicated that it can be a real problem for industry and power intakes. He said that stakeholders are not worried about getting rid of Cladophora so much as keeping it out on the lake and not on the shore. He said there are certain "hotspots" where Cladophora will always wash on shore.

Someone asked if the model will simulate past Cladophora blooms. Bootsma said the old model did accurately predict those blooms but it will not predict the current blooms. He said this is likely due to the fact that the old model does not account for the introduction of mussels and that the newer models identify light as the primary reasoning for the current blooms.

Lastly, an attendee asked if, given the figures generated for phosphorus supply and demand, the growth of Cladophora will be phosphorus-limited. Bootsma said that Cladophora growth is always phosphorus-limited and that it does not need a high concentration to grow. He said that below concentrations of 0.6, it cannot grow. But he also indicated that light is a more limiting factor as the new models suggest that at a given phosphorus content, Cladophora growth will change dependent on light.

Workgroup Updates

Sue Brauer - Air

The same regulatory program monitoring networks that were in place before are still in place now and, of the LaMP pollutants, these monitor only mercury. GLNPO's International Air Deposition Network monitors cancelled pesticides and PCBs which are Lake Michigan Lakewide Management Plan pollutants. No network monitors all LaMP pollutants. The

monitoring networks emphasize air pollutants (or precursors of the pollutants) for which there are National Ambient Air Quality Standards (lead, ozone, particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide) and mercury.

Mike Ripley – Aquatic Nuisance Species

Ripley said the workgroup had its first conference call in August, which was very timely because soon after that hydrilla was discovered in Indiana, 50 miles from Lake Michigan. He said they want to be monitoring for hydrilla and that there is now an education and outreach effort in place in Wisconsin and Michigan. Ripley concluded saying the workgroup will focus around a report that John Hummer will be circulating at the Great Lakes Panel meeting in December regarding a survey of early detection and monitoring of AIS in the basin.

Great Lakes Fishery Commission – Fisheries

No one was present to report on this workgroup.

Norm Grannemann - Groundwater

Grannemann indicated the workgroup is working hard to get groundwater more comprehensively covered in the Great Lakes Water Quality Agreement and as a result have made some more headway there. He brought with him a USGS water availability fact sheet and several other related publications on groundwater recharge, groundwater storage, and groundwater divides in various aquifers. He said that the only groundwater-related SOLEC indicator reported on at this time was baseflow due to groundwater discharge to streams. Finally, Grannemann indicated the group is still very interested in aquifer mapping.

Judy Beck – Land Use

Beck said that the workgroup had approached their work by trying to get regional planning commissions involved. She said they have two grants out and they have received some requests from a third proposal. Finally, she said they are in phase three of the Lake Michigan Watershed Academy and as a result are getting more regional planning commissions involved.

Glenn Warren – Open Lake

Warren said the workgroup has been working on the normal two surveys but has also started a pilot project in Lake Michigan. They are trying to implement new technology for looking at algal blooms in the lake.

Alex da Silva – Recreational Waters

da Silva said that while beach season has ended, they have not yet had a chance to collect the 2006 summer data. He indicated that they would like to incorporate the beach data in the Lakewide Management Plan (LaMP) and would like to work in coordination with beach managers to get the data ahead of time so there is no scrambling to get the data in the LaMP format. He said Cladophora is a new wrinkle in how to move forward in the group and that IDEM is working with USGS and NOAA on this.

Charlie Peters - Tributaries

Peters said the workgroup is conducting a coordinated ten-year anniversary tributary mass balance study. He said they have completed sampling and found mercury, PCBs and nutrients at five of the sites. He indicated the analysis is two-thirds complete and they are planning to

conduct data validation and interpretation over the winter. He also indicated that there is a statistical effort to compare what was done in 1994 to what they are doing now and that report will be out sometime in 2007.

Roger Gauthier (for John Hummer) - Wetlands

Nothing to report.

Bob Kavetsky - Wildlife

Kavetsky passed out his card indicating the Great Lakes Coastal Program website address so that people may consider applying for grants. He announced that Rich Greenwood would be retiring and provided his comments on the workgroup through email. It was indicated that the workgroup has not met since the last LMMCC meeting and ideas were given regarding recruiting a new co-chair or temporary alternate.

Announcements and Other Business

None.

Next Steps

The meeting participants were reminded that LMMCC in-person meetings would always be tacked on to larger events and that conference call meetings in the interim would allow workgroups to continue to report on their work. It was suggested that the next LMMCC meeting could be part of the IJC meeting in Chicago on June 5-7, 2007 at the University of Illinois. Further details for the IJC meeting are available on their website. Participants were also reminded that the State of Lake Michigan is scheduled for October 3-5, 2007 in Traverse City, MI. The LMMCC may also plan a meeting then and possibly meet via conference call in the spring.