

Report of the Michigan Great Lakes Wind Council

September 1, 2009

Prepared for

Governor Jennifer M. Granholm

Submitted by

Mikinetics Consulting LLC
Portland, Oregon

and

Public Sector Consultants Inc.
Lansing, Michigan
www.pscinc.com

On behalf of

Michigan Great Lakes Wind Council

Acknowledgments

This report was prepared by Public Sector Consultants Inc. and Mikinetics Consulting LLC at the direction of the Michigan Great Lakes Wind Council. Funding was provided by the Michigan Economic Development Corporation.

Errata: February 19, 2010

The megawatt (MW) and megawatt-hour (MWh) calculations in the note under Exhibit 13 on page 30 of the Michigan Great Lakes Wind Council's report issued on September 1, 2009, are incorrect. These estimates used a benchmark that did not convert square kilometers to square miles. The corrected MW and MWh estimates for the conditional and most favorable areas combined are as follows:

30 METERS AND SHALLOWER

- 97,358 MW
- 298 million MWh to 426 million MWh

45 METERS AND SHALLOWER

- 131,054 MW
- 402 million MWh to 574 million MWh

The corrected MW number is based on the National Renewable Energy Laboratory's estimate of offshore wind turbine density of 5 MW per square kilometer referenced in the source below. The MWh estimates are based on average capacity factors ranging from 35 percent to 50 percent. The corrected version of Exhibit 13 is shown below.

EXHIBIT 13

Square Miles in Categorical Exclusion, Conditional, and Most Favorable Areas

Area type	No depth restriction (sq. miles)	30 Meters and shallower (sq. miles)	45 Meters and shallower (sq. miles)
Categorical exclusion area	1,717	356	528
Conditional area	19,714	6,981	8,898
Most favorable area	17,017	537	1,222
Total	38,448	7,874	10,648

SOURCE: Institute for Fisheries Research, UM/MDNR, 2009.

NOTE: Using benchmarks from prior studies of offshore wind potential and other assumptions, the conditional and most favorable areas combined at 30 meters or shallower have a theoretical maximum total generating capacity potential of 97,358 MW and annual energy production potential ranging from 298 million MWh to 426 million MWh. At 45 meters and less, these estimates are 131,054 MW and from 402 million MWh to 574 million MWh. For comparison, total electricity consumption across all sectors in Michigan during 2007 was 109 million MWh (DOE/EIA, 2009). These figures assume an average turbine density of 5 MW per square kilometer (or 12.95 MW per square mile) and average annual capacity factors ranging from 35 percent to 50 percent. These MW and MWh per square mile ranges were developed for a prior study of offshore wind energy potential. See <http://westcoastcoceans.gov/Docs/Mirko%20Previsic%20Ocean%20Energy%20Resources.pdf>. The application of these ranges assumes for simplicity that turbines would be located across all of the conditional and most favorable areas. That is not expected to happen, nor is it recommended by the council. The actual placement of turbines is complicated and would require analyses of wind characteristics, environmental features, interconnection requirements, and other site-specific conditions that will affect turbine placement and spacing. These figures do not account for economic, engineering, or other issues associated with the integration of wind energy turbines in the Great Lakes. The figures are presented for comparison only. Conditions will vary widely over time and acceptance or use of the assumptions underlying these calculations may also vary widely among professionals in the industry.

Contents

EXECUTIVE SUMMARY	1
BACKGROUND	1
KEY RECOMMENDATIONS	1
<i>Mapping Criteria</i>	1
<i>Permitting, Leasing, and Public Engagement</i>	4
<i>Programmatic Environmental Impact Statement</i>	6
FUTURE ROLE OF THE COUNCIL AND OTHER NEXT STEPS	6
INTRODUCTION	8
IMPETUS FOR THE COUNCIL	8
THE COUNCIL’S CHARGE	9
COUNCIL MEMBERSHIP AND PROCESS.....	10
LESSONS LEARNED FROM OTHER JURISDICTIONS.....	12
TRENDS AND INITIATIVES	12
KEY LESSONS LEARNED	15
CURRENT REGULATORY AND LEGAL FRAMEWORK	18
STATE PERMITTING AND LEASING	19
<i>Permits</i>	19
<i>Conveyance of Bottomlands: Leases and Use Agreements</i>	19
ADDITIONAL AUTHORITIES	20
COUNCIL RECOMMENDATIONS	24
RECOMMENDED MAPPING CRITERIA.....	25
CATEGORICAL EXCLUSION CRITERIA	25
CRITERIA FOR MAPPING MOST FAVORABLE AREAS	26
ADDITIONAL DATA LAYERS FOR MAPPING	29
RECOMMENDED NEXT STEPS ON AREA MAPPING	31
BOTTOMLANDS LEASING AND PERMITTING.....	32
PERMITTING AND LEASING STATUTE.....	32
RECOMMENDED PROCESS: ACCESS TO BOTTOMLANDS	33
<i>Initial Site Assessment</i>	33
<i>Nomination by the Prospective Developer</i>	34
<i>State Site Selection and Competitive Public Auction</i>	34
<i>Lease and Permit for Construction and Operation</i>	35
PROTECTION OF THE PUBLIC TRUST	35
<i>Recommendations</i>	35
OTHER ADMINISTRATIVE RECOMMENDATIONS	36
COMPENSATING THE PUBLIC FOR USE OF BOTTOMLANDS	36
<i>Recommendations</i>	37
FEDERAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT.....	38
RECOMMENDATIONS	39
PUBLIC ENGAGEMENT PROCESS	40
GUIDING PRINCIPLES OF EFFECTIVE PUBLIC ENGAGEMENT	40

RESEARCH, EDUCATION, AND INFORMATION EXCHANGE.....	41
<i>Education and Outreach</i>	41
<i>Public Opinion Research</i>	42
<i>Information Exchange and Sharing</i>	43
PUBLIC ENGAGEMENT IN PERMITTING	43
<i>Recommendations</i>	43
CONCLUSION	47
FUTURE ROLE OF COUNCIL.....	47
<i>First six months (September 1, 2009–February 28, 2010)</i>	47
<i>Next six months (March 1, 2010–August 31, 2010)</i>	48
ADDITIONAL NEXT STEPS	48
REFERENCES	50
APPENDIX A: Executive Order 2009-1, Department of Energy, Labor, and Economic Growth Great Lakes Wind Council	55
APPENDIX B: Protocol for Operations of the Michigan Great Lakes Wind Council	61
APPENDIX C: Annotated List of Offshore Great Lakes Wind-Siting Authorities	63
APPENDIX D: Application of Mapping Criteria	71
APPENDIX E: Public Opinion Research	79

Executive Summary

The Michigan Great Lakes Wind Council, created by Executive Order No. 2009-1, serves as an ad hoc advisory body within the Michigan Department of Energy, Labor & Economic Growth to examine issues and make recommendations related to offshore wind development in Michigan. The 25-member council consists of key state agency representatives and stakeholders appointed by Governor Jennifer M. Granholm. The primary tasks of the council are to recommend criteria to review applications for offshore wind development, as well as criteria to identify and map the least and most favorable areas for such development in the lakes. In accordance with the council's charge set forth in the executive order, this final report includes suggested changes to legislation and administrative rules and policies to establish a clear and balanced process for siting offshore wind projects in Michigan's Great Lakes. This report also includes lessons learned from other jurisdictions with experience related to offshore wind development.

BACKGROUND

Michigan has vast natural resources—including over 38,000 square miles of state-owned Great Lakes bottomlands and uniquely attractive wind resources over the lakes—to support the development of offshore wind in the state. If properly developed in a prudent and thoughtful manner, offshore wind energy in Michigan's Great Lakes could be a significant source of clean, renewable energy that improves energy security, reduces expenditures on out-of-state fuels as well as greenhouse gas and other emissions, and provides new opportunities for job creation and retention in the state and region.

Numerous states, including Michigan's Great Lakes neighbors Wisconsin, Ohio, and New York, as well as the federal government are moving forward with regulatory or study efforts to prepare for offshore wind development in their jurisdictions. During 2008 in Michigan, state and federal agencies involved in permitting of offshore activities in Michigan's Great Lakes began to examine how the existing state laws and rules would apply to offshore wind development in the state. This was done as part of a "dry run" permitting exercise involving hypothetical offshore wind projects in Saginaw Bay and southern Lake Michigan. The council's work builds on this effort by identifying criteria for mapping the least and most favorable areas to develop offshore wind energy in the lakes, as well as recommending permitting criteria, a public engagement process, and other legal and administrative rule changes. The primary purpose of these current efforts is to ensure that Michigan is prepared for any development proposals and has a permitting and leasing framework with clear guidelines for agencies, developers, and the public.

KEY RECOMMENDATIONS

Mapping Criteria

The council recommends a set of criteria to identify and map areas of the Great Lakes that appear to be the most favorable for wind turbine placement, areas where development should be categorically excluded, and conditional areas where turbines may

be permitted but require additional study or mitigation compared to the most favorable areas (see Exhibit 1).

EXHIBIT 1 Definition of Mapping Criteria and Areas

Area Name	Definition	Types of Criteria
Categorical exclusion area	Bottomlands that are not suitable for development due to existing uses and/or state and federal laws that provide for other exclusive uses	Coastal airport setbacks, military operation areas,* aids to navigation, navigation channels, and submerged utility (telecommunications, oil, gas, electric) transmission lines
Conditional areas	Bottomlands outside of categorical exclusion areas that may have potential for development but contain one or more potentially competing values as defined by screening criteria to identify the most favorable areas	Screening criteria include: Biological (e.g., fish spawning areas, species of concern, habitat for threatened and endangered species) Physical (e.g., harbors/marinas, large river mouths, shoreline) Protected features (e.g., national park lakeshore, state bottomland preserves, shipwrecks and other state-recognized areas of archeological significance) Other (e.g., international and state boundaries, commercial fishing areas, recommended shipping course lanes)
Most favorable areas	Bottomlands outside of categorical exclusion areas and conditional areas	NA (do not contain features defined by screening criteria)

SOURCE: Michigan Great Lakes Wind Council, compiled by Public Sector Consultants Inc. and Mikinetics Consulting LLC, 2009.

*Development within a military operation area may be permitted if allowed by the federal government.

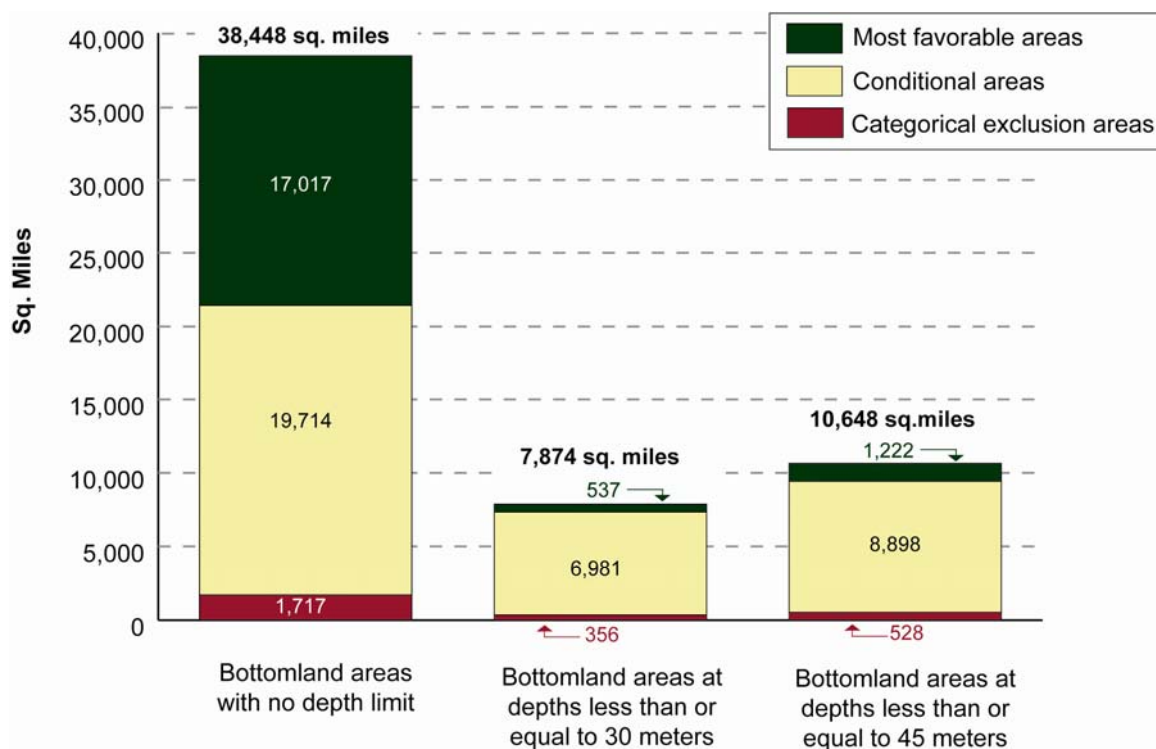
Working with the Institute for Fisheries Research (University of Michigan and Michigan Department of Natural Resources), the council applied the criteria to map the resulting areas using a geographic information system (GIS) mapping tool. The institute's new mapping tool includes data sets, or layers, for a variety of biological, physical, and other features collected from several sources. It is important to note that data for some criteria are not yet available and, therefore, the maps presented in this report do not reflect all the criteria identified by the council.

While information about wind resources, bathymetry, and proximity to the electric grid are important to siting, the council believes these data should not be included among the criteria to identify the categorical exclusion, conditional, or most favorable areas because of the dynamic nature of this quickly evolving industry. As new technologies emerge, such as deep water anchoring systems or floating platforms, the limits on where turbines can be located may change.

With this in mind, the council asked the developers of the mapping tool to apply selected depth restrictions along with proposed criteria to illustrate where offshore wind facilities could be installed using today's technology. The statewide mapping results are presented in Exhibit 12. Approximately 20 percent of Michigan's 38,000 square miles of bottomlands occur at a depth of 30 meters or less, a practical depth limit for placement of

wind turbines based on readily available technology (USDOE 2008). Of the 7,874 square miles of shallow water (30 meters or less), 356 square miles are in categorical exclusion areas; 537 square miles are in the most favorable areas; and 6,981 square miles are in conditional areas (see Exhibit 2).¹ The most favorable and conditional areas combined represent about 95 percent of Michigan’s waters 30 meters or less. If deep-water technology limitations can be overcome, 44 percent of the water under state jurisdiction is in the *most* favorable areas. Exhibit 2 also shows the breakdown of areas based on a depth limit of 45 meters or less.²

EXHIBIT 2
Breakdown of Bottomland Areas by Depth



SOURCE: Michigan Great Lakes Wind Council, prepared by Public Sector Consultants Inc. and Mikinetics Consulting LLC, using data from Institute for Fisheries Research UM/MDNR, 2009.

The council’s approach to mapping the most/least favorable areas is designed to focus developer and state interest on sites with minimal constraints to wind development and to maximize public support by avoiding areas where impacts on natural resources or recreation may be greatest. For example, it protects existing viewsheds around national parks and will decrease a developer’s cost by flagging sites that may require additional site assessment activities or mitigation. The mapping criteria are not intended to represent the full scope of what will be required during permitting: site-specific studies will be necessary during any development process. The classification of particular areas is for

¹ For reference, a typical utility-scale offshore wind project would occupy roughly 20 square miles.

² In 2007, a small (10 megawatt) demonstration project began producing energy 15 miles off the coast of Scotland in water 45 meters deep.

policymaking and planning purposes, to provide a general indication of where siting may be more streamlined and where it may be more complex because of potential constraints. The criteria should be used to target future sites and research, as well as to inform outreach activities and to solicit input from the public when offshore wind energy proposals are received.

Limitations of the mapping information—data and other factors that may change with new information and technology—should be clearly understood by tool users. As discussed further in this report, the council believes that additional efforts should be undertaken to incorporate the best available GIS data sets and make other refinements to the tool so it can be used this year to identify a set of discrete locations that are most favorable for offshore wind development.

Permitting, Leasing, and Public Engagement

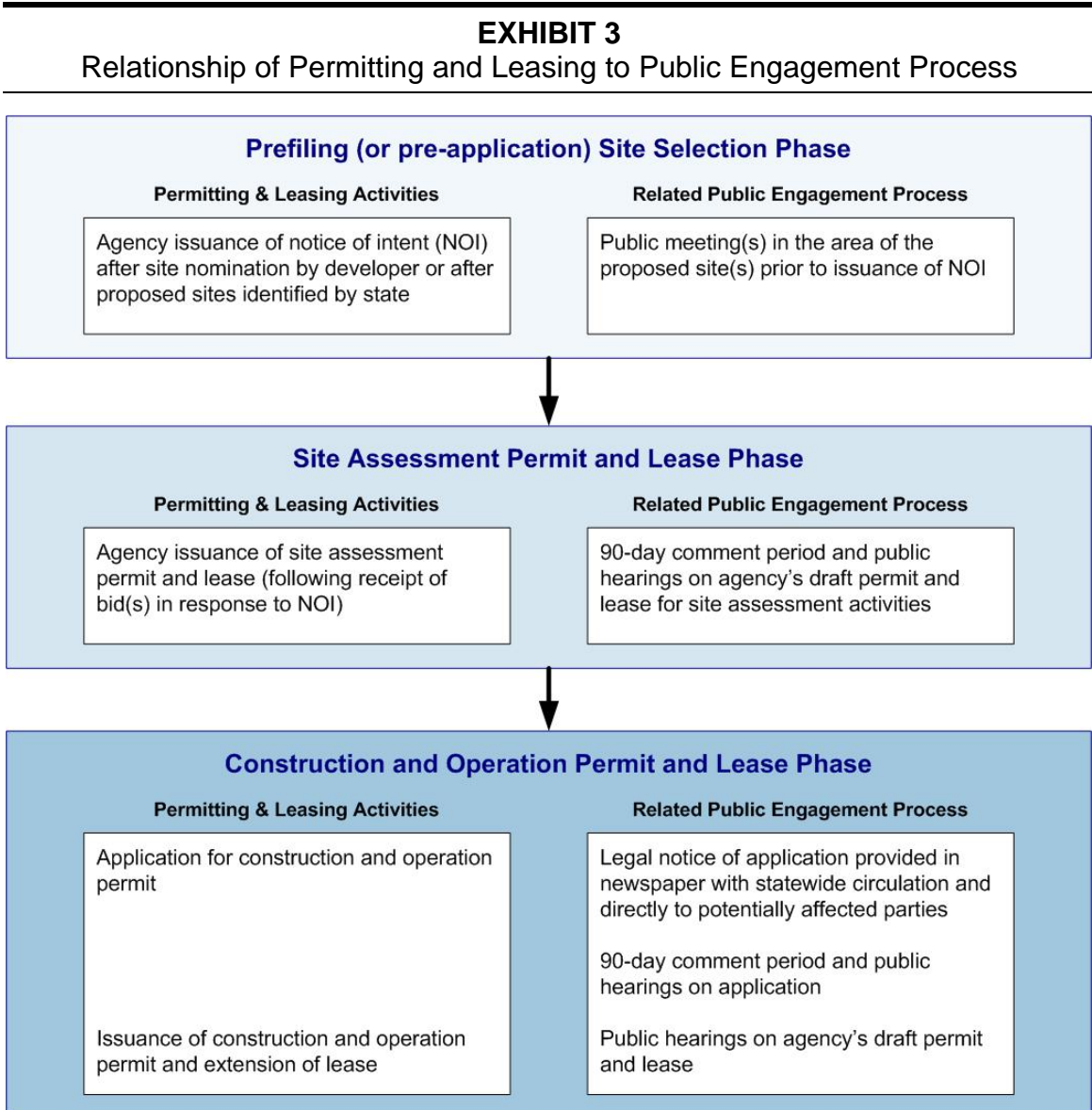
A process for approving or denying offshore use of the Michigan's Great Lakes bottomlands for wind energy does not currently exist. If an application were received today, the state's review process would prove inadequate and would likely lead to confusion within government agencies as well as for the applicant and the public. Therefore, the council recommends a package of legislative and rule changes to establish a seamless process before the first application is received. This would clarify the expectations of all involved.

The legislation should specify the public engagement process, permit review criteria, compensation structure for the use of the state's bottomlands, and the uses of compensation. Key legislative recommendations are as follows:

- Amend Part 325 of Michigan's Natural Resources and Environmental Protection Act (NREPA) to clearly indicate that it does not apply in the case of permits and leases for offshore wind development. Part 325 should be congruent with a new statute that specifically regulates leasing and permitting for use of Michigan's Great Lakes bottomlands and waters for wind energy development and production.
- The new legislation should: (1) govern offshore wind energy under a new stand-alone statute independent of Part 325; (2) clarify that a non-riparian can apply for a permit and lease to develop an offshore wind energy system and to conduct related site assessment and monitoring activities in the state's Great Lakes; and (3) provide that offshore wind energy systems that are authorized by the state and developed in accordance with the statute and applicable rules will have minimal impact on the public trust. The legislation should explain the long-term value of offshore wind development (such as reduced reliance on fossil fuels, energy security, improved air quality, economic development opportunities) and describe specific positive benefits that might accrue to the public trust (such as reduced mercury pollution, increased fish habitat).
- The new legislation and related rules must outline application requirements, permit review criteria, site assessment requirements (complete with benchmarks and timelines), construction plan, operation plan, decommissioning plan, and uses of funds by the state. The legislation should be as specific as possible, but should allow rulemaking by the designated agency.

- The legislation should provide authority to the designated agency to establish the compensation structure for use of the state’s bottomlands (application fee, rent, royalties).

Exhibit 3 provides an overview of the council’s recommended process for permitting and leasing offshore wind facilities, and illustrates how public engagement should be integrated as part of the regulatory process. To help developers, agencies, and the public navigate this process, the council recommends that the state develop a one-stop clearinghouse to facilitate the permitting, leasing, construction, and monitoring of offshore wind projects. The clearinghouse should be managed by a single agency, which would be responsible for coordination of all other relevant agencies involved in offshore wind development in the state.



SOURCE: Michigan Great Lakes Wind Council, compiled by Public Sector Consultants Inc. and Mikinetics Consulting LLC, 2009.

Based on offshore wind siting experiences in other jurisdictions and siting of other energy projects in Michigan, the council recognizes that public engagement will be critical. Therefore, in addition to recommending a process for the public to play an active role in the siting and regulatory processes for offshore wind projects, the council recommends additional activities to begin engaging the public on this topic now—prior to receiving any permit applications; these activities involve targeted public opinion research, education and outreach, and information exchange. The council also recommends consulting with local and Tribal governments, the public, and other stakeholders as part of the process to identify the set of most favorable locations for offshore wind development and to implement the council’s other recommendations.

Programmatic Environmental Impact Statement

The council recommends that the state ask the U.S. Army Corps of Engineers (USACE) to conduct a programmatic environmental impact statement (PEIS) to examine potential impacts, jurisdictional issues, and agency roles as part of an offshore wind development program in the Great Lakes.³ This should be based on the recent experience of the U.S. Department of Interior Minerals Management Service in conducting a PEIS on a renewable energy program for the outer continental shelf. The outer continental shelf PEIS could be adapted with minimal modifications by the USACE to function very well in the Great Lakes. In its request to the USACE the state should make clear that regardless of whether a PEIS or another procedure is employed (such as an interagency memorandum of understanding or letter agreement) the desired results are: anticipation of agency concerns; clarification of requirements; improved agency coordination; and streamlined permitting.

FUTURE ROLE OF THE COUNCIL AND OTHER NEXT STEPS

As discussed further in the Conclusions section, the council believes that it should remain engaged beyond September 1, 2009, for a one-year period, to provide guidance on a discrete number of activities involving state agencies, universities, industry, and other stakeholders. These activities include refinements to the mapping tool and identification of a handful of the most favorable locations for bottomland leasing and related public engagement; development of education, outreach, and public opinion research plans; development of model lease documents; and creating a one-stop source for permitting and information on offshore wind research, technology, and policy. The council also believes that additional activities, including baseline environmental studies, research, wind monitoring, and economic analyses, will be needed to collect information and provide a path forward.

The council was not charged with examining the economic or financial viability of offshore wind in the Great Lakes, but recognizes that the economics will drive the pace and nature of any developments.⁴ To help flesh out the economic issues underlying

³ Under the federal National Environmental Policy Act (NEPA), an environmental impact statement may be required when a new federal program could have significant environmental impacts, hence the label “programmatic.”

⁴ According to a U.S. Department of Energy report published in 2008, the installed capital cost of offshore projects is estimated in the range of \$2,400 to \$5,000 per kilowatt. For comparison, the cost of land-based wind energy project is roughly \$1,500-\$2,500 per kilowatt. Moreover, the turbine costs for offshore

Michigan's existing cost and regulatory structure, the council recommends that the Michigan Public Service Commission convene a forum to work with stakeholders and experts on an economic analysis of the costs and benefits, as well as model incentive structures and leasing revenue potential under different policy scenarios.

projects represents only one-third of the total installed cost, whereas on land, the turbine cost represents more than half of the total installed cost. The USDOE report indicates, however, that offshore wind technology is considerably less mature than land-based wind energy and has significant potential for future cost reduction. See USDOE, July 2008, 49–50 and 183.

IMPETUS FOR THE COUNCIL

The Great Lakes Wind Council was created in response to emerging and significant opportunities associated with offshore wind energy development around the world, including the Great Lakes. The council was directed to identify permitting criteria and the most favorable and least favorable places for wind development because it is likely that in the near future wind energy developers will approach the State of Michigan with proposals to build offshore wind energy systems in the Great Lakes.

The strength and consistency of the wind resources over the lakes, which were only recently mapped by the U.S. Department of Energy (USDOE), are uniquely attractive to potential developers.⁵ Michigan has potential to generate a significant amount of electricity from offshore wind energy systems (Adelaja and McKeown 2008, USDOE 2008). Michigan—the “Great Lakes state” that borders four of the five Great Lakes—has more coastline than any state other than Alaska. The state owns 38,000 square miles, or 40 percent, of the Great Lakes bottomlands. Deploying offshore wind systems in even a small portion of the state’s Great Lakes could help meet Michigan’s electricity needs, reduce reliance on fossil fuels and related environmental impacts,⁶ mitigate risks associated with potential climate change and fuel price volatility, and create jobs in a growing industry. Discussion at the federal level over policies to restrict carbon emissions and/or create a national renewable portfolio standard are driving interest in renewable energy, including offshore wind.

When balanced with other new sources of electricity, including land-based wind energy systems, energy efficiency initiatives, and other low-carbon energy options, offshore wind energy development could also be part of a broader strategy to reposition the state as a leader in new energy technologies. Such a strategy could build upon the state’s natural resources, proximity to markets, research universities, skilled workforce, and manufacturing capability. The USDOE estimates that Michigan has the potential to create over 30,000 jobs in wind turbine manufacturing (USDOE 2008). Due to transportation costs and other considerations, wind turbine manufacturers typically invest in manufacturing facilities in areas with local markets. Based on a recent survey, an overwhelming majority (96.8 percent) of Michigan residents believe renewable energy is important to Michigan’s economic recovery (Adelaja 2009).⁷

⁵ The wind resources over large portions of Great Lakes are classified by the National Renewable Energy Laboratory as “excellent,” “outstanding,” and “superb.” For maps and additional background information, see the Michigan Wind Energy Resource Maps on the website of the Michigan Department of Energy, Labor & Economic Growth (MDELEG 2009).

⁶ The USDOE reported that obtaining 20 percent of the nation’s energy from wind energy by 2030 would avoid a cumulative total of 7,600 million metric tons of carbon dioxide emissions and avoid the consumption of approximately four trillion gallons of water (USDOE 2008, 14, 17). Electricity generation from coal-fired power plants is a significant source of carbon dioxide, mercury, and other emissions in Michigan, while wind energy systems produce zero emissions.

⁷ Offshore wind could use idle plant and underutilized work force capacity and fund retraining for wind and other forms of renewable energy design, development, finance, manufacturing, construction and operation.

Michigan has unique wind resources and a prime location in the industrial Midwest but the state does not currently have established criteria to govern the siting of offshore wind energy systems. In late 2007, Michigan embarked on a “dry run” permitting exercise to understand the applicable regulatory framework and gaps that would be barriers to the development of offshore wind energy. This exercise involved state and federal agencies reviewing mock applications for two 500-megawatt (MW) hypothetical projects, one in Lake Michigan and the other in Saginaw Bay. Agencies contributed to a catalogue of applicable regulatory authorities and requirements in the final report. Through this exercise, it was evident that there were no processes or criteria specifically addressing offshore wind energy projects. The participants recommended the development of a technical council involving key agencies and stakeholders to identify criteria for mapping the least favorable development areas and most favorable development areas (Klepinger 2008, 3). The dry run exercise suggested that creating an offshore wind council would provide the citizens of Michigan with a public forum to begin to answer important questions about where in the Great Lakes wind energy systems might be prudently sited and where wind energy systems should never be sited.

Executive Order 2009-1, issued by Governor Granholm on February 6, 2009, established the Great Lakes Wind Council to recommend the criteria to identify the most and least desirable areas for development as well as a clear process for permitting and leasing and related public engagement to ensure that future development of offshore wind is predictable and balanced and protects the state’s most precious natural resources. (EO2009-1 is provided in Appendix A.)

THE COUNCIL’S CHARGE

Under Executive Order 2009-1, the council is charged with the following tasks:

- Identify criteria that can be used to review applications for offshore wind development
- Identify criteria for identifying and mapping areas that should be categorically excluded from offshore wind development as well as those areas that are most favorable to such development, and provide these criteria in a report to the governor by September 1, 2009

The council’s report must also include:

- A recommended process for engaging the people of Michigan in a public dialogue about offshore wind to ensure that statewide interests are considered whenever significant permitting decisions are made
- A summary of lessons learned from American and international offshore experience related to public policy, regulatory, and siting concerns for offshore wind development
- Options for compensating the public for bottomland leasing and wind rights for wind energy systems
- Recommendations for legislation and for changes in administrative rules and policies related to the siting and development of offshore wind energy systems

- A recommendation as to whether Michigan should support the preparation of a programmatic environmental impact statement by the federal government for permitting offshore wind development in the Great Lakes
- An estimate of the costs and description of the benefits of continuing the work of the council, if the council deems it advisable

The council must complete its work by September 1, 2009.

COUNCIL MEMBERSHIP AND PROCESS

The council serves as an advisory body to the Michigan Department of Labor, Energy & Economic Growth (DELEG). There are 25 members of the council, including eight state agency representatives as well as representatives of various constituencies as outlined in Exhibit 4. The director of DELEG serves as the chair.

EXHIBIT 4 Council Members and Affiliations

Member	Position/Affiliation
State Agencies	
Stanley "Skip" Pruss (council chair)	Director, Michigan Department of Energy, Labor & Economic Growth
Steven E. Chester (Designee: Jim Sygo, Deputy Director)	Director, Michigan Department of Environmental Quality
Ken DeBeaussiaert	Director, Office of the Great Lakes, Michigan Department of Environmental Quality
Mark Hoffman (Designee: John Halsey, State Archeologist)	Acting Director, Michigan Department of History, Arts and Libraries
Rebecca A. Humphries (Designee: Dennis Knapp, Assistant to Resource Management Deputy)	Director, Michigan Department of Natural Resources
Orjiakor N. Isiogu	Chairman, Michigan Public Service Commission
D. Gregory Main (Designee: Cindy Douglas, Vice President of Business Development)	President and Chief Executive Officer, Michigan Economic Development Corporation
Kirk T. Steudle (Designee: Roberta "Bobbi" Tisdale Chair, Green Initiatives Team)	Director, Michigan Department of Transportation
Additional Members Appointed by the Governor	
Adesoji O. Adelaja	Director and founder, Michigan State University Land Policy Institute, John A. Hannah Distinguished Professor in Land Policy, Michigan State University
T. Arnold Boezaart	Grand Valley State University, Michigan Alternative and Renewable Energy Center
Leonard J. Bohmann	Associate Dean of Engineering, Michigan Technological University
James P. Clift	Policy Director, Michigan Environmental Council
J. Wilfred Cwikiel	Harbor Springs, Michigan
Frank D. Ettawageshik	Chair, Little Traverse Bay Bands of Odawa Indians

Member	Position/Affiliation
Margaret R. Gale	Dean, School of Forest Resources & Environmental Science, Michigan Technological University
Dennis L. Grinold	Member, Michigan Charter Boat Association
Curtis A. Hertel Sr.	Executive Director, Detroit-Wayne County Port Authority
Thomas L. Hickner	Bay County Executive
M. Jack Knowles	Vice President, Dietrich, Bailey and Associates, PC
Steven E. Kurmas	President and Chief Operating Officer, Detroit Edison
Marty G. Lagina	Chief Executive Officer, Heritage Sustainable Energy, LLC
James D. MacInnes	Co-owner and Chief Executive Officer, Crystal Mountain Resort and Spa
John G. Russell	President and Chief Operating Officer, Consumers Energy Company
Richard F. Vander Veen	President, Mackinaw Power
Joseph L. Welch	Chairman, President, and Chief Executive Officer, ITC Holdings Corp.

SOURCE: Michigan Great Lakes Wind Council, compiled by Public Sector Consultants Inc. and Mikinetics Consulting LLC, 2009.

The council held four meetings at various locations in Lansing to hear from experts and to define and discuss issues related to the charge outlined in the executive order. The council also accepted public comment at all of its meetings.

During the council's meetings, representatives from the following organizations and companies made formal presentations addressing various topics related to offshore wind development in the United States and internationally, including, but not limited to, environmental assessment and monitoring; adaptive management; identification and mapping of the least and most favorable wind development areas; electric interconnection and transmission facilities; permitting; and public opinion and engagement.

- Black & Veatch
- Bluewater Wind
- Energetics Inc.
- Helimax Energy Inc.
- Institute for Fisheries Research, University of Michigan and Michigan Department of Natural Resources
- RPS Group Plc
- University of Delaware

The council adopted procedures for its operations and decision making; these procedures are included in Appendix B for reference. The council's recommendations were based on consensus and a majority vote of the council. The council's staff, Mikinetics Consulting LLC and Public Sector Consultants Inc., organized and facilitated meetings, prepared briefing materials, and drafted the final report with guidance and direction from the council.

Lessons Learned from Other Jurisdictions

The council is charged with identifying “lessons learned from American and international offshore experience related to public policy, regulatory, and siting concerns for offshore wind development.” To provide context for these lessons learned, this section first highlights trends and initiatives related to offshore wind in the United States and internationally.

TRENDS AND INITIATIVES

Wind energy is one of the fastest growing sources of electricity in the world (NREL 2009). Europe is leading the way in offshore wind development. The first offshore wind projects were installed in the early 1990s off the coasts of Denmark and Sweden (EWEA 2009, Henderson 2001). As of January 2009, Europe had offshore wind projects in operation that represented 1,471 megawatts (MW) of generating capacity; the majority of this generating capacity is located in Denmark, the United Kingdom, Sweden, and the Netherlands, with the United Kingdom having the largest share (39 percent, or 591 MW) followed by Denmark, with 28 percent, or 409 MW (EWEA 2009). Germany, which currently has 12 MW installed, is expected to expand its offshore wind portfolio rapidly in the coming years with 10,928 MW planned by 2015. Across Europe, developers plan to have 37,442 MW of offshore wind projects operational by 2015 (EWEA 2009).

Wind energy development activity in the United States has been focused primarily on land, particularly in the Midwest, Great Plains, Texas, and California. Recently, however, increasing levels of interest in offshore wind development have emerged in the United States as well as Canada. Most of the proposed projects are located along the Atlantic coast of the northeastern United States. A snapshot of current proposed projects in North America is shown in Exhibit 5.

EXHIBIT 5

Proposed Projects in United States, as of June 2009

State	Developer	Project size (Megawatts)	Project information
Delaware	Bluewater Wind	200 MW	25-year power purchase agreement with Delmarva Power approved by state Public Service Commission in 2008
New Jersey	Garden State Offshore Energy (joint venture of PSEG Renewable Generation and Deepwater Wind)	346 MW	Garden State Offshore Energy selected by state Board of Public Utilities to construct wind farm after competitive solicitation; three bidders—Garden State Offshore Energy, Bluewater Wind, and Fisherman's Energy—approved for rebates to construct wind monitoring towers; MMS issued exploratory leases to three bidders in June 2009

State	Developer	Project size (Megawatts)	Project information
Massachusetts	Cape Wind	454 MW	Project off Nantucket proposed in 2001; received state and local permits from state siting board and final federal environmental impact statement in 2009
Rhode Island	Deepwater Wind	20 MW	Won bid in response to competitive solicitation issued by the state to construct 20-megawatt project
Texas	Wind Energy Systems Technology	Not yet determined	Obtained leases from Texas General Land Office; wind monitoring towers installed and collecting data; total of 84,435 acres under lease for five sites in state waters off Texas coast

SOURCES: USDOE 2008, 125; U.S. Offshore Wind Collaborative, September 2008; Offshore Wind.net, 2009; Wind Energy Systems Technology, N.D.; USDOI/MMS, June 23, 2009.

NOTE: For a more exhaustive list of proposed and announced projects, see <http://offshorewind.net/index.html>. One megawatt of wind energy produces electricity to serve approximately 240-300 households in the United States.

During 2009, a significant milestone was reached for offshore wind in the United States. The final rule, issued by the U.S. Department of Interior Minerals Management Service in April 2009, establishes a consolidated process for the leasing and siting of offshore wind on the outer continental shelf (USDOI/MMS 74FR 19638). Although it does not apply to the Great Lakes basin, the rule will likely influence federal agency procedures in the Great Lakes region. As developer interest in the unique wind resources of the basin has grown in the last few years, states have also charted new ground through feasibility studies, competitive solicitations, and other initiatives to prepare for future development activity. Recent state or provincial activities related to offshore wind in Great Lakes basin are summarized in Exhibit 6.

EXHIBIT 6

Recent State and Provincial Offshore Wind Initiatives in the Great Lakes Region

State/Province	Summary of Initiative
Michigan	Conducted dry-run permitting exercise in 2008 and established Great Lakes Wind Council in early 2009 to recommend legal or policy changes and criteria for identifying the most and least favorable areas for offshore development
New York	New York Power Authority issued Request for Expression of Interest in April 2009 to obtain information about potential request for proposal for offshore development in Lakes Erie and Ontario; NYSERDA funded studies to examine feasibility of developing offshore wind in nearshore Lake Erie and consider jurisdictional issues
Ohio	DNR developed criteria to identify and map favorable areas for offshore wind in Lake Erie; draft offshore regulations for submerged lands in progress; Cuyahoga County Great Lakes Energy Development Task Force completed feasibility study on proposed pilot project in Lake Erie
Ontario	Conducted study to identify and prioritize the most favorable sites for potential development; issued development guidelines after 14-month moratorium and performed environmental studies

State/Province	Summary of Initiative
Wisconsin	Public Service Commission led stakeholder process and issued report in 2008 on regulatory process and other issues related to offshore wind in Lakes Michigan and Superior

SOURCES: U.S. Offshore Wind Collaborative, September 2008; Soder, 2009; USDOE, April 29, 2009; ODNR, April 2009.
NOTE: This is not an exhaustive list of all activities and initiatives related to offshore wind in the Great Lakes.

Eight additional states, primarily on the East Coast, have embarked on initiatives to examine or promote the development of offshore wind projects. Exhibit 7 includes a summary of state offshore wind initiatives in marine waters of the United States.

EXHIBIT 7

Recent State Offshore Wind Initiatives in Marine Waters of United States

State	Initiative
Delaware	In 2008, Public Service Commission approved Delmarva Power's power-purchase contract with Bluewater Wind for offshore wind project
Georgia	Conducted two-year feasibility study on offshore wind
Maine	Legislature enacted governor's task force recommendations for goal of 300 MW of offshore wind capacity by 2020
Massachusetts	In May 2009, state siting board approved all state and local permits for Cape Wind project (federal government issued final environmental impact statement for this project in 2008); new state law enacted in 2009 calls for identification of offshore wind development sites by December 2009
New Jersey	State funded \$4.5 million baseline environmental study on migratory patterns of avian species, fish, marine resources in designated area (report expected in 2009 or 2010); provided funding for wind monitoring towers; governor set goal for offshore wind generating capacity of 1,000 MW by 2013 and 3,000 MW by 2020; solicited bids for projects in 2007 with offer of \$19 million production tax credit over five years; Public Utilities Board provided \$12 million in grants to three developers (federal government issued exploratory leases to three developers in June 2009)
New York	Long Island Power Authority and Consolidated Edison exploring projects off of Long Island with plans to issue a RFEI by end of 2009*
Rhode Island	State conducted siting study to identify the most viable areas on land and offshore for wind development; state issued RFP supply not less than 15 percent of state's electricity and received 7 bids; state signed contract in 2009 for phase I (20 MW project) to be built by Deepwater Wind; funded Coastal Resources Management Council to define zones for Rhode Island's offshore waters (two-year commitment for Office of Energy Resources is \$3.6 million)
Texas	Conducted open bidding for leases in 2006; State's General Land Office issued six leases for offshore wind development in Texas-jurisdictional waters in the Gulf of Mexico
Virginia	Established coastal energy research consortium; provided funding for offshore wind (\$750,000 annually in fiscal years 2008 and 2009)

SOURCES: U.S. Offshore Wind Collaborative, September 2008; Massachusetts Executive Office of Energy and Environmental Affairs, May 28, 2009; University of Delaware, College of Marine and Earth Studies, N.D.; GMI Inc., October 30, 2007; Rundle, October 9, 2008; New Jersey Office of the Governor, June 23, 2009.

* A prior project, which was proposed by LIPA and Florida Power & Light, is on hold indefinitely after costs increased.

KEY LESSONS LEARNED

Setting up an effective and comprehensive wind energy policy requires dealing with a large number of complex issues. However, much experience and knowledge have been gained in other states and countries and this foundation was drawn upon during the council's deliberations. When possible, lessons learned from these efforts should help make things easier, and also faster, for Michigan to promote wind energy. Lessons learned can be summarized as follows:

- **Regulatory environment and jurisdictional issues:** Articulating clear and expeditious procedures to developers and creating regulatory certainty are necessary.
 - The example of European countries shows that clear guidelines on the assessment of the environmental impact of wind energy farms can be especially useful. The environmental impact of wind farms is usually one of the first arguments in opposition. Guidelines can help avoid unacceptable environment impacts and also help avoid public rejection of projects (Schwarz 2008).
 - Delaware conducted an “all source” request for proposals, placing carbon-based and nuclear energy in direct competition with offshore wind. This resulted in cost-levelization studies and allowed for a more detailed analysis of non-market economic, social, and environmental trade-offs.
 - The British compilation *Guidance Notes* makes the permitting process highly effective in regulating offshore wind development. The document methodically addresses the concerns of offshore wind developers and other wind stakeholders—proponents, opponents, and those stakeholders who have not taken a strong position (DTI 2004).
 - Ontario, following European examples, conducted a GIS-based analysis of its wind resources and preliminarily identified several dozen sites large enough to accommodate wind fields of 100 MW capacity. The British MaRS (Marine Resource System) approach to this idea is perhaps the most advanced in the world (Helimax Energy Inc. 2008).

- **Incentives and a friendly market environment:** Incentives, as well as committed state leadership, play a significant role for startup operations.
 - Tax credits have been one of the main drivers for the increase in U.S. wind energy capacity. Since 1992, a production tax credit has been offered to wind energy developers (0.019\$/kilowatt in 2005) as well as income tax credits. Many European countries, such as Finland, France, Germany, Ireland, Spain, and the UK, also offer tax incentives (Schwarz 2008).
 - Direct subsidies are often provided for projects when a country is at the beginning of its wind energy learning curve. Direct subsidies allow demonstration or pilot projects to be implemented. In the EU-15, many smaller wind energy countries, such as Finland, Greece, Luxembourg, and Sweden, still have investment incentives. Spain has regional investment incentives linked to local manufacturing requirements set up by regional authorities seeking to attract jobs related to the manufacturing of components and turbines. Some countries have created specific funds to invest in wind energy (or in renewables in general). The 2005 Chinese renewable law provided for the creation of such a fund (Schwarz 2008).

- Feed-in tariffs are applied by 17 of the 25 European Union member states as the main instrument to support renewable energy generation (Klein et al., N.d.)⁸ Feed-in tariffs allow electricity generators to sell renewable energy at a fixed tariff price, including a return, for a determined period of time. Alternatively, the feed-in tariff can be paid in the form of an additional premium on top of the electricity market price. Some countries, such as the Netherlands, France, Germany, and Greece, have higher tariff prices for offshore than land-based wind systems. New Jersey set offshore wind production targets, funded a \$4.5 million baseline environmental study, provided rebates for installation of monitoring towers, provided production incentives to developers, and initiated a state-private partnership to demonstrate the viability of offshore wind. This policy initiative creates a tiered and phased incentive program to foster early development of offshore wind energy (U.S. Offshore Wind Collaborative 2008).
- **Public engagement, education, and outreach:** Increasing the awareness and knowledge of the public, government agencies, and private companies is key.
- Rhode Island’s two-step process is a good model: (1) identification of ten offshore areas by an informed statewide study team (ruling out some obvious areas early) and (2) the subsequent open stakeholder engagement effort. The first step made the second step more productive, less contentious (U.S. Offshore Wind Collaborative 2008).
 - The British trust called COWRIE (Collaborative Offshore Wind Research Into The Environment) and its permanent panel to guide offshore wind environmental research, data collection, and dissemination, offers a model for open dialogue among wind professionals and continuous improvement in wind technology and wind resource management (COWRIE 2008).
 - Public policies and practices that foster early and effective public engagement appear to alleviate equity and fairness issues, streamline the development process, and increase public acceptance. European experience suggests that geographic variables, such as the quantity of wind near a city or an industrial load center, are in themselves insufficient to explain patterns of implementation of wind power in different nations or states. Unambiguous policy makes a big difference.
 - Public opinion can be influenced by the perceived lack of opportunities for local input during the planning and development phase (DONG Energy et al. 2006, 119);⁹ this suggests that a well-designed process for stakeholder participation, including local input, can improve the level of support and/or reduce opposition.
- **Consolidation and streamlining of information dissemination and permit review:** A one-stop center to coordinate multiple agency activities can facilitate faster response times to the public and developers, lenders, etc.
- European studies and subsequent procedural adaptations have identified “one-stop” permitting as the most significant of several best practices governments could adopt to advance the development of offshore wind.

⁸ This does not include Italy, which has a feed-in tariff only for photovoltaic energy systems.

⁹ Interviews revealed that one of the two major concerns that caused initial opposition in Denmark was the perception that the decision-making process was highly centralized with no local “co-decision.”

- Detailed environmental assessment and monitoring requirements for pre-construction, construction, and post-construction phases help streamline permitting. The Danish and British models are quite thorough and they are now widely accepted. (DONG Energy et al., 2006).

Experience shows that good wind resources are not on their own sufficient to ensure successful wind energy development. Jurisdictions with strong political leadership that have set up a comprehensive policy structure have succeeded in developing wind power.

Current Regulatory and Legal Framework

The Great Lakes watershed, which includes portions of eight U.S. states and two Canadian provinces, is governed by a complex network of laws, policies, and institutions (Isely 2009). The state of Michigan is owner and trustee of the bottomlands and waters of the state's Great Lakes and has a duty to manage these resources for the benefit of its residents (MDEQ N.D.). As shown in Exhibit 8, Michigan's jurisdiction extends to the international boundary with Canada and to the boundaries with other Great Lake states. The state owns 38,000 square miles, or 40 percent, of the Great Lakes bottomlands. There are no waters with exclusive federal jurisdiction in the Great Lakes—in contrast to the oceans off the coasts of the United States, where federal waters begin beyond three nautical miles from the coast (except off the coast of Texas and in the Gulf coast of Florida, where the state boundary extends nine nautical miles).

EXHIBIT 8
Jurisdictional Boundaries in the Great Lakes



SOURCE: Public Sector Consultants, using data from Google Maps, 2009.

The state of Michigan is responsible for managing its Great Lakes bottomlands and waters for the prevention of pollution, for the protection of natural resources, and to maintain the public's rights of hunting, fishing, navigation, commerce, etc. The "public trust doctrine," a common law concept that applies to navigable waters, gives a state authority not only to manage but also to protect the public's fundamental rights to use the property. Absent any changes in law specifically addressing offshore wind facilities, the use and management of the bottomlands for this purpose would be governed by existing state statute and rules as discussed below.

STATE PERMITTING AND LEASING

Presently, access to Michigan's Great Lakes bottomlands is regulated by the Michigan Department of Environmental Quality (MDEQ) under Part 325, Great Lakes Submerged Lands, of Act 451 of 1994, the Natural Resources and Environmental Protection Act (NREPA) as amended (MCL 324.32501–324.32516) and rules promulgated pursuant to the act (Michigan Administrative Code, R322.1001 et seq.). This act regulates the use of Great Lakes bottomlands by requiring a permit for occupation or alteration of the bottomlands, such as dredging, construction of a marina, or shore protection. The act also governs the state's conveyance of bottomlands to private and public parties through leases or use agreements for any occupation of the bottomlands. There are separate applications for conveyances and permits, and a structure such as a wind turbine would require both.

Permits

The Part 325 permit process is part of the MDEQ and U.S. Army Corps of Engineers joint permitting process. Part 325, when written and amended, only contemplated the use of offshore bottomlands for development directly related to the adjacent upland use (for example, a marina, ferry dock, or commercial wharf). A specific process for permitting offshore use of bottomlands for wind energy has never been developed through statutory or rule amendments or agency guidance.

Although Part 325 and the pertinent rules do not include specific application requirements or permit review criteria addressing offshore wind, the MDEQ is required to consider the impact on the public trust when reviewing Part 325 permit (and conveyance) applications. This consideration includes impacts on boating and navigation, as well as on fisheries and wildlife habitat, which are directly related to other public trust uses such as hunting and fishing. In other words, if a proposed private use would substantially and adversely impact the public trust, the MDEQ's regulatory authority requires that the proposal be modified, mitigated, or denied altogether in order to minimize those impacts.

Conveyance of Bottomlands: Leases and Use Agreements

Part 325 allows the MDEQ to convey bottomlands by lease or use agreement in limited instances when the public use of those lands will not be impaired or substantially affected (MCL 324.32502). In the past, leases and use agreements have allowed the following uses on Great Lakes bottomlands:

- Marinas, yacht clubs, and boat clubs
- Commercial ferry operations
- Boat repair yards
- Commercial bulk loading docks for sand, gravel, ore, petroleum, etc.

When approving a lease or use agreement for bottomlands, Part 325 requires the MDEQ to determine the dollar amount to be paid to the state by the applicant for the lease (MCL 324.32506). In the past, certain agreements have been negotiated on the basis of a one-time payment to compensate the people of Michigan for the use of the public trust lands. More recently, all use agreements and marina leases require annual payments to the state for the duration of the use period.¹⁰ Existing nearshore lease provisions also include terms related to assurances for long-term site maintenance and eventual site restoration; this has been a component of leases for offshore wind energy projects in Europe.

It is important to emphasize, however, that under Part 325, a lease may be granted *only* to riparian land owners¹¹ (MCL324.32504[1]). This requirement also applies to permits under Part 325. Riparian owners enjoy the right to dockage, access to navigable water, and reasonable use of water for household uses, as well as the rights of hunting, fishing, swimming, pleasure boating, or navigation; these rights are subject to the public trust doctrine (MCL 324.32502). This riparian requirement, which was conceived for a program that historically focused on the regulation of the nearshore area, appears to be unsuitable for offshore wind and is addressed as part of the council’s recommendations in this report.

ADDITIONAL AUTHORITIES

Offshore wind energy projects and related infrastructure, such as the facilities connecting to the electric grid, may also trigger various local, state, and federal statutes and authorities. An annotated list of these authorities, which are adapted from the 2008 dry run permitting exercise in Michigan, are included in Appendix C; this list of authorities reflects agency input during the dry run exercise.

Although the state will be responsible for the siting and leasing of offshore wind projects in Michigan’s Great Lakes, the federal government—through numerous agencies and authorities—will play a significant role. Federal laws that may be triggered for an offshore wind project in the Great Lakes include the National Environmental Policy Act (NEPA), the Rivers and Harbors Act, the Clean Water Act, the Migratory Bird Treaty Act, and the National Historic Preservation Act. Exhibit 9 provides a summary of key laws and programs that may apply to offshore wind development in the Great Lakes.

¹⁰ Tom Graf, Michigan Department of Environmental Quality, personal communication, April 10, 2009.

¹¹ A riparian owner is one whose property borders on a body of water or watercourse (*Black’s Law Dictionary*, 1999).

EXHIBIT 9

Key Federal Laws and Authorities Related to Offshore Wind Development in the Great Lakes

Reference	Agency	Description
American Indian Religious Freedom Act	National Park Service; Advisory Council on Historic Preservation; State or Tribal Historic Preservation Office	Requires federal agencies to facilitate Native American access to and ceremonial use of sacred sites on federal lands, to promote greater protection for the physical integrity of such sites, and to maintain the confidentiality of such sites, where appropriate.
Bald and Golden Eagle Protection Act, 16 USC 668–668d; Migratory Bird Treaty Act, 16 USC 703–712	Fish and Wildlife Service	Do not specifically allow the agency to provide for the unauthorized taking of migratory birds (incidental collisions) but the agency recognizes the need for prosecutorial discretion toward those who have made good faith efforts to avoid the taking of migratory birds [and raptors].
Clean Water Act, Section 404	Army Corps of Engineers	Requires a permit from the Corps before discharging dredged or filled material into waters of the United States.
Coastal Zone Management Act	National Oceanic and Atmospheric Administration	Specifies that coastal states may protect coastal resources and manage coastal development. A state with a coastal zone management program approved by NOAA can deny or restrict development off its coast if the reasonably foreseeable effects of such development would be inconsistent with the state's coastal zone management program.
Code of Federal Regulations Title 33: Navigation and Navigable Waters, 33 CFR 64, 66, 67	U.S. Coast Guard	Requires a permit to establish and operate a private aid-to-navigation to a fixed structure located in navigable waters of the United States. Wind field equipment will be required to install, maintain, and operate Class I private aids.
Endangered Species Act	Fish and Wildlife Service	Requires federal agencies to consult with the FWS to ensure proposed federal actions are not likely to jeopardize continued existence of any species listed at the federal level as endangered or threatened, or result in destruction or adverse modification of critical habitat designated for such species.
Code of Federal Regulations Title 14: Aeronautics and Airspace, FAA Part 77	Federal Aviation Administration	Requires that, when construction, alteration, establishment, or expansion of a structure is proposed, adequate notice be given to FAA as necessary to promote safety in air commerce and efficiency use and preservation of airspace.
Fish and Wildlife Coordination Act, 16 USC 661-667e	Fish and Wildlife Service	Provides basic authority for agency involvement in evaluating impacts to fish and wildlife from proposed water resource development projects; requires that fish and wildlife receive equal consideration to other project features.

Reference	Agency	Description
National Environmental Policy Act	Army Corps of Engineers (Detroit District Office)/Council on Environmental Quality	Requires federal agencies to prepare an Environmental Impact Statement to evaluate potential environmental impacts of any proposed major federal action that would significantly affect the quality of the human environment, and to consider alternatives to such proposed actions.*
National Historic Preservation Act	National Park Service	Requires each federal agency to consult with Advisory Council on Historic Preservation and state and Tribal historic officer before allowing federally licensed activity to proceed in area where cultural or historic resources may be located; authorizes Interior Secretary to undertake the salvage of archeological data that may be lost due to federal project.
Ports and Waterways Safety Act	U.S. Coast Guard	Authorizes Coast Guard to implement, in waters subject to the jurisdiction of the United States, measures for controlling or supervising vessel traffic or for protecting navigation and the marine environment. (Measures may include reporting and operating equipment, surveillance and communication systems, and fairways.)
Rivers and Harbors Act, Section 10	Army Corps of Engineers (Detroit District Office)	Delegates to Corps authority to review and regulate certain structures and work that are located in or that affect navigable waters of the United States.

SOURCES: Klepinger, 2008; Ram, 2004; USDOI/MMS 74FR 19638.

* Federal Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (January 10, 2001), also requires that federal agencies taking actions likely to negatively affect migratory bird populations enter into a memorandum of understanding with the FWS, which, among other things, ensures that environmental reviews under NEPA evaluate the effects of agency actions on migratory birds, with emphasis on species of concern.

The U.S. Army Corps of Engineers has permitting authority for an offshore wind project in the Great Lakes under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act as part of the joint permitting process with the MDEQ (MDEQ 2008). A permit from the USACE would likely be considered a major federal action “significantly affecting the quality of the human environment” and therefore require an environmental impact statement under NEPA. The NEPA process would examine the potential impacts and alternatives and provide opportunities for public participation and comment.¹² It would also examine the applicability of the various federal laws to the specific project and coordinate the related agency reviews.

As discussed in the Recommendations section, a programmatic environmental impact statement (EIS) under NEPA for an offshore wind program in the Great Lakes (as opposed to a project-specific EIS) would provide upfront guidance that would streamline site-specific reviews under NEPA and clarify the federal agency roles and processes. The final rule of the Department of Interior, Minerals Management Service, governing the siting and leasing of renewable energy facilities on the outer continental shelf does not apply to the waters of the Great Lakes. Nonetheless, the rule is important to understand

¹² See, for example, the final environmental impact statement (FEIS) of the U.S. Department of Interior Minerals Management Service (MMS) for the Cape Wind project (USDOI/MMS 2009).

because it may influence future policies and procedures in the Great Lakes region. Briefly stated, the competitive leasing process under the MMS involves the following steps:

- Request for Interest
- Call for Information and Nominations
- Area identification (includes NEPA review, concurrent with Coastal Zone Management Act [CZMA] consistency review and determination)
- Issuance of Proposed Sale Notice (public announcement of lease provisions issued 4–6 months prior to sale date)
- Issuance of Final Sale Notice
- Receipt and evaluation of bids
- Lease executed

A noncompetitive lease is also available, which is subject to a slightly different approval process.

Council Recommendations

The following sections provide the council's recommendations related to the following topics as set forth in the executive order:

- Criteria for identifying and mapping the least and most favorable areas for offshore wind development
- Bottomlands leasing and permitting, including recommended legislation and changes in administrative rules and policies for siting offshore wind energy projects, as well as options for compensating the public for use of bottomlands
- Preparation of federal programmatic environmental impact statement
- Public engagement

Recommended Mapping Criteria

Selecting suitable areas for development of offshore wind energy is a multifaceted and multidisciplinary process. In an effort to determine the geographic areas that might accommodate future offshore wind power development in Michigan, Executive Order No. 2009-1 called on the council to recommend criteria to identify and map areas that should be categorically excluded from offshore wind development as well as those areas that are most favorable to such development.

The council recommends a set of criteria to help guide future efforts to select and evaluate sites for wind energy development in Michigan's Great Lakes. To develop the criteria, the council examined approaches used in other jurisdictions (such as Ohio and Ontario), and then applied a new mapping tool (called the Michigan GIS Lakebed Alteration Decision Support Tool) and data sets that are specific to Michigan's Great Lakes. The criteria are not the result of site-specific studies. They are intended to show the general areas that may be more or less favorable for offshore wind development based on available data.

The criteria are separated into a two-tiered classification system to distinguish between types of data currently available. Tier I criteria are supported by data sets collected by trained and knowledgeable professionals and volunteers using standardized methodologies. When available, data sets developed by panels of scientific experts and subjected to rigorous peer review have been incorporated as Tier I data layers. It is important to note, however, that some Tier I data layers may or do require updated data sets (for example, fish spawning areas). Tier II criteria require additional resources to build a data layer for purposes of mapping the offshore area.

CATEGORICAL EXCLUSION CRITERIA

The criteria for identifying categorical exclusion areas consist of features that would not be compatible with offshore wind development due to existing uses and/or state and federal laws that provide for other exclusive uses (for example, navigation channels, airport setbacks, or military operation areas). The recommended criteria for categorical exclusion areas are described in Exhibit 10, and are depicted as the red areas on the map prepared for the council in Exhibit 12.

EXHIBIT 10
Recommended Criteria for Identifying Categorical Exclusion Areas

Criteria	Description	Tier	Buffer
Aids to navigation	A navigational aid on land or water—markers such as buoys, beacons, or lights that enable navigators to avoid danger and fix their position	I*	Defer to Coast Guard standards for navigational safety to Coast Guard (handled on case-by-case basis using risk-based assessment)
Buoyed navigation channels	A deep channel cut into the lakebed and dredged on a periodic basis to maintain depth or other navigation channel marked by buoys	I*	Channel width; defer to Coast Guard on buffer
Coastal airports	An FAA-registered facility for purposes of passenger and commercial air traffic**	I	Defer to Michigan and FAA requirements
Military operation areas	Land- and water-based areas utilized for military exercises with protected airspace. These are areas of caution where military craft may be operating and firing artillery rounds or flying low.	I	Department of Defense guidelines
Submerged transmission lines	Existing submerged telecommunications, oil, gas, or electrical distribution lines	II*	Utilize industry siting standards and safety guidelines

SOURCE: Michigan Great Lakes Wind Council, 2009.

* Data not yet incorporated into the Michigan GIS Lakebed Alteration Decision Support Tool.

**Neither state nor federal statute includes an exclusion area. Structures that are within 20,000' of public use airports, and that penetrate a 1:100 slope from the airport, are required to notify the FAA and obtain a Michigan Tall Structure Permit. For maps in this report, airports within three miles of the coast were highlighted.

CRITERIA FOR MAPPING MOST FAVORABLE AREAS

The goal of mapping the “most favorable” areas is to highlight locations that present the fewest siting hurdles for wind development in the near term. To identify the most favorable areas, the council recommends the following approach:

1. Define all the areas of the lakes remaining after applying the categorical exclusion criteria.
2. Apply a second set of screening criteria (biological, physical, and protected features), identified by the council, to identify conditional areas and isolate the most favorable areas.

This second set of screening criteria are described in Exhibit 11 and identify geographic locations that are subject to one or more potentially competing values or features, such as fish spawning sites or marinas, but are not deemed categorical exclusions. The most favorable areas—those that remain outside the boundaries of this second set of screening criteria as well as the categorical exclusions—are shown in green in Exhibit 12. Although

site-specific studies of any project would still be needed, these most favorable areas may allow for more streamlined site assessment and permitting processes.

EXHIBIT 11
Screening Criteria for Mapping Most Favorable Areas

Criteria	Description	Tier	Buffer
Biological features			
Globally or continentally significant concentrations of bird or bat species of conservation concern	Bird and bat use sites identified using nationally or internationally recognized criteria, such as through the Important Bird Areas Program, developed to protect rare species	I* Globally significant birds II* Other	5 miles
Habitat for Threatened and Endangered Species	Habitat necessary to the conservation of rare species of wildlife, including Element Occurrences of state-listed species and critical habitat for federally listed species (does not include plants)	I*	5 miles
Recreational fish spawning sites and refuges	Substrate documented by state or federal authorities where fish spawning occurs for sensitive species and/or "species of recovery"	I Lake Whitefish and Lake Trout II Other species*	1 mile
Very high concentrations of birds or bats on at least a seasonal basis	Sites including significant stopover locations, off-shore waterfowl foraging areas (e.g., islands), documented migration and travel corridors, nesting locations of colonial birds, and flight routes into bat hibernacula	I*	5 miles
Zone of High Biological Productivity	More rigorous study will be required during nearshore permitting	I	3 miles
Physical features			
Confined disposal sites (n = 26)	A facility or area specifically for the disposal of contaminated dredged sediment	I	0.5 mile
Harbors/ marinas	A state-licensed marina and/or harbor of refuge	I	5 miles
Large river mouth	Points where the watershed's annual discharge is within the top 80 percent of total discharge in Michigan.	I	5 miles
Shoreline	The fringe of land at the edge of a Great Lake (accounts for viewsheds, as well as historic and ceremonial use properties, and near-shore activities (e.g., recreational boating)	I	6 miles**

Criteria	Description	Tier	Buffer
Protected features			
National park lakeshore	U.S. Department of Interior designation	I	13 miles
Shipwrecks	State-recognized and mapped shipwrecks	I	0.5 mile
Shoreline parks and wilderness areas	State, county and locally designated parks with contiguous shoreline, including areas managed for waterfowl production and hunting	I	6 miles
State bottomland preserves	Michigan's underwater preserves; includes federally recognized Thunder Bay National Marine Sanctuary*	I	Preserve boundary only (no buffer)
Underwater archeological sites***	State-recognized areas of archeological significance (determined case by case)	II*	TBD
Other			
Commercial fishing areas	Tribal and non-Tribal licensed fishing sites based on reported fish harvest locations	I*	0.5 miles
International and state boundaries	Legal land boundary between state or provincial jurisdictions	I	0.5 mile (unless approved multi-jurisdictional project)
Recommended course lines	A designated upbound and downbound path through open water primarily used for commercial shipping traffic and so noted on a nautical chart	I	1 mile on each side of course line

SOURCE: Michigan Great Lakes Wind Council, 2009.

* Data not yet incorporated into the Michigan GIS Lakebed Alteration Decision Support Tool.

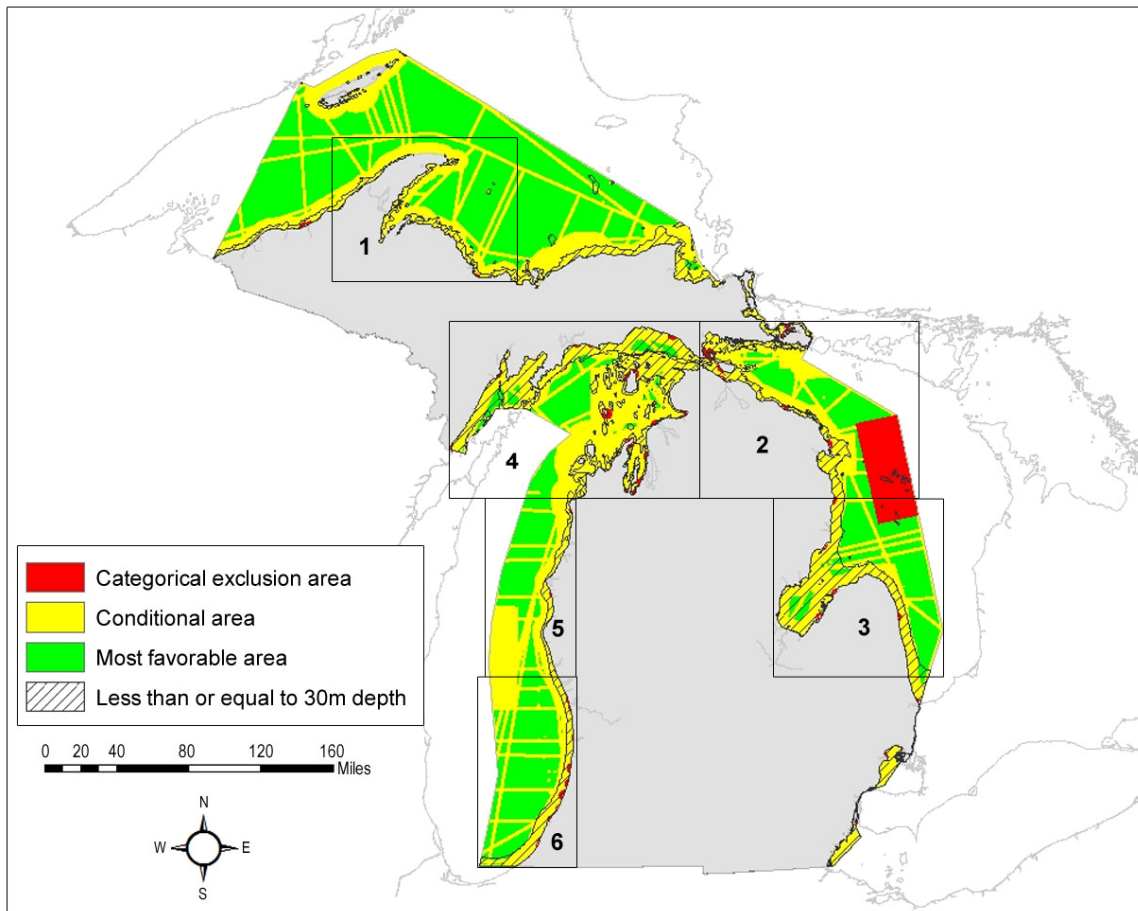
** University of Delaware researchers found that public acceptance of offshore wind turbine visibility increased significantly when survey respondents were shown simulations of developments beginning at a distance of approximately 6 miles from shore. After about 10 years of offshore wind siting experience, British authorities recently issued guidance including a precautionary coastal exclusion zone ranging in width from 8 km to 13 km (5 to 8 miles) to reduce the visual impact of development and to avoid sensitive shallow-water feeding areas for certain species of sea ducks. In 2007, a Danish siting committee recommended several suitable development areas, all of which were at least 8 miles from shore. (The council separated visibility from habitat concerns.)

***This may never be fully mapped.

Conditional areas that *include* the features and buffers defined by these screening criteria are depicted in yellow in Exhibit 12. These conditional areas may still have potential for development, but are likely to involve issues that would be examined through the site assessment and permitting processes that would warrant additional due diligence by the developer (such as studies and/or mitigation to offset potential impacts). Typical pre-construction studies should be able to further clarify any necessary restrictions/setbacks. Detailed site analysis will be a function of the permitting process regardless of where a development is proposed.

Exhibit 12 illustrates the application of the mapping criteria statewide with a depth limit of 30 meters. For each of the six areas of interest outlined in Exhibit 12, see Appendix D for greater detail on the application of the mapping criteria and the impact of depth limits at both 30 meters and 45 meters.

EXHIBIT 12
Application of Recommended Mapping Criteria



SOURCE: Institute for Fisheries Research, UM/MDNR, 2009.

NOTE: Data for the following criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map: aids to navigation; buoyed navigation channels; submerged transmission lines; globally or continentally significant concentrations of bird or bat species of conservation concern; habitat for threatened and endangered species; very high concentrations of birds or bats on at least a seasonal basis; underwater archaeological sites; and commercial fishing areas. In addition, the Thunder Bay National Marine Sanctuary in Lake Huron is not reflected on this map.

ADDITIONAL DATA LAYERS FOR MAPPING

The council was cautious not to define the least or most favorable areas based on technology or economic criteria, such as depth or proximity to the electric grid,¹³ because

¹³ The capability of the electric grid to deliver power from particular offshore sites is site specific and will depend on the size and location of the offshore project, electric demand, other generation sources, and future improvements to the grid. Such site-specific assessments would be conducted as part of the generation interconnection studies coordinated by the applicable transmission grid operator (PJM or Midwest Independent Transmission System Operator). These studies examine the impacts of the proposed electric generation project on the electric system and identify any required system improvements to reliably deliver the expected power output to customers. As part of a high-level planning exercise, the Michigan Public Service Commission has also collaborated with transmission companies and other stakeholders to examine transmission system improvements to accommodate different amounts of wind generation in the

as new technologies emerge, such as deep water anchoring systems or floating platforms, the limits on where turbines can be located or the production capability of individual turbines may change. Therefore, the council focused on criteria that will allow offshore wind development to advance in the near term while leaving opportunity for technological advancements and acknowledging the need to develop additional data sources.

Nevertheless, the council realizes that development in the near term is limited by current technological capabilities. The mapping tool developed by the Institute for Fisheries Research for the council includes data layers on wind resources, bathymetry (depth), and substrate type. Working with the tool’s developers, the council applied a depth restriction of 30 meters or less to illustrate areas where offshore wind facilities could be installed using current industry technological capability. Exhibit 13 shows the number of square miles available in the categorical exclusion, conditional, and most favorable areas with no depth restriction and at 30 meters or shallower. This exhibit also shows the number of square miles at 45 meters and shallower.

EXHIBIT 13
Square Miles in Categorical Exclusion, Conditional, and Most Favorable Areas

Area type	No depth restriction (sq. miles)	30 Meters and shallower (sq. miles)	45 Meters and shallower (sq. miles)
Categorical exclusion area	1,717	356	528
Conditional area	19,714	6,981	8,898
Most favorable area	17,017	537	1,222
Total	38,448	7,874	10,648

SOURCE: Institute for Fisheries Research, UM/MDNR, 2009.

NOTE: Using benchmarks from prior studies of offshore wind potential and other assumptions, the conditional and most favorable areas combined at 30 meters or shallower have a theoretical maximum total generating capacity potential ranging from 13,157 MW to 18,795 MW and annual energy production potential ranging from 113 million MWh to 165 million MWh. At 45 meters and less, these figures range from 17,720 MW to 25,300 MW and from 152 million MWh to 223 million MWh. For comparison, total electricity consumption across all sectors in Michigan during 2007 was 109,297 million MWh (DOE/EIA, 2009). These figures assume an average power production per square mile of 1.75MW–2.5MW and average annual energy production per square mile of 15,000 MWh–22,000 MWh. These MW and MWh per square mile ranges were developed for a prior study of offshore wind energy potential on the West Coast ocean energy resources. See <http://westcoastoceans.gov/Docs/Mirko%20Previsic%20Ocean%20Energy%20Resources.pdf>. The application of these ranges assumes for simplicity that turbines would be located across all of the conditional and most favorable areas. That is not expected to happen, nor is it recommended by the council. The actual placement of turbines is complicated and would require analyses of wind characteristics, environmental features, interconnection requirements, and other site-specific conditions that will affect turbine placement and spacing. These figures do not account for economic, engineering, or other issues associated with the integration of wind energy turbines in the Great Lakes. The figures are presented for comparison only. Conditions will vary widely over time and acceptance or use of the assumptions underlying these calculations may also vary widely among professionals in the industry.

state; one of the scenarios studied included 1,000 megawatts of offshore wind (500 megawatts in the southern end of Lake Michigan and 500 megawatts in Saginaw Bay). More information about this Michigan Wind Energy Transmission Study is available at: http://michigan.gov/mpsc/0,1607,7-159-16377_47107_52010-201613--,00.html.

RECOMMENDED NEXT STEPS ON AREA MAPPING

Although the mapping tool has limitations and is a work in progress, it provides a strong foundation for the council's work and it quickly illustrated the impact of proposed criteria. The council's selection of criteria should help shape future development of the tool and its data inputs.

The council recommends additional work in the near term to improve the mapping tool with the best available data sets, including historical lighthouses and some habitat data not presently available. This could help Michigan identify and prioritize a handful of discrete locations that are most favorable to offshore wind energy development. This would be comparable to the Michigan Wind Energy Resource Zone (WERZ) Board's recent identification of regions of the state with the highest land-based wind energy potential. As in the WERZ Board process, it would be appropriate to solicit input from additional stakeholders and the public as part of this process. The identification of a few areas could help target future efforts related to public education and outreach, as well as scientific research and monitoring, which, in turn, could further refine data for decision-making.

Bottomlands Leasing and Permitting

The governor's executive order instructs the council to include in its report:

- Criteria that can be used to review applications for offshore wind development,
- Options for how the public could be compensated for bottomlands leasing and wind rights for wind energy systems, and
- Recommendations for legislation and for changes in administrative rules and policies related to the siting and development of offshore wind energy systems.

These directives in the executive order raise the following questions:

- How should access to bottomlands be provided to wind energy developers?
- How should the public be compensated for the use of bottomlands and wind rights?
- How will public resource values be protected, or at least not substantially impaired, during the siting, operation, and decommissioning of offshore wind turbines and related facilities?

PERMITTING AND LEASING STATUTE

The council discussed whether an amendment to Part 325 (MCL 324.32501–32516), or a new statute, or both would be appropriate to accommodate siting and development of offshore wind generation in Michigan's Great Lakes. The council determined that the wind development process would likely progress in a series of stages: site identification; site assessment; development proposal; and operations. With this in mind, the council decided that both amendment to Part 325 and a new statute are necessary.

The existing Part 325 was established to protect the public trust in Great Lakes bottomlands and waters. Uses such as development of offshore wind in Michigan were not contemplated when the statute was developed. Under the current statute, permits may not be issued to a non-riparian. To remove this constraint, the council concluded that the law must be amended to indicate that Part 325 does not apply in the case of offshore wind site assessment, construction, development, or operation.

The council determined that a more comprehensive statute would be necessary to regulate the use of bottomlands for offshore wind development through a new permitting and leasing process. Specifically, the council recommends new legislation that would define the requirements for a thorough site assessment; the process for submitting a development/construction plan; the requirements for operations and decommissioning plans; the method of compensation to the state; and numerous other related issues. The legislation should emphasize the benefit to the public trust of offshore wind development (such as reduced reliance on fossil fuels, improved air quality, etc.). The permitting and leasing process should be designed to attract both public and private sector investment in offshore wind. The legislation should be as specific as possible, but should allow rulemaking by the designated agency.

In addition to the state regulation of Michigan's bottomlands and waters, the U.S. Army Corps of Engineers also regulates any use that occupies, alters, or disturbs the

bottomlands. As discussed in the Current Regulatory and Legal Framework section, Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Waters Act regulate the use of the Great Lakes bottomlands and waters and require a permit from the USACE. Michigan statutes should be developed in consultation with the federal authorities and rules so that the requirements are compatible, and not overly burdensome.

RECOMMENDED PROCESS: ACCESS TO BOTTOMLANDS

The council discussed the specific regulatory method for providing access to bottomlands for wind energy developers. The group reviewed the U.S. Department of Interior, Mineral Management Service (MMS) rule on offshore wind and elected a similar approach for granting access to Michigan's Great Lakes bottomlands. The council concluded that access should be granted in phases for:

- Site assessment
- Construction and operation

Access should include a permit and a lease for both phases. The permit and lease will be granted during the site assessment phase and will be extended and modified for the construction and operation phase. The requirements for the permits and leases for each phase will differ significantly.

The council recommends that the state develop a one-stop clearinghouse to facilitate permitting, leasing, construction, and operation of offshore wind development. The clearinghouse should be managed by a single agency, which would be responsible for coordination of all other relevant agencies.

Initial Site Assessment

The council determined that the initial lease for site assessment should meet the following requirements:

- It should be relatively easy to acquire by qualified applicants (using qualification requirements similar to the “multi-factor” criteria of the MMS).
- It should require proof of a nominal bond (for example, \$100,000) by the applicant.
- The fee to the state for the site assessment lease should be nominal and based on the area defined in the lease (such as a flat fee per acre or square mile as discussed further below).
- It should be clear that the lease is for “site assessment” purposes only, and that a reasonable expectation to develop the project would only arise upon receipt of the “development authorization” set forth below.
- It should be for a term of five years to allow complete site assessment and permit approval for construction and operation, provided that milestones (e.g., installation of monitoring equipment, studies) are met to demonstrate progress.
- It should include clearly defined benchmarks and timelines required for a thorough site assessment. If substantial progress on the site assessment benchmarks has been demonstrated, an extension may be granted for continued site assessment beyond the initial five-year period. The MMS rules could be used as a starting point when

Michigan develops benchmarks, in an effort to be consistent with the federal approach and encourage development.

- After the site assessment has been completed, there should be thorough public review of the finding and a determination made regarding whether the project will meet all environmental, financial, and other legal requirements.
- Upon such a determination, the developer would be granted the exclusive right to develop and operate a wind energy facility on that parcel subject to fulfilling all permitting requirements and milestones.
- It should include an extension allowing additional time for agency review and approval of plans.
- It should be assignable with state approval.
- It should include an undefined right of easement to get to shore, subject to permitting requirements.

The council recommends that leases for parcels of Great Lakes bottomlands should be made available to prospective developers through two methods:

- Nomination by the prospective developer
- State selection and competitive public auction

Nomination by the Prospective Developer

Under this approach, parcels of Great Lakes bottomlands can be nominated by prospective developers through a nomination and notice of intent (NOI) process. Submission of a nomination will require a nomination fee and basic information about the proposed project. When the state receives a nomination, a public hearing is announced and the state issues an NOI and solicits any competing interest in the parcel. If the state endorses the project outlined in a noncompetitive NOI, it will issue a lease for site assessment during which time the prospective developer will be required to receive a permit from the state to do a site assessment in accordance with the requirements of the new offshore wind development statute. The lease will contain a clause for extension to allow development and operation on that site subject to an approved site assessment and fulfilling all permitting requirements for construction and operation of an offshore wind development. If competing interests exist for a nominated area, the parcel will be treated the same as those parcels selected by the state and put up for public auction.

State Site Selection and Competitive Public Auction

In order to encourage investment in Michigan's offshore wind energy development, the council concluded that it would be advisable to offer a select few parcels of Great Lakes bottomlands at a competitive public auction soon after new legislation is adopted.¹⁴ Under this approach, the state would select a limited number of sites that are the most favorable based on the application of the mapping criteria and any site-specific information available. The state would then offer these sites in a competitive bidding

¹⁴ The new legislation may include the MDEQ as the lead agency or it may designate a joint state authority to regulate the program. The general terms, "the state" or "the agency" will be used in the council report to refer to this undetermined state regulatory authority.

process in which a prospective developer submits a bid to the state for site assessment and potential development. The state would review bids received and select a bidder who would receive a lease for site assessment, during which time the prospective developer would receive a permit from the state to complete a site assessment in accordance with the requirements of the new offshore wind development statute. When auctioning leases, the state should reserve the right to set a minimum price for each auctioned area.

The site assessment lease will contain a clause for extension to allow development and operation on that site subject to an approved site assessment and fulfilling all permitting requirements for construction and operation of an offshore wind energy facility.

Lease and Permit for Construction and Operation

During the term of the site assessment lease, the developer will submit all required information (for example, a site assessment summary, construction plan, operation plan, and decommissioning plan) to support the proposed construction and operation of an offshore wind energy facility (the complete application for development). The information required from the developer should be outlined in a checklist developed by the state. The state will review the application for development and approve or deny the proposal. If the state approves the proposal, it will grant a lease extension and a permit to construct and operate an offshore wind energy development.

The lease extension will include a schedule for compensation to the state (see below); it will be subject to continued adherence to permit requirements, and continued operation of the facility. This lease will become automatically renewable as long as the facility is operating within the requirements of its permits for the life of the facility. Lease extension requests should be submitted two years prior to lease expiration.

The permit for construction and operation application will outline the requirements for construction and operation, a decommissioning plan, a long-term monitoring plan, and a financial assurance plan.

PROTECTION OF THE PUBLIC TRUST

The council discussed approaches for protecting public resource values during the siting, operation, and decommissioning of offshore wind turbines and related facilities.

Recommendations

- The legislature or executive should make a determination that development of renewable energy in the form of offshore wind is in the public's best interest if sited with adequate due diligence to protect natural features, historic and cultural sites, public recreation, navigation, and Tribal, commercial, and recreational fishing resources.
- In addition to site-specific data related to the mapping criteria identified by the council (e.g., substrate, navigation lanes, fish spawning reefs, bathymetry), permit criteria should include sufficient specificity to allow the state to understand the risks to the public trust resources while also accounting for public benefits associated with increased development (for example, energy security, jobs, environmental

protection). The permitting and leasing process should strike a balance between resource protection and development.

- In addition to the recommendation below to direct some of the compensation received by the state for leasing toward support for the regulatory program, a portion of royalties collected by the state should be directed to another public use that will offset the impacts of offshore wind development (for example, supporting related programs for offshore fisheries habitat; developing recreation opportunities; protecting and managing bottomlands, including shipwreck management; and/or contributing to additional energy efficiency advancements within the state).

OTHER ADMINISTRATIVE RECOMMENDATIONS

- This regulatory program should allow for changes to the process as state officials and industry learn more about the process of developing offshore wind energy in Michigan's Great Lakes bottomlands.
- State agencies and stakeholders should work together to develop the lease documents for this program with the assistance of other state agencies and other experts.
- The regulatory program under the new offshore wind energy development statute should be coordinated through a single agency.
- Agencies should coordinate throughout the application process. The process of agency coordination on decision making and notice should be defined by statute.
- Sufficient resources should be provided to the lead state agency to allow it to administer the program. Fees for applications for development should be set by statute and should significantly offset the costs of the extensive review required for the state to approve or deny lease and permit applications.
- The offshore wind energy development statute should allow for the promulgation of rules; however, the statute should contain sufficient detail so that minimal rulemaking will be required.
- The occupation and alteration thresholds¹⁵ that trigger a Part 325 permit should also apply to the offshore wind energy application process.
- The state should develop a checklist of information that must be provided by the applicant as part of a completed site assessment and development plan in order for the state to adequately assess the environmental impacts of wind energy development to the offshore area. (The MDEQ currently uses a checklist to obtain all the necessary information from an applicant before reviewing a nearshore permit application.)

COMPENSATING THE PUBLIC FOR USE OF BOTTOMLANDS

The council discussed methods for compensating the public for use of the bottomlands, and agreed on the following combination of compensation methods:

- A fee for the initial nomination or bid for a potential site

¹⁵MCL 324.32503 and 324.32513 provide for permits to be issued whenever the bottomlands are altered and lease agreements whenever the bottomlands are occupied by a private use for any non-temporary period of time.

- Rent on the area leased for the duration of the project, including site assessment, construction, operation, and decommissioning phases of the wind energy facility
- Royalties collected during the operation (production) phase of the project (These royalties should be phased in as the development advances. The royalty structure should be optimized to compensate the public trust for the use of the bottomlands while avoiding undue burdens on offshore wind energy developers.)

Recommendations

- Application fees should be nominal but should substantially cover reasonable costs of the agency review.
- Applicants should be required to post a modest assurance bond (e.g., \$100,000).
- Rent should be collected over a fixed time period during the initial lease of bottomlands while site assessment is being completed. This would be similar to holding an option for development.
- The rental payments should be related to the area of bottomlands occupied and the other public uses that are displaced by the development.
- The amount of rent should not be so onerous that it inhibits offshore wind energy development, and should approximate rents for similar developments in other state or federal waters.
- In order to initially encourage development, the state should have the ability to waive or modify rent or royalties for a limited period of time (for example, three to five years). This incentive may also be provided as a rebate, in order to avoid conflicts with the requirement to collect appropriate compensation to the public for use of bottomlands. Rebates should be used to minimize cost-free speculation.
- Once site assessment is complete, the compensation scheme should include both rental of the site and a royalty for the projected life of the project (e.g., 25 years or as long as actively producing at a predetermined level of megawatts per acre.) The compensation scheme should be phased in as the development advances from construction (non-production) to production.
- The royalties should be related to the value of the energy (measured at the revenue meter).¹⁶ The royalty calculation should include the value of any renewable energy credits received by operators.
- The legislation should provide the designated agency the authority to set the appropriate compensation structure.
- Some portion of the compensation to the state should be dedicated by statute to support the state's offshore wind regulatory program with specific emphasis on mitigation of environmental impacts and long-term monitoring to protect the public trust. Another portion could be directed to energy-related public interests.

¹⁶ Power measuring device used to calculate the revenue owed to the supplier.

Federal Programmatic Environmental Impact Statement

The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. To meet NEPA requirements, federal agencies prepare a detailed statement known as an Environmental Impact Statement (EIS) whenever their decisions could significantly affect the environment. The U.S. Environmental Protection Agency (USEPA) reviews and comments on EISs prepared by other federal agencies, maintains a national filing system for all EISs, and assures that its own actions comply with NEPA.

In Michigan, a joint permit from the U.S. Army Corps of Engineers (USACE) and the MDEQ is required for offshore wind energy development in the Great Lakes. The issuance of a permit by the USACE is a federal decision-making process that requires review under NEPA. It has been suggested by Great Lakes leaders that this process, while not presently a federal “program,” should nevertheless be the subject of a federal programmatic environmental impact statement (PEIS). A PEIS completed by the USACE and reviewed by the EPA could streamline the process for authorizing Great Lakes offshore wind developments. The Great Lakes Wind Collaborative recently asked the USACE to complete a PEIS for the basin.¹⁷

A PEIS would include an assessment of the impacts of and alternatives to wind energy development in the offshore areas of the Great Lakes; discussion of relevant mitigation measures to address those impacts; clarification of applicable regulations and agency roles; and identification of appropriate, programmatic policies and best management practices (BMPs). A PEIS does not evaluate site-specific issues associated with individual wind energy development projects; thus, individual projects would likely still require review under NEPA but the process should be more streamlined.

The United States Department of the Interior (USDOI), Minerals Management Service (MMS), recently prepared a PEIS to support the establishment of a program for authorizing renewable energy development activities on the outer continental shelf (USDOI/MMS 2009). In addition, the USDOI, Bureau of Land Management (BLM), prepared a PEIS to evaluate issues associated with wind energy development on Western public lands (excluding Alaska) administered by the BLM (USDOI/BLM June 2005).

The outer continental shelf PEIS could be adapted with minimal modifications by the USACE to function very well in the Great Lakes if the USACE establishes a basin-wide renewable energy permitting program. Another way the USACE could discover federal agency issues and streamline permitting would be signing an inter-agency memorandum of understanding.

¹⁷ Terry Yonker, Chair, Great Lakes Wind Collaborative Steering Committee, personal communication, June 19, 2009.

For Michigan's offshore wind program to be successful, it must be closely coordinated with permitting and other activities conducted by the federal government. The state should draw on the deep knowledge and expertise of federal agencies operating in the Great Lakes basin and work with these federal agencies, states, and other partners, such as the Great Lakes Wind Collaborative, to develop a framework for effective inter-agency coordination.

RECOMMENDATIONS

The council recommends that the governor ask the U.S. Army Corps of Engineers to complete a PEIS for offshore wind energy development in the Great Lakes.

The PEIS should be designed to accomplish the following objectives:

- Help identify potential issues, impacts, alternatives, and mitigation measures associated with offshore wind development in the Great Lakes
- Focus on areas and technologies that could potentially be deployed in the relative near term, while also anticipating longer-term developments in technology (e.g., deepwater turbines, ice protection) and baseline environmental research that may fundamentally alter the location, scope, and pace of development in the Great Lakes
- Clarify and streamline the program for offshore wind development in the Great Lakes, as well as state and federal roles, and encourage coordination among states in the Great Lakes region and the federal government related to environmental, navigation, and other common issues
- Put the Great Lakes on a more equal playing field with coastal areas on the outer continental shelf, which are covered by the MMS rule and final PEIS

The programmatic EIS should not delay site-specific EISs or other environmental assessments.

As part of a PEIS, it may also be appropriate to examine other potential renewable energy sources in the Great Lakes, such as hydrokinetic energy technologies using waves and currents.

Public Engagement Process

The council is charged with recommending a “process for engaging the people of Michigan in a public dialogue about offshore wind to ensure that statewide interests are considered whenever significant permitting decisions are made.”¹⁸ In response to this charge, the council examined potential public acceptance issues and opportunities based on experiences in other jurisdictions and identified guiding principles and regulatory and nonregulatory strategies that Michigan could implement in the near and long term as part of a public engagement process. The council’s goal for this process is to

- improve the understanding of public perceptions and potential opportunities and concerns in general and in response to specific wind development proposals,
- provide opportunities for increased outreach and education, and
- create a clear and fair process for public input as part of the permitting process.

Although the council is not charged with implementing this process, it is expected that many of the agencies and organizations represented on the council would play a key role in implementation activities.

Because Michigan has no direct experience with an offshore wind project and there is little, if any, survey data on how residents might respond to such a project, the council considered research and experience related to public opinion from other jurisdictions. Appendix E includes a summary of this research.

GUIDING PRINCIPLES OF EFFECTIVE PUBLIC ENGAGEMENT

The council’s recommended guiding principles for a public engagement process are as follows:

- The public engagement process should provide a legitimate, authoritative, fair, and transparent process that engages the public through education and in decision making and facilitates information exchange.
- The first, and most critical, step in public engagement is education. A variety of organizations, agencies, and individuals can and should play a role in educating the public on this topic; the education process should begin as soon as possible—before the state’s first development application is received.
- The state needs new regulatory requirements for public input as part of the permitting of offshore wind proposals. All stakeholders should know how input is considered in decision making as well as when, how, and by whom decisions are made and how conflicts are resolved.
- Effective communications—both formal and informal—among developers, federal and state agencies, Tribal and local governments, and the public should take place as early as possible and before permit applications are filed. While all residents of Michigan have a stake in the management of the Great Lakes, involvement from communities and Tribes near a proposed project (for example, all coastal jurisdictions

¹⁸ See EO 2009-1 (Feb. 6, 2009), Appendix A.

within the nearest two or three counties) will be essential and should be solicited early and often.

- Ongoing research on public opinion related to offshore wind development in Michigan's Great Lakes is needed and should be designed to inform local and state policymakers, industry, and the public. Research should begin now and continue after the installation of any offshore developments.
- The public engagement process should be monitored and updated as needed based on experience and new information, including practices that have proven to be successful and lessons learned in other areas addressing offshore wind development.¹⁹

RESEARCH, EDUCATION, AND INFORMATION EXCHANGE

The council recommends the following research and education strategies to be implemented as soon as possible as part of a public engagement process. Although these strategies will not require changes to law or official state policy, they will require significant involvement and coordination by various entities—including state agencies, universities, nonprofit organizations, and industry—to effectively engage the public and other interested parties. Additional funding and resources may be needed to carry out these nonregulatory aspects of the public engagement process.

Education and Outreach

Education is central to the public engagement process and should begin now. At least initially, the State Wind Outreach Team,²⁰ which is facilitated by DELEG, should continue its work and be encouraged to specifically address offshore wind as part of future education and outreach efforts. These efforts should:

- Involve a range of entities, including industry, state agencies, local and Tribal governments, nonprofit organizations, and educational institutions, to communicate to various constituencies about opportunities and challenges associated with offshore wind, as well as the need for renewable and low-carbon energy.

¹⁹ Denmark, the United Kingdom, and other areas such as states in the northeastern United States have direct experience addressing offshore wind projects and related public engagement opportunities and challenges. While some issues will be unique to Michigan or even to certain portions of the state, Michigan can learn from the existing body of public opinion research, processes for public engagement, and information-sharing tools used by other areas. For example, in Delaware, there has been considerable research of public opinion, which has informed the debate as well as stakeholder and public involvement in processes that led to the state's approval of a power-purchase contract to supply the local utility with electricity generated from an offshore wind project. In addition, the United Kingdom has a research and education organization, Collaborative Offshore Wind Research Into The Environment (COWRIE), that supports research and education to improve the understanding of the environmental impacts of offshore wind farm development.

²⁰ The State Wind Outreach Team is facilitated by staff of the DELEG, Bureau of Energy Systems, and involves state and university employees, as well as other stakeholders involved in outreach and communications related to wind energy. The team's goal is to provide accurate, balanced, current, and complete information, based on the best available science, to inform both individual purchase and development decisions and local and state policies. For more information, see http://www.michigan.gov/dleg/0,1607,7-154-25676_25774-75767--,00.html.

- Share facts and perspectives about the potential benefits and costs of offshore wind and other renewable and nonrenewable alternatives; the education efforts should not attempt to persuade or advocate for any specific project or technology.
- Be informed by ongoing public opinion research (discussed below) and address near-term opportunities as well as long-term initiatives to aid the understanding and decision making related to offshore wind development. Potential near-term opportunities include, but are not limited to, training sessions, presentations, and discussions at local government meetings, association and trade group forums (such as Michigan Townships Association regional meetings), workshops and forums offered by institutions of higher education (for example, MSU Extension and Citizen Planner), events and conferences (such as the Great Lakes Renewable Energy Fair), legislative forums, and other gatherings.
- Work with regulatory and nonregulatory agencies to educate the public about the applicable regulatory standards, criteria, and processes for bottomland permitting and leasing so the public can provide relevant and timely information and comments during the agency decision-making processes.

The council encourages the State Wind Outreach Team to develop an education and outreach strategy for offshore wind. As part of that strategy, the State Wind Outreach Team could develop standard presentations, talking points, and fact sheets that could be available online and distributed to a network of organizations for use at the various forums discussed above. Such materials should be periodically updated as new information and regulatory developments evolve.

Public Opinion Research

Michigan should develop and implement a plan, in coordination with universities and other experts, to better understand public opinion related to offshore wind development and factors that influence opinion over time. The plan should:

- Identify targeted research needs and address timing, funding, roles and responsibilities, and coordination issues
- Attempt to integrate research on offshore wind with existing or new efforts to examine public acceptance issues associated with wind developments on land in coastal areas along the Great Lakes
- Leverage existing efforts in survey design and administration in the state, such as the State of the State Survey conducted by the Institute for Policy and Social Research at Michigan State University, which conducts quarterly surveys of Michigan residents on a wide variety of topics
- Build on the extensive survey work related to offshore wind (such as factors influencing public opinion, impacts on tourism) conducted by the University of Delaware and by entities in Europe to craft survey tools for Michigan
- Address how survey results are disseminated, including ways to help inform policymakers and individuals working on education and outreach on this topic

Information Exchange and Sharing

Michigan should secure and allocate resources to create a “one-stop” website with all the necessary information related to offshore wind development in Michigan for developers, agencies, the public, and other stakeholders.

- This website should include summary and detailed information on the applicable laws and regulations, including those under development, as well as additional background materials and permitting information on specific projects. The project-specific information should include permit applications, draft agency documents or issuances, and other publicly available materials about proposed projects, as well as a list of agencies involved and corresponding processes, timelines, and contacts.
- The state should provide initial seed funding to support the effort. The website could be hosted by an existing state agency or independent organization and funded, at least in part, by royalty revenues.
- Prior to establishment of a centralized, well-maintained, and easy-to-use website, agencies should clearly post on their websites procedural and technical information related to applicable requirements and any specific projects under review. If the information is publicly available (that is, not protected due to proprietary or security reasons), it should be available online in a readily accessible format.

PUBLIC ENGAGEMENT IN PERMITTING

The state’s existing public engagement provisions for conveyance and permitting of Great Lakes bottomlands, as set forth under Part 325 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and accompanying Michigan Department of Environmental Quality (MDEQ) rules, have traditionally been used for projects that are tied directly to the upland property, such as marinas and docks. These provisions are not suited for offshore wind development due to the complexity of the issues and broad interests at stake. Among other limitations, the notice, timelines, and opportunities for comment under Part 325 may be insufficient, especially considering the expected level of public interest in the topic.

Recommendations

The council recommends the following framework for public engagement as part of the state’s permitting process for offshore wind. These recommendations could be applied regardless of whether Michigan amends Part 325 or enacts a new law specifically governing offshore wind development, or does both.

General

- Any legislation governing offshore wind siting should include clear, equitable, and reasonable requirements for public participation.
- The state public engagement provisions for permitting and conveyance of Great Lakes bottomlands and any other regulatory review or approval processes for specific offshore wind proposals and related infrastructure should be coordinated and, where practical, concurrent with those of other state and federal agencies (for example, the, Federal Aviation Administration, Federal Communications Commission, U.S. Coast Guard/Department of Homeland Security, U.S. Army Corps of Engineers, Michigan

Public Service Commission). Coordination among agencies should be both formal and informal and should specifically focus on the alignment of communications and timelines related to public engagement to avoid potential confusion and delay caused by multiple processes with different timelines.²¹

- The governor should collaborate with neighboring states to call on the federal government to ensure that the lead federal agency, the U.S. Army Corps of Engineers, coordinates any federal review processes, permits, or approvals, including potential review under the National Environmental Policy Act, with the individual states' processes to authorize offshore wind development in the Great Lakes. Such coordination and designation of roles could be accomplished through a memorandum of understanding or programmatic environmental impact statement, as recommended above.
- Legislation should include explicit decision-making criteria to permit offshore wind and determine appropriate compensation for this new use of bottomlands to avoid some controversy and challenges over the appropriate standards and their application.
- Agencies and other organizations should educate the public on the permit criteria and processes to ensure that the public can provide specific and relevant comments and information in response to regulatory filings. Without such education, the public input process may have little impact on agency decision making.

Pre-filing process

- Before any filings are made with regulatory agencies, developers should be strongly encouraged to hold meetings with local, Tribal, state, and federal officials and the general public.²² This could include open houses with the public to solicit input and provide an opportunity for experts to interact with the public. Pre-filing meetings could include visual simulations of the proposed wind farm development to illustrate the potential impact on the landscape.
- After receipt of a developer's site nomination, or after the state's initial identification of potential sites for lease through a public auction process, as applicable, the state should hold at least one public hearing in the area of the proposed site(s) to take public comment. All interested agencies, as well as local and Tribal governments, will be encouraged to attend. The site nomination should be accompanied by a reasonable fee to cover the agency's cost associated with the hearing, including notice. After completion of the public hearing process, the state may issue a notice of intent to accept bids for the permitting and leasing of a proposed site for site assessment purposes.

Notice and Hearing Requirements for Site Assessment Activities

- Based on the state's review of bid(s) received in response to the notice of intent, the responsible agency should issue for public comment a draft permit and lease for the

²¹ The Part 325 process is currently administered by the MDEQ under a joint permitting process with the U.S. Army Corps of Engineers, which has responsibilities under the Rivers and Harbors Act, the Clean Water Act, the National Historic Preservation Act, and other laws. Some coordination already occurs, but additional federal agencies, such as the Coast Guard and Federal Aviation Administration, may have larger roles in the siting of an offshore wind project.

²² See, for example, the British Department for Trade and Industry *Guidance Notes* (DTI, March 2004).

preliminary site assessment activities at the applicable site(s). The draft permit and lease should contain the terms and conditions under which site assessment activities are conducted, as well as any compensation to the state for the use and occupation of the bottomlands. The state should be required to hold at least one public hearing in Lansing and one public hearing in the county nearest to the proposed development. While the initial permit and lease issued for site assessment activities would be final agency decisions, they would not authorize construction or operation of the offshore wind project.

Application, Notice, and Hearing Requirements for Construction and Operation Activities

- After completion of the necessary site assessment activities, the developer may file a full application for a permit and conveyance to construct and operate the offshore wind project. Among other items contained in the application, the developer should provide:
 - A detailed project description with a summary of the expected benefits and impacts, as well as a description of the applicant's efforts to identify all parties of interest and its outreach efforts (such as meetings, open houses) prior to the filing of the application.
 - A description of all other approvals by local, state, and federal agencies that have been received or will be needed. (Part 325 requires the applicant to obtain written consent from a local government for installations and bottomland occupations at the shoreline; this provision should not apply to offshore wind development.)
 - Proposed notice to be approved by the responsible agency based on guidelines set forth in the applicable law or rules.
- After the responsible agency approves the form of the proposed public notice, the applicant will be responsible for providing the public notice through newspapers of statewide circulation. In addition, the applicant should provide direct notice to coastal jurisdictions in the two or three counties nearest to the proposed development, as well as neighboring landowners. The state should also provide notice of the application through its regular publications and website. The notice requirements should reflect the unique local interests near a proposed development as well as the broad set of other affected interests.
- The comment period on the application should be extended beyond 20 days to at least 90 days from the date of the public notice.
- Public hearings on the application should be required. After receipt of the complete application, the state should be required to hold at least one public hearing in Lansing and one public hearing in the county nearest to the proposed development.
- Prior to issuing a lease agreement and in order to provide guidance to developers, the responsible agency should be required to consult with local and Tribal governments and the public near the proposed development as part of the permitting and conveyance processes.
- In addition to holding public hearings on any application, the agencies directly involved should hold a public hearing and comment period for any draft permit or

conveyance document (e.g., lease agreement). The public comment period should remain open for 30 days beyond the last public hearing.

- Like other permits issued by the state, the agency decision should be subject to review under the Administrative Procedures Act if it is challenged by an aggrieved party.

Conclusion

Offshore wind power has the potential to add to a growing portfolio of renewable energy sources in Michigan and the Great Lakes basin, and provide benefits to the state in terms of “green” jobs, energy security, environmental protection, and diversification of the economy. In an effort to determine the geographic areas that might accommodate future offshore wind power development in Michigan, the Great Lakes Wind Council is recommending criteria for mapping areas that are most favorable for wind turbine placement, along with areas that should be categorically excluded.

The council is also recommending permitting criteria, a public engagement process, and changes to legislation and administrative rules and policies to establish a clear process for siting offshore wind energy in the state. The council’s recommendations, if implemented through new legislation and other policies and practices, should provide greater certainty for developers, agencies, and the public on this important topic. Two key recommendations to advance the near-term development of offshore wind in Michigan are

- creation of a one-stop clearinghouse to facilitate timely permitting, effective information dissemination, and overall coordination of government activities, and
- identification of some of the larger contiguous geographic areas that are most favorable to offshore wind development.

The implementation of these two recommendations will help focus Michigan’s public policy conversation and make the state more competitive compared to the other places around the world where investment in offshore wind is being considered.

FUTURE ROLE OF COUNCIL

There are a number of near-term efforts that should be undertaken to better understand the potential of offshore wind in the state and related economic, environmental, and social considerations. The council believes that it should continue to serve in an advisory capacity to the Michigan Department of Energy, Labor & Economic Growth (DELEG) beyond September 1, 2009, to provide strategic input and guidance on the following activities over the next year.

First six months (September 1, 2009–February 28, 2010)

- Work with the Institute for Fisheries Research and others to refine the mapping tool and identify several large areas that are the most favorable locations for offshore wind development based on the application of the council’s criteria and the best available data. Part of this effort should focus on how to integrate Tribal cultural resources into the mapping process without compromising the private nature of such information.
- Solicit feedback from the public on the identified locations and this report through public meetings around the state; comments could also be provided through an online form or other means.
- Work with legal and technical experts to develop model lease and solicitation documents and review recommendations of the council.

- Provide input on the scope and process for a baseline environmental study in targeted locations, as well as potential placement of wind monitoring towers (discussed further below).
- Serve as a resource in reviewing drafts of legislation.
- Identify research needs and priorities and devise a strategy to better position Michigan to receive vital public and private funding for offshore wind energy in the areas of education, research, engineering, manufacturing and business development, and worker training.

Next six months (March 1, 2010–August 31, 2010)

- Further refine the list of potential lease areas based on more rigorous analysis and input from the public. Prepare to offer these areas for lease when new legislation is adopted.
- Provide direction to a multidisciplinary team on the development of a targeted public opinion and engagement research plan related to offshore wind development, as well as land-based wind energy development in coastal areas.
- Support and provide guidance to the State Wind Outreach Team in developing outreach and education plan related to offshore wind energy.

It would be appropriate to revisit council’s role in nine months to determine whether it should continue beyond September 1, 2010.

ADDITIONAL NEXT STEPS

The implementation of the council’s recommendations in this report and additional efforts in the coming months may eliminate or diminish some barriers to the development of offshore wind, reduce risks inherent in these activities, and identify a path toward development. Nevertheless, some obstacles may remain. Although the council was not charged with examining the economic constraints or the financial viability of offshore wind, it recognizes that these will be key considerations and that some form of incentive or direct market involvement will likely be necessary if the state wants to attract this industry and the associated jobs and investment in the near term (USDOE 2008). Incentives could be structured in a number of different ways through lease payments, public-private partnerships in infrastructure, tax incentives, grants, ratemaking incentives, pricing, cost recovery guarantees, alteration of the renewable energy standard, or acquisition of renewable energy for public entities. Any incentive structure should be carefully examined, however, to ensure that the benefits outweigh the costs and that public funds are appropriately invested to achieve the desired outcome for the state.

Therefore, the council recommends that DELEG work with the Michigan Public Service Commission to convene a forum on offshore wind costs and benefits, as well as model incentive structures and leasing revenue potential under different scenarios (for example, carbon restrictions, national renewable portfolio standard) and report back to the council within one year.

Additional activities that would provide valuable information and help define the path forward for policy makers, industry, and the public include the following:

- Secure public and private resources, including potential federal funds, to install a select number of wind monitoring towers in the lakes. These could be located in areas identified through the mapping, outreach, and data collection efforts discussed above.
- Conduct focused research on economic impacts and barriers, supply-chain implications, tourism and offshore wind interactions, deep-water technologies, turbine performance in fresh water, and other technologies (such as energy storage, installation vessels, hydrokinetics) that could increase the feasibility and financial viability of offshore wind in the Great Lakes. Michigan universities should build on their existing assets and be leaders in these research areas.
- Commission a targeted baseline environmental study on aquatic and avian impacts, including migratory pathways, and other appropriate environmental assessments that would inform state and federal agencies, developers, and stakeholders. Input on the design of such a study should be solicited from all levels of government, the public, and other stakeholders. Results should be publicly available and integrated with continued efforts to identify the most and least desirable areas for offshore wind development. The effort should be coordinated with other research and initiatives through appropriate forums such as the Great Lakes Wind Collaborative, U.S. Offshore Wind Collaborative, and the American Wind Wildlife Institute. The state should explore approaches to secure funding from various sources, including federal funds, foundations, and industry consortiums.
- Connect with other renewable energy initiatives in the Great Lakes to share information and leverage resources. To be a leader in this area, Michigan should plug into the extensive knowledge and communication networks of public and private agencies in the Great Lakes region.

References

- Adelaja, Adesoji, and Charles McKeown. September 30, 2008. *Michigan's Offshore Wind Potential*. Report HPRP-2008-Renewable Energy-003. East Lansing, Mich.: Land Policy Institute, Michigan State University. [Online, accessed 7/2/09.] Available:
http://www.landpolicy.msu.edu/modules.php?name=News&op=viewlive&sp_id=71.
- Black's Law Dictionary*, 7th ed. 1999. St. Paul, Minn.: West Group.
- COWRIE (Collaborative Offshore Wind Research Into The Environment). 2008. Offshore Windfarms Putting Energy into the UK. [Online, accessed 7/2/09.] Available: <http://www.offshorewindfarms.co.uk/Pages/COWRIE/>.
- DONG Energy, Vattenfall, The Danish Energy Authority, and the Danish Forest and Nature Conservancy. *Danish Offshore Wind: Key Environmental Issues*. November 2006. [Online, accessed 4/16/09.] Available: http://www.ens.dk/graphics/Publikationer/Havvindmoeller/havvindmoellebog_nov_2006_skrm.pdf.
- Department for Trade and Industry (DTI). March 2004, updated August 2004. *Guidance Notes: Offshore Wind Farm Consents Process*. London: DTI. [Online, accessed 7/2/09.] Available: <http://www.berr.gov.uk/files/file22990.pdf>.
- European Wind Energy Association (EWEA). 2009. *Offshore Statistics January 2009*. [Online, accessed 7/2/09.] Available: http://www.ewec2009.info/fileadmin/ewec2009_files/documents/Media_room/Offshore_Wind_Farms_2008.pdf.
- Executive Order 13186. 2001. Responsibilities of Federal Agencies to Protect Migratory Birds. *Federal Register* 66, no. 11 (January 17, 2001): 3853. [Online, accessed 7/2/09.] Available: <http://www.epa.gov/owow/wetlands/regs/eo13186.pdf>.
- Geo-Marine Inc. (GMI). October 30, 2007. GMI Awarded New Jersey Ocean/Wind Power Ecological Baseline Studies. [Online, accessed 7/2/09.] Available: http://www.geo-marine.com/7_NJ_wind_power.htm.
- Henderson, A. R., C. Morgan, and B. Smith. 2001. *Offshore Wind Energy in Europe*. Proc. of 23rd Annual British Wind Energy Association Conference, Brighton, UK.
- Helimax Energy Inc. April 2008. Analysis of Future Offshore Wind Farm Development in Ontario. [Online, accessed 7/1/09.] Available: http://www.powerauthority.on.ca/Storage/69/6446_D-5-2_Att_1_Helimax_Analysis_FINAL.pdf.
- Isely, Elaine Sterrett, and Victoria Pebbles. 2009. U.S. Great Lakes Policy and Management: A Comparative Analysis of Eight States' Coastal and Submerged Lands Programs and Policies. *Coastal Management* 37(2): 197–213.
- Klein, Arne, Anne Held, Mario Ragwitz, Gustav Resch, and Thomas Faber. N.d. *Evaluation of different feed-in tariff design options—Best practice paper for the International Feed-in Cooperation*. A research paper funded by the Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). [Online,

- accessed 8/11/09.] Available: http://www.worldfuturecouncil.org/fileadmin/user_upload/Miguel/best_practice_paper_final.pdf.
- Klepinger, M. May 2008. *Michigan Great Lakes Offshore Wind Permitting Dry Run, Final Report* [Online, accessed 7/1/09.] Available: http://www.michigan.gov/documents/dleg/Report_on_Dry_Run_with_applns_252813_7.pdf.
- Massachusetts Executive Office of Energy and Environmental Affairs. May 28, 2009. *Siting Siting Board Grants State, Local Permits to Cape Wind* (press release). [Online, accessed 7/2/09.] Available: http://www.mass.gov/?pageID=eoeepressrelease&L=1&L0=Home&sid=Eoeea&b=pressrelease&f=090528_pr_cape_wind&csid=Eoeea.
- Michigan Administrative Code* R322.1001 et seq., Great Lakes Submerged Lands. [Online, accessed 7/6/09.] Available: http://www.state.mi.us/orr/emi/admincode.asp?AdminCode=Single&Admin_Num=32201001&Dpt=&RngHigh=32599408.
- Michigan Compiled Laws* (MCL) sec. 324.32501-324.32516, Great Lakes Submerged Lands, Part 325 of Act 451 of 1994, Natural Resources and Environmental Protection Act (NREPA) as amended. [Online, accessed 7-6-09.] Available: [http://www.legislature.mi.gov/\(S\(nmhreu3pje1qv4515sjxe45\)\)/mileg.aspx?page=getobject&objectname=mcl-451-1994-iii-1-the-great-lakes-325](http://www.legislature.mi.gov/(S(nmhreu3pje1qv4515sjxe45))/mileg.aspx?page=getobject&objectname=mcl-451-1994-iii-1-the-great-lakes-325).
- Michigan Department of Energy, Labor & Economic Growth (MDELEG). 2009. *Michigan Wind Energy Resource Maps*. Data from AWS Truewind and U.S. Department of Energy, National Renewable Energy Laboratory, 2004. [Online, accessed 7/1/09.] Available: http://www.michigan.gov/dleg/0,1607,7-154-25676_25774-101765--,00.html.
- Michigan Department of Environmental Quality (MDEQ). 2008. *MDEQ/USACE Joint Permit Application*. [Online, accessed 7/1/09.] Available: http://www.michigan.gov/deq/0,1607,7-135-3307_29692_24403---,00.html.
- . N.D. *Great Lakes Bottomland Conveyances*. [Online, accessed 7/1/09.] Available: http://www.michigan.gov/deq/0,1607,7-135-3313_3677_3702-10865--,00.html.
- Michigan Office of the Governor, February 6, 2009. *Executive Order 2009-1, Department of Energy, Labor and Economic Growth Great Lakes Wind Council*. [Online, accessed 7/1/09.] Available: <http://www.michigan.gov/gov/0,1607,7-168-21975-208366--,00.html>.
- National Renewable Energy Laboratory (NREL). 2009. *Wind Research*. [Online, accessed 7/1/09.] Available: <http://www.nrel.gov/wind/>.
- New Jersey Office of the Governor. June 23, 2009. *Governor Corzine Lauds release of Windpower Leases* (press release). [Online, accessed 7/1/09.] Available: <http://www.state.nj.us/governor/news/news/2009/approved/20090623a.html>.
- Offshore Wind.net. 2009. *North American Offshore Wind Project Information*. Map of Offshore Wind Energy Activity in North America. [Online, accessed 7/8/09.] Available: <http://offshorewind.net/index.html>.

- Ohio Department of Natural Resources (ODNR), Office of Coastal Management. April 2009. Wind Turbine Placement Favorability Analysis Map. Sandusky, Ohio: ODNR. [Online, accessed 7/1/09.] Available: <http://www.dnr.state.oh.us/LakeErie/WindEnergyRules/tabid/21234/Default.aspx>.
- Ram, Bonnie. 2004. Offshore Wind Development in the United States; Institutional Issues, Environmental Regulations, and Jurisdictions. Paper presented at World Renewable Energy Congress VIII, Denver, Colorado, August 28–September 3, 2004. [Online, accessed 7/1/09.] Available: http://www.energetics.com/pdfs/renewables/wind_analysis.pdf.
- Rundle, Elaine. October 9, 2008. Offshore Wind Power Technology on New Jersey's Horizon, *Government Technology*. [Online, accessed 7/1/09.] Available: <http://www.govtech.com/gt/420593?topic=290183>.
- Schwarz, Virginie. May 2008. *Promotion of Wind Energy: Lessons Learned from International Experience and UNDP-GEF Projects*. May 2008. Prepared for the United Nations Development Program, Bureau for Development Policy, Energy and Environment Group under the supervision of Marcel Alers. New York: United Nations Development Programme, Bureau for Development Policy, Environment and Energy Group. [Online, accessed 7/1/09.] Available: http://www.indiaenvironmentportal.org.in/sites/cse/files/6_0.pdf.
- Soder, Chuck. May 1, 2009. Wind Power Initiative on Lake Erie Passes Feasibility Test, *Crain's Cleveland Business*. [Online, accessed 7/1/09.] Available: <http://www.crainscleveland.com/article/20090501/FREE/905019949>.
- University of Delaware, College of Marine and Earth Studies. N.D. Offshore Wind Power–Delaware Offshore Wind Project. [Online, accessed 7/1/09.] Available: <http://www.ceoe.udel.edu/Windpower/deproject.html>.
- U.S. Department of Energy (USDOE). April 29, 2009. Efficiency and Renewable Energy, EERE News website, *Interior Department Sets Rules for Offshore Wind Energy Projects*. [Online, accessed 7/1/09.] Available: http://apps1.eere.energy.gov/news/news_detail.cfm/news_id=12477.
- . July 2008. *20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply*. DOE/GO-102008-2567. [Online, accessed 7/1/09.] Available: <http://www1.eere.energy.gov/windandhydro/pdfs/41869.pdf>.
- U.S. Department of Energy (USDOE), Energy Information Administration (EIA). 2009. *Table F13a: Electricity Consumption Estimates by Sector, 2007*. [Online, accessed 7/1/09.] Available: http://www.eia.doe.gov/emeu/states/sep_fuel/html/pdf/fuel_use_es.pdf.
- U.S. Department of the Interior (USDOI), Bureau of Land Management (BLM). June 2005. *Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States*. Washington, D.C.: USDOI/BLM. [Online, accessed 7/1/09.] Available: <http://windeis.anl.gov/documents/fpeis/index.cfm>.

- U.S. Department of the Interior (USDOI), Minerals Management Service (MMS). 2009. 30 CFR parts 250, 285, and 290, Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf; Final Rule. *Federal Register* 74, no. 81 (April 29, 2009): 19638.
- . June 23, 2009. Secretary Salazar Announces Five Exploratory Leases for Offshore Wind Energy Development off Coasts of New Jersey and Delaware (press release). [Online, accessed 7/1/09.] Available: <http://www.mms.gov/ooc/press/2009/press0623.htm>.
- . January 2009. *Cape Wind Energy Project Final Environmental Impact Statement*, Volume I of 3. MMS EIS-EA OCS Publication No. 2008-040. [Online, accessed 7/1/09.] Available: <http://www.mms.gov/offshore/AlternativeEnergy/PDFs/FEIS/Cape%20Wind%20Energy%20Project%20FEIS.pdf>. This report can be viewed by section at: <http://www.mms.gov/offshore/AlternativeEnergy/CapeWindfeis.htm>.
- U.S. Offshore Wind Collaborative. September 2008. Status of US Offshore Wind Development Activity by State. [Online, accessed 7/1/09.] Available: <http://www.usowc.org/pdfs/Stateoffs>.
- Wind Energy Systems Technology. N.D. Wind Farm Updates [Online, accessed 7/81/09.] Available: <http://www.windenergypartners.biz/windfarm.html>.

Appendix A:

Executive Order 2009-1, Department of Energy, Labor, and Economic Growth Great Lakes Wind Council

WHEREAS, Section 1 of Article V of the Michigan Constitution of 1963 vests the executive power of the State of Michigan in the Governor;

WHEREAS, Section 52 of Article IV of the Michigan Constitution of 1963 provides that “[t]he conservation and development of the natural resources of the state are hereby declared to be matters of paramount public concern in the interest of the health, safety, and general welfare of the people”;

WHEREAS, the Great Lakes are Michigan’s most precious natural resource and the government of this state has a solemn, perpetual, fiduciary responsibility to protect and preserve the waters of the Great Lakes in public trust for the citizens of Michigan;

WHEREAS, the Great Lakes provide tremendous economic value to the citizens of Michigan in the tourism, recreation, fishing, and shipping industries;

WHEREAS, the availability, consistency, and velocity of wind in the Great Lakes makes their waters uniquely attractive to wind energy developers seeking to build offshore wind energy systems;

WHEREAS, Michigan State University’s Land Policy Institute recently issued a study determining that Michigan could produce a significant amount of electric generating capacity from offshore wind energy systems in the Great Lakes;

WHEREAS, wind developers are currently exploring offshore wind energy projects in many states, including in the Great Lakes waters of New York, Ohio, Ontario, and Wisconsin;

WHEREAS, the State of Michigan holds title to approximately 40% of the bottomlands of the Great Lakes;

WHEREAS, it is likely that in the near future wind energy developers will approach the State of Michigan with proposals to build offshore wind energy systems in the Great Lakes;

WHEREAS, Michigan does not currently have established criteria to govern the siting of offshore wind energy systems;

WHEREAS, Michigan must proactively prepare for the possibility of wind energy systems in the Great Lakes by ensuring that wind energy systems are not constructed in locations that would unduly impact Michigan’s tourism, recreation, shipping, or fishing industries, its wildlife populations, its property values, or its citizens’ quality of life;

WHEREAS, if developed properly, offshore wind energy systems in a very small portion of Michigan’s vast share of the Great Lakes could provide a significant portion of

Michigan's and the Midwest's electricity needs, improve Michigan's economy, and create jobs in this state;

WHEREAS, electricity generation from coal-fired power plants is a significant source of mercury, sulfur dioxide, and greenhouse gases that are harmful to the Great Lakes, while wind energy systems produce zero emissions of mercury, sulfur dioxide, and greenhouse gases;

WHEREAS, wind power is currently cost-competitive with other new sources of electricity generation, making wind power the fastest growing renewable energy resource in the United States and creating tens of thousands of jobs in this industry;

WHEREAS, because of the significant costs of transporting enormous utility-scale wind turbines, wind turbine manufacturers typically invest in manufacturing facilities in regions that have significant local markets for their products;

WHEREAS, the U.S. Department of Energy recently cited a study showing that Michigan is one of the top four states to expand jobs in wind turbine manufacturing, with a job creation potential of over 30,000 jobs;

WHEREAS, Michigan already is home to dozens of companies in the wind energy industry, and hundreds more Michigan companies are exploring expansions in this industry;

WHEREAS, a Great Lakes Wind Council would provide the citizens of Michigan with a public forum to begin to answer important questions about where in the Great Lakes wind energy systems might be prudently sited and where wind energy systems should never be sited;

NOW, THEREFORE, I, Jennifer M. Granholm, Governor of the State of Michigan, by virtue of the power and authority vested in the Governor by the Michigan Constitution of 1963 and Michigan law, order the following:

I. DEFINITIONS

As used in this Order:

- A. "Department of Energy, Labor, and Economic Growth" or "Department" means the principal department of state government created by Section 225 of the Executive Organization Act of 1965, 1965 PA 380, MCL 16.325, and renamed by Executive Order 1996-2, MCL 445.2001, by Executive Order 2003-18, MCL 445.2011, and by Executive Order 2008-20.
- B. "Council" means the Great Lakes Wind Council created under Section II of this Order.

II. CREATION OF THE GREAT LAKES WIND COUNCIL

- A. The Michigan Great Lakes Wind Council is created as an advisory body within the Department of Energy, Labor, and Economic Growth.

- B. The Council shall consist of the following voting members:
1. The Director of the Department of Energy, Labor, and Economic Growth, or his or her designee.
 2. The Director of the Department of Environmental Quality, or his or her designee.
 3. The Director of the Department of Natural Resources, or his or her designee.
 4. The Director of the Department of Transportation, or his or her designee.
 5. The Director of the Department of History, Arts, and Libraries, or his or her designee.
 6. The President of the Michigan Strategic Fund, or his or her designee.
 7. The Chairperson of the Michigan Public Service Commission, or his or her designee.
 8. The Director of the Office of the Great Lakes, or his or her designee.
 9. The following members appointed by the Governor:
 - a. One resident of this state representing a statewide environmental organization.
 - b. One resident of this state representing the tourism industry.
 - c. One resident of this state representing the commercial shipping industry.
 - d. One resident of this state representing the charter fishing industry.
 - e. Two residents of this state representing electric utilities.
 - f. One resident of this state representing independent electric transmission companies.
 - g. One resident of this state representing the wind energy development industry.
 - h. One resident of this state representing Native American tribal governments.
 - i. One resident of this state representing local government officials.
 - j. Three other residents of this state.
- C. Members of the Council shall serve until September 1, 2009.
- D. A vacancy on the Council shall be filled in the same manner as the original appointment.
- E. The Director of the Department, or his or her designee, shall serve as the Chairperson of the Council. The Council shall elect a member of the Council to serve as Vice-Chairperson of the Council.

III. CHARGE TO THE COUNCIL

- A. The Council shall act in an advisory capacity and shall do all of the following:
1. Identify criteria that can be used to review applications for offshore wind development.
 2. Identify criteria for identifying and mapping areas that should be categorically excluded from offshore wind development as well as those areas that are most favorable to such development, and provide these criteria in a report to the Governor by September 1, 2009.
 3. The Council's report shall include, but not be limited to, the following:
 - a. A recommended process for engaging the people of Michigan in a public dialogue about offshore wind to ensure that statewide interests are considered whenever significant permitting decisions are made.
 - b. A summary of lessons learned from American and international offshore experience related to public policy, regulatory, and siting concerns for offshore wind development.
 - c. Options for how the public could be compensated for bottomland leasing and wind rights for wind energy systems.
 - d. Recommendations for legislation and for changes in administrative rules and policies related to the siting and development of offshore wind energy systems.
 - e. A recommendation as to whether Michigan should support the preparation of a programmatic environmental impact statement by the federal government for permitting offshore wind development in the Great Lakes basin.
 - f. An estimate of the costs and description of the benefits of continuing the work of the Council, if the Council deems it advisable.
 4. Other functions related to the Council's responsibilities as requested by the Governor.
 5. The Council shall complete its work by September 1, 2009.

IV. OPERATIONS OF THE COUNCIL

- A. The Council shall be staffed and assisted by personnel from the Department, subject to available funding. Any budgeting, procurement, or related management functions of the Council shall be performed under the direction and supervision of the Director of the Department.
- B. The Council shall adopt procedures consistent with Michigan law and this Order governing its organization and operations.

- C. A majority of the members of the Council serving constitutes a quorum for the transaction of the Council's business. The Council shall act by a majority vote of its serving members.
- D. The Council shall meet at the call of the Chairperson and as may be provided in procedures adopted by the Council.
- E. The Council may establish advisory workgroups composed of representatives of entities participating in Council activities or others deemed necessary by the Council to assist the Council in performing its duties and responsibilities. Such members may include representatives from industry and the academic community, as well as individuals representing U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the U.S. Department of the Interior, the National Oceanic and Atmospheric Administration, the Federal Aviation Administration, and the U.S. Coast Guard. The Council may adopt, reject, or modify any recommendations proposed by an advisory workgroup.
- F. The Council may, as appropriate, make inquiries, studies, investigations, hold hearings, and receive comments from the public. The Council may also consult with outside experts in order to perform its duties, including, but not limited to, experts in the private sector, organized labor, government agencies, and at institutions of higher education.
- G. Members of the Council shall serve without compensation. Members of the Council may receive reimbursement for necessary travel and expenses consistent with relevant statutes and the rules and procedures of the Civil Service Commission and the Department of Management and Budget, subject to available funding.
- H. The Council may hire or retain contractors, sub-contractors, advisors, consultants, and agents, and may make and enter into contracts necessary or incidental to the exercise of the powers of the Council and the performance of its duties as the Director of the Department deems advisable and necessary, in accordance with this Order, the relevant statutes, and the rules and procedures of the Civil Service Commission and the Department of Management and Budget.
- I. The Council may accept donations of labor, services, or other things of value from any public or private agency or person.
- J. Members of the Council shall refer all legal, legislative, and media contacts to the Department.

V. MISCELLANEOUS

- A. All departments, committees, commissioners, or officers of this state, or of any political subdivision of this state, shall give to the Council or to any member or representative of the Council, any necessary assistance required by the Council or any member or representative of the Council, in the performance of the duties of the Council so far as is compatible with its, his, or her duties. Free access shall also be given to any books, records, or documents in its, his, or her custody, relating to matters within the scope of inquiry, study, or review of the Council.

- B. This Order shall not abate any suit, action, or other proceeding lawfully commenced by, against, or before any entity affected under this Order. Any suit, action, or other proceeding may be maintained by, against, or before the appropriate successor of any entity affected under this Order.
- C. The invalidity of any portion of this Order shall not affect the validity of the remainder of the Order, which may be given effect without any invalid portion. Any portion of this Order found invalid by a court or other entity with proper jurisdiction shall be severable from the remaining portions of this Order.
- D. This Order is effective upon filing.

Given under my hand and the Great Seal of the State of Michigan this 6th day of February in the year of our Lord, two thousand nine.

JENNIFER M. GRANHOLM
GOVERNOR

BY THE GOVERNOR:

Secretary of State

Appendix B:

Protocol for Operations of the Michigan Great Lakes Wind Council

COUNCIL MEETINGS

- Meetings will begin on time.
- Council members should be present at scheduled meetings to assure continuity. If necessary, alternates may sit in the place of a council member.
- A website (www.michiganglowcouncil.org) will be provided where meeting schedules and meeting summaries will be posted, as well as background materials and press releases.
- Meeting summaries will be e-mailed to council members and posted to the council website. Council members' comments will not be attributed in the summaries.
- The council will work toward general consensus recommendations (a consensus-reaching process document will be distributed during the recommendations phase).
- Minority reports will not be contained in the final report of the council.
- Meetings will be open to the public and council documents will be available to the public on the council website.
- E-mail will be the primary means of communications to council members. Please make sure that PSC, Mikinetics, and DELEG have your current e-mail address.

DISCUSSION GUIDELINES

- We will acknowledge one another as equals in the discussion.
- We will stay open to each other's perspective.
- We will not criticize the ideas of another, but will offer our own ideas that might be different.
- We will slow down so we have time to think and reflect.
- We will remember that this process allows us to think together and expect the process to be messy at times, particularly given the complexity of the issues with which the council will be grappling.
- We will stay focused on the charge set forth in the Executive Order.

PUBLIC COMMENTS

- Public comments will be received at the end of each council meeting.
- Persons desiring to provide input will be restricted in the time allowed based upon the number of people desiring to speak.
- Each person desiring to offer input will be requested to fill out a public comment card and provide it to council staff prior to the start of the public comment period.
- Public comments will also be received in writing:
 - Online: www.michiganglowcouncil.org (click on Public Questionnaire)

- Facsimile: (517) 484-6549
 - Mail: Michigan Great Lakes Wind Council
c/o Public Sector Consultants Inc.
600 W. Saint Joseph St., Suite 10
Lansing, MI 48933
 - E-mail: *info@michiganglowcouncil.org*
- All comments received will be reviewed and considered, but **will not** receive a personal reply.
 - Summaries of public comments will be included in the meeting summary.

Appendix C:

Annotated List of Offshore Great Lakes Wind-Siting Authorities¹

During the 2008 dry run exercise, federal and state regulatory agencies were asked to cite the authorities they relied upon when considering the mocked-up offshore permit applications. The annotated list below (sorted by agency, law, and program) reflects agency input adapted from the dry run project; it has not been reviewed or approved by agency attorneys.

A. The Michigan Department of Environmental Quality (MDEQ)

MDEQ's current regulatory authority related to offshore wind-energy facility siting derives from constitutional and statutory laws and implementing regulations, as well as common law that has been established and refined over the years to protect the Great Lakes in accordance with the public-trust doctrine. The agency's responsibilities arise from the Constitution and the following laws:

(1) Michigan Constitution, Article 4, Section 52:

The conservation and development of the natural resources of the state are hereby declared to be of paramount public concern in the interest of the health, safety and general welfare of the people. The legislature shall provide for the protection of the air, water and other natural resources of the state from pollution, impairment and destruction.

(2) Michigan Natural Resource and Environmental Protection Act (NREPA), Great Lakes Submerged Lands, Part 325, M.C.L. 324.32501 *et seq.*:

A permit is required for all filling, dredging, and placement of permanent structures (i.e., groins, docks, piers, pilings, etc.) below the "ordinary high water mark" and on all upland channels extending landward of the "ordinary high water mark" of the Great Lakes.

This law and the subsequent Administrative Rule 322.1001 *et seq.* established the MDEQ "joint permit" process with USACE for all Great Lakes bottomland alteration projects and conveyances. Permit review and issuance follows a sequence process that encourages avoidance of impacts, followed by minimizing impacts and, finally, requiring mitigation for unavoidable impacts to the aquatic environment.

¹ Adapted from excerpt of M. Klepinger, *Michigan Great Lakes Offshore Wind Permitting Dry Run, Final Report* [online, accessed 7/1/09]. Available: http://www.michigan.gov/documents/dleg/Report_on_Dry_Run_with_applns_252813_7.pdf.

(3) The Michigan Department of Natural Resources (MDNR) has broad resource management responsibilities across the Great Lakes. These are derived some several authorities, including the Michigan Constitution (as above), statutory law, treaties, court orders, and the public-trust doctrine. MDEQ would be required to seek MDNR review during an offshore wind-development joint-permit process or a bottomland conveyance process. The MDNR exercises statutory authority under NREPA:

- Part 365, Endangered Species Protection
- Part 401, Wildlife Conservation
- Part 473, Commercial Fishing
- Part 801, Marine Safety

The State is bound by a 2000 consent decree on the waters of the Great Lakes under the tribal Treaty of 1836 (a.k.a. the Treaty of Washington, or the Treaty of March 28, 1836. 7 Stat. 491) in which five tribes ceded certain lands to the United States. Among other things, the consent decree requires lakewide management and rehabilitation of lake trout.

Michigan, like the other Great Lakes states, is bound by the Great Lakes Basin Compact (PL 90-419). The compact's purposes are:

1. To promote the orderly, integrated, and comprehensive development, use, and conservation of the water resources of the Great Lakes Basin (Basin).
2. To plan for the welfare and development of the water resources of the Basin as a whole as well as for those portions of the Basin that may have problems of special concern.
3. To make it possible for the States of the Basin and their people to derive the maximum benefit from utilization of public works, in the form of navigational aids or otherwise, which may exist or which may be constructed.
4. To advise in securing and maintaining a proper balance among industrial, commercial, agricultural, water supply, residential, recreational, and other legitimate uses of the water resources of the Basin.
5. To establish and maintain an intergovernmental agency to the end that the purposes of this compact may be accomplished more effectively.

In 1954 the Convention on Great Lakes Fisheries (Great Lakes Fishery Act of 1956) created the Great Lakes Fishery Commission, whose duties include advising the two countries on issues affecting sustainable benefits from fish stocks of common concern. Interstate cooperative objectives are memorialized in the 1980 Joint Strategic Plan to Manage Great Lakes Fisheries, and subsequent plans.

The State of Michigan has assumed from the U.S. Environmental Protection Agency (EPA) the authority to regulate the placement of fill material in waterways and wetlands

under provisions of Section 404(g)(1) of the Clean Water Act of 1977 (33 U.S.C. §1251 et seq.). However, because Section 10 of the Rivers and Harbors Act (discussed below) does not provide for similar transfer to states, the USACE retains Section 404 jurisdiction within the navigable waters of the U.S. and their adjacent wetlands. The discharge of any fill materials must comply with state water quality standards consistent with Sections 301, 307, and 401 of the Clean Water Act. If discharges of “pollutants” are part of the plan, a project would require a surface-water discharge permit under Part 31 of NREPA, MCL 324.3101 *et seq.* and under parallel provisions of the Clean Water Act. It is not clear whether the National Pollutant Discharge Elimination System process would apply.

(4) Michigan Coastal Management Program. The federal Coastal Zone Management Act, (CZMA) 16 U.S.C. §§1451-1465 (2000), requires that any federal action in the coastal zone be consistent with State management plans. A timely objection raised by a State that a project is inconsistent with the State’s coastal management program precludes federal agencies from granting a license or permit for the project unless, on appeal by the applicant or on the Secretary of Commerce’s own initiative, the Secretary overrides the objection because the activity is “consistent with the objectives of the CZMA.” Under the Energy Policy Act of 2005 the Secretary must issue a decision on a CZMA consistency appeal within a maximum of 310 days from the date of the Notice of Appeal. The Michigan Coastal Management Program, which applies many of the above state provisions, does not specifically address energy developments on the Great Lakes.

B. The United States Army Corps of Engineers (USACE)

The USACE regulatory authority related to offshore wind energy facility siting derives primarily from the Rivers and Harbors Act of 1899 and the Clean Water Act, listed below. It is the lead federal partner in MDEQ joint permit processing and also has compliance review responsibilities under Section 106 of the National Historic Preservation Act.

(1) Rivers and Harbors Act of 1899, Section 10. 33 U.S.C. § 403 (2000)

This prohibits the obstruction or alteration of navigable waters of the United States without a permit from the USACE.

(2) Clean Water Act. 33 U.S.C. §1344 (2001)

This prohibits the discharge of dredged or fill material into all waters of the United States, including wetlands, both adjacent and isolated, without a permit. The Corps is responsible for the day-to-day administration and permit review and EPA provides program oversight. The fundamental rationale of the program is that no discharge of dredged or fill material should be permitted if there is a practicable alternative that would be less damaging to aquatic resources or if significant degradation would occur to the nation’s waters.

(3) National Historic Preservation Act, Section 106. 16 U.S.C. § 470 *et seq.* (1966)

This act requires Federal agencies to review all actions that may affect a property listed on the National Register of Historic Places, or that may affect property eligible for listing. The Act functions like NEPA, requiring a determination of the presence of historic items or sites, and an evaluation of the effects of proposed developments on them.

“The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation ... a reasonable opportunity to comment with regard to such undertaking.”

C. The United States Environmental Protection Agency (EPA)

(1) National Environmental Protection Act (NEPA) 42 U.S.C. § 4371 *et seq.* (1969)

NEPA contemplates that a lead federal agency involved in a major undertaking with a significant potential for environmental impacts can do an Environmental Assessment to determine if an Environmental Impact Statement is needed. USACE would identify interested parties to the undertaking while processing the MDEQ joint permit as part of its scoping process. NEPA also requires agencies to consider cumulative impacts of development (positive or negative) on the environment, including impacts on air quality under the Clean Air Act.

(2) Clean Water Act (CWA) 33 U.S.C. §1251 *et seq.* (2001)

The EPA and USACE jointly administer Section 404. EPA may object to or veto a decision. EPA would look to the state DEQ for a determination on the need for an NPDES permit if offshore energy conversion systems (e.g., hydrogen production via electrolysis and resultant hydrogen storage as proposed in the dry run permit application) could result in the discharge of pollutants.

D. The US Fish and Wildlife Service (USFWS)

(1) Fish and Wildlife Coordination Act (FWCA) 16 U.S.C. § 661-667e (1958)

The FWCA provides the basic authority for USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features.

With rising interest in siting wind energy facilities, the Service has issued voluntary Interim Guidelines to avoid and minimize wildlife impacts.² According to the Guidelines,

Birds can strike the towers; electrocutions can occur if designs are poor; and wind farms may impact bird movements, breeding, and habitat use. [Offshore] Collision mortality, while generally unknown, is believed to be small because birds appear to avoid offshore wind farms.³

The Service plans to develop an operations manual for evaluation, site selection, design, construction, operation, and monitoring of wind energy facilities in both terrestrial and aquatic environments.⁴

(2) National Environmental Policy Act (NEPA), 42 U.S.C. § 4371 *et seq.* (1969)

Requires USFWS review and comment on the MDEQ-USACE joint permit per sections 1501.6 (opportunity as a cooperating agency) and section 1503.4 (duty to comment on federally-licensed activities for agencies with jurisdiction by law). USFWS will apply policy and procedures from the following statutes during its review:

-Migratory Bird Treaty Act, 16 U.S.C. §§ 703-712 (1918); Bald and Golden Eagle Protection Act 16 U.S.C. § 668-668-d (1962)

These acts do not specifically allow the Department to provide for unauthorized taking of migratory birds (incidental collisions) but the Department recognizes the need for prosecutorial discretion toward those who have made good faith efforts to avoid the taking of migratory birds [and raptors].⁵

(3) Endangered Species Act 16 U.S.C. §§ 1531-1544 (1973)

Requires USFWS to assist other Federal agencies in ensuring that any action they authorize, implement or fund will not jeopardize the continued existence of a federally endangered or threatened species.

E. The Federal Aviation Administration and the Michigan Department of Transportation

(1) The Michigan Tall Structure Act 259 of 1959 has identical notice and filing criteria to the applicable federal regulation under 14 CFR 77, (Objects Affecting Navigable Airspace) Aeronautics and Space, Department of Transportation, Special Federal Aviation Regulation Number 98.

² Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines. USFWS, May 2003

³ Ibid. Appendix 7 - Known and Suspected Impacts of Wind Turbines on Wildlife

⁴ Ibid.

⁵ Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines. USFWS, May 2003

Under this FAA regulation, and the Michigan Tall Structures Act, the FAA and MDOT control structures exceeding 200 feet into navigable airspace and shorter structures which break the plane of the airspace in a 1:100 slope near a landing field within 20,000 feet (roughly 3.75 miles). The FAA and the Michigan Department of Transportation Bureau of Aeronautics and Freight Services use similar applications. The FAA uses Notice of Proposed Construction or Alteration Form FAA 7460-1 and MDOT requires an application for a “Michigan Tall Structure Permit” be filed with the Bureau of Aeronautics and Freight Services, to regulate tall structures on land or water.

(2) Michigan Airport Zoning Act, Public Act 23 of 1950, and the local laws it authorizes, would apply to wind developments within about 10 miles of shore if certain distance-from-landing-zone and height criteria are encountered, according to a formula.

F. The United States Coast Guard, Department of Homeland Security (USCG)

(1) 33 CFR 64, 66, 67 Private Aids to Navigation

USCG requires a permit to establish and operate a private aid-to-navigation to a fixed structure located in navigable waters of the United States. Wind field equipment will be required to install, maintain and operate Class I private aids, using Forms CG-2554 and 4143. The District Commander reviews the application for compliance with all regulations including NEPA and CZMA. In some cases, the application will be sent up to the Commandant for approval. USCG makes a recommendation to the National Ocean Service to publish a notice to mariners and to chart the aid locations. Any part of a wind field within a fairway or navigational channel will be listed on the Light List and entered into I-ATONIS. Permitting by USCG requires prior approval of the USACE.

G. The Federal Energy Regulatory Commission (FERC) 18 C.F.R. §§ 380.1 – 380.15

FERC authority regarding generating facilities concerns authorizing wholesale generators to engage in sales at market based rates. The only electric generating projects that require FERC approval are hydropower projects. FERC does have NEPA responsibilities related to transmission of energy. Under Section 1221 of the Energy Policy Act of 2005, the Commission has been given limited authority to site interstate electric transmission.

H. The Michigan Public Service Commission (MPSC)

(1) Public Act 106 of 1909; Transmission of Electricity §§ 460.551 - 460.559 authorizes the MPSC to regulate energy transmission, similar to some of the authorities of FERC.

(2) Public Act 30 of 1995; Electric Transmission Line Certification Act §§ 460.561 - 460.575

Act 30 regulates the location and construction of certain transmission facilities and authorizes the MPSC to issue a certificate of convenience and necessity for a transmission line, which is defined as “all structures, equipment, and real property necessary to transfer electricity at system bulk supply voltage of 100 kilovolts or more.” Certificate is required for a “major transmission line, which is defined as a “transmission line of 5 miles or more in length...through which electricity is transferred at system bulk supply voltage of 345 kilovolts or more.” A certificate may also be issued—but is not required—for a transmission line that does not meet the definition of a major transmission line⁶ (such voluntary applications have been made in response to local ordinances or requirements).

Construction plans must be included with the application and provided “to each municipality in which construction of the planned major transmission line is intended.” The law also provides that “Before applying for a certificate... company shall schedule and hold a public meeting in each municipality” and requires that “In the 60 days before a public meeting ...company shall offer in writing to meet with the chief elected official of each affected municipality...”

A certificate issued by the MPSC “take[s] precedence over a [municipality’s] conflicting local ordinance, law, rule, regulation, policy, or practice that prohibits or regulates the location or construction of a transmission line for which the commission has issued a certificate.”⁷ Moreover, in an eminent domain proceeding, a certificate is conclusive and binding as to the public convenience and necessity for that transmission line.⁸

⁶ See MCL 460.569(1).

⁷ MCL 460.570(1); see also, MCL 460.570(2), which provides that any ordinance or limitation imposed after an electric utility files for a certificate “shall not limit or impair the transmission line’s construction, operation, or maintenance.”

⁸ MCL 460.570(3). This subsection also provides that the certificate is conclusive and binding as to the line’s “compatibility with the public health and safety or any zoning or land use requirements in effect when the application was filed.”

Appendix D:

Application of Mapping Criteria

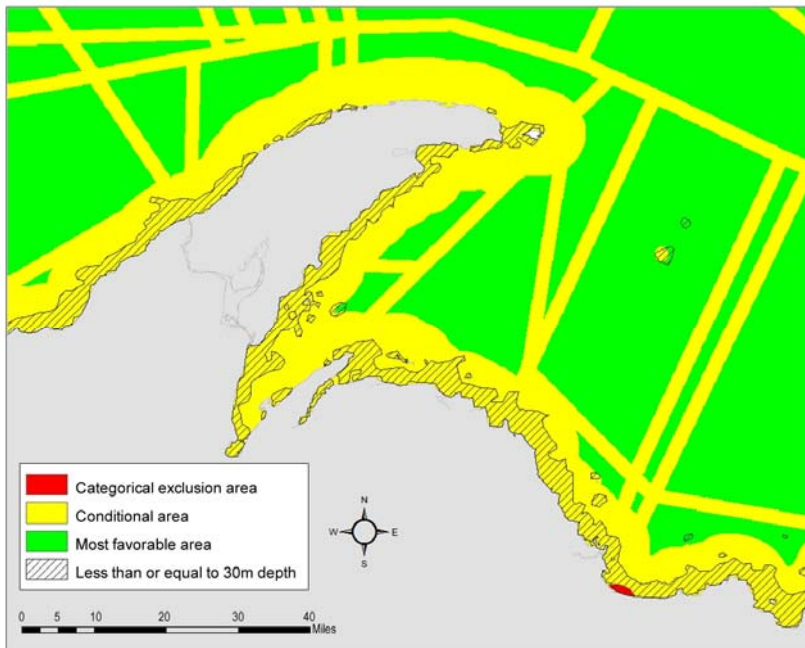
The maps below illustrate the application of the council's mapping criteria on six different locations within the Great Lakes. For each location, there are two maps presented to illustrate the areas available at different depths: one map showing areas up to 30 meters and one map showing areas up to 45 meters. These maps were prepared for the council by the Institute for Fisheries Research using the Michigan GIS Lakebed Alteration Decision Support Tool. Data for the following criteria are **not** yet included in this mapping tool and are, therefore, not reflected in these maps:

- Aids to navigation
- Buoyed navigation channels
- Submerged transmission lines
- Globally or continentally significant concentrations of bird or bat species of conservation concern
- Habitat for threatened and endangered species
- Very high concentrations of birds or bats on at least a seasonal basis
- Underwater archaeological sites
- Commercial fishing areas

In addition, the Thunder Bay marine sanctuary in Lake Huron is not reflected on this map.

EXHIBIT D-1

Area 1: Lake Superior/Keweenaw Peninsula Area (30 Meters and Shallower)

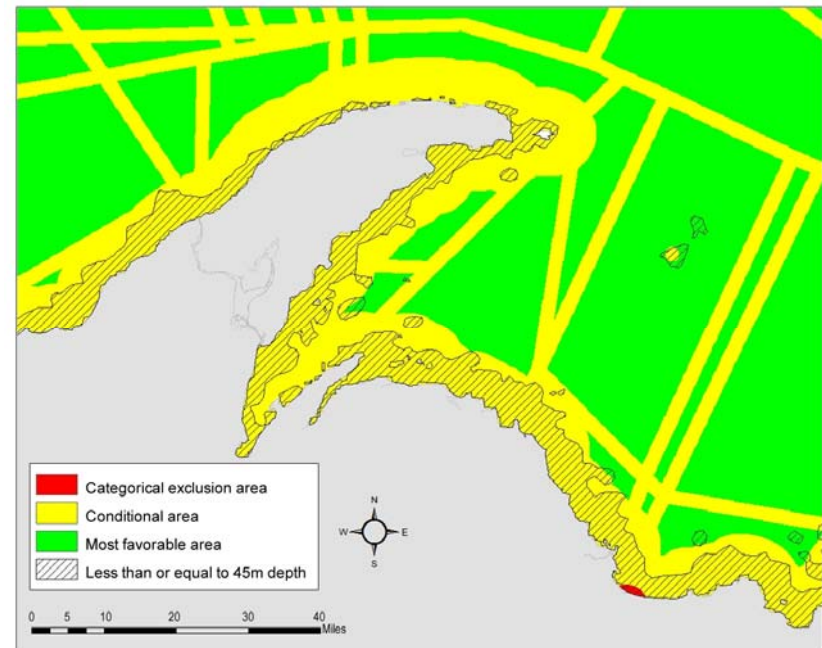


SOURCE: Map from Institute for Fisheries Research, UM/MDNR, prepared for council, 2009.

NOTE: Data for some mapping criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map.

EXHIBIT D-2

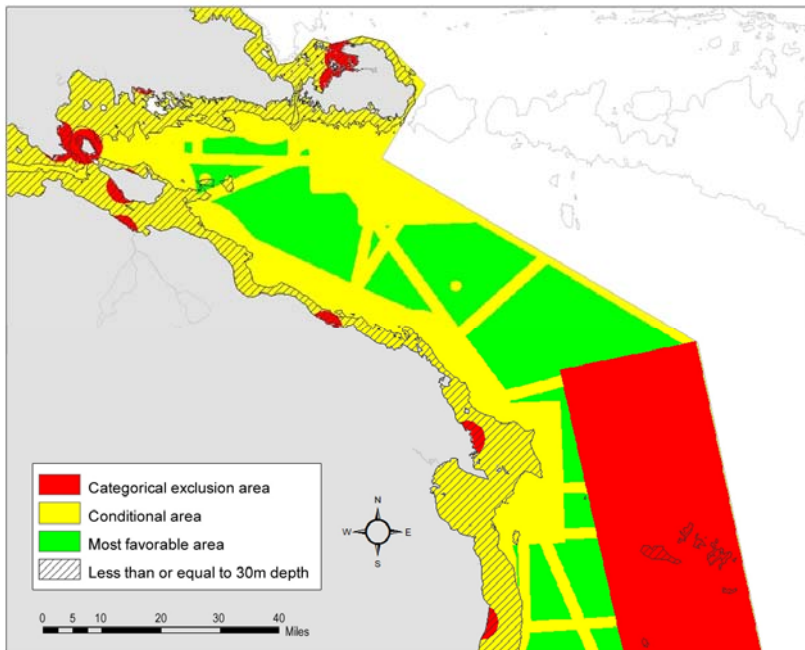
Area 1: Lake Superior/Keweenaw Peninsula Area (45 Meters and Shallower)



SOURCE: Map from Institute for Fisheries Research, UM/MDNR, prepared for council, 2009.

NOTE: Data for some mapping criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map.

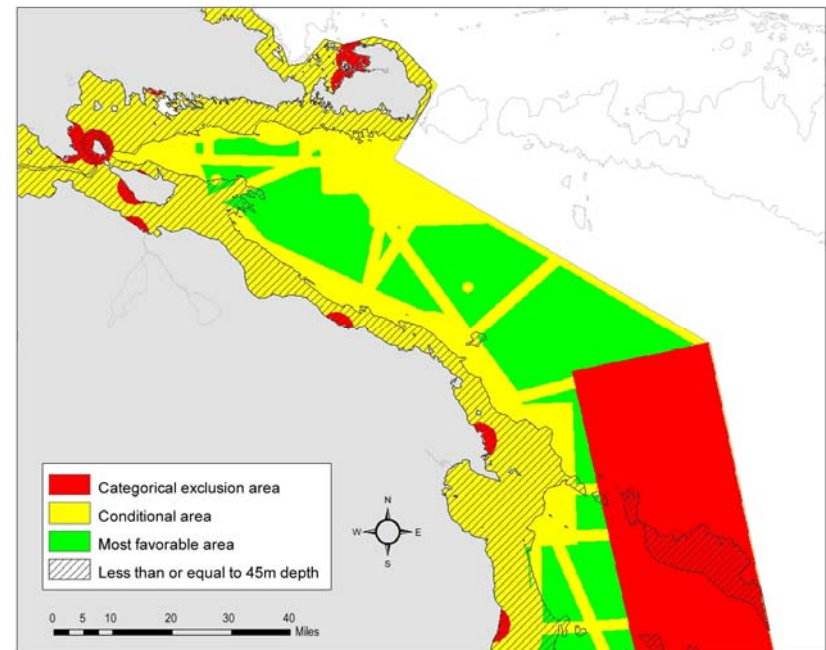
EXHIBIT D-3
Area 2: Northern Lake Huron
(30 Meters and Shallower)



SOURCE: Map from Institute for Fisheries Research, UM/MDNR, prepared for council, 2009.

NOTE: Data for some mapping criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map.

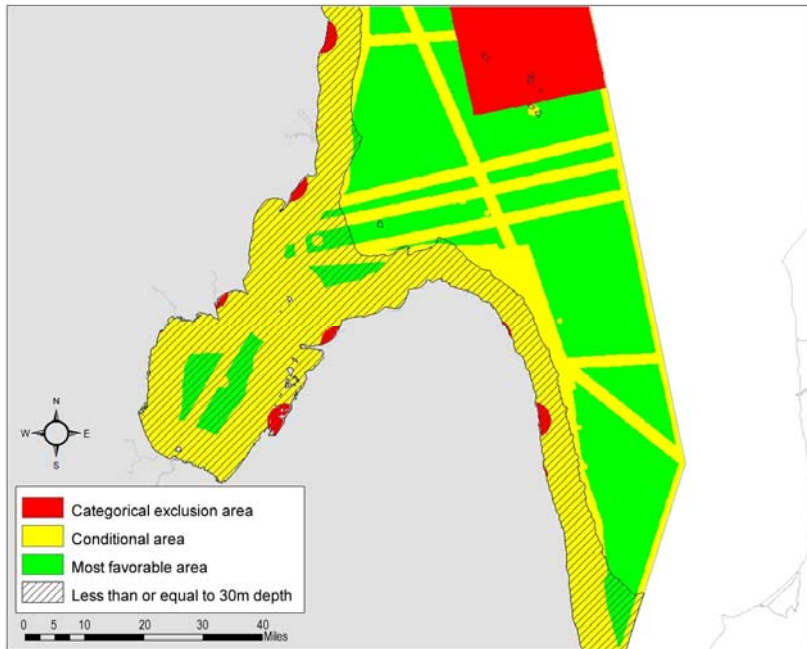
EXHIBIT D-4
Area 2: Northern Lake Huron
(45 Meters and Shallower)



SOURCE: Map from Institute for Fisheries Research, UM/MDNR, prepared for council, 2009.

NOTE: Data for some mapping criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map.

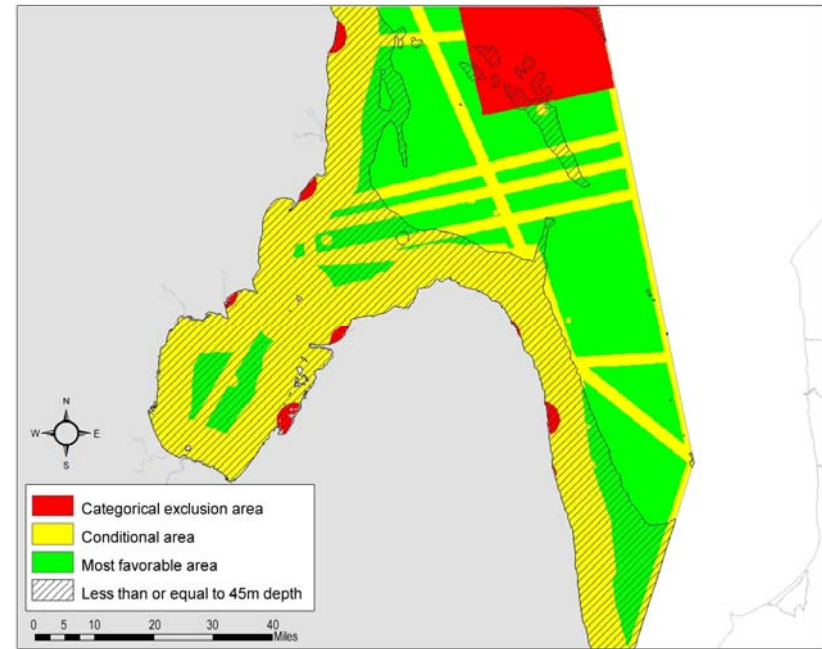
EXHIBIT D-5
Area 3: Saginaw Bay
(30 Meters and Shallower)



SOURCE: Map from Institute for Fisheries Research, UM/MDNR, prepared for council, 2009.

NOTE: Data for some mapping criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map.

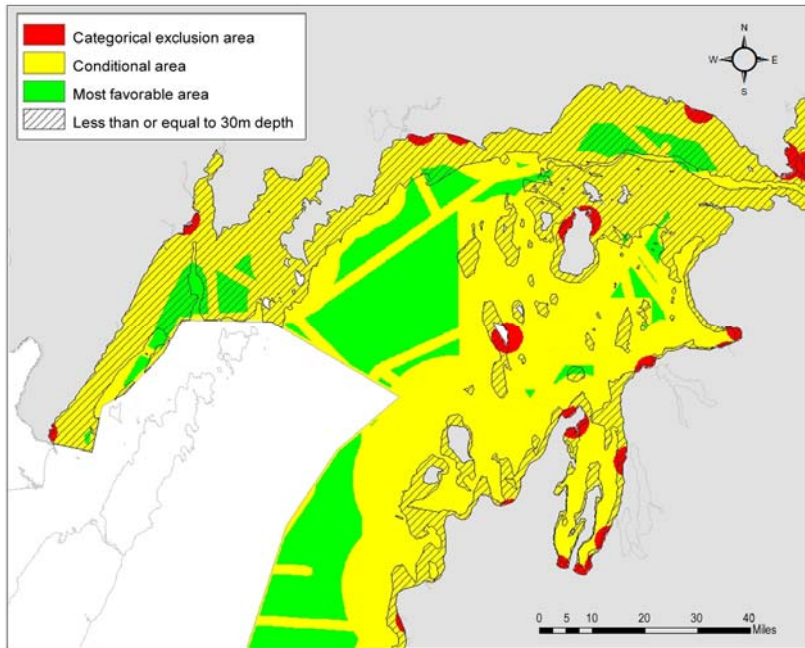
EXHIBIT D-6
Area 3: Saginaw Bay
(45 Meters and Shallower)



SOURCE: Map from Institute for Fisheries Research, UM/MDNR, prepared for council, 2009.

NOTE: Data for some mapping criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map.

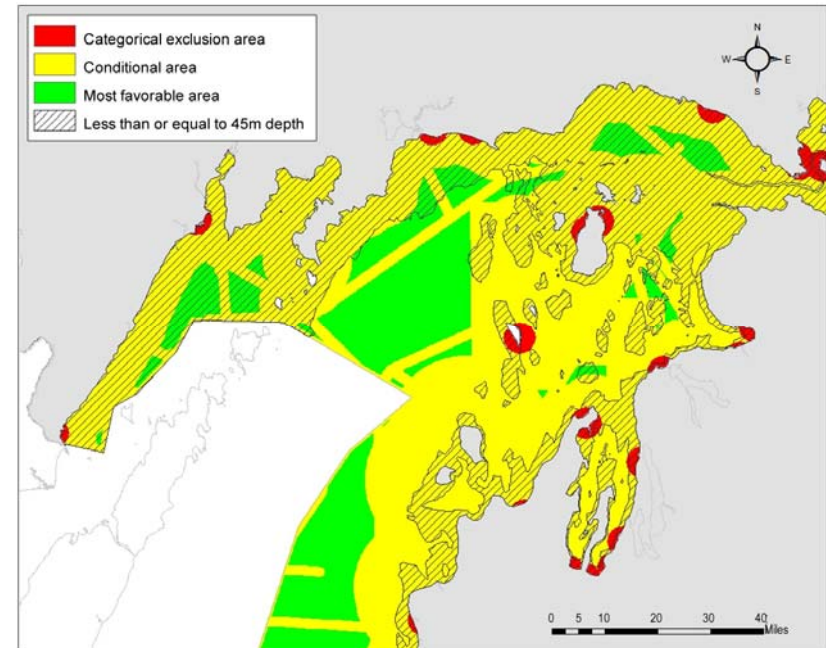
EXHIBIT D-7
Area 4: Northern Lake Michigan
(30 Meters and Shallower)



SOURCE: Map from Institute for Fisheries Research, UM/MDNR, prepared for council, 2009.

NOTE: Data for some mapping criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map.

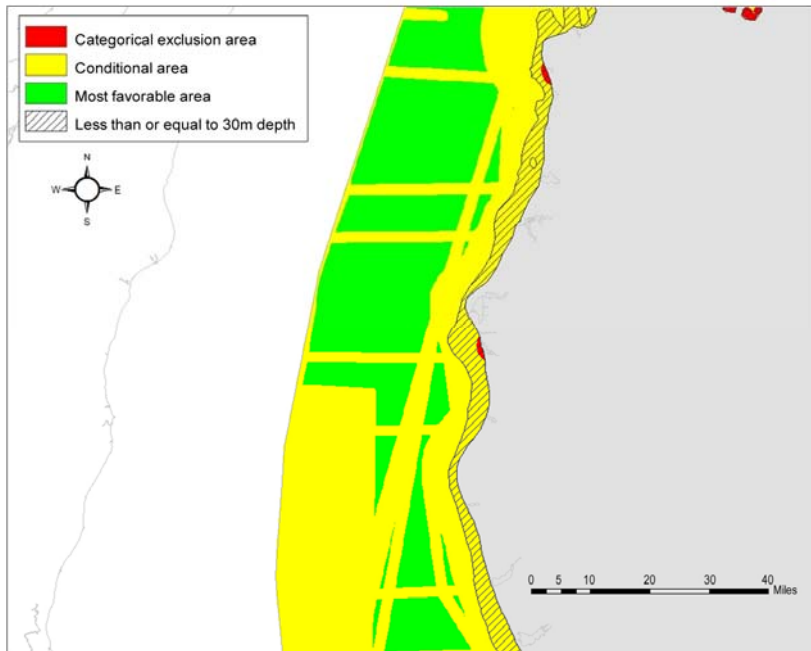
EXHIBIT D-8
Area 4: Northern Lake Michigan
(45 Meters and Shallower)



SOURCE: Map from Institute for Fisheries Research, UM/MDNR, prepared for council, 2009.

NOTE: Data for some mapping criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map.

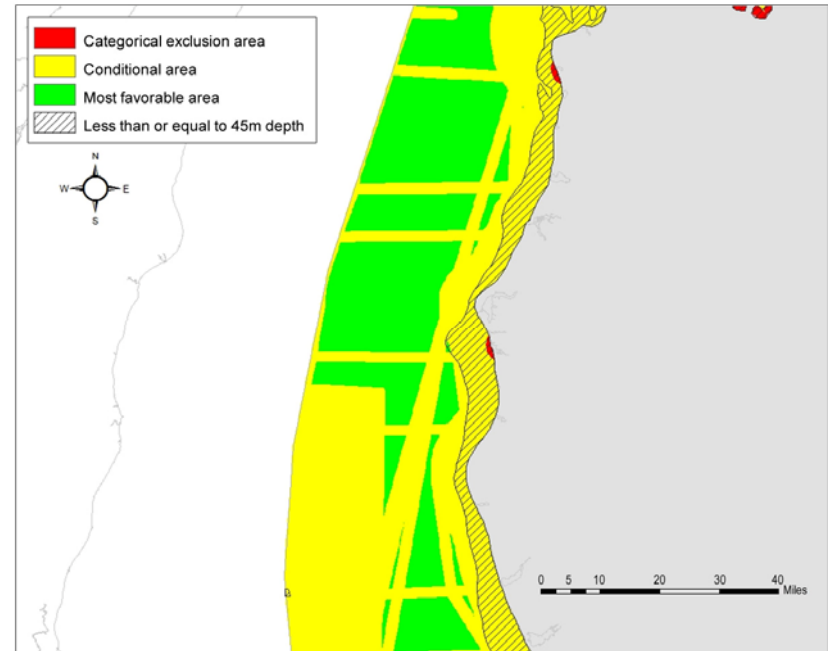
EXHIBIT D-9
Area 5: Central Lake Michigan
(30 Meters and Shallower)



SOURCE: Map from Institute for Fisheries Research, UM/MDNR, prepared for council, 2009.

NOTE: Data for some mapping criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map.

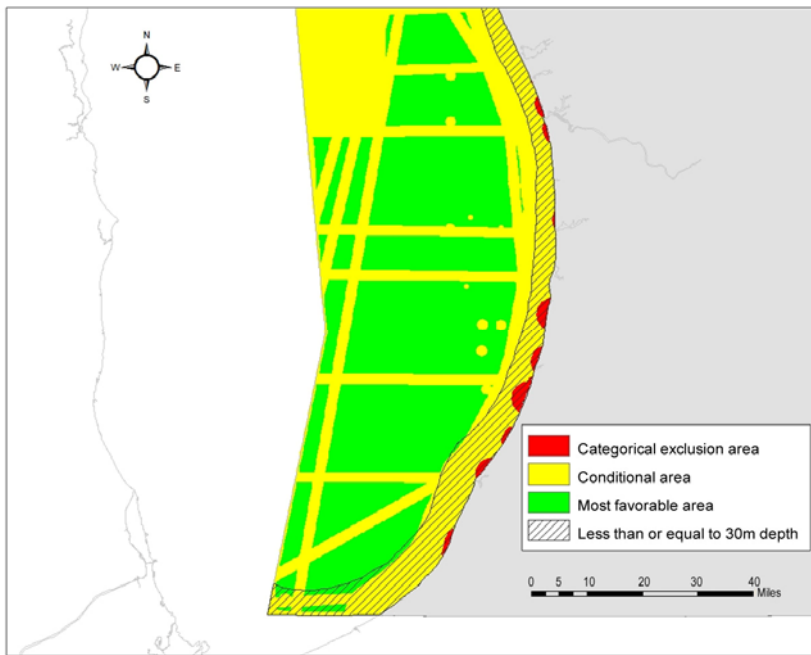
EXHIBIT D-10
Area 5: Central Lake Michigan
(45 Meters and Shallower)



SOURCE: Map from Institute for Fisheries Research, UM/MDNR, prepared for council, 2009.

NOTE: Data for some mapping criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map.

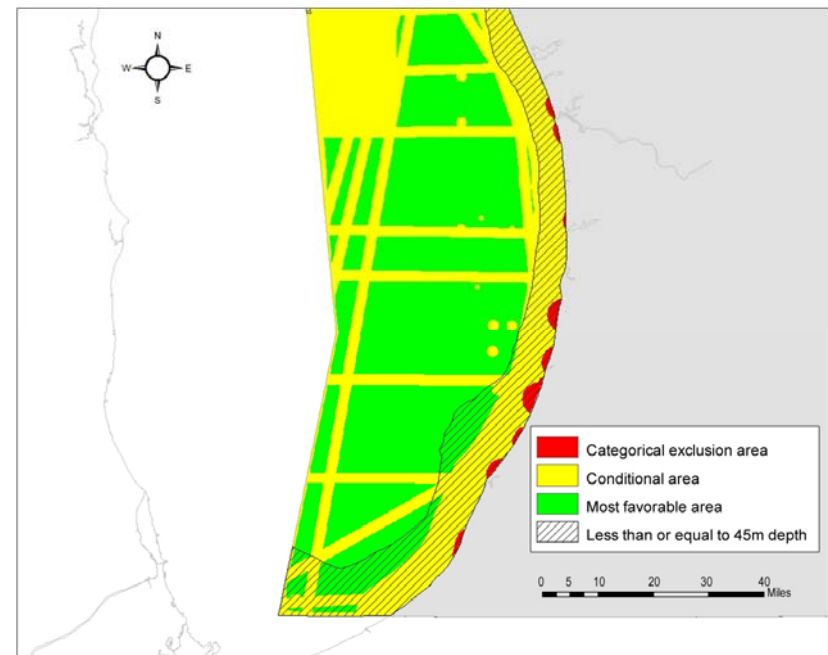
EXHIBIT D-11
Area 6: Southern Lake Michigan
(30 Meters and Shallower)



SOURCE: Map from Institute for Fisheries Research, UM/MDNR, prepared for council, 2009.

NOTE: Data for some mapping criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map.

EXHIBIT D-12
Area 6: Southern Lake Michigan
(45 Meters and Shallower)



SOURCE: Map from Institute for Fisheries Research, UM/MDNR, prepared for council, 2009.

NOTE: Data for some mapping criteria are not yet included in the Michigan GIS Lakebed Alteration Decision Support Tool and are not reflected in this map.

Appendix E: *Public Opinion Research*¹

Little is known about how stakeholders will react to offshore wind proposals in Michigan.² Although they may not be indicative of what to expect in Michigan, observations from literature on public opinion related to offshore wind proposals on the East Coast and elsewhere can be instructive.

- There is often a gap between public opinion related to wind power generally and a specific project.
- Public acceptance and opposition can vary significantly by area and are often site specific; for example, surveys reveal that Delaware residents, even those living near the ocean or with an ocean view, are considerably more supportive of offshore wind farm development than are Cape Cod residents;³ there was also a contrast in the level of public acceptance between two projects in Denmark.⁴
- Public opinion can change based on new information, social climate, and time.⁵ Some studies have suggested increased support after projects are constructed, or a “U”- or “V”-shaped pattern, when public acceptance is initially high, drops during planning and construction, and then rebounds after operation begins.⁶
- Reasons cited for opposition are not uniform across areas, but aesthetic impacts and perceived negative alterations to the existing landscape tend to be dominant factors. Other reasons include, but are not limited to, negative effects on property values, tourism, or fishing and wildlife/environmental impacts. Some researchers have argued that there is limited empirical support for the so-called “not in my backyard,” or NIMBY hypothesis (i.e., people may approve of something in theory but don’t

¹ This information, with some updates, was included in a briefing paper prepared for the council.

² The State of the State surveys conducted by Michigan State University offer limited data on public opinion related to renewable energy but not wind power specifically. The data indicate strong support for renewable energy even if the “community look changes” (over 90 percent agree or strongly agree) and also for the state to “encourage renewable energy” (more than 80 percent agree or strongly agree). See Michigan State University, Institute of Public Policy and Social Research, “State of the State Survey” (Fall 2007); cited in “Wind Energy Siting and Policy Issues” (Presentation by Michigan Citizen Planner and MSU Extension [2008]). The State of the State survey conducted in March 2009 revealed that over 96 percent of respondents believe that renewable energy is important to Michigan’s economic recovery (see S. Adelaja, Michigan People and State Economic Recovery, Land Policy Institute Report No. NE-2009-4 (July 2009).

³ Firestone, Kempton, and Krueger (in press), “Public Acceptance of Offshore Wind Power Projects in the United States” (manuscript; accepted November 28, 2008), *Wind Energy*, pp. 8, 10. [Online, accessed 4/16/09.] Available: <http://www.ocean.udel.edu/Windpower/docs/PublicAccept-OffshoreWind-FirestoneEtAl-Proof-2008.pdf>.

⁴ See DONG Energy et al., *Danish Offshore Wind: Key Environmental Issue* (Denmark: DONG Energy, Vattenfall, The Danish Energy Authority and the Danish Forest and Nature Conservancy, November 2006), 113–123. [Online, accessed 4/16/09.] Available: http://www.ens.dk/graphics/Publikationer/Havvindmoeller/havvindmoellebog_nov_2006_skrm.pdf.

⁵ Firestone et al., 9–10.

⁶ *Ibid.*, 5.

want it located near them);⁷ others have suggested the term simply labels the opposition without identifying an explanation.⁸

- Factors influencing support differ by area and include, but are not limited to, environmental benefits (such as air quality or climate change); desire to promote renewable energy; reduction in foreign oil imports; supply reliability and electricity rates; and employment or job benefits.⁹
- Financial incentives and benefits, as well as the type of applicant (i.e., public vs. private) may influence public opinion; moreover, in the surveys of Cape Cod and Delaware residents, public support increased substantially when the offshore wind project was described as the “first among many” (i.e., local project leading to large-scale deployment). The researchers concluded that better communication about the value of offshore wind projects and a better public understanding of the magnitude and economic competitiveness of offshore wind might be more important to public support than resolving aesthetic concerns.
- Public opinion can also be influenced by the perceived lack of opportunities for local input during the planning and development phase;¹⁰ this suggests that a well-designed process for stakeholder participation, including local input, can improve the level of support and/or reduce opposition.

The findings suggest that public acceptance in Michigan—and even in different parts of the state—may differ substantially from that in other areas. Without additional research, it is difficult to know how specific communities and the general public in Michigan will respond to offshore wind proposals and what factors will influence public opinion, including the types and sources of information. Michigan should expect a range of positions in response to proposed developments and will benefit from a proactive and transparent process that considers all interests from the planning stages to implementation.

⁷ P. Devine-Wright, Beyond NIMBYism: Towards an Integrated Framework for Understanding Public Perceptions of Wind Energy, *Wind Energy* 8, no. 2 (2005): 125–139.

⁸ Firestone et al. at 4, citing W. Kempton, J. Firestone, J. Lilley, T. Rouleau, and P. Whitaker, The Offshore Wind Power Debate: Views from Cape Cod, *Coastal Management* 33, no. 2 (2005): 119–149, doi: 10.1080/08920750590917530, also available at <http://www.ceoe.udel.edu/windpower/docs/KempEtAl-OffshoreWindDebate05.pdf> [accessed 7/8/09].

⁹ *Harnessing Wisconsin's Energy Resources: An Initial Investigation Into Great Lakes Wind Development, A Report to the Public Service Commission of Wisconsin*, Docket 5-EI-144, at 146 (January 15, 2009), citing Danish Offshore Wind: Key Environmental Issues.

¹⁰ Danish Offshore Wind: Key Environmental Issues at 119. Interviews revealed that one of the two major concerns that caused initial opposition in Denmark was the perception that the decision-making process was highly centralized with no local “co-decision.”