

BENEFITS OF INTEGRATED ASSESSMENT

Information for Decision Makers, Project Leaders and Scientists



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INTRODUCTION

Integrated Assessment (IA) brings together natural, social, and economic information to assist analysis of policy options for decision makers. The IA process also brings together scientists, policy makers, citizens, NGO, and industry representatives to evaluate options for particularly challenging – or wicked – problems. Since IA builds partnerships and a framework to share knowledge, problems that have both arguable definitions and solutions are best suited to this process.

IAs vary widely depending on the geographic scope, budget, type of issue, and range of decision makers. The following are useful IA steps that ensure the process is both relevant to participants and factually credible: 1) define the policy-relevant question, 2) document status and trends, 3) describe the causes and consequences of those trends, 4) identify desired outcomes and policy options, 5) evaluate the likely environmental, social, and economic outcomes of each option, 6) provide technical guidance for implementation, and 7) assess uncertainty (www.graham.umich.edu/pdf/ia-guide.pdf). These elements are best seen as a flexible framework – different stages might be emphasized depending on the policy context and the scientific and public understanding of the issue.

Integrated Assessment can appear to be overly complex with vague outcomes. However, because sustainability problems often lack a clear cause or solution, the IA process offers an innovative way to build consensus and guide decisions for these pressing and unique challenges. It is also important to acknowledge that there are both tangible and intangible benefits associated with IA. The goal of this study is to communicate both sets of benefits.

To illustrate how IA delivers both sets of benefits, we interviewed a range of participants – from state and federal agency staff to scientists, consultants, and community members - from a series of IA projects of different focus, scale, and level of stakeholder involvement about their perspectives on the IA process and products. The accumulated results illustrate the strength of Integrated Assessment by showing that participants from very different projects articulated similar messages.

METHODS

Four projects were chosen for this study to represent different issues, scales and levels of stakeholder involvement:

Northeast Michigan Integrated Assessment – Connecting Great Lakes Coastal Access, Tourism, and Economic Development: Communities in Northeast Michigan recently turned to tourism to boost the economy by promoting the natural and cultural assets in the area. Despite the potential for new economic development, community leaders wanted to proceed cautiously to avoid overdevelopment and destruction of the area's natural resources. This IA was organized to support a regional planning process related to

economic development and coastal resources in three counties. The project brought together representatives from 32 local and regional organizations.

Rein in the Runoff – Tracing the Path and Influence of Water in Spring Lake: Pressures associated with increasing development in the Spring Lake Watershed magnified stormwater runoff problems. This IA identified stormwater management alternatives that allow for future development while mitigating impacts of stormwater to improve the quality of Spring Lake and its surrounding waterbodies. Environmental, economic, and recreational aspects of the issue were addressed in relation to the surrounding communities. Town managers, planning commission members, stormwater managers, and residents were involved in the project.

Fish Consumption Advisories in the Detroit River – What’s Safe to Eat and Why? This project looked at reasons why and when fish contamination occurs in the Detroit River, and how consumption advisories can be made more effective. The IA brought together policy makers, interested stakeholders, scientists, and governmental agencies from the U.S. and Canada to develop a common understanding of issues related to PCB contaminant advisories. New approaches for managing the River were identified as part of the IA.

Hypoxia in the Northern Gulf of Mexico – Documenting the Dead Zone: This IA focused on identifying policy options for reducing the size of the low dissolved oxygen region in the Gulf of Mexico. The complex problem, which affects important ecosystem function as well as commercial and recreational fishing, involves agricultural, environmental, and energy interests along with all levels of government. Private consultants, academic scientists, and federal and state agency resource managers and scientists were all involved in the project.

Interviewers from the Michigan Sea Grant College Program and the Graham Environmental Sustainability Institute used a list of ten questions (Appendix A) to construct structured interviews about participants’ perspectives on the benefits derived from their Integrated Assessment projects. Interview subjects were selected in a snowball technique by asking a lead from each project to identify five key informants who were intimately involved in the project. Those being interviewed were also asked to suggest additional individuals to participate in this study.

Overall, 25 people were interviewed, including 5-7 interviews per project. Diverse participants were targeted: academic scientists, private consultants, planners, non-profit leaders, citizens, and scientists, managers and administrators from federal, state and local agencies. Interviews took place by either phone or over email, depending on the subject’s preference. Phone interviews lasted approximately 30 minutes, during which the interviewer took detailed notes of each conversation. Relevant quotes were extracted from the notes and email responses and were organized by project into the following categories: tangible deliverables, perspectives, partnerships, processes, and opportunities.

RESULTS

Project profiles and interview results organized by project are in Appendix B, and results organized by benefit theme are in Appendix C. These results were synthesized across the four projects to illustrate common themes, benefits, and outcomes and demonstrate how the perspectives gathered from such diverse IA projects provide similar outcomes.

The interview results illustrate that these IAs generated both the specific *tangible benefits* (reports, datasets, models, and outreach materials) and *intangible benefits* (new perspectives, partnerships, process, and opportunities). Examples of these tangible and intangible benefits are described in more detail below.

Tangible Benefits – reports, datasets, compiled information

IA Reporting:

One of the most important tangible outcomes of an IA is the actual report that evaluates policy options. The IA report provides one accessible source of accurate, agreed upon information developed from multiple perspectives and is a foundation to maintain credibility on an issue. Even if actions are not immediately implemented, the accumulation of reliable information remains a valuable resource, particularly for addressing long-term issues. A compilation of information into one report also helps to “dispel myths”, minimize debate about the science, and can be used as a factual basis in subsequent debate. Through the reporting process, other tangible benefits result – including datasets, models, or other technical information.

Interview Examples:

“The reports compile the best available science into one place so they can be readily accessed to address the controversies about cause and effect of nutrient loading. Having these documents helps dispel some of the myths about the science.”

--- John Wilson, EPA staff scientist serving on the Gulf Hypoxia Task Force.

“This project really helped to provide accurate information. And if people have accurate information they make better decisions.”

--- John Nash, Spring Lake Township Supervisor

“The final report has been and will continue to be a good tool to look back to for support for community development efforts. We have quoted the final report on several different grant applications. Also, the reports were helpful in confirming our plans to pursue a regional coastal plan to get communities to think about consistent approaches to planning and zoning.”

--- Rick Deuell, Northeast Michigan Council of Governments

“What was good was that they took existing ideas and made them applicable to our area. The researchers used their expertise to determine what might be the best solutions for our community. This tailored approach was really useful.”

--- John Nash, Spring Lake Township Supervisor

Intangible Benefits - perspectives, partnerships, process, and opportunities

Modified perspectives:

IAs can create a shift from local to regional perspectives – allowing people to see a greater connectivity of issues and use a broader lens to view topics. Not only do people see an issue from new perspectives, it can make them think about challenges and strategies they have not thought of before. An example of this shift is when communities learn how their local issues are often connected to watershed or regional inputs. Building a collective understanding and community awareness often increases their enthusiasm for tackling the problems. The awareness that people, places, and things are linked often moves IA participants to take greater responsibility in crafting options to address their sustainability issue.

Interview Examples:

“This project brought home even more so how serious our stormwater related problems are. New ideas and solutions came from the meetings. The enthusiasm was definitely there from the community.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“What’s really important, what really excited me, is how we now look at our work as more of a regional endeavor as opposed to just a county or town or single property. What’s good for Harrisville is good for Alpena, what’s good for one business is also is good for others. If we can get people off US23 at Standish to experience our coastline, we all win.”

--- *Dan Mullen, Michigan Department of Natural Resources and Environment*

“Although there are still some organizations that argue against the findings, I think the Integrated Assessment affected public and organizational attitude. There became a collective scientific understanding, which resulted in less debate about the science.”

--- *Doug Daigle, Mississippi River Basin Alliance*

“The IA focused dialog around a specific problem and supporters became more willing to look toward different solutions. But it also gave opponents something to target for their energy – ultimately leading to the reassessment and second action planning process.

When an issue gets such intense focus and directed resources, it can cause the opposition to coalesce their support, target gaps in data, or find new angles to attack an initiative.”

--- *John Wilson, EPA staff scientist serving on the Task Force and IA Team.*

New partnerships:

The IA process catalyzes partnerships by bringing people together to tackle a challenging issue from multiple perspectives. Groups realize they have similar goals and see the benefit of working together. The process can have multi-jurisdictional benefits because it gathers participants from different sectors and institutional levels. Many of these working relationships continue long after the process is over because IAs build communication, cooperation, trust, and public participation.

Interview Examples:

“The NEMIA process is probably of more importance to me than any of the tangible products. We intend to keep the relationships going. We don’t want to lose the trust that we have built.”

--- *Paul Curtis, Michigan Department of Natural Resources and Environment*

“To have people working in chorus is always an advantage for any initiative. There is better cooperation and communication and the initiative is more likely to have a positive outcome when you have representation from all communities in the same room at the same time. For this project we were able to understand and communicate about the issue from the very beginning. Now we can work together on common solutions.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“The IA catalyzed the mission and continued efforts of the Mississippi River Gulf of Mexico Watershed Nutrient Taskforce, which was established in 1997. This group, which continues to meet every year to address nutrient loading issues, includes state and federal agencies, along with environmental groups, industry, and regional organizations as stakeholders. The Taskforce represents a cross-section of many interests and gives them an organization through which they can work together to address a common issue.”

--- *Victor Bierman, senior scientist at LimnoTech and author/ co-lead of the “Effects of reducing nutrient loads to surface waters...” technical report.*

“The NEMIA project strengthened those efforts by allowing the local committees to realize the value of continuing cooperation even though the final result would not be achieved for many years into the future.”

--- *Bethany Styer, Alcona Economic Development Corporation*

“I’ve been very active in every community I’ve lived in but I had never met a drain commissioner! I didn’t know what one was, what one looked like, and what one did. When I learned that we had a drain commission at one of our meetings I was so excited! It was really valuable to have exposure to another dimension of our community through this project.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“NEMIA allowed people to experience regional cooperation and planning, to realize that working regionally was workable in spite of geographic challenges, and overcoming ‘turf’ issues manifested by village, city, township and county officials was possible.”

--- *Bethany Styer, formerly of Alcona Economic Development Corporation*

Change in Process:

IAs often shift current processes and practices through policy modifications and new strategic planning. IAs also increase information access to policy makers and other groups (especially NGOs, local organizations, and interested citizens) and often bridge the gap between science and policy. As a result, lessons learned through an IA can change organizational decision making. Participants often get involved in an IA without understanding the length of the process and their commitment to it - but stay involved because of these benefits, which take time.

Interview Examples:

“I believe that as a result of Rein in the Runoff, local officials are re-evaluating the way they make certain land use decisions.”

--- *Elaine Sterrett Isely, Annis Water Resources Institute, and Rein in the Runoff Project Manager*

“I attended every meeting. I provided insight to our community needs and what some of our challenges had been as far as stormwater. In return I was educated by the researchers about stormwater solutions.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“...the interface between the researchers and the public was really important to keeping people involved, and committed to acting. The technical level of this project was also very important. We wanted specific technical information on where to, how to, what to; that’s what we needed in the community. The researchers were competent, sincere, credible, organized and they knew their stuff. I already had the enthusiasm for the issues; this project gave me an avenue for acting in concert with others who were in a position to impact.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“The project turned out very different than I had envisioned. Through the process many good things came out and people found value in different areas that I hadn’t thought of. Participants came up with their own ideas for their own relevant spinoffs.”

--- *Rose Ellison, US EPA*

“The IA served as a bridge between the Task Force and the scientists doing the studies. A big part of moving the process forward was to get a readable report that was action oriented to start bridging the gap of science to action planning. This ultimately helped the Task Force focus on opportunities.”

--- *Wayne Anderson, Minnesota Pollution Control Agency and staff to the Task Force*

“Team leads for each of the six science assessment groups met regularly (once or twice a month) at NOAA offices in DC for a day to talk about pieces, progress, and steps needed to keep the process moving forward. This part of the project gave all team leads tremendous experience in project integration – otherwise they would not have come together outside their disciplines to have these conversations. The regular communication helped make the IA real and give all involved an understanding about the necessary sequence of tasks (not just an end report coming together).”

--- *Otto Doering, faculty member at Purdue University and author/team lead for the “Evaluation of Economic Costs and Benefits...” technical report.*

Leveraging new opportunities and resources:

Information and products generated through an IA demonstrate the results of collaborative work and can motivate participants to continue their efforts beyond the project. Since the process demonstrates established partnerships and support, they often leverage spinoff projects and grant opportunities.

Interview Examples:

“We do a lot of grant writing and the grantors always want backup info. Now we have loads of it, which will make a significant difference in our ability to get grants because now we have topic expertise to back up our ideas.”

--- John Nash, *Spring Lake Township Supervisor*

“The final report has been a good tool to support community development efforts. We have quoted the final report on several different grant applications.”

--- Rick Deuell, *Northeast Michigan Council of Governments*

“The project helped leverage resources and opportunities in a huge way. We used our project as matching funds on a grant for outreach material. In addition, we have submitted several grant proposals that (we hope) will help with a positive outcome.”

--- Donna Kashian, *Wayne State University*

“Rein in the Runoff put us in a better position to gain resources, because now we have all the information, a common understanding, and a relationship with [researchers]. We are informed, knowledgeable, and we know what we need. For grant writing, we can cite the report or the knowledge gained.”

--- Elizabeth Wheeler, *resident of the Village of Spring Lake, former planning commission member*

CASE STUDIES

The following project examples help “tell the story” for each of these tangible and intangible benefits. While the four IA’s focused on for these interviews had all the outcomes described above, each one seemed to have particular strength. For example one IA had outcomes illustrating stronger partnerships than a change in process. Another had more significant spinoff projects, new support and grant opportunities. The benefits are best described within the context of the following IAs:

- IA Reporting – *Hypoxia in the Gulf of Mexico*
- Modified Perspectives – *Rein in the Runoff*
- New Partnerships - *Fish Consumption Advisories in the Detroit River*
- Change in Process – *Northeast Michigan Integrated Assessment*
- New Opportunities and Resources - *Northeast Michigan Integrated Assessment*

BENEFIT: IA REPORTING

Project Example – Hypoxia in the Gulf of Mexico

This Integrated Assessment is based on six peer-reviewed technical reports, compiled by six teams established to review and analyze existing data. The IA draws heavily on these reports, which synthesize massive amounts of direct and indirect evidence collected over many years of scientific inquiry on the following topics:

1. Characterization of hypoxia.
2. Ecological and economic consequences.
3. Flux and sources of nutrients.
4. Effects of reducing nutrient loads.
5. Methods of reducing nutrient loads.
6. Evaluation of economic costs and benefits of methods for reducing nutrient loads .

These reports provide the foundation for the final Integrated Assessment entitled, “*An Integrated Assessment: Hypoxia in the Northern Gulf of Mexico*”. The IA summarizes the extent, characteristics, causes, and effects of hypoxia in the northern Gulf of Mexico and concludes that hypoxia was caused by excess nitrogen from the Mississippi-Atchafalaya River basin, in combination with stratification of Gulf waters. The IA evaluates alternative solutions and management strategies.

“The IA served as a bridge between the Task Force and the scientists doing the studies. A big part of moving the process forward was to get a readable report that was action oriented to start bridging the gap of science to action planning. This ultimately helped the Task Force focus on opportunities.”

— Wayne Anderson, Minnesota Department of Environmental Quality and staff to the Task Force

“Even though the report is almost ten years old, I still go back and use it to reference key findings - it helps me take a stronger stand when justifying management actions.”

— Wayne Anderson, Minnesota Department of Environmental Quality and staff to the Task Force

The scientific reporting was an effective way to use readily available information to compile data sets for point source discharges for the entire region. Until then, there hadn't been a dataset related to permitted facilities and point source pollutants of concern for this large of a region. Ultimately it helped strategic planning for future data acquisition.”

— John Wilson, EPA staff scientist serving on the Task Force and IA Team

“The individual reports and the IA catalyzed partnerships with NOAA and other federal agencies and defined the playing field in terms of short and long term targets for mitigation strategies and programs.”

— Tim Strickland, US Department of Agriculture technical liaison

BENEFIT: MODIFIED PERSPECTIVES

Project Example – Rein in the Runoff

The communities in the Spring Lake watershed enjoy a picturesque waterfront setting adjacent to the five-mile long Spring Lake and just inland from Lake Michigan. Yet this attractive location also poses challenges, particularly after heavy rains. On these occasions, stormwater runoff carries pollutants into Spring Lake and its main tributary streams. It then flows downstream to the nearby Grand River and eventually into Lake Michigan, where it could impair nearshore water quality and threaten aquatic life.

Historically, these pollutants have resulted in the impairment of the waters of Spring Lake, the Grand River, and the nearshore areas of Lake Michigan. Beach closings, no-contact (to water) advisories, and lost recreational opportunities have become more common. In addition pressures associated with increasing development in the Spring Lake area have magnified the stormwater issue. Surrounding communities have begun to see the intimate connections between stormwater and a number of economically and recreationally important aquatic systems.

This Integrated Assessment investigated the causes, consequences, and corrective actions of stormwater runoff and its impacts in Spring Lake Township, the Village of Spring Lake, and the City of Ferrysburg. As part of this project, researchers worked together with local stakeholders to: 1) increase general knowledge among residents and decision-makers about stormwater issues in the community; and 2) increase stewardship of local water resources and participation in stormwater control and management.

“The project brought awareness to leaders that they ought to consider impacts to the watershed when planning for the future.”

— *Craig Bessinger, City of Ferrysburg Manager*

“What was good was that they took existing ideas and made them applicable to our area. The researchers used their expertise to determine what might be the best solutions for our community. This tailored approach was really useful.”

— *John Nash, Spring Lake Township Supervisor*

“I attended every meeting. I provided insight to our community needs and what some of our challenges had been as far as stormwater. In return I was educated by the researchers about stormwater solutions. I’m now better informed about the risks and solutions for our waterways. I learned that whatever happens here impacts all these waterways and wetlands.”

— *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“Rein in the Runoff has helped educate stakeholders regarding the complexities of stormwater impacts and management, including how everyday activities can exacerbate the effects of stormwater runoff to their local waterways.”

— *Elaine Sterrett Isely, Annis Water Resources Institute, and Rein in the Runoff Project Manager*

BENEFIT: NEW PARTNERSHIPS

Project Example – Detroit Fish Consumption Advisory IA

The Detroit River remains under several fish consumption advisories that are in place to protect human health but which also impact the local economy. Despite the impact of these advisories, little progress has been made in developing effective strategies that address them. Many uncertainties remain regarding the drivers behind these advisories, including the relative contribution of sediment hot spots, the role of point versus non-point contaminant sources, and the appropriateness of methods in setting and identifying allowable contamination levels for consumption advisories.

The overall goal of this IA was to bring together policy-makers, interested stakeholders, scientists, and governmental agencies from the U.S. and Canada to develop a common understanding of issues related to PCB contaminant advisories, and to use new information and integrate historical elements in creating new approaches to manage the River. To address key project questions, the project team organized four working groups comprising stakeholders and researchers: outreach, food web, environmental justice, and beneficial use impairments. These groups worked in partnership to develop a number of products to advance understanding and awareness of the causes and health impacts of fish consumption advisories.

“Those meetings brought together a lot of people who hadn’t had contact before. It got people talking. The people were great to work with, and we were all working toward the same goal. Could have been quicker, but that’s the process.”

— *Bob Burns, Friends of the Detroit River*

“Although no policy has been developed, there is now discussion regarding how/if the Canadian and U.S. agencies can develop similar communications regarding fish consumption.”

— *Mary Bohling, Michigan Sea Grant Extension Educator*

“Local angler groups are now working with MDCH and MSG to conduct fish cleaning demonstrations at community events. These demos act as a draw allowing MDCH and MSG to distribute brochures and other information regarding fish consumption advisories. Canadian entities are also now working with U.S. entities to create similar communication tools for the Canadian side of the river.”

— *Mary Bohling, Michigan Sea Grant Extension Educator*

“I now have a great working relationship with MDCH that has expanded beyond the Detroit River IA. We are now working together on projects in the Saginaw Bay and have written a grant to work on a statewide program for fish consumption advisories. I have also developed a new relationship with the Metro West Steelheaders due to their participation with fish cleaning demos.”

— *Mary Bohling, Michigan Sea Grant Extension Educator*

“I am currently working with several groups to secure additional funding. These partnerships are a result of the project.”

— *Donna Kashian, Wayne State University*

BENEFIT: CHANGE IN PROCESS

Project Example – Northeast Michigan Integrated Assessment

Community leaders in Northeast Michigan recently turned to tourism to boost their resource-based economy by promoting the natural and cultural assets unique to the area, especially those associated with the coast. The region has many natural and cultural sites, including the Thunder Bay National Marine Sanctuary and several undeveloped public lands. Despite the potential for economic development, the communities are proceeding cautiously to avoid overdevelopment and destruction of the area's resources.

Responding to these needs and concerns, Michigan Sea Grant organized the Northeast Michigan Integrated Assessment (NEMIA) to foster a regional planning process related to economic development and coastal resources in Alcona, Alpena, and Presque Isle counties. The project included a series of stakeholder workshops that brought together representatives from 32 local and regional organizations to address the following question: How can coastal access be designed, in a regional context, for sustainable tourism that stimulates economic development while maintaining the integrity of natural and cultural resources, and quality of life? The process involved developing a shared vision for the environment and economy and identifying potential actions for reaching the region's goals.

“NEMIA served as a catalyst for the Michigan Department of Natural Resources to develop regionally coordinated management plans for Negwegon, Rockport, and Thompson's Harbor State Parks. In addition to developing individual management plans for each park, the MDNR has developed a regional plan for all three properties with input from a newly formed citizen advisory committee made up of local residents.”

— *Brandon Schroeder, Michigan Sea Grant Extension Educator*

“NEMIA gave a huge boost to the concept of regional planning and project development in spite of the historic opposition to that way of thinking and working in NE Michigan. It led directly to better cooperation and participation in the focus groups that were held to gather input for the creation of the coastal tourism business support website. Within the region, efforts had already been made to designate US 23 as the 'Sunrise Coastal Highway'; signage was installed and dedication ceremonies were held during the NEMIA project. This was followed by efforts to create a bikeway along the entire Lake Huron shoreline from Standish to Alpena. The NEMIA project strengthened those efforts by allowing the local committees to realize the value of continuing cooperation even though the final result would not be achieved for many years into the future.”

— *Bethany Styer, Alcona Economic Development Corporation*

“NEMIA reinforced the need for regional planning. NEMCOG has been promoting regional planning, but having all of these different players within the community provide input saying “regional planning is a good idea” really helps support our organization's efforts. NEMIA confirmed our plans to pursue a regional coastal plan to get communities to think together about consistent approaches to planning and zoning. Currently only Alpena has a planner.”

— *Rick Deuell, Northeast Michigan Council of Governments*

BENEFIT: NEW OPPORTUNITIES AND RESOURCES

Project Example – Northeast Michigan Integrated Assessment

The NEMIA project described in the previous example is also the focus for illustrating opportunities derived from IA:

Regional Coastal Tourism Survey

The NEMIA socioeconomic assessment identified a need for a survey of expenditures of visitors to northeast Michigan. After the conclusion of NEMIA, Marine Sanctuary staff and NEMCOG partnered with other NEMIA work group members to conduct a study to gather tourism data that are current, specific and relevant to northeast Michigan.

Maritime Heritage Trail Expansion

The Thunder Bay National Marine Sanctuary (TBNMS) partnered with the US-23 Heritage Route Management Council group to submit a proposal to Michigan Department of Transportation to expand their Maritime Heritage Trail to include the three-county NEMIA study area. The NEMIA report was cited in support of this proposal as evidence that the proposed project was technically credible and responded to a locally identified priority.

Support for Marine Sanctuary Expansion

The NEMIA process allowed the federal agency to form partnerships with the surrounding counties and to explore opportunities to expand the Sanctuary. The TBNMS ran their 5-year management plan review process parallel the NEMIA process, which allowed them to engage new stakeholders and decision makers in neighboring Alcona and Presque Isle Counties in their management planning process. TBNMS is now planning to expand the Sanctuary to include those counties and the relationships built during NEMIA were pivotal to receiving required local support letters.

Michigan Sea Grant Initiatives

According to Brandon Schroeder, Michigan Sea Grant Extension Educator for Northeast Michigan: “NEMIA process has provided research-based and community-based input and guidance toward our own Sea Grant Extension program investments in northeast Michigan. As a result of NEMIA process, I have designed and focused my Extension plans and programming around addressing and developing three specific action opportunities identified in NEMIA process and relevant to our MSG mission.” These include creating: 1) a coastal tourism business support website; 2) methods for revitalizing fishing-related tourism; and 3) a Great Lakes youth stewardship education initiative.

CONCLUSION

These interviews capture diverse perspectives on the Integrated Assessment process and products. Results illustrate that IAs generate five different types of benefits:

1. Tangible benefits in the form of the IA report and associated datasets, models, and outreach materials;
2. Modified perspectives and creative ways of thinking;
3. New partnerships and ways of interacting;
4. A change in process with new policies and strategic planning; and
5. Opportunities and resources that include additional funding and support for the project.

This study describes the five benefits through quotes and four project profiles compiled from 25 interviews. From this analysis, it is clear that IAs:

- Are effective at multiple scales, from national to local;
- Identify policy options based on stakeholder input and scientific assessment;
- Leverage new resources or result in successful spinoff projects;
- Are flexible and often evolve based on participant interests;
- Build coalitions and alliances that would otherwise not exist; and
- Provide a neutral, common ground for people to meet and address contentious issues with initially polarized parties.

Since Integrated Assessment is generally viewed as being a complex process, this study helps communicate simpler and more common, real-world IA benefits so that future participants will better understand and be more willing to invest time, energy, and resources into an IA of their own.

APPENDIX A – INTERVIEW QUESTIONS

The following ten questions were asked of each person interviewed – either by phone or through email responses.

1. What was your role in the IA project?
2. What were some important tangible outcomes? (the final report, datasets, modeling). How did you use them?

The next set of questions refer to outcomes that are less tangible but equally important.

3. Did you see new partnerships/ social interactions develop as a result of the IA project? Did you personally establish new working relationships – and are you still working with the individuals/organizations?
4. Did you witness a change in process as a result of the IA? For example, were new policies adopted or did the IA better define any follow-up strategic planning to address the issues?
5. Do you think the IA generated new ideas or perspectives on the topic? For example, did public/organizational attitude change? Were new research priorities defined based on results or data gathered?
6. Did the IA help leverage resources and opportunities that would otherwise be harder to access? For example, were there new grants that could be targeted, additional funding secured, increased support for the project?
7. Is there anything else the IA accomplished that we did not discuss?
8. What was your position during the timeframe of the IA? Has your job changed since then?
9. Do you mind if we include your name and some of the information we discussed in the project profiles that we are writing? If we use any direct quotes, we will be sure and verify them with you before publication.
10. Are there other people you think I should contact?

APPENDIX B – PROJECT PROFILES

Northeast Michigan Integrated Assessment: *Connecting Great Lakes Coastal Access, Tourism, and Economic Development*

Known as the “sunrise side,” Michigan’s northeast coastal region is rich in natural resources and home to many significant historical and cultural sites. Residents and visitors alike enjoy the region’s long stretches of undeveloped shoreline for hunting and fishing, visit the area’s network of lighthouses and dive the many shipwrecks preserved in Thunder Bay. Historically, the region has depended on lumbering, mining, manufacturing and agriculture; however, the past few decades have been economically challenging. Community leaders have more recently turned to tourism to boost the economy by promoting the natural and cultural resources unique to the area, especially those associated with the coast. The region has many natural and cultural assets, including the Thunder Bay National Marine Sanctuary and several undeveloped public lands. Despite the potential for economic development, the communities are proceeding cautiously to avoid overdevelopment and destruction of the area’s resources.

Responding to these needs and concerns, Michigan Sea Grant organized the Northeast Michigan Integrated Assessment (NEMIA) to foster a regional planning process related to economic development and coastal resources in Alcona, Alpena, and Presque Isle counties. The project included a series of stakeholder workshops that brought together representatives from 32 local and regional organizations.

The following question guided project activities:

How can coastal access be designed, in a regional context, for sustainable tourism that stimulates economic development while maintaining the integrity of natural and cultural resources, and quality of life?

The goal of the project was to help communities in Northeast Michigan:

- Develop a shared vision for their environment and economy
- Identify a suite of potential actions for reaching the region’s goals
- Build new partnerships among town planners, natural resource managers and business leaders
- Connect with technical experts who could provide a science-based, peer-reviewed assessment of the region.
- Access relevant information that could help guide future decision-making.

TANGIBLE DELIVERABLES

Based on needs identified by local stakeholders, Michigan Sea Grant assembled five technical assessment teams to gather and analyze data that could guide decision-making. The teams were led by specialists from the University of Michigan, NOAA National Marine Sanctuary Program, Michigan State University Extension, the Nature Conservancy and the American Institute for Architects. Each assessment team focused on a different topic:

Socioeconomic Assessment: How do tourism and natural resources affect the local economy? This assessment uses demographic, economic, recreation, and travel data to create Geographic Information System (GIS) layers, a traffic flow model, and a tourism economic input model that estimates total visitor spending in the area and associated economic effects.

Ecological Resources Assessment: What natural resources need greater protection and which could be better utilized? This study used GIS layers to highlight the ecologically valuable lands throughout the region. The goal was to illustrate how policy options can take advantage of natural features while also preserving and protecting their ecological function and value.

Cultural Assets Assessment: What are the key coastal cultural assets of the region? This assessment team used data from existing documents, databases, and initiatives to compile and classify a list of coastal cultural assets of the region, both on coastal lands and in Lake Huron waters.

Planning and Zoning: Are plans and codes designed to manage growth and advance community goals? This team conducted content analyses of local comprehensive plans and zoning ordinances, followed by interviews of local elected officials and decision-makers. The objective was to evaluate the extent to which plans and codes are designed to effectively manage growth and advance community goals.

Sustainability Design Assessment: How can planning and design be used to promote sustainable communities? Northeast Michigan was chosen by the American Institute of Architects to receive a Sustainability Design Assessment Team grant. The program included an intensive three-day site visit by a team of multidisciplinary professionals with experience in sustainability principles.

Implementation Guidance: How can Northeast Michigan implement the ideas generated by the assessment? The technical assessments and stakeholder input and vision were synthesized into a chapter presenting policy options, potential actions, or legislative tools that will help the region realize its vision for a sustainable future.

Throughout the process, the assessment teams discussed their plans and results at stakeholder workshops and then, if needed, modified the focus of their work.

Stakeholders used the information to develop policy options related to sustainable tourism and economic development that could be put into place in the region. After undergoing peer-review the technical assessments and implementation guidance were incorporated into a final report. The final report is available at <http://www.miseagrant.umich.edu/downloads/nemia/report/NEMIA-Final-Report.pdf>

Tangible Deliverable Perspectives

“The final report was particularly valuable for Alcona County residents and was used by them in an “Economic Development Summit” called by the EDC in October 2007 and subsequent implementation committee meetings.”

--- *Bethany Styer, formerly of Alcona Economic Development Corporation*

“Final datasets [from the Planning and Zoning Assessment] show potential environmental impacts of current zoning. As I have updated zoning ordinances for communities along the coast, I have kept in mind where these environmentally sensitive areas are and then critically assessed the zoning scenario in those areas.”

--- *Denise Cline, Northeast Michigan Council of Governments*

“The final report has been a good tool to support community development efforts. We have quoted the final report on several different grant applications. Also, the reports were helpful in confirming our plans to pursue a regional coastal plan to get communities to think together about consistent approaches to planning and zoning. Having the AIA work on the project was very valuable. NEMCOG will use the SDAT report to guide community development efforts.”

--- *Rick Deuell, Northeast Michigan Council of Governments*

INTANGIBLE DELIVERABLES

Perspectives – new ways of thinking

“MDNRE had been looking at planning for three undeveloped coastal properties individually, not necessarily as a component of the region. NEMIA aimed us down the road to consider them as a regional asset. NEMIA encouraged planning from a regional context, collaboration, and building partnerships. This regional philosophy was the most beneficial and important aspect of NEMIA for us.”

--- *Paul Curtis, Michigan Department of Natural Resources and Environment*

“What’s really important, what really excited me, is how we now look at our work as more of a regional endeavor as opposed to just a county or town or single property. What’s good for Harrisville is good for Alpena. What’s good for one business is also good for others. If we can get people off US23 at Standish to experience our coastline, we all win.”

--- *Dan Mullen, Michigan Department of Natural Resources and Environment*

“NEMIA allowed people to experience regional cooperation and planning, to realize that working regionally was workable in spite of geographic challenges, and overcoming ‘turf’ issues manifested by village, city, township and county officials was possible. By bringing together a diverse group from the three counties, the process allowed these stakeholders to interact outside their usual milieu (e.g. the DNR and non-profits) and gain new insights and perspectives. They also learned more about each other’s initiatives, resources, attitudes and limitations. NEMIA brought the three counties together to help take a look at the needs, to broaden our focus and realize that what we have in common is greater than what separates us.”

--- *Bethany Styer, formerly of Alcona Economic Development Corporation*

“This project assisted communities in realizing the potential that the northeast region has as well as the need to move forward as a region, rather than as individual communities. It helped them realize that the resources are already here, and it provided guidance for how to maximize those resources. So, I do think there has been a change in attitude in terms of collaboration as well as a realization that we live in an area rich in many different types of resources.”

--- *Denise Cline, Northeast Michigan Council of Governments*

“NEMIA was not a brick and mortar project. It was about getting different organizations to the table to talk and think about what they have and where they want to be. With the economy down, people were realizing that individual communities were not going to be able to survive alone. Interaction among different communities previous to NEMIA was on a project by project basis. NEMIA really got communities meeting and talking together, which helped existing efforts and further it allowed communities to come together to develop new ideas for how to use regional resources to fill in gaps in the local economy. It takes a group approach for the people living in the region to understand what they have.”

--- *Rick Deuell, Northeast Michigan Council of Governments*

“Having the AIA work on the project was very valuable. Professionals from outside the region were able to investigate the area and listen to the communities. This helped people to get a better understanding of what they have. Living in the middle of this wonderful area, people don’t often realize just how special it is, especially if you’ve lived there your whole life.”

--- *Rick Deuell, Northeast Michigan Council of Governments*

Partnerships - new ways of interacting

“NEMIA facilitated and enhanced communication and relationship development opportunities between Michigan DNR Parks Division and the NOAA Thunder Bay National Marine Sanctuary. The two agencies now have since collaborated to use DNR Parks facilities as satellite sites for “fact shacks,” outdoor covered displays with outreach materials for the Sanctuary’s regional Maritime Heritage Trail project. As an example in the other direction, DNR Parks were able to organize and design their Negwegon-

Rockport-Thompson's Harbor (NRTH) regional citizen advisory committee using the Sanctuary Advisory Committee (SAC) as a model.

--- *Brandon Schroeder, Michigan Sea Grant Extension Educator*

"NEMIA came along at the perfect time. It was the glue that brought many organizations and efforts together. Through NEMIA we recognized we have similar goals in mind, and many groups started working together. NEMIA fostered communication and interdepartmental cooperation, trust, and public participation. Efforts just took off!"

--- *Dan Mullen, Michigan Department of Natural Resources and Environment*

"I met individuals who I probably would not have known otherwise and became aware of other agencies' studies and research projects that I had not known about."

--- *Bethany Styer, formerly of Alcona Economic Development Corporation*

"NEMIA expanded partnerships, and they continue to expand. It was hugely important to have meetings that DNR was a part of but did not moderate, to get people to take part in a meeting about the coastal environment that was not dictated or outlined by what the DNR wants. We have a much better relationship with the public now. They have a local contact, and they know that what they say matters, that we are listening. NEMIA laid the foundation for a lot of things to come in the future. The DNRE has established new relationships, and we're still working together."

--- *Dan Mullen, Michigan Department of Natural Resources and Environment*

"The DNRE established the Negwegon Rockport Thompson's Harbor (NRTH) Advisory Committee to bring local planning partners into the parks planning process. This committee was made of representatives from all over the region, and many of these people were also involved in NEMIA. These two efforts (NEMIA and NRTH) complemented and reinforced each other, worked hand in hand. Now we're very comfortable with each other, and it is no longer "us vs. them," it's "we." This is largely a result of the face-to-face interaction in the context of the NEMIA meetings. MDNRE now has better relationships with local units of government. The NEMIA process is probably of more importance to me than any of the tangible products. We intend to keep the relationships going. We don't want to lose the trust that we have built."

--- *Paul Curtis, Michigan Department of Natural Resources and Environment*

Process – new ways of working

"NEMIA served as a catalyst for the Michigan Department of Natural Resources to develop regionally coordinated management plans for Negwegon, Rockport, and Thompson's Harbor State Parks. In addition to developing individual management plans for each park, the MDNR has developed a regional plan for all three properties with input from a newly formed citizen advisory committee made up of local residents."

--- *Brandon Schroeder, Michigan Sea Grant Extension Educator*

"NEMIA gave a huge boost to the concept of regional planning and project development in spite of the historic opposition to that way of thinking and working in NE Michigan. It

led directly to better cooperation and participation in the focus groups that were held to gather input for the creation of the coastal tourism business support website. Within the region, efforts had already been made to designate US 23 as the 'Sunrise Coastal Highway'; signage was installed and dedication ceremonies were held during the NEMIA project. This was followed by efforts to create a bikeway along the entire Lake Huron shoreline from Standish to Alpena. The NEMIA project strengthened those efforts by allowing the local committees to realize the value of continuing cooperation even though the final result would not be achieved for many years into the future."

--- *Bethany Styer, Alcona Economic Development Corporation*

"NEMIA reinforced the need for regional planning. NEMCOG has been promoting regional planning, but having all of these different players within the community provide input saying "regional planning is a good idea" really helps support our organization's efforts. NEMIA confirmed our plans to pursue a regional coastal plan to get communities to think together about consistent approaches to planning and zoning. Currently only Alpena has a planner."

--- *Rick Deuell, Northeast Michigan Council of Governments*

Opportunities and Resources

Creating Entrepreneurial Communities Initiative

NEMIA helped position a team from northeast Michigan to be selected as a CEC Pilot Community, a regional economic development opportunity supported by Michigan State University Extension and the MSU Product Center. Four people were chosen to represent the three-county region as "Team Huron Shore" in intensive five-day training focused on energizing entrepreneurs.

"The training and subsequent meetings to develop local programs led to cooperative efforts to create a new youth entrepreneur program, a partnership with Junior Achievement, the formation of a young entrepreneurs club and discussions to develop a regional business incubator."

--- *Bethany Styer, Alcona Economic Development Corporation*

Huron Blueways Project

NEMIA provided a grass roots process that led to successful MDEQ Coastal Management Program funding of a project coordinated by NEMCOG to identify coastal access points, water routes and other amenities from Mackinac to Harrisville in an effort to enhance recreational opportunities for paddlers along northern Lake Huron.

Regional Coastal Tourism Survey

The NEMIA socioeconomic assessment identified a need for a survey of expenditures of visitors to northeast Michigan. After the conclusion of NEMIA, Marine Sanctuary staff and NEMCOG partnered with other NEMIA work group members to conduct a study to gather tourism data that are current, specific and relevant to northeast Michigan.

Maritime Heritage Trail Expansion

The Thunder Bay National Marine Sanctuary partnered with the US-23 Heritage Route Management Council group to submit a proposal to Michigan Department of Transportation to expand their Maritime Heritage Trail to include the three-county NEMIA study area. The NEMIA report was cited in support of this proposal as evidence that the proposed project was technically credible and responded to a locally identified priority.

Support for Marine Sanctuary Expansion

The NEMIA process allowed the federal agency to form partnerships with the surrounding counties and to explore opportunities to expand the sanctuary. The Thunder Bay Marine Sanctuary ran their 5-year management plan review process parallel the NEMIA process, which allowed them to engage new stakeholders and decision makers in neighboring Alcona and Presque Isle Counties in their management planning process. TBNMS is now planning to expand the Sanctuary to include those counties and the relationships built during NEMIA were pivotal to receiving the local support letters required to start the federal expansion designation process.

National Scenic Byways Designation

The U.S. 23 Heritage Route Management Council is developing a Federal Scenic Byways proposal, building on the priorities identified by the NEMIA regional work group that are documented in the final report.

“We are using some of the recommendation in the NEMIA report to apply for National Scenic Byway funding to develop an interpretive program for the US 23 Heritage Route. We are using language directly from the NEMIA report to justify the project. In addition, we are researching the possibility of applying for National Scenic Byway status for US 23 (also a recommendation from the NEMIA report).”

--- *Denise Cline, Northeast Michigan Council of Governments*

Michigan Sea Grant Initiatives

According to Brandon Schroeder, Michigan Sea Grant Extension Educator for Northeast Michigan: “NEMIA process has provided research-based and community-based input and guidance toward our own Sea Grant Extension program investments in northeast Michigan. As a result of NEMIA process, I have designed and focused my Extension plans and programming around addressing and developing three specific action opportunities identified in NEMIA process and relevant to our MSG mission.” These include:

1. **Coastal Tourism Business Support Website** --- Diversifying Region’s Tourism Portfolio: Michigan Sea Grant is developing a web-based “toolbox” designed to provide targeted support to emerging entrepreneurs interested in eco- or cultural-coastal tourism in the northeast region. Based on Queensland, Australia business support model identified in NEMIA case studies.

2. **Revitalizing Fishing-Related Tourism** --- Retaining economic value of traditionally important sport fishery: Based on an opportunity identified by the assessment, Michigan Sea Grant is now working with fishery-dependent businesses in the region to identify new products and marketing strategies necessary to thrive within a changing ecosystem and economy.
3. **Great Lakes Stewardship Initiative: Engaging Youth Through Place-based Education** --- Engaging school and youth groups in addressing several coastal resource issues through new place-based education projects that focus on community engagement and environmental stewardship. For example, a group from Alcona schools is developing 12 interpretive signs for Negwegon State Park. NEMIA helped in developing collaborative partners and in identifying specific community needs, allowing Michigan Sea Grant to pursue and secure over \$230,000 in educational support from the Great Lakes Fishery Trust.”

“The place-based education program with Alcona Schools came out of the NEMIA meetings. We have been able to involve 3 different classes of students in the making of the interpretive signs! All of these kids now take ownership of Negwegon State Park. They are members of the Friends group, they use the park, and they will be very important stewards taking care of and policing the property, especially since we don’t have the staff or money to be out there all the time.”

--- *Dan Mullen, Michigan Department of Natural Resources and Environment*

Rein in the Runoff: Alternative Stormwater Management Practices that Address the Environmental, Social, and Economic Aspects of Water Resources in the Spring Lake Watershed

The communities in the Spring Lake watershed enjoy a picturesque waterfront setting adjacent to the five-mile long Spring Lake and just inland from Lake Michigan. Yet this attractive location also poses challenges, particularly after heavy rains. On these occasions, stormwater runoff carries pollutants into Spring Lake and its main tributary streams. It then flows downstream to the nearby Grand River and eventually into Lake Michigan, where it could impair nearshore water quality and threaten aquatic life.

As increasing amounts of land are converted to impervious surfaces water that was once absorbed naturally into the soil now flows into storm drains, pipes and canals, and ultimately into nearby surface waters, carrying with it nutrients and other pollutants picked up along the way. Historically, these pollutants have resulted in the impairment of the waters of Spring Lake, the Grand River, and the nearshore areas of Lake Michigan. Beach closings, no-contact (to water) advisories, and lost recreational opportunities have become more common. In addition pressures associated with increasing development in the Spring Lake area have magnified the stormwater issue.

Given the intimate connections between stormwater and a number of economically and recreationally important aquatic systems, an Integrated Assessment approach was used to investigate the causes, consequences, and corrective actions of stormwater runoff and its impacts in Spring Lake Township, the Village of Spring Lake, and the City of Ferrysburg.

The following question guided project activities:

What stormwater management alternatives are available to the Village of Spring Lake and Spring Lake Township that allow for future development and also mitigate the impacts of stormwater and improve the quality of Spring Lake, the Grand River and Lake Michigan?

The researchers worked together with local stakeholders to accomplish the following project goals:

- 1) Increase general knowledge among residents and decision-makers about stormwater issues in the community;
- 2) Increase stewardship of local water resources, in particular, increase participation in stormwater control and management;
- 3) Identify inconsistencies between state regulations and/or local ordinances that can improve local stormwater management and control; and
- 4) Provide a suite of alternative stormwater management Best Management Practices (BMPs) tailored to Spring Lake Township and the Village of Spring Lake.

TANGIBLE DELIVERABLES

The principal investigators formed a trans-disciplinary team of experts to synthesize existing natural and social scientific information related to the issue and to develop

options for better management of stormwater management in the study area. The project team developed a number of products and tools for the stakeholders in the Spring Lake Watershed to use to help improve local stewardship of, and to better manage and control stormwater runoff to, their local waterways. These tools also provide resources, insight, and guidance to researchers and policy-makers interested in improving water quality through the control and management of stormwater runoff. These products include:

Datasets. The project team created updated land use and land cover data for the Spring Lake Watershed, and projections for future stormwater pollution in light of different rates of population growth and continued urbanization of the watershed.

Best Management Practices Options. To help the Spring Lake Watershed stakeholders with the selection of appropriate management practices, the project team conducted a broad-scale analytical review of structural and non-structural BMPs (ordinances, performance standards) that have been successfully implemented in other communities in Michigan and throughout the country. A summary of BMP alternatives and where they might be most successfully applied in the Spring Lake Watershed is provided in the final report

Economic Analysis of Structural BMPs. To help the Spring Lake Watershed stakeholders with the selection – and ultimately the implementation – of structural BMPs, the project team conducted an economic analysis of the different structural BMP alternatives including direct costs, and opportunity costs.

Citizens Guide to Stormwater. This guide is an abbreviated version of the full Project Report, targeting the residents of the Spring Lake Watershed. This guide summarizes the Integrated Assessment process and outcomes, and provides information directly relevant to how individuals can manage and control stormwater runoff associated with their own activities.

Conceptual Ecological Model for Stormwater. Using the data and resources described above, the project team developed an ecological conceptual model to help stakeholders appreciate the complexities of the stormwater problem and think about which attributes of their water resources they most highly value.

Spring Lake Watershed Atlas. The project team developed a variety of watershed maps to explain and help visualize the Rein in the Runoff project. In addition, the maps describe the scope, current watershed conditions, and expected and potential future outcomes associated with current stormwater management practices, project results, and the results from additional projects within that Spring Lake Watershed that arose out of this Integrated Assessment.

Grant Resources. The project team identified potential funding sources for stormwater management, low impact development (LID), or other nonpoint source pollution control projects to assist local stakeholders with finding potential sources of grants or loans.

A stakeholder steering committee comprising decision-makers in these two municipalities and other interested parties throughout the watershed was formed to ensure that potential resource management options were realistic from a practical and political standpoint. After undergoing peer-review the project products were incorporated into a final report that summarizes the technical and stakeholder components of the process, including the underlying data and modeling approaches relied upon by the project team to assess the causes and consequences of stormwater pollution within the watershed, and the extent of the stakeholder education and participation. The final report is available at <http://www.miseagrant.umich.edu/downloads/coastal/rein-in-the-runoff/Full-Report-and-Appendices.pdf>

Tangible Deliverable Perspectives

“The final report can be used as a resource when projects are undertaken within the City for best management practices. The document will be available for City Boards and Commissions to learn how growth affects the watershed. The stormwater ordinance was also valuable.”

--- *Craig Bessinger, City of Ferrysburg Manager*

“The Final Report and the storm water management ordinance will be really useful. We have the final report on display in the lobby, the ordinance is under Planning Commission review.”

--- *Ryan Cotton, Village of Spring Lake Manager*

“For me and my work as an environmental regulator, the final report, datasets and wetland and shoreline assessments provide tangible outcomes and products that I plan on using in my work. As an analyst with the Department of Natural Resources and Environment (DNRE), I review permit applications for wetland and stream impacts, and deal with violations of the wetland and inland lakes and streams statutes. When evaluating proposed impacts to these resources, we must quantify the direct impact as well as the indirect and cumulative impacts that may result from the project. I am hopeful that the results of the assessment will provide information that we can use when applying the criteria in the statutes, especially the wetland functionality assessment and the shoreline assessment. I plan on using these two tools to inform our regulatory decisions and to serve as an indicator of overall ecosystem health in the watershed.”

--- *Derek Haroldson, Michigan Department of Natural Resources and Environment*

“Stormwater is not regulated, which means we have to figure out how to deal with it. The first step is education. This project really helped to provide accurate information. And if people have accurate information they make better decisions.”

--- *John Nash, Spring Lake Township Supervisor*

“Through this project we were able to accumulate concrete data that a lot of people make assumptions about. We are an environmentally assertive community and it’s good to have data that verifies that what we are saying and doing makes sense.

--- *John Nash, Spring Lake Township Supervisor*

The research team was very professional and the work they did was very professional. When we are trying to explain to people what we are trying to do we can use this document (the final report) as intellectual leverage.”

--- *John Nash, Spring Lake Township Supervisor*

“Listing the BMPs and what they would cost was really useful because as a mid-sized municipality we don’t have the time or resources to do that work.”

--- *John Nash, Spring Lake Township Supervisor*

“As we start applying the principles we learned through the process will have a lot of excellent resources for future implementation.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

INTANGIBLE DELIVERABLES

Perspectives – new ways of thinking

“The project brought awareness to leaders that they ought to consider impacts to the watershed when planning for the future.”

--- *Craig Bessinger, City of Ferrysburg Manager*

“Our Zoning Administrator and DPW Supervisor are now up to speed.”

--- *Ryan Cotton, Village of Spring Lake Manager*

“What was good was that they took existing ideas and made them applicable to our area. The researchers used their expertise to determine what might be the best solutions for our community. This tailored approach was really useful.”

--- *John Nash, Spring Lake Township Supervisor*

“I attended every meeting. I provided insight to our community needs and what some of our challenges had been as far as stormwater. In return I was educated by the researchers about stormwater solutions. I’m now better informed about the risks and solutions for our waterways. I learned that whatever happens here impacts all these waterways and wetlands.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“This project brought home even more so how serious our stormwater related problems are. New ideas and solutions came from the meetings. The enthusiasm was definitely

there from the community.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“During the Rein in the Runoff project In the Village we installed a demonstration rain garden at the DPW building geared toward residents and businesses. There is a new condo building and in front of it is one parking lot built to collect stormwater, this happened during Rein in the runoff...And the model street idea was a product of the initial meeting.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“Spring Lake Township is pursuing opportunities for rain garden installations. The Village of Spring Lake is considering a demonstration project (similar to Sea Street in Seattle). The Wetland Detectives at Spring Lake Intermediate School are now considering stormwater management principals in relation to the wetland studies and projects.”

--- *Elaine Sterrett Isely, Annis Water Resources Institute, and Rein in the Runoff Project Manager*

“Rein in the Runoff has helped educate stakeholders regarding the complexities of stormwater impacts and management, including how everyday activities can exacerbate the effects of stormwater runoff to their local waterways.”

--- *Elaine Sterrett Isely, Annis Water Resources Institute, and Rein in the Runoff Project Manager*

Partnerships - new ways of interacting

“Most if not all meetings, those attended arrived before the meeting started to discuss the project and other items with others present. I was able to introduce myself to a number of people I have spoken to on the telephone or corresponded via email.”

--- *Craig Bessinger, City of Ferrysburg Manager*

“A number of residents and representatives of organizations attended the meetings and provided valuable feedback and comments during the process. These people will be an asset to help improve the watershed.”

--- *Craig Bessinger, City of Ferrysburg Manager*

“The interactions we had with existing partners were more focused on the desired outcomes. Annis Water Resources Institute feels like a key partner now in our efforts. The MDEQ participated in one of our meetings for which I was grateful for their greater knowledge about what we are doing.”

--- *Ryan Cotton, Village of Spring Lake Manager*

“The sharing of notes along the way with other participants led us to increased use of leaching basins when we re-do streets and parking lots (a major stormwater

improvement) and the public input has led to more favorable citizen feelings about their local government.“

---Ryan Cotton, Village of Spring Lake Manager

“The project made those of us who turn the wheel on the ground better informed about what the resources are for impacting stormwater runoff. We now have the confidence that there are solutions and we have resource to look to in AWRI. We now have a relationship with them. There was cooperation from the township, village and from different roles in the community. We are all now on the same page, and we are able to communicate about the issues and solutions.

--- Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member

“To have people in chorus is always an advantage for any initiative. There is better cooperation and communication and the initiative is more likely to have a positive outcome when you have representation from all communities in the same room at the same time. For this project we were able to understand and communicate about the issue from the very beginning. Now we can then work together on common solutions.”

--- Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member

“I’ve been very active in every community I’ve lived in but I had never met a drain commissioner! When I learned that we had a drain commission at one of our meetings I was so excited! It was really valuable to have exposure to another dimension of our community through this project.”

--- Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member

“In many initiatives people show up at first but then interest fades or they don’t follow through. In this project people stayed involved. For one, the project appealed to a long term concern in the community. But the interface between the researchers and the public was really important to keeping people involved, and committed to acting. The technical level of this project was also very important. We wanted specific technical information on where to, how to, what to; that’s what we needed in the community. The researchers were competent, sincere, credible, organized and they knew their stuff. I already had the enthusiasm for the issues; this project gave me an avenue for acting in concert with others who were in a position to impact.”

--- Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member

“This project seems to have improved the communication between the community decision-makers in the Village of Spring Lake, Spring Lake Township, and Ferrysburg.”

--- Elaine Sterrett Isely, Annis Water Resources Institute, and Rein in the Runoff Project Manager

Process – new ways of working

“A joint meeting of the Boards and Council of the Stakeholder communities gave all exposure to the possibility of enacting a storm water ordinance. Also, this meeting was an excellent opportunity to educate the leaders of the communities how the watershed is impacted.”

--- *Craig Bessinger, City of Ferrysburg Manager*

“The stormwater ordinance will provide major changes as we work for zero new runoff.”

--- *Ryan Cotton, Village of Spring Lake Manager*

“We were working on our master plan while this project was going on. We incorporated the findings from the IA into the master plan in the form of incentives for developers to manage stormwater on site better.”

--- *John Nash, Spring Lake Township Supervisor*

“I believe that as a result of Rein in the Runoff, local officials are re-evaluating the way they make certain land use decisions.”

--- *Elaine Sterrett Isely, Annis Water Resources Institute, and Rein in the Runoff Project Manager*

Opportunities and Resources

“At this time no new funding has been secured, however, with the communities agreeing to support the ideas in the final report, working together may help secure funding for projects that will be beneficial to the watershed.”

--- *Craig Bessinger, City of Ferrysburg Manager*

“We haven’t yet had the chance to pursue new opportunities, but we do a lot of grant writing and the grantors always want backup info. Now we have loads of it, which will make a significant difference in our ability to get grants because now we have topic expertise to back up our ideas.”

--- *John Nash, Spring Lake Township Supervisor*

“As a result of Rein in the Runoff, in 2009 AWRI was awarded another grant from the Grand Haven Community Foundation to determine the extent and composition of shoreline hardening for the entirety of the Spring Lake shoreline. In addition, in 2008-2010 researchers at AWRI selected the Spring Lake Watershed for inclusion in a functional wetlands assessment for subwatersheds of the Lower Grand River Watershed (LGRW). It is anticipated that Rein in the Runoff will provide a basis for local communities to use in future grant applications for implementation and demonstration projects.”

--- *Elaine Sterrett Isely, Annis Water Resources Institute, and Rein in the Runoff Project Manager*

“Rein in the Runoff put us in a better position to gain resources, because now we have all the information, a common understanding, and a relationship with AWRI. We are

informed, knowledgeable, and we know what we need. For grant writing, we can cite the report or the knowledge gained.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

Detroit Fish Consumption Advisories Integrated Assessment: What are the Causes, Consequences and Correctives of Fish Contamination in the Detroit River AOC that Cause Health Consumption Advisories?

The Detroit River remains under several fish consumption advisories that are in place to protect human health but which also impact the local economy. Despite the impact of these advisories, little progress has been made in developing effective strategies that address them. For example, although more than \$120 million dollars has been spent removing toxic sediment in the river, there is little understanding of the extent of ecosystem improvement. Many uncertainties remain regarding the drivers behind these advisories, including the relative contribution of sediment hot spots, the role of point versus non-point contaminant sources, and the appropriateness of methods in setting and identifying allowable contamination levels for consumption advisories.

Solutions for eliminating fish consumption advisories on the Detroit River, according to project researchers, will likely require novel approaches directed at both decreasing contaminant levels in fish over the long term and reducing human health risks in the short- and long term. This Integrated Assessment reviewed the causes, consequences, and correctives for fish contamination on the Detroit River. More specifically, it looked at the reasons why fish contamination advisories are issued when they are. The overall goal of the project was to bring together policy-makers, interested stakeholders, scientists, and governmental agencies from the U.S. and Canada to develop a common understanding of issues related to PCB contaminant advisories, and to use new information and integrate historical elements in creating new approaches to manage the River.

Project stakeholders identified the following key questions to guide project activities:

- How can we increase public awareness of fish consumption advisories?
- Do the fish collected for contaminant analysis represent the population of fish accurately?
- What are the contaminant levels of fish not included in the fish consumption advisory that are consumed from the Detroit River?
- Where are the sources of contaminants in the basin that are high enough to translate into a fish consumption advisory?
- Are we appropriately measuring emerging contaminants?
- What data is available on human health effects of contaminants in the Detroit River?

TANGIBLE DELIVERABLES

To address the key questions, the project team organized four working groups comprising stakeholders and researchers: outreach, food web, environmental justice, and beneficial use impairments. These groups developed a number of products to advance understanding and awareness of the causes and health impacts of fish consumption advisories. The following products are included in the project's final report, available at <http://www.miseagrant.umich.edu/downloads/research/projects/detroitriver/Full-Project-Report.pdf>:

Datasets: Researchers compiled data sets related to contaminants on the Detroit River by gleaning information from the scientific literature, reports, and available datasets from both Canadian and U.S. sources. Datasets were made available to project researchers and stakeholders on the project website.

Model Results: The Detroit River Fish Consumption Hazard Assessment Model, the existing tool used to evaluate contamination in the Detroit River and its potential to contribute to sport fish advisories issued for the system, was updated and modified. Researchers used the revised food web bioaccumulation model to:

- Conduct risk analyses of PCB body burdens in fish, including those not included in the advisories.
- Spatially integrate water and sediment inputs for predicting PCB body burdens in fish.

Brochure and Flier: A brochure on safe fish-eating habits ("Eat Safe Fish in the Detroit Area: A guide to buying and catching fish that are healthy for you and your family") and an alternate catfishing location flyer ("Best Spots for Catfish in the Detroit Area") were also developed and have been distributed in a number of ways including on-line, at community events including Shiver on the River and health fairs, and via the different stakeholders groups such as the City of Detroit Department of Health and Wellness Promotion and the Wayne County Health Departments for their Women, Infant, and Child (WIC) and environmental health clients. The Friends of Detroit River, Michigan Sea Grant, Wayne State University and Wayne County distribute them for their outreach programs. In addition, outreach materials were distributed at River Days in Detroit and evaluated by the community.

Public Signs: Signs on "Eating Fish from the Detroit River" were designed and produced and installed at 25 shorefishing locations mostly along the Detroit River, but also along the River Raisin and one location on the western Lake Erie shore, on April 29, 2010. These signs provide anglers with fish advisory information, proper fish cleaning methods, and alternate locations to catch catfish that are lower in chemical contamination.

Fishing Behavior Survey Results: A graduate student team was recruited from the University of Michigan to address environmental justice issues related to fish consumption advisories on the Detroit River. They interviewed anglers on the Detroit River to assess fishing behavior and consumption, and knowledge, attitudes, and beliefs about contamination and fish consumption by race and income.

Tangible Deliverable Perspectives

"The one-page info sheets on fish consumption have been really useful. We have been making them available in health centers. They are still current and still available from the State Department of Community Health so we will keep distributing them."

--- Paul Max, City of Detroit Health Department

“The public signs provided two main benefits: targeted outreach and public awareness. The people fishing on a subsistence level are consuming a lot of fish that are unsafe to eat. These are generally not well informed or educated people, not on the internet or seeking out information on fish consumption, so targeting them where they fish is the best way to reach them. The signs targeted these populations specifically with direct messages about fish consumption concerns at locations with tremendous fishing exposure. The signs alert not only the people fishing, but the general public. When the signs went up I got quite a few calls. I did a radio spot on public radio the day of the event. This media attention increases awareness of the issue. We have to alert the public that we still have issues and problems in the river and contaminated fish are one of them. We still have work to do to improve the river and public awareness is essential. People frequently ask me why we put up the signs. After I answer that the follow up question is almost always, “why are some fish good to eat and others are not?” So you cannot talk about fish consumption advisories without also talking about the underlying problem.”

--- *Bob Burns, Friends of the Detroit River*

“Without this project I would have never known about the environmental justice work that the graduate students did as part of this project. We now have a much better idea about who is eating what from the Detroit River. We didn’t really have a handle on this behavior, now we do. It helps inform future ideas, thoughts, and decisions. I’m glad to have access to it and have referred to it many times.”

--- *Rose Ellison, US EPA*

INTANGIBLE DELIVERABLES

Perspectives – new ways of thinking

“In response to new research priorities, the group recognized a need to obtain contaminant level data on catfish from the Detroit River.”

--- *Bob Reider, DTE Energy*

“It’s too early to tell if public perception changed, and beyond the scope of our project to measure. But as for the organizational attitudes, based on our survey results participant perception of their knowledge about issues, the network, and resources increased over the course of our project. Participants agreed “the Integrated Assessment project has helped to address top priority issues for DR-FCAs.”

--- *Donna Kashian, Wayne State University*

“Through this project we developed consensus on the need for more outreach.”

--- *Donna Kashian, Wayne State University*

“We have known for quite some time that fish contaminant data from the Detroit River needs to be updated but funding has not been available. More priority has been placed on acquiring more recent fish samples and data, including catfish, contingent upon funding. It is unknown if public attitude has changed and is too soon to be able to measure new

knowledge since the signs have only recently been posted and brochure distribution is recent as well. The stakeholder group has identified future projects for a grant application that would allow further work in the area, including a survey of anglers to determine if knowledge of the Detroit River fish advisory has increased and if behavioral changes have occurred. If funding is successful, data will be measured against the 2008 University of Michigan Environmental Justice study.“

--- Sue Manente, Michigan Department of Community Health

“It was a new approach to tailor fish consumption information to specific audiences and water bodies.”

--- Rose Ellison, US EPA

“Yeah I think so. I think once people within our organization saw the information sheets I think they increased their knowledge and awareness of it too. Put the issue out there. They were aware but at the back of their consciousness.”

--- Paul Max, City of Detroit Health Department

“It always helps to get people from different perspectives together to trade ideas. The whole concept of putting the signs up was something I hadn’t thought of. I’m glad the city was willing to participate in that effort and allow them.”

--- Paul Max, City of Detroit Health Department

“The project turned out very different than I had envisioned. Through the process many good things came out, people found value in different areas that I hadn’t thought of. Participants came up with their own ideas for their own relevant spinoffs.”

--- Rose Ellison, US EPA

“The project did a good job of narrowing down to the questions that really mattered.”

--- Rose Ellison, US EPA

Partnerships - new ways of interacting

“Local angler groups are now working with MDCH and MSG to conduct fish cleaning demonstrations at community events. These demos act as a draw allowing MDCH and MSG to distribute brochures and other information regarding fish consumption advisories. Canadian entities are also now working with U.S. entities to create similar communication tools for the Canadian side of the river.”

--- Mary Bohling, Michigan Sea Grant Extension Educator

“I now have a great working relationship with MDCH that has expanded beyond the Detroit River IA. We are now working together on projects in the Saginaw Bay and have written a grant to work on a statewide program for fish consumption advisories. I have also developed a new relationship with the Metro West Steelheaders due to their participation with fish cleaning demos.”

--- Mary Bohling, Michigan Sea Grant Extension Educator

“I am currently working with several groups to secure additional funding. These partnerships are a result of the project.”

--- *Donna Kashian, Wayne State University*

“I definitely saw new partnerships develop. We established new working relationships with Michigan Sea Grant, Friends of the Detroit River, University of Michigan, Wayne State University, Michigan Department of Natural Resources and Environment, staff from the province of Ontario, both local health departments within the jurisdiction, and several others. These working relationships continue as we strive to identify new funding sources for continued work.”

--- *Sue Manente, Michigan Department of Community Health*

“We haven’t developed new programs with the new people I met, but I’ve called people from the group to talk about other issues.”

--- *Paul Max, City of Detroit*

“Those meetings brought together a lot of people who I hadn’t had contact with before. It got people talking. The people were great to work with, and we were all working toward the same goal. Could have been quicker, but that’s the process they choose to follow. The health department people were new to me, and they set the pace of the project. Since they needed to get permissions from property owners to install signs in the chosen areas and MDCH couldn’t do it because they are a state agency our organization, the Friends of the Detroit River stepped in to help this process along.. We were the intermediary for getting permission with property owners to put up signs.”

--- *Bob Burns, Friends of the Detroit River*

“Anytime you can get multiple people together from different jurisdictions is a positive thing.”

--- *Bob Burns, Friends of the Detroit River*

“The team that got together to produce the FCA guide... that wouldn’t have happened if it weren’t for this project. Formed a group and got a product out the door. MDCH invited to be part of stakeholder group, but also had something to bring to the table that they could advance. MDCH was looking for a local partner.”

--- *Rose Ellison, US EPA*

“The project let me integrate more with Ken Droulliard. I know better what he’s doing and may have opportunities in the future to work with him. Project laid the groundwork for us to work together in the future if things align. Understanding when we may want to intersect.”

--- *Rose Ellison, US EPA*

“The relationships built were important. The networking was useful in giving us the ability to advance our interests knowing what others are doing.”

--- Rose Ellison, US EPA

Process – new ways of working

“The group made a real effort at finding ways to get the information to the targeted audience, e.g. displays at special events, clear straight forward messages on the signs and placement at multiple locations.”

--- Bob Reider, DTE Energy

“Although no policy has been developed, there is now discussion regarding how/if the Canadian and U.S. agencies can develop similar communications regarding fish consumption.”

--- Mary Bohling, Michigan Sea Grant Extension Educator

“There is more of a unified effort to improve the advisory itself in terms of readability, and include new fish, new data in the advisory for the Detroit River.”

--- Donna Kashian, Wayne State University

“There was great desire from the IA group to coordinate and combine the Canadian and Michigan fish advisories into one advisory. It became obvious that one advisory is not possible. However, Ontario and Michigan are sharing more fish data than previously and will continue to do so. It’s possible that templates for the products, such as the sign may be common to both locations. The fish advisory signs that will be posted on the Michigan side of the river have been suggested to the Ontario RAP committee to provide consistency for ease in angler use. Content would be revised to reflect the Ontario advisory and other relevant information.”

--- Sue Manente, Michigan Department of Community Health

“The project and funding allowed MDCH to dedicate more resources to Detroit River fish consumers than previously and increased our knowledge of the area and issues facing residents.”

--- Sue Manente, Michigan Department of Community Health

Opportunities and Resources

“MDCH had a small grant of \$4000 to spend on communicating fish consumption advisories. This was matched by \$4000 from MSG to complete the signage, brochure and flier. Since then, several partners have collaborated to apply for two new grants offered through the GLRI.”

--- Mary Bohling, Michigan Sea Grant Extension Educator

“The project helped leverage resources and opportunities in a huge way. We used our project as matching funds on a grant the Mich. Dept. of Community Health prepared and received –which covered the cost of the signs to be posted along the river, and printing of the outreach material. In addition, we have submitted several grants that (we hope) will help with a positive outcome. In January 2010 working with the Michigan Department of

Community Health we submitted a proposal titled to the Great Lakes Restoration Initiative titled "Enhanced Michigan Fish Contaminant Monitoring and Advisories." Also I am currently working with the public outreach group identified (formed) in workshop three to submit a proposal to the Erb Foundation."

--- *Donna Kashian, Wayne State University*

"MDCH had a very small pot of money, a \$4,000 grant from the Environmental Protection Agency, for fish advisory education and outreach work on the Detroit River. It would have been very difficult to realize the maximum potential of those funds without the support of the stakeholder group. Michigan Sea Grant contributed another \$4,000. In addition there was much in-kind funding in terms of staff time dedicated to the project."

--- *Sue Manente, Michigan Department of Community Health*

"MDCH has applied for grant funding from the Great Lakes Restoration Initiative (GLRI) and for specific funding to continue work on the Detroit River. The stakeholder group is also researching a funding request to the Erb Family Foundation to provide more intensive outreach (materials dissemination as well as hiring staff to walk the river and meet with shore anglers), more material, and program evaluation."

--- *Sue Manente, Michigan Department of Community Health*

An Integrated Assessment: Hypoxia in the Northern Gulf of Mexico

Since 1985, scientists have been documenting a hypoxic zone in the Gulf of Mexico each year. The hypoxic zone, an area of low dissolved oxygen that cannot support marine life, generally manifests itself in the spring. Since marine species either die or flee the hypoxic zone, the spread of hypoxia reduces the available habitat for marine species, which are important for the ecosystem as well as commercial and recreational fishing in the Gulf. The challenging nature of this problem incorporates agricultural, environmental, and energy interests along with all levels of government.

To address the hypoxia problem, the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force was formed in 1997 with representatives from federal agencies, states and tribes to consider options for responding to hypoxia. The Task Force asked the White House Office of Science and Technology Policy to conduct a scientific assessment of the causes and consequences of Gulf hypoxia through its Committee on Environment and Natural Resources (CENR). The assessment, which led to the following five investigations from 1998 to the present, illustrates that environmental decisions and improvements require a balance between research, monitoring, and action.

1. The *scientific assessment* was led by the National Oceanic and Atmospheric Administration with oversight among several federal agencies. The goal of the assessment was to document the state of knowledge of the extent, characteristics, causes, and effects (both ecological and economic) of hypoxia in the northern Gulf of Mexico. As a first step, six interrelated scientific reports examining different aspects of the hypoxia issue were developed by six teams with experts from within and outside of government (for a summary of the six key topics covered in these reports, see http://oceanservice.noaa.gov/products/pubs_hypox.html). These six reports provided the foundation for the next step in the process – writing the Integrated Assessment to evaluate alternative solutions and management strategies.
2. In 2000 the CENR completed *An Integrated Assessment: Hypoxia in the Northern Gulf of Mexico* (available at http://oceanservice.noaa.gov/products/hypox_final.pdf). The Integrated Assessment's (IA) goal was to compile existing information on nutrient sources, identify alternatives for reducing nutrient inputs, and examine the costs and benefits associated with reducing the nutrient loads to surface waters.
3. Informed by the *Integrated Assessment*, in 2001 the Task Force completed an *Action Plan for Reducing, Mitigating and Controlling Hypoxia in the Northern Gulf of Mexico* (available at <http://www.epa.gov/msbasin/taskforce/actionplan.htm>). This plan was submitted in accordance with The Harmful Algal Bloom and Hypoxia Research and Control Act of 1998. In its 2001 *Action Plan*, the Task Force pledged to implement ten management actions and to assess progress every five years. Thus, while the IA

led to this follow-up action plan, it also gave momentum to a larger process and a continuation of collaborative efforts.

4. In 2006, the Task Force requested that the EPA's Science Advisory Board (SAB) convene an independent panel to evaluate the state of the science regarding hypoxia and potential nutrient mitigation and control options. The SAB conducted the *Update by the EPA Science Advisory Board* to reassess the nutrient load reductions achieved, the responses of the hypoxic zone and associated water quality and habitat conditions, and economic and social effects. When issuing their report in 2007, the SAB reaffirmed the major finding of the *Integrated Assessment*, namely that contemporary changes in the hypoxic area in the northern Gulf of Mexico are primarily related to nutrient loads from the Mississippi Atchafalaya River basin. (available at http://www.epa.gov/msbasin/pdf/sab_report_2007.pdf)
5. The reassessment led to the release of a second **2008 Action Plan** describing a national strategy to reduce, mitigate, and control hypoxia in the Northern Gulf of Mexico and improve water quality in the Mississippi River Basin. The revised action plan reflects emerging science included in the EPA's SAB report. [Eleven key actions](#) in the 2008 Action Plan highlight the need to complete and implement nitrogen and phosphorus reduction strategies, promote effective conservation practices and management practices, track progress, reduce existing scientific uncertainties, and promote effective communications to increase awareness of Gulf hypoxia. (available at <http://www.epa.gov/msbasin/actionplan.htm>)

TANGIBLE DELIVERABLES

The Integrated Assessment is based on six peer-reviewed hypoxia assessment reports and the public comment received in them. Six teams were established to review and analyze existing data and apply existing models of the watershed-Gulf system. The IA draws heavily on these reports, which synthesize massive amounts of direct and indirect evidence collected and reported over many years of scientific inquiry. Each team report summarized the state of knowledge for the following topics:

Report 1. Characterization of hypoxia. This report describes the seasonal, interannual, and long-term variation of hypoxia in the northern Gulf of Mexico, and its relationship to nutrient loadings. It also documents the relative roles of natural and human-induced factors in determining the size and duration of the hypoxic zone.

Report 2. Ecological and economic consequences of hypoxia. This report presents an evaluation of the ecological and economic consequences of nutrient loading, including impacts on Gulf of Mexico fisheries and the regional and national economy.

Report 3. Flux and sources of nutrients in the Mississippi-Atchafalaya River Basin. This report identifies the sources of nutrients with two distinct components. The first is to identify where, within the basin, the most significant nutrient additions to the surface water system occur. The second, more difficult component, is to estimate the relative importance of specific human activities in contributing to these loads.

Report 4. Effects of reducing nutrient loads to surface waters within the Mississippi River basin and Gulf of Mexico. This report estimates the effects of nutrient source reductions on water quality in the Mississippi-Atchafalaya Basin and on primary productivity and hypoxia in the Gulf of Mexico.

Report 5. Reducing nutrient loads. The focus of this report was to identify and evaluate methods to reduce nutrient loads to surface water, groundwater, and the Gulf of Mexico.

Report 6. Evaluation of economic costs and benefits of methods for reducing nutrient loads to the Gulf of Mexico. In addition to evaluating the social and economic costs and benefits of the methods identified in topic 5 for reducing nutrient loads, this analysis included an assessment of various incentive programs and any anticipated fiscal benefits generated for those attempting to reduce sources.

These six reports provided the foundation for the final Integrated Assessment entitled, ***“An Integrated Assessment: Hypoxia in the Northern Gulf of Mexico”***. The IA summarizes the state of knowledge about the extent, characteristics, causes, and effects of hypoxia in the northern Gulf of Mexico and concludes that hypoxia was caused by excess nitrogen from the Mississippi-Atchafalaya River basin, in combination with stratification of Gulf waters. The IA goes a step beyond the scientific reports to evaluate alternative solutions and management strategies.

Tangible Deliverable Feedback

“The individual reports and the IA catalyzed partnerships with NOAA and other federal agencies and defined the playing field in terms of short and long term targets for mitigation strategies and programs.”

--- *Tim Strickland, US Department of Agriculture technical liaison*

“The scientific reporting was an effective way to use readily available information to compile data sets for point source discharges for the entire region. Until then, there hadn’t been a dataset related to permitted facilities and point source pollutants of concern for this large of a region. Ultimately it helped strategic planning for future data acquisition.”

--- *John Wilson, EPA staff scientist serving on the Task Force and IA Team*

“The reports compile the best available science into one place so they can be readily accessed to address the controversies about cause and effect of nutrient

loading. Having these documents helps dispel some of the myths about the science.”

--- *John Wilson, EPA staff scientist serving on the Task Force and IA Team*

“The Integrated Assessment served as a foundation for the 2001 Action Plan. While that plan isn’t used so much now, it was part of a larger process that resulted in the 2006 EPA Science Advisory Board formation to reassess the science surrounding the issue. The SAB report is currently one of the key documents of reference.”

--- *Doug Daigle, Mississippi River Basin Alliance*

“The IA served as a bridge between the Task Force and the scientists doing the studies. A big part of moving the process forward was to get a readable report that was action oriented to start bridging the gap of science to action planning. This ultimately helped the Task Force focus on opportunities.”

--- *Wayne Anderson, Minnesota Department of Environmental Quality and staff to the Task Force*

“Even though the report is almost ten years old, I still go back and use it to reference key findings - it helps me take a stronger stand when justifying management actions.”

--- *Wayne Anderson, Minnesota Department of Environmental Quality and staff to the Task Force*

INTANGIBLE DELIVERABLES

In addition to the tangible deliverables described above, we asked participants and stakeholders to provide insight into the IA’s intangible benefits including a change in: 1) perspectives, 2) partnerships, 3) process, and 4) opportunities and resources. Responses below are organized into these four categories.

Perspectives – new ways of thinking or research priorities

“Although there are still some organizations that argue against the findings, I think the Integrated Assessment affected public and organizational attitude. There became a collective scientific understanding, which resulted in less debate about the science.”

--- *Doug Daigle, Mississippi River Basin Alliance*

“The general awareness that everything, every place, and everyone are linked and share equal responsibilities in creating or solving problems was enhanced by the effort. I hope the IA process increased our own (the Federal Government’s) awareness about the responsibility we have in educating the public on the consequences of acting too quickly or too slowly. I also hope that some of us realize the critical need to anticipate outcomes and plan many years in advance of implementation. Ecosystems are resilient, but responding after crossing the precipice is much more difficult and costly than understanding system capacities and working within them.”

--- *Tim Strickland, US Department of Agriculture technical liaison.*

“The public’s ability to key in on large issues has improved through this process. Before, there was a tendency to limit initiatives locally with less of a focus on what is happening downstream. The IA was able to help shift public thinking on the issue of nutrients in the water to more awareness and recognition of a global perspective as they act locally. For example, local nutrient issues in the state of Minnesota - like reducing phosphorus in lakes and nitrogen as it affects drinking water - are becoming linked to how these local issues relate to regional agricultural impacts. Hitting a larger public perspective is important when it comes to integrated watershed planning and implementation and development of state and local policies. The ability to lean in close and then step back for a larger perspective has created a check and balance to evolving policy. In the long term, we will be both proactive as well as restorative relative to resource management.”

--- *Wayne Anderson, Minnesota Pollution Control Agency and staff to the Task Force*

“The IA focused dialog around a specific problem and supporters became more willing to look toward different solutions. But it also gave opponents something to target for their energy – ultimately leading to the reassessment and second action planning process. When an issue gets such intense focus and directed resources, it can cause the opposition to coalesce their support, target gaps in data, or find new angles to attack an initiative.”

--- *John Wilson, EPA staff scientist serving on the Task Force and IA Team.*

“The IA definitely generated stronger support by the science, because most studies came to similar conclusions, with different or same data sets or methods. But the IA also set a polarization among the sectors of society in the watershed and offshore. Ultimately, the visibility of the issue of hypoxia was raised considerably within the public and led to actions among nongovernmental organizations and smaller public-based efforts to influence policy and reduce nutrients.”

--- *Nancy Rabalais, faculty member at Louisiana Universities Marine Consortium and author/team lead of the “Characterization of Hypoxia” technical report.*

“While research priorities did not initially change, they are being revisited now – with the IA and related products being used for benchmarking purposes. In key areas, it is still the only - or best-game-in-town - in terms of research synthesis, especially the economic analysis and outcomes.”

--- *Otto Doering, faculty member at Purdue University and author/team lead for the “Evaluation of Economic Costs and Benefits...” technical report.*

Partnerships - new ways of interacting and working together

“The IA process helped me get to know leading researchers working at the local level. Since I worked for the EPA, it also helped me to develop relationships with other federal staff working at NOAA – these partnerships were very useful for developing the Action Plan. I also saw the nonprofit sector, who already worked with the federal government, develop new partnerships with local organizations and agencies.”

--- *John Wilson, EPA staff scientist serving on the Task Force and IA Team.*

“I got to know a larger group of engineers and scientists working on hypoxia issues both at the local and national level. I’m still working with the second Action Plan as a member of the Task Force Coordinating Committee. While working with scientists on uncertainties, we are able to help bridge the gap between science and policy. There was a recognition that the science needed to have an appropriate influence over policy, and this IA and the larger process helped policy makers reach out to scientists in real-time. Ultimately, this is the working definition of “adaptive management” – we were trying to help adapt nutrient loading relative to incoming scientific analysis.”

--- *Wayne Anderson, Minnesota Pollution Control Agency and staff to the Task Force*

“There has certainly been a continuation of partnerships and interaction among the various federal and state agencies with a stake in the process. The second Action Plan is evidence of that continuing relationship.”

--- *Tim Strickland, US Department of Agriculture technical liaison.*

“I worked closely with many of the NOAA funded research program investigators, but developed new lines of communication with additional members of the other five technical reporting teams. I am still working with many of the original authors of these reports. Some are now retired, but some I still serve with on panels, NRC committees, and attend similar meetings.”

--- *Nancy Rabalais, faculty member at Louisiana Universities Marine Consortium and author/team lead of the “Characterization of Hypoxia” technical report.*

“The IA catalyzed the mission and continued efforts of the Mississippi River Gulf of Mexico Watershed Nutrient Taskforce, which was established in 1997. This group, which continues to meet every year to address nutrient loading issues, includes state and federal agencies, along with environmental groups, industry, and regional organizations as stakeholders. The Taskforce represents a cross-section of many interests and gives them an organization through which they can work together to address a common issue.”

--- *Victor Bierman, senior scientist at LimnoTech and author/ co-lead of the “Effects of reducing nutrient loads to surface waters...” technical report.*

Process – new ways of working or new policies and strategic planning

“There continues to be a stronger push toward integration of efforts and information among federal agency scientists.”

--- *Tim Strickland, US Department of Agriculture technical liaison.*

“The IA served as a reference document for policy proposals - it was a summary of information to justify actions because they were addressing a priority identified in a written plan.”

--- *Doug Daigle, Mississippi River Basin Alliance*

“The IA provided a foundation for strategic planning discussions and strengthened the whole effort of the Task Force. Over the course of the next five years, opposition was reduced with less discussion about the validity of science and more of a shift toward

policy discussions. The IA turned discussions from questioning agricultural pollution sources to finding feasible ways of mitigating some of the nutrient loading. When arguments about agricultural pollution sources came up five years later, opponents challenged the integrity of scientific results again. The EPA agreed to convene a second scientific review by establishing the Science Advisory Board (SAB), which had an agricultural stakeholder. When their reviews led to same conclusion, the SAB was able to justify the scientific integrity in the original IA. These two assessment processes led to an acknowledgement of the problem and ultimately to policy discussion and development. Overall, the IA changed the nature of the debate - even though it took awhile to happen with a second, but necessary, confirmation of results.”

--- *John Wilson, EPA staff scientist serving on the Task Force and IA Team.*

“Team leads for each of the six science assessment groups met regularly (once or twice a month) at NOAA offices in DC for a day to talk about pieces, progress, and steps needed to keep the process moving forward. This part of the project gave all team leads tremendous experience in project integration – otherwise they would not have come together outside their disciplines to have these conversations. The regular communication helped make the IA real and give all involved an understanding about the necessary sequence of tasks (not just an end report coming together).

Communication along the way was essential to the process – it could not be held up by any one team or person. Different disciplines and activities had to feed into the process and the IA helped coordinate it all. The IA forced each of us to learn more about the discipline and technology of others....everyone had to learn about economic analysis, cost benefits, nutrient balances and flows, impact of differences in rainfall. Everyone had to learn something about everybody’s discipline to have discussions and mesh the pieces needed into analysis and strategies. There was a recognition about what you needed to get done to help others and move the process along. And it forced a common language of communication – biological and economic jargon had to have a common linguistic frame - so that all disciplines could understand each other. Ultimately this helped communicate the information to the public.”

--- *Otto Doering, faculty member at Purdue University and author/team lead for the “Evaluation of Economic Costs and Benefits...” technical report.*

“While overall, policies and actions with respect to hypoxia in the Gulf did not change as a result of the IA, the project still provided baseline information for people to go back to and access. The IA was a starting point and while it may not have led to initiatives, it did give the issue momentum – and is still a process in progress.”

--- *Otto Doering, faculty member at Purdue University and author/team lead for the “Evaluation of Economic Costs and Benefits...” technical report.*

Opportunities and Resources – additional funding and support for the project

“It is certainly my impression that the OMB and Congress’ direction for USDA to quantify the effects of agricultural conservation practices paid for by federal programs was an outgrowth of the IA. The Conservation Effects Assessment Project (CEAP) is led by the USDA Natural Resources Conservation Service (NRCS) and seeks to assess the

value of hundreds of millions of dollars in conservation payments. This has also served to galvanize the research efforts of USDA and has leveraged much of the resources within our Natural Resources and Sustainable Agriculture Research program. There were also additional resources made available to university researchers and extension specialists targeting the CEAP objectives through USDA's competitive grants programs and through the NRCS' CEAP Watershed Program funds."

--- *Tim Strickland, US Department of Agriculture technical liaison.*

"Within federal agencies the IA process has helped leveraged funding to address the hypoxia issue. For NOAA it has helped justify research needs and get funding for programs through their reauthorization. The process also helped the EPA build their research and policy program to address the hypoxia issue. In terms of policy, it gave momentum in the revised Farm Bill and directed more resources to the Mississippi Basin – especially for experimental and nutrient reduction strategies. The Department of Agriculture is directing funds to help reduce pollution from agricultural sources and protect water quality. That approach is new – before the focus was to reduce soil loss and farmers' expenses. Now there is more of a focus on improving water quality through agricultural policy."

--- *John Wilson, EPA staff scientist serving on the Task Force and IA Team.*

"It has been more of an incremental leveraging of resources than the planning team envisioned. Originally, the thought was to strategically plan with large grants, but it turns out that it has been more of a piecemeal approach with resources going to high priority elements of the Action Plan. The difficulty with this piecemeal approach is that it's been harder to integrate actions as a state or federal policy driver."

--- *Wayne Anderson, Minnesota Pollution Control Agency and staff to the Task Force*

"While the IA involved much planning and policy work, there were few actions implemented to reduce nitrogen loading. Both the 2001 and 2008 action plans relied on voluntary actions and when something is voluntary, it usually does not get done unless it is funded. The planning and goals needed more resources allocated for implementation."

--- *Victor Bierman, senior scientist at LimnoTech and author/ co-lead of the "Effects of reducing nutrient loads to surface waters..." technical report.*

"When the IA was written, the authors did not anticipate the future context of limited resources. Instead, the Action Plan identified large budgetary efforts, so now in these tough economic times, it's hard to implement. The good news is that some money is now flowing with line items from EPA and states are trying to make contributions with the realization that there is not much federal money being allocated to address the issues."

--- *Wayne Anderson, Minnesota Pollution Control Agency and staff to the Task Force*

APPENDIX C – KEY QUOTES ORGANIZED BY TYPE OF BENEFIT

TANGIBLE BENEFITS

“The reports compile the best available science into one place so they can be readily accessed to address the controversies about cause and effect of nutrient loading. Having these documents helps dispel some of the myths about the science.”

--- *John Wilson, EPA staff scientist serving on the Task Force and IA Team.*

“The IA served as a bridge between the Task Force and the scientists doing the studies. A big part of moving the process forward was to get a readable report that was action oriented to start bridging the gap of science to action planning. This ultimately helped the Task Force focus on opportunities.”

--- *Wayne Anderson, Minnesota Pollution Control Agency and staff to the Task Force*

“Even though the report is almost ten years old, I still go back and use it to reference key findings - it helps me take a stronger stand when justifying management actions.”

--- *Wayne Anderson, Minnesota Pollution Control Agency and staff to the Task Force*

“The final report has been and will continue to be a good tool to look back to for support for community development efforts. We have quoted the final report on several different grant applications. Also, the reports were helpful in confirming our plans to pursue a regional coastal plan to get communities to think together about consistent approaches to planning and zoning. Having the AIA come and work on the project was very valuable. NEMCOG will use the SDAT report to guide community development efforts.”

--- *Rick Deuell, Northeast Michigan Council of Governments*

“Stormwater is not regulated, which means we have to figure out how to deal with it. The first step is education. This project really helped to provide accurate information. And if people have accurate information they make better decisions. Through this project we were able to accumulate concrete data that a lot of people make assumptions about. We are an environmentally assertive community and it's good to have data that verifies that what we are saying and doing makes sense. The research team was very professional and the work they did was very professional. When we are trying to explain to people what we are trying to do we can use this document as intellectual leverage.”

--- *John Nash, Spring Lake Township Supervisor*

“This project really helped to provide accurate information. And if people have accurate information they make better decisions.”

--- *John Nash, Spring Lake Township Supervisor*

“What was good was that they took existing ideas and made them applicable to our area. The researchers used their expertise to determine what might be the best solutions for our community. This tailored approach was really useful.”

--- *John Nash, Spring Lake Township Supervisor*

PERSPECTIVES

“What’s really important, what really excited me, is how we now look at our work as more of a regional endeavor as opposed to just a county or town or single property. What’s good for Harrisville is good for Alpena, what’s good for one business is also is good for others. If we can get people off US23 at Standish to experience our coastline, we all win.”

--- *Dan Mullen, Michigan Department of Natural Resources and Environment*

“What was good was that they took existing ideas and made them applicable to our area. The researchers used their expertise to determine what might be the best solutions for our community. This tailored approach was really useful.”

--- *John Nash, Spring Lake Township Supervisor*

“I attended every meeting. I provided insight to our community needs and what some of our challenges had been as far as stormwater. In return I was educated by the researchers about stormwater solutions. I’m now better informed about the risks and solutions for our waterways. I learned that whatever happens here impacts all these waterways and wetlands.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“This project brought home even more so how serious our stormwater related problems are. New ideas and solutions came from the meetings. The enthusiasm was definitely there from the community.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“Although there are still some organizations that argue against the findings, I think the Integrated Assessment affected public and organizational attitude. There became a collective scientific understanding, which resulted in less debate about the science.”

--- *Doug Daigle, Mississippi River Basin Alliance*

“The public’s ability to key in on large issues has improved through this process. Before, there was a tendency to limit initiatives locally with less of a focus on what is happening downstream. The IA was able to help shift public thinking on the issue of nutrients in the water to more awareness and recognition of a global perspective as they act locally. For example, local nutrient issues in the state of Minnesota - like reducing phosphorus in lakes and nitrogen as it affects drinking water - are becoming linked to how these local issues relate to regional agricultural impacts. Hitting a larger public perspective is important when it comes to integrated watershed planning and implementation and development of state and local policies. The ability to lean in close and then step back for a larger perspective has created a check and balance to evolving policy. In the long term, we will be both proactive as well as restorative relative to resource management.”

--- *Wayne Anderson, Minnesota Pollution Control Agency and staff to the Task Force*

“ The IA focused dialog around a specific problem and supporters became more willing

to look toward different solutions. But it also gave opponents something to target for their energy – ultimately leading to the reassessment and second action planning process. When an issue gets such intense focus and directed resources, it can cause the opposition to coalesce their support, target gaps in data, or find new angles to attack an initiative.”

--- *John Wilson, EPA staff scientist serving on the Task Force and IA Team.*

“The project turned out very different than I had envisioned. Through the process many good things came out, people found value in different areas that I hadn’t thought of. Participants came up with their own ideas for their own relevant spinoffs.”

--- *Rose Ellison, US EPA*

PARTNERSHIPS

“The IA catalyzed the mission and continued efforts of the Mississippi River Gulf of Mexico Watershed Nutrient Taskforce, which was established in 1997. This group, which continues to meet every year to address nutrient loading issues, includes state and federal agencies, along with environmental groups, industry, and regional organizations as stakeholders. The Taskforce represents a cross-section of many interests and gives them an organization through which they can work together to address a common issue.”

--- *Victor Bierman, senior scientist at LimnoTech and author/ co-lead of the “Effects of reducing nutrient loads to surface waters...” technical report.*

“The DNRE established the Negwegon Rockport Thompson’s Harbor (NRTH) Advisory Committee to bring local planning partners into the parks planning process. This committee was made of representatives from all over the region, and many of these people were also involved in NEMIA. These two efforts (NEMIA and NRTH) complemented and reinforced each other, worked hand in hand. Now we’re very comfortable with each other, and it is no longer “us vs. them,” it’s “we.” This is largely a result of the face-to-face interaction in the context of the NEMIA meetings. MDNRE now has better relationships now with local units of government. The NEMIA process is probably of more importance to me than any of the tangible products. We intend to keep the relationships going. We don’t want to lose the trust that we have built.”

--- *Paul Curtis, Michigan Department of Natural Resources and Environment*

“The project made those of us who turn the wheel on the ground better informed about what the resources are for impacting stormwater runoff. We now have the confidence that there are solutions and we have resource to look to in AWRI. We now have a relationship with them. There was cooperation from the township, village and from different roles in the community. We are all now on the same page, and we are able to communicate about the issues and solutions.

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“To have people in chorus is always an advantage for any initiative. There is better cooperation and communication and the initiative is more likely to have a positive outcome when you have representation from all communities in the same room at the

same time. For this project we were able to understand and communicate about the issue from the very beginning. Now we can then work together on common solutions.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“I’ve been very active in every community I’ve lived in but I had never met a drain commissioner! I didn’t know what one was, what one looked like, and what one did. When I learned that we had a drain commission at one of our meetings I was so excited! It was really valuable to have exposure to another dimension of our community through this project.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

“I now have a great working relationship with MDCH that has expanded beyond the Detroit River IA. We are now working together on projects in the Saginaw Bay and have written a grant to work on a statewide program for fish consumption advisories. I have also developed a new relationship with the Metro West Steelheaders due to their participation with fish cleaning demos.”

--- *Mary Bohling, Michigan Sea Grant Extension Educator*

“NEMIA came along at the perfect time. It was the glue that brought many organizations and efforts together. Through NEMIA we recognized we have similar goals in mind, and many groups started working together. NEMIA fostered communication and interdepartmental cooperation, trust, and public participation. Efforts just took off!”

--- *Dan Mullen, Michigan Department of Natural Resources and Environment*

PROCESS

“Team leads for each of the six science assessment groups met regularly (once or twice a month) at NOAA offices in DC for a day to talk about pieces, progress, and steps needed to keep the process moving forward. This part of the project gave all team leads tremendous experience in project integration – otherwise they would not have come together outside their disciplines to have these conversations. The regular communication helped make the IA real and give all involved an understanding about the necessary sequence of tasks (not just an end report coming together).”

--- *Otto Doering, faculty member at Purdue University and author/team lead for the “Evaluation of Economic Costs and Benefits...” technical report.*

“While overall, policies and actions with respect to hypoxia in the Gulf did not change as a result of the IA, the project still provided baseline information for people to go back to and access. The IA was a starting point and while it may not have led to initiatives, it did give the issue momentum – and is still a process in progress.”

--- *Otto Doering, faculty member at Purdue University and author/team lead for the “Evaluation of Economic Costs and Benefits...” technical report.*

“Although no policy has been developed, there is now discussion regarding how/if the Canadian and U.S. agencies can develop similar communications regarding fish consumption.”

--- *Mary Bohling, Michigan Sea Grant Extension Educator*

“The project turned out very different than I had envisioned. Through the process many good things came out and people found value in different areas that I hadn’t thought of. Participants came up with their own ideas for their own relevant spinoffs.”

--- *Rose Ellison, US EPA*

“The IA served as a bridge between the Task Force and the scientists doing the studies. A big part of moving the process forward was to get a readable report that was action oriented to start bridging the gap of science to action planning. This ultimately helped the Task Force focus on opportunities.”

--- *Wayne Anderson, Minnesota Pollution Control Agency and staff to the Task Force*

“...the interface between the researchers and the public was really important to keeping people involved, and committed to acting. The technical level of this project was also very important. We wanted specific technical information on where to, how to, what to; that’s what we needed in the community. The researchers were competent, sincere, credible, organized and they knew their stuff. I already had the enthusiasm for the issues; this project gave me an avenue for acting in concert with others who were in a position to impact.”

--- *Elizabeth Wheeler, resident of the Village of Spring Lake, former planning commission member*

OPPORTUNITIES

“The project helped leverage resources and opportunities in a huge way. We used our project (with permission from Sea Grant) as matching funds on a grant the Mich. Dept. of Community Health prepared and received –which covered the cost of the signs to be posted along the river, and printing of the outreach material. In addition, we have submitted several grants that (we hope) will help with a positive outcome. In January 2010 working with the Michigan Department of Community Health we submitted a proposal titled to the Great Lakes Restoration Initiative titled “Enhanced Michigan Fish Contaminant Monitoring and Advisories.” Also I am currently working with the public outreach group identified (formed) in workshop three to submit a proposal to the Erb Foundation.”

--- *Donna Kashian, Wayne State University*

“We do a lot of grant writing and the grantors always want backup info. Now we have loads of it, which will make a significant difference in our ability to get grants because now we have topic expertise to back up our ideas.”

--- *John Nash, Spring Lake Township Supervisor*

“The final report has been a good tool to support community development efforts. We have quoted the final report on several different grant applications.”

--- *Rick Deuell, Northeast Michigan Council of Governments*

“The project helped leverage resources and opportunities in a huge way. We used our project as matching funds on a grant for outreach material. In addition, we have submitted several grant proposals that (we hope) will help with a positive outcome.”

--- *Donna Kashian, Wayne State University*