Lake Michigan Offshore Wind Energy Report

Prepared by the Illinois Department of Natural Resources

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Preface

From the Director of the Department of Natural Resources

Marc Miller
Director

Offshore wind power in Lake Michigan is both a great opportunity and challenge for Illinois. Successful development of this industry in the Great Lakes will mean a stronger economy with new high value manufacturing jobs and Investment. It also means a cleaner environment with reduced carbon and mercury emissions.

The Great Lakes are a jewel that we are committed to preserving for this and future generations, and across the globe offshore wind power is being developed responsibly and protective of our natural resources. Exciting breakthroughs in technology are occurring that will reduce or eliminate many of the significant cost challenges, and it is our hope that this study will provide valuable guidance to the Governor's office and the legislature as we explore this new opportunity.

From the Mayor of Waukegan

Robert Sabonjian
Mayor of Waukegan

The development of offshore wind energy in Illinois will augment existing regional power sources as part of the state's renewable-energy portfolio and could provide power for up to 100,000 homes in the region. This project will also serve as a major economic development opportunity that could create hundreds of jobs.

Acknowledgments

Development of this report is due in large part to the leadership of State Representative Robyn Gabel who introduced and helped pass House Bill 1558, officially creating the Lake Michigan Offshore Wind Energy Advisory Council Act. We thank Representative Gabel for her dedication and commitment to the prospect of offshore wind as a viable and environmentally sound form of renewable energy in Illinois.

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Lake Michigan Offshore Wind Energy Advisory Committee

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Cover photo and watermark: Nysted Offshore Wind Farm in Denmark. Photo credit: Chris Wisseman

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This report can be found online at
www.dnr.illinois.gov/councils/LMOWEAC

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Introduction

Lake Michigan is a priceless natural resource. Millions of people rely on the Lake to provide drinking water, boating, recreational fishing, and other natural resource values. The Lake provides vital commercial resources supporting shipping and transportation services, other maritime activities and commercial fishing. The Lake provides habitat for birds, aquatic species, invertebrates, benthic organisms and a host of ecological services to people and wildlife. The Lake is part of the web of natural resources held in trust for its citizens that generates billions of dollars in annual economic activity for Illinois and surrounding States.

The wind blowing over the Great Lakes, including Lake Michigan, produces some of the most powerful and consistent concentrations of energy in the United States. Public and private interest in harnessing this natural resource for public benefit is growing for several reasons. Few places in the United States have so large a renewable energy resource positioned so accessibly close to metropolitan population centers. Interest in renewable energy is also driven by concern over fossil fuel power generation emissions. While no source of power generation is without adverse impacts, wind is free from emissions of carbon dioxide, sulfur dioxide and nitrogen oxide and the need for any fossil fuel byproduct waste disposal.[1] The on-shore wind energy industry has also matured from futuristic to feasible as the costs of electricity generation from wind have declined by more than 80% from 1980-2000. Government and the private sector both expect offshore wind prices to also drop once the "first-time" costs of a domestic industry ramp-up pass, with the federal Department of Energy outlining a path to reduce offshore wind costs to 7¢/kWh by 2030.[2] Finally, Illinois is well-positioned, because of its industrial base and transportation network, to leverage the supply chain of the wind energy industry for significant economic development, if it takes steps now.

Both federal and state policy strongly support wind energy for the reasons cited above. States bordering the Great Lakes have enacted renewable portfolio standards ranging from 10% by 2015 (Wisconsin) to 29% by 2025 (New York and Minnesota).[3] Current federal policy also strongly supports offshore wind development, with the Great Lakes part of that mix.[4]

This governmental support aligns with popular opinion. A Harris poll in October 2010 found that 87% of Americans want more wind energy and 49% of respondents were willing to pay between 5% and 40% more for electricity generated using renewable energy sources.[5] In Illinois, more than 80% of the respondents to a 2010

[1] "On average, one gigawatt of installed offshore wind power capacity can generate 3.4 million megawatt-hours (MWh) of electricity annually. Generating the same amount of electricity with fossil fuels would consume 1.7 million tons of coal or 27.6 billion cubic feet of natural gas and would emit 2.7 million tons of carbon dioxide equivalent (CO2e) annually (S. Dolan 2010)." U.S. Dept. of Energy, A National Offshore Wind Strategy: Creating an Offshore Wind Energy Industry in the United States , February 2011, at 6..

[2] Id at 15-16.

[3] Great Lakes Wind Collaborative, Best Practices for Sustainable Wind Energy Development in the Great Lakes Region, July 2011.

[4] U.S. Dept. of Energy, Large-Scale Offshore Wind Power in the United States, Assessment of Opportunities and Barriers, September 2010. U.S. Dept. of Energy, Strengthening America's Energy Security with Offshore Wind, February 2011,, U.S. Dept. of Energy, 20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply , July 2008, .

[5] The Harris Poll, Large Majorities in U.S. and Five largest European Countries Favor More Wind Farms and Subsidies for Bio-fuels, but Opinion is Split on Nuclear Power, http://www.harrisinteractive.com/vault/HI-FT-Renewable-Energy-2010-10-13.pdf, October 2010.

study by the Center for Renewable Energy at Illinois State University supported the development of wind farms in their community, agreeing that wind energy benefits the environment, job creation, and economic development.[6]

Before authorizing offshore wind development however, Illinois must comprehensively evaluate impacts from projects or activities that could diminish established ecological functions or harm long-term sustainable commercial or recreational uses of Lake Michigan. To responsibly address the emerging issues related to offshore wind energy in Lake Michigan the Illinois General Assembly created the Lake Michigan Offshore Wind Energy Advisory Council ("Council"). The Council was charged with assisting the Illinois Department of Natural Resources ("Department") in its preparation of this report to the Governor and General Assembly evaluating the following issues:

- Appropriate criteria for the Department to use to review applications for offshore wind development of Lake Michigan lakebed leases.
- Criteria for identifying areas that are favorable, acceptable, and unacceptable for offshore wind development, including, but not limited to, impacts to wildlife, protected habitats, navigation, commercial fisheries, and recreational uses of Lake Michigan.
- A recommended process for ensuring public engagement in the Department's process for leasing Lake Michigan lakebed for offshore wind energy projects.
- Options for how the State shall be compensated for Lake Michigan lakebed leasing.
- A summary of the lessons learned from other domestic and international offshore wind development experiences, including, but not limited to, those related to public policy, regulatory, and siting concerns for offshore wind development.
- Identification of local, State, and federal authorities with permitting, siting, or other approval authority for wind power development in Lake Michigan.
- Recommendations for needed State legislation and regulations governing offshore wind farm development.

[6] Center for Renewable Energy at Illinois State University, Public Beliefs and Opinions-Wind Energy in Illinois, June 2010.

Public Trust Doctrine

Although not a topic specifically identified in the Lake Michigan Offshore Wind Advisory Council Act, one issue of primary concern in the analysis of any questions involving construction on or over the bed of Lake Michigan is the public trust doctrine. Federal and state common law recognize the State of Illinois holds its public water resources, specifically including the water and the bed of Lake Michigan, in trust for the benefit of and the use by its citizens. As trustee, the State owes the public a duty to not act inconsistently with the rights of its citizens in matters relating to public waters resources. As the beneficiary of this trust, the public has the right to seek the reversal of any such inconsistent actions by the State. This means that the public, by an individual, citizen group or representative (such as the State Attorney General), has standing to bring suit against the State alleging violations of the public trust. The right to such reversal has been sought from and granted by both federal and state courts, which have overturned otherwise validly-enacted state laws based on inconsistency with the public trust doctrine.

In 1892 a case arising out of an Illinois legislative grant of title to a portion of the Lake Michigan lakebed set the stage for all future public trust doctrine evaluations. In Illinois Central Railroad v. Illinois[7] the Supreme Court was asked to determine title to lands on the lakefront and an area of the lakebed lying east of Chicago. The Supreme Court described the State's title to the lakebed as, "… a title held in trust for the people of the state, that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing therein, freed from the obstruction or interference of private parties."[8] In invalidating the transfer of title of the lakebed, the Supreme Court said, "[t]he state can no more abdicate its trust over property in which the whole people are interested, like navigable waters and soils under them, so as to leave them entirely under the use and control of private parties….than it can abdicate its police powers in the administration of government and the preservation of the peace."[9] The most recent example of Illinois law being overturned for violating the public trust doctrine was a legislative grant of 18.5 acres of the bed of Lake Michigan to a private university to expand its campus into the lake. In Lake Michigan Federation v. U.S. Army Corps of Engineers[10], the following reasoning from the court is instructive to the rationale behind the public trust doctrine:

> Three basic principles can be distilled from this body of public trust case law. First, courts should be critical of attempts by the state to surrender valuable public resources to a private entity. Second, the public trust is violated when the primary purpose of a legislative grant is to benefit a private interest. Finally, any attempt by the state to relinquish its power over a public resource should be invalidated under the doctrine.
>
> Applying these criteria to the legislative grant of the lakebed to Loyola, it is apparent that the transfer violates the public trust doctrine. First, while the project has some aspects which are beneficial to the public, the primary purpose of the grant is to satisfy a private interest. …the inescapable truth is that the lakebed property will be sacrificed to satisfy Loyola's private needs. Under the public trust doctrine, such a sacrifice cannot be tolerated.

[7] 146 U.S. 387 (1892).
[8] Id. at 452.
[9] Id. at 453.
[10] 742 F.Supp. 441 (N.D. Ill. 1990).

> Not only does the challenged legislation give away public trust property to satisfy a private interest, but it also constitutes an attempt to relinquish state power over this property. Upon completion of the project, Loyola will become the owner of 18.5 acres of land which previously belonged to the state. Accordingly, the state will relinquish its control over the [land] and its corresponding ability to safeguard the interests of the public as to this land.[11]

Numerous other cases have both upheld and overturned Illinois laws pertaining to the use of the bed of Lake Michigan. Illinois courts have ruled in favor of a public roadway, public water treatment plant, public exposition facilities and public football stadium. Courts have ruled against private railroad facilities, steel plants and university expansions.

A formal analysis of the public trust doctrine's consistency with potential development of offshore wind power facilities in Lake Michigan is not provided in this Report because any analysis would likely turn on specific facts developed pursuant to vigorous debate before a court of competent jurisdiction and any such analysis is beyond the charge of the Lake Michigan Offshore Wind Advisory Council Act. The public trust doctrine must be recognized for its importance in determining whether and how offshore wind development occurs in Lake Michigan. The Illinois General Assembly would serve future evaluation of this issue by providing clear public policy guidance on whether the Department should encourage leasing of the lakebed of Lake Michigan for offshore wind development.

[11] Lake Michigan Federation at 445.

Appropriate Criteria for the Department to use to review applications for offshore wind development of Lake Michigan lakebed leases. 20 ILCS 895/10(b)(1)

The Department currently has broad authority to grant a lease[12] or license[13] authorizing a wide array of commercial and private activities on lands under the Department's jurisdiction. In addition to seeking a lease or license from the Department, those seeking to undertake construction in Lake Michigan must also receive a permit[14] from the Department and the Illinois Environmental Protection Agency. The Department issues licenses for a number of public-utility type uses of Department-owned property including water supply and sewer infrastructure, electricity, cable and telephone lines, and rail lines. Each request is evaluated individually taking into consideration the impact on protected species and natural resources as well as the character and other uses of Department property.

While the Department's existing leasing authorities provide a solid foundation on which to build specific authorities to guide the development of offshore wind energy projects in Lake Michigan, the scale of offshore energy projects demands the development of specific authorities designed to meet the unique needs of a landscape-scale development. The Department's existing authorities are general in nature, granting authority designed for use in a variety of circumstances. An offshore wind-energy project would present a situation unanticipated by existing authorities and beyond their current scope. Rather than leasing land for a snack shop and boat rental facility, or the installation of water supply pipeline, the Department would be faced with leasing the lakebed for a landscape-scale project that may involve installation of hundreds of wind turbines covering thousands of acres.

The Department recommends any future offshore wind energy leasing process be developed using a phased approach to leasing. A phased approach would follow the typical project development process and provide both the State and applicant with sufficient certainty to allow the development to proceed without a final commitment of resources and capital before all necessary pre-construction activity is completed. In order to properly develop an offshore wind-energy project, the applicant will need to select and evaluate a potential site, undertake pre-construction engineering and natural resource impact studies, properly design the project, construct the project, conduct post-construction natural resource monitoring, and provide for eventual decommissioning. Project development could be modified, curtailed or halted at any stage of the process if unacceptable natural resource impacts or other unacceptable consequences are identified.

A phased approach is consistent with what other state and federal authorities have concluded when considering how to develop wind-energy permitting authorities. In 2007 the federal government organized the Wind Turbine Guidelines Advisory Committee ("FACA Committee") under the Federal Advisory Committee Act.

[12] The Department of Natural Resources Act, 20 ILCS 801/1-20. The Department has the power: (b) To lease, from time to time, any land or property, with or without appurtenances, of which the Department has jurisdiction, and which are not immediately to be used or developed by the State; provided that no such lease be for a longer period of time than that in which it can reasonably be expected the State will not have use for such property, and further provided that no such lease be for a longer period of time than 5 years.

[13] The Department of Natural Resources (Conservation) Law, 20 ILCS 805/805-260. The Department has the power to grant licenses and rights-of-way within the areas controlled by the Department for the construction, operation, and maintenance upon, under, or across the property of facilities for water, sewage, telephone, telegraph, electric, gas, or other public service, subject to terms and conditions determined by the Department.

[14] The Rivers, Lakes and Streams Act, 615 ILCS 5/18.

The FACA Committee prepared a series of recommendations to the Secretary of the Interior in a 2010 report[15]. The recommendations included a tiered approach to site evaluation and risks to natural resources. The U.S. Fish and Wildlife Service finalized the guidelines[16] on March 23, 2012. In 2009 and 2010 the Michigan Great Lakes Wind Council prepared two reports for Michigan's Governor that evaluated the potential for offshore wind-energy development as well as associated siting, permitting and regulatory issues.[17] The Michigan Report's recommended a phased approach to siting and permitting that included site selection, site assessment planning, and construction and operation.

A phased approach to lakebed leasing and permitting should include at least two phases: site assessment followed by construction and operation. Site assessment would include the collection of wildlife and other natural resource, geo-physical and cultural resource data as well as information on potential impacts to existing uses of Lake Michigan. In order to obtain a site assessment lease, applicants should be able to demonstrate the area is favorable or acceptable for offshore wind energy development and pay a lease fee. Following the conclusion of site assessment activities if the lessee seeks to construct and operate turbines or related structures, the Department and other permitting or authorizing agencies will review and evaluate data derived from site assessment activities, conduct public meetings and other outreach to potentially-affected people or organizations, and request additional studies or assessments if necessary. If the lessee decides to pursue development following Department review and public comment, and if the lessee can demonstrate compliance with all lakebed lease criteria and permitting obligations (including pre-construction monitoring), the Department would then issue a site construction and operation lease allowing the construction and operation of the wind energy facility and including requirements for retrofitting as appropriate, decommissioning and potential transfer of the lease. The site assessment and the construction and operation lease should have a defined lifespan and the lessee should be required to demonstrate measurable progress towards interim and final benchmarks. The entire leasing process should provide assurances for the wind energy industry that monetary or other investments will be protected through exclusive use of the areas under assessment, construction or operation.

As a component of a phased approach to leasing, the Department recommends that existing statutes should be amended to include specific authority for lakebed leasing for offshore wind-energy projects. The legislature should also make clear the suitability of leasing the lakebed, and whether the public trust doctrine presents any impediments to leasing the lakebed for wind energy development. The legislature should adopt the following general criteria and allow the administrative rulemaking process to develop specific lease review criteria from these general criteria.

The following is a list of appropriate lakebed lease criteria:

[15]Wind Turbine Guidelines Advisory Committee, Wind Turbine Guidelines Advisory Committee Recommendations, 2010.
[16] U.S. Fish & Wildlife Service, U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines, (2012).
[17] Michigan Great Lakes Wind Council, Report of the Michigan Great Lakes Wind Council, (2009) and Final Report of the Michigan Great Lakes Wind Council, (2010).

(1) Environmental Factors:

(a) Visual Impacts - *No unreasonable interference*[18] *with residential, business, recreational and tourism-related shoreline uses. The State may also consider enhanced standards for protected shorelines.*[19]

(b) Fish Spawning Areas/Refuges - *No unreasonable impact on existing fish spawning areas or refuges.*

(c) Waterbird Nesting, Resting and Feeding Areas – *No unreasonable impact on shoal and shallow water areas used by ducks, geese and other waterbirds.*

(d) Reef - *No unreasonable impact on existing reef structures.*

(e) Threatened or Endangered Species and their habitat - *Compliance with State and Federal endangered species laws and other laws designed to protect specific natural resources.*

(f) Migratory Flyways of Birds and Bats – *Compliance with Federal laws designed to protect migratory birds and bats and no unreasonable impacts to migratory birds.*

(g) Avian Nesting, Feeding and Resting Areas - *No unreasonable impacts to avian nesting, feeding and resting areas, including migratory species and winter residents.*

(h) Geology and Sediments - *Suitable geologic conditions exist to support the long-term installation of off-shore wind energy turbines and other associated equipment or facilities and the installation of off-shore wind energy turbines will not adversely affect lake ice formation and sediment transport processes.*

(i) Benthic and Aquatic Habitats - *No unreasonable impacts to benthic and aquatic species and their habitats, including avoiding introductions of non-native species.*

(j) Terrestrial Ecology - *No unreasonable impacts to terrestrial species or habitats.*

(k) Electrical and Magnetic Fields - *No unreasonable impacts to benthic and aquatic species and their habitats.*

(l) Acoustic Impacts - *No unreasonable acoustic impacts to people, avian, benthic or aquatic species during construction and operation.*

(m) Available Wind Resources - *Suitable wind resources to provide economic justification for installation of offshore wind energy facilities.*

(2) Marine Factors:

(a) Recreational Boating - *No unreasonable impacts to recreational boating on Lake Michigan.*

(b) Historical/Archeological/Shipwrecks/Cultural Resources - *Compliance with State and Federal cultural resource protection laws.*

(c) Sport and Commercial Fishing - *No unreasonable impacts to sport and commercial fishing in Lake Michigan.*

(d) Other Existing Uses - *No unreasonable impacts to other existing and lawful uses of Lake Michigan.*

[18] As used in this report "unreasonable interference" or "unreasonable impact" means an adverse impact that is disruptive of routine community or ecological functions and is not avoidable with proper mitigation.

[19] As used in this report "protected shorelines" is intended to include State or local parks or natural areas, but not public beaches outside of designated parks or natural areas.

(3) Public Infrastructure:

(a) Electrical Transmission equipment - *Transmission equipment must connect to the transmission grid in accordance with all federal, state and local laws, ordinances and other requirements.*

(b) Water Supply Infrastructure - *No unreasonable interference with existing water supply infrastructure and equipment.*

(c) Littoral Zone - *No unreasonable impacts to littoral zone erosion or accretion processes.*

(d) Other Public Infrastructure - *No unreasonable impacts to existing public infrastructure and equipment.*

(e) Feasibility – *Acceptable and appropriate design and construction methodologies, equipment, and timeframes.*

(4) Transportation/Security:

(a) Recommended Shipping Lanes - *No unreasonable impacts to recommended shipping lanes.*

(b) Federal Aviation Administration/Air Transportation - *Compliance with all State and federal air transportation laws and regulations.*

Criteria for identifying areas that are favorable, acceptable, and unacceptable for offshore wind development, including, but not limited to, impacts to wildlife, protected habitats, navigation, commercial fisheries and recreational uses of Lake Michigan. 20 ILCS 895/10(b)(2)

Lake Michigan is a shared natural resource held in trust for the people of Illinois. Any intrusions on the availability of the Lake for navigation, commerce and fishing require the explicit support of the legislature and the Governor, and may still be subject to challenge. The Department must carefully balance the existing uses and expectations against the impacts and benefits derived from a wind-energy project. To aid this balancing effort, the Department recommends the following criteria for identifying areas that are favorable, acceptable, and unacceptable for offshore wind development.

In order to aid our evaluation, the Department developed and applied the following working definitions:

"**Areas favorable for offshore wind development**." Areas having conditions necessary for offshore wind energy development where unreasonable impacts to protected resources or existing uses can be avoided.

"**Areas acceptable for offshore wind energy development**." Areas having conditions necessary for offshore wind energy development where unreasonable impacts to protected resources or existing uses can be minimized or mitigated.

"**Areas unacceptable for offshore wind energy development**." Areas either lacking the conditions necessary for offshore wind energy development, or where unreasonable impacts to protected resources or existing uses cannot be minimized or mitigated.

The Department recommends the following as appropriate criteria for use in identifying areas that are favorable, acceptable, and unacceptable for offshore wind development.

Criterion: Adequate Wind Resources. Area(s) under consideration must have sufficient wind resources to support a commercially viable wind-energy project.

Criterion: Suitable Geologic Resources. Area(s) under consideration must have a substrate suitable for long-term support of available construction technologies.

Criterion: Water Depth. Water depth must be less than current practical limitations for the use of existing foundation technology. Using current mono pile technology, the practical depth limitation is approximately 30 meters. This depth limitation is expected to increase as new technologies are developed.

Criterion: Aesthetic Impact Shoreline Setback. Great Lake States impose shoreline setbacks to avoid any unreasonable aesthetic impacts. The Department recommends Illinois also adopt a shoreline setback criterion to avoid any unreasonable aesthetic impacts.

Numerous studies in Europe and the United States have shown that public acceptance of offshore wind farms increases with increasing distance from the shoreline. At six miles offshore, wind turbines will be visible but are not likely to be obtrusive. A six mile setback would provide approximately 198 square miles with a water

depth less than 30 meters for potential wind energy development. By comparison, land-based wind energy projects in Illinois have a minimum setback from a residence of a "non-participating" (i.e. non-leaser) land owner of 1,000 feet, ranging upward in some counties to 1,600 feet. Where a municipality chooses to bar commercial wind turbines within its zoning jurisdiction, the result can be an effective setback of from one and one-half miles to three miles (in cases where extra-territorial zoning jurisdiction is exercised over non-wind energy projects).

Criterion: Impacts to Commercial and Military Navigation. Wind energy facilities should be located and constructed to have only a minimal impact on commercial shipping and no impact on military navigation. In order to ensure minimal or no impact, the State should establish a setback from protected or designated navigation zones. A buffer of one mile on either side of a NOAA-recommended shipping lane or any restricted zone should represent an adequate buffer for any proposed wind energy development.

Most NOAA-designated shipping lanes in Illinois waters provide ingress and egress for ports in Indiana. Although mapped, NOAA-designated shipping lanes are only recommended tracks and pilots and ship masters are not required to follow them. Consequently, the construction of wind turbines in waters with sufficient depth to accommodate commercial vessels will impair free and open navigation to some degree. Nevertheless, time and fuel costs tend to concentrate shipping in specific areas, and these tracks can be buffered with wind turbine exclusion zones to provide unimpeded navigation for the majority of commercial vessels. The only restricted military zone in Illinois on Lake Michigan is a zone extending one mile off-shore from the Great Lakes Naval Station.

Criterion: Impacts to commercial fishing. Wind energy facilities should be located and constructed to avoid impacts to established and potential commercial fishing grounds.

Commercial fishing vessels are a special category of commercial vessel, whose operations are determined by the location of fishing grounds. Currently, the only active commercial fishery in Illinois waters is that for bloater chub. These grounds are located in more than 220 feet of water; consequently there will be limited impact from wind turbines constructed using monopile technology limited to depths less than 30 meters.

Yellow perch is the other potential commercial species. Due to the collapse of the Lake Michigan population, the current commercial quota for this species is zero, as it has been for several years, pending recovery of the Lake Michigan population to a point where harvest can be sustained. Yellow perch are commercially-fished in waters less than 30 meters deep, so that the use of monopile wind turbine technology poses a potential conflict with commercial fishing for this species. A shoreline setback commensurate with other Great Lakes jurisdictions would prevent siting of wind-energy facilities in a significant portion of perch-fishing waters.

Criterion: Obstruction of Recreational Navigation. Wind energy facilities should be constructed to avoid unreasonable impacts to the public's right to use the Lake for recreational navigation. Marinas in Illinois provide moorings for several thousand recreational watercraft. Human-powered craft, such as "sea kayaks" which can be launched from any beach, are increasing in popularity. Recreational navigation also includes vessels which can be chartered for sport fishing excursions. Chicago-based yachting organizations sponsor regattas, with some races involving the full length of Lake Michigan.

Criterion: Protection of Historic Sites/Shipwrecks. Wind energy facilities should be constructed to avoid unlawful impacts to historic sites or other cultural resources. No construction should occur in the vicinity of a shipwreck or other historic site. A one-half mile buffer from an intact wreck site or the edges of a debris field, or other archaeological or historic site should provide sufficient protection for these resources. The Great Lakes contain more shipwrecks than all other coastal waters of the United States. Relatively few wreck locations are known with certainty, and in even fewer cases is the identity of the vessel known. Perhaps the most famous wreck in the Illinois waters of Lake Michigan is that of the *Lady Elgin* whose debris is scattered over a broad area. Analysis or survey of potential construction sites would be appropriate prior to any leasing or construction activity.

Jurisdiction over historic and cultural resources rests with the Illinois Historic Preservation Agency.[20] Abandoned wrecks on the bed of Lake Michigan are the property of the State of Illinois, and are under the trusteeship of the Illinois Historic Preservation Agency. Depending on its age, condition, or historic significance, a wreck may be eligible for listing on the *National Register of Historic Places*. The water level of Lake Michigan has varied significantly during the period of human occupation of North America, being sometimes higher and sometimes lower. Between 11,000 and 6,000 years ago, the surface of "Lake Chippewa" was more than 100 meters lower than the present mean elevation of Lake Michigan. People occupied shoreline areas throughout this period because they depended heavily on food resources associated with the lakeshore.[21] Erosion by a rising lake may have altered or destroyed occupation sites, but some may have survived intact. The two-acre remnant of an in-place forest more than 8,000 years old has been found 16 miles east of Chicago at a depth of 80 feet.[22] Thus, there may be some potential to encounter submerged prehistoric archeological resources whose registration as a National Historic Site could be at issue.

Adeline Geo-Karis Illinois Beach State Park. Photo credit: Adele Hodde

Criterion: Protected Shorelines. Wind energy facilities should be located and constructed to avoid unreasonable impacts to protected shorelines.

The State should consider providing additional aesthetic protections for state and local parks in order to avoid any visual intrusions. Beaches in State and local parks are popular sites for recreation, and the bluffs and dunes which border Lake Michigan support rare ecological communities

[20]The Illinois Historic Preservation Agency has a regulatory role under the National Historic Preservation Act of 1966, 16 U.S.C. 470, the Abandoned Shipwreck Act, 43 U.S.C. 2101, the Illinois State Agency Historic Resources Preservation Act, 20 ILCS 3420, the Archaeological and Paleontological Resources Protection Act, 20 ILCS 3435, and the Human Skeletal Remains Protection Act, 20 ILCS 3440.

[21] Charles W. Markman, Chicago Before History: The Prehistoric Archaeology of a Modern Metropolitan Area. Studies in Illinois-Archaeology 7, 1991.

[22] Michael J. Chrzastowski, et al., Discovery And Preliminary Investigations Of The Remains Of An Early Holocene Forest On The Floor Of Southern Lake Michigan, J. Great lakes Res. 17(4): 543-552, 1991.

of plants and animals. Adeline Geo-Karis Illinois Beach State Park receives more than one million visitors each year and occupies six miles of Lake Michigan shoreline in Lake County. Indiana Dunes National Lakeshore lies in a neighboring state, but the narrow extent of Indiana waters in Lake Michigan creates the potential for wind turbines in Illinois waters to have a visual impact there.

Criterion: Threatened and Endangered Species Habitat. Wind energy facilities should be constructed to avoid any unlawful impacts to threatened or endangered species.

Lake Michigan currently provides essential habitat for four fish and one amphibian listed as endangered or threatened. An individual of one of these species could occur almost anywhere in Lake Michigan, however, their occurrence is more likely in some areas than others. Defining which areas are most important for each species requires more research data than are currently available.

Criterion: Migratory Birds and Bats. Wind energy facilities should be constructed to avoid any unreasonable or unlawful impacts to migratory birds and bats. Sites including significant offshore stopover locations, waterfowl and bat foraging areas (e.g., reefs), migration and travel corridors, wintering areas and colonial bird nesting locations should be protected against unreasonable impacts from offshore wind energy facilities.


Photo Credit: Adele Hodde

Birds and bats may be directly killed or injured by wind turbines through collisions and pressure changes encountered within the rotor sweep, as well as displacement of their habitat or their prey's habitat. Spring movements by nocturnal migrants may be one of the most significant sources of potential mortality; land birds which find themselves over the Lake at dawn head for shore to rest and feed, a movement which would make wind turbines near to the shore more dangerous to them. Typical long-range flights occur at altitudes However, weather events (fog or overcast low clouds, sudden storms and wind shifts) especially in the critical time before dawn when migrating passerines head to shore to seek locations for feeding and resting, could lead to altered flight patterns or altitudes increasing mortality from turbine blade collisions.

Migratory waterbirds spend the winter at the southern end of Lake Michigan in relatively shallow waters. If these species prove sensitive to the presence of wind turbines, the turbines could serve to displace these birds from favored wintering areas, thus denying them access to primary feeding areas. Migratory Canada Geese wintering at LaSalle Lake in LaSalle County have been observed foraging in nearby agricultural fields occupied by wind turbines with little displacement effect and mortality. It is unclear whether this will prove true on Lake Michigan. Fish (and their predators including birds) may be attracted to wind turbines, increasing exposure and mortality. Existing research at European wind energy projects shows responses vary by species; some species

will avoid wind turbines entirely, others will not. Current knowledge is insufficient to reliably predict behavior or impact for all species.

Criterion: Existing Lakebed and Shoreline Infrastructure. Wind energy facilities should be constructed to avoid any impacts to existing lakebed and shoreline infrastructure. A number of public water supply intakes and their attendant pipelines and power lines already exist within Lake Michigan and its shoreline. And, while it is assumed that most wind generated energy will come ashore in Illinois, this need not necessarily be the case. Some potential exists for power transmission lines to be laid directly to other States.

A recommended process for ensuring public engagement in the Department's process for leasing the Lake Michigan lakebed for offshore wind energy projects. 20 ILCS 895/10(b)(3)

If the Department receives a lease application for an offshore wind energy project, it will provide opportunities for public participation to ensure that all interested parties have ample opportunity to review and comment prior to the Department issuing any lease(s).

Upon receipt of a completed lakebed lease application for an offshore wind energy development the Department will prepare a public notice that will adequately describe the project, including its size, scope and location, and provide information about the public hearing. Contact information will also be included so that interested parties can obtain specific details about the proposal. The comment period will allow for an adequate time period in which to review and comment on a proposal.

The Department will schedule at least one public hearing or meeting to be held towards the end of the public comment period in the vicinity of the proposed wind energy project. The timing of the public hearing or meeting will ensure sufficient opportunity to submit written comments following the public hearing or meeting before the close of the public comment period. At the public hearing or meeting, testimony and comments on the proposal can be made in person, preferably in written form, but verbal comment will be also be accepted.
The Department will provide broad distribution of the public notice. Notice will be sent to:

- counties, communities and park districts that border Lake Michigan.
- federal and state elected officials with districts bordering on Lake Michigan.
- riparian property owners that are within the vicinity of the proposed offshore wind farm.
- the Governors of Indiana, Michigan and Wisconsin
- interest groups that are on the Department's current public notice list.

The public notice and notice of public hearing will also be published in a newspaper of general circulation at least twice.

Option for how the State shall be compensated for Lake Michigan lakebed leasing. 20 ILCS 895/10(b)(4)

The State of Illinois is currently compensated when land owned or managed by the Department is leased for a private purpose. Leases for wind energy facilities should also include compensation for the State. There are several methods for compensating the State for use of the bed of Lake Michigan, and the Department recommends the following:

- A lease fee for site access to conduct pre-construction site investigation activities.

- A lease fee for the area leased for construction, operation and decommissioning of the wind-energy project. The lease fee should compensate the State for lakebed areas used for turbine construction, but also all other associated infrastructure, facilities and equipment.

- Royalties collected during the operation (wind-energy generation) phase of the project. These royalties must be designed to fairly compensate the State without creating unnecessary barriers to the feasibility of an offshore wind-energy project.

- An application fee for lakebed leases. These fees should be sufficient to cover Department (or other agency) costs to conduct the application review/lease issuance, any necessary mitigation or survey/study activities, and any monitoring or oversight.

- Financial assurance to provide for any decommissioning activities and expenses if the applicant is unable or unwilling to decommission the project at the end of its useful life.

- A substantial portion of the compensation should be dedicated by statute to support the Department's offshore wind regulatory and natural resource monitoring and survey activities as well as mitigation of adverse impacts or the acquisition of natural resources.

A summary of lessons learned from other domestic and international offshore wind development experiences, including, but not limited to, those related to public policy, regulatory, and siting concerns for offshore wind development. 20 ILCS 895/10(b)(5)

Many coastal states in the United States are considering developing offshore wind projects, and offshore wind projects have been deployed or are planned for coastal nations in Europe and Asia. Because the issues surrounding offshore wind development are complex and controversial, the experiences of other states and countries should inform the decision-making process in Illinois. The Council has reviewed available information on economic, environmental and public policy in other states and countries and has identified the following lessons to aid future offshore wind development in Illinois.

(1) Clear public policy will facilitate a streamlined development process. Offshore wind involves highly visible use of public trust resources. Offshore wind development also requires recognition of the differing impacts from available power generation technologies. Coal, oil, natural gas, nuclear, hydropower, solar and wind energy technologies all have inherent in their implementation some undesirable impacts. As Illinois implements its renewable portfolio standards and develops plans to address future power generation requirements, it should evaluate the costs as well as the environmental and social impacts resulting from the various energy generation technologies. For both public acceptance of offshore wind and protection of the public resource, any legislation authorizing offshore wind development should assure the development of the unique resources sets no precedent that would undermine the public trust or the sustainable use of a public trust natural resource. Any resulting regulation of the offshore wind development process must also provide sufficient certainty for all stakeholders, with clearly defined roles for private developers and public regulators.

At the federal level, the U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy Wind and Water Power Program has outlined the actions it will pursue to support the development of a world-class offshore wind industry in the United States.[23] The DOE has recently dedicated $180 million to development of a domestic industry by funding demonstration scale projects. The federal government has production tax incentives which, at least in the past, included offshore wind. The Federal Bureau of Ocean Energy Management, Regulations and Enforcement has been given regulatory authority for offshore renewable energy activity on the Outer Continental Shelf.

European countries like the UK and Germany have set specific deployment targets and mobilized significant resources to evaluate and prescribe siting, evaluate environmental compatibility, evaluate wind resources, set up regulatory structures for permitting, leasing and selling power, run bidding, develop ports, develop transmission and conduct research. China and Japan are also pursuing offshore wind energy. Offshore wind has proven to be very labor intensive and has created substantial employment across Europe.[24] Other states in the Great Lakes region are moving forward with plans to build offshore wind supply chain infrastructure. If Illinois wants to create significant employment and other economic development associated with offshore wind, it should be taking steps now to do so.

[23] U.S. Department of Energy, A National Offshore Wind Strategy: Creating an Offshore Wind Energy Industry in the United States, February 2011.
[24] European Wind Energy Association, Wind In Our Sails Report, 2011.

"If Illinois wants to create significant employment and other economic development associated with offshore wind, it should be taking steps to do so now."

(2) Early and effective public engagement is critical to the success of any offshore wind project. Identifying, addressing and alleviating local concerns is important to both private developers and public officials. As a result of offshore wind or other coastal planning efforts, many states now have a framework for effective public participation. The almost decade-long review process for the proposed Cape Wind facility in Nantucket Sound provides an example of inefficient public engagement. The lessons learned from the Cape Wind process, its numerous public meetings, court challenges and administrative reviews have helped to push the development of specific governmental organizations and processes designed to effectively coordinate state and federal action on offshore wind in Atlantic coastal waters. Public recognition of fairness, and the knowledge that governmental agencies are acting in the public interest, can reduce delay and cost associated with a project.

The Middelgrunden Wind Farm in Denmark experienced huge success as a result of early and robust public engagement which resulted in strong support from local citizens and businesses. Photo credit: Chris Wisseman

(3) The State should identify sites that should be excluded from wind energy development. Setting clear boundaries for areas closed to offshore wind development can make public hearings less contentious and provide certainty for the public and private developers. In the Great Lakes area, the Michigan Great Lakes Wind Council used mapping criteria to identify and map areas generally favorable for wind energy, areas that should be excluded, and areas that are conditional and need additional study or mitigation. Conditional areas have potential but contain one or more competing values, such as waterbird feeding and resting areas, movement corridors, fish spawning areas, habitat for threatened and endangered species, harbors, national park lakeshore, commercial fishing areas, or recommended shipping lanes.[25]

Ohio marked Lake Erie into one-minute grids and ranked them in terms of high, moderate, or low impact, with varying levels of criteria for studies that are required. Areas with a low score (0 or 1) are excluded or considered least favorable; areas with the highest score (4) are considered most favorable.[26] Table 1 summarizes the criteria used by Michigan and Ohio. Many states are using coastal zone mapping to identify the best locations for offshore wind. New Jersey developed an environmental sensitivity index. Areas with low index scores are more favorable for development; areas with higher scores may require additional research or mitigation efforts to reduce potential impacts. Areas with obstructions, shipping lanes, traffic separation zones, pipelines, cables, etc. are Prohibited Development Areas.[27]

(4) Visibility is one of the most significant factors in public acceptance of offshore wind. At Horns Rev wind farm in Denmark, a limited survey revealed that the public preferred wind farms to be located farther from the shore—the further from the shoreline, the more positive the perception.[28] Denmark recommends an eight mile buffer, the United Kingdom recommends a five to eight mile buffer, and Michigan is recommending a six mile buffer from its shoreline. [29] A New Jersey public opinion poll indicated greater public acceptance with distance from shore.[30] Illinois should consider a minimum distance from shore as an initial means of creating certainty and reducing barriers to development.

[25] Michigan Great Lakes Wind Council, Report of the Michigan Great Lakes Wind Council, 2009.
[26] Ohio Department of Natural Resources, Office of Coastal Management, Wind Turbine Placement Favorability Analysis Map, May 2009.
[27] New Jersey Department of Environmental Protection, Ocean/Wind Power Ecological Baseline Studies, July 2010.
[28] National Renewable Energy Laboratory, Large-Scale Offshore Wind Power in the United States, Assessment of Opportunities and Barriers, September 2010.
[29] Michigan Great Lakes Wind Council, Report of the Michigan Great Lakes Wind Council, 2009.
[30] Zogby International & William J. Hughes Center for Public Policy at the Richard Stockton College of New Jersey, Opinions on Wind Turbines at the Southern New Jersey Shore, July 2009.

This photo simulation compares the visibility of wind turbines placed at varying distances from shore. Specifically, the turbines are depicted at distances, left to right, of 2 miles, 3 miles, 4 miles, 5 miles, 6 miles, 7 miles and 8 miles from the shore. Different light, wind and haze conditions could make them more or less visible. Photo credit: Santee Cooper

(5) While engineering and construction methods do not generally present impediments to offshore wind development, construction in the Great Lakes presents several important challenges. Construction methods well established in Europe and elsewhere do not translate entirely to the Great Lakes. The lock system in the Great Lakes limits the breadth of vessels to 24.4m, smaller than many existing European turbine installation vessels. Oil and gas vessels would require modification and most are not available for wind energy at this time. The high cost and the uncertainty about future offshore wind build-out will restrict new vessel construction in the United States. In Europe, the first dedicated offshore heavy-lift wind construction ships were built after the installations ramped up. These existing European vessels could not operate here because of the federal Jones Act—only US flagged ships built here, owned by United States citizens and crewed by personnel authorized to work in the United States will be able to transport, construct, install and maintain offshore wind turbines.

Heavy-Lift Wind Construction Ship aids in construction of Horns Rev 2 in Denmark. Photo credit: Chris Wisseman

Offshore wind in the Great Lakes will also need ports that meet specific requirements: quaysides 200m to 300m long that can accommodate vessels up to 140m in length with a 45m beam and a draft of 6m. Quayside infrastructure must be able to offload rotors, nacelles, towers and foundations. Experience suggests that each turbine requires between three-quarters and one acre of land per turbine for lay-down and preassembly.

(6) The primary sources of controversy associated with offshore wind development are the use of public trust lands, transparency, compensation to the public, allocation of costs and benefits and economic incentives and policies. Regulatory agencies need to develop clear permitting and leasing standards and coordinate their activities to avoid unnecessary interruptions in the process. European experience has demonstrated that when regulatory constructs are in place, private capital finds solutions to implementation. It will be critical to undertake offshore wind development in Lake Michigan using a collaborative approach that addresses technical and environmental issues along with social and community concerns.

(7) The potential success of offshore wind development requires a deliberate approach to address all aspects of public and economic policy. Where offshore wind has succeeded or is succeeding (UK, Germany, Denmark), it started small, learned from doing, and incorporated lessons learned into plans for commercial scale projects.[31] Rhode Island, Ohio and New Jersey have taken a similar approach with pilot projects as a first step towards larger implementation. In areas with successful offshore wind development, regulatory structures exist to address three main requirements that enable a project to proceed: (1) permitting, (2) leasing and (3) power sales.

(8) Private developers and regulatory agencies must address potential site and species-specific impacts to wildlife and natural resources during the early stages of the leasing and permitting process. A significant factor in public acceptance is the availability of detailed environmental assessments for each site proposed for development. While clear guidelines for environmental assessment can be preferable to developers, the European experience shows that risks can be highly site and species-specific and are dependent upon local conditions. Wildlife or natural resource studies must be tailored to site and specifies-specific needs and may require multi-year data collection efforts. Any guidelines should be flexible to accommodate the conditions and data needs at specific sites.

While risks are site and species-specific, existing research suggest directing efforts at reducing risks by monitoring and understanding migratory bat, and transient and resident bird behaviors, and by avoiding high density, migratory, and breeding areas; and long-term monitoring is necessary to fully track ecological shifts.[32] For instance, waterbird movement patterns may vary over years and seasons requiring comprehensive multi-year research on the location and use of habitat in Lake Michigan by birds and bats. Studies funded and managed by private developers seeking to install turbines should be subject to Department review and oversight. If lakebed leases are granted, developers and operators should be required to use best available design and technology to avoid unreasonable impacts to wildlife. Extensive study of the construction and operation of two large offshore wind farms in Denmark showed varying levels and types of impacts that were location and species-dependant. Taken in context, the conclusions reached in the study by the Danish Ministry focused on avoidance behavior rather than collision with turbines. The Danish study found that birds "generally demonstrate avoidance behavior… although the responses are highly species specific."[33] The study also found that "the proportions of birds approaching the wind farm area post-construction and crossing the wind farm area have decreased relative to the pre-construction baseline" and that these changes resulted in "gradual and systematic modification to [birds] flight routes in response to the visual stimulus of the wind farm, with (ii)

[31] European Wind Energy Association, Wind In Our Sails Report, 2011.
[32] National Renewable Energy Laboratory, Large-Scale Offshore Wind Power in the United States, Assessment of Opportunities and Barriers, September 2010.
[33] National Environmental Research Institute Ministry of the Environment . Denmark, Final results of bird studies at the offshore wind farms at Nysted and Horns Rev, Denmark, 2006.

more dramatic changes in flight deflection close to the outermost turbines."[34] The presence of the turbines resulted in some species adjusting their flight patterns in a manner that reduced the collision risk and the study failed to find any bird species coming anywhere near an increased mortality of 1%. Even with this effective habitat loss due to the presence of the wind turbines, these effects must be considered within the context of the wider habitat areas available for the species. As offshore wind installations continue to be considered in the Great Lakes, careful location and species-specific studies must be undertaken both pre and post-construction.

A 2009 report to the Wisconsin Public Service Commission highlights the need for further Lake Michigan-specific research. The 2009 report identified peak bird migration periods over the Great Lakes as being from mid-April to late May and mid-August to late September with more than 70% of Wisconsin's 116 rare bird species migrating over or along Lake Michigan.[35] The report identified the possibility that a large wind facility may alter the direction and velocity of currents, which could affect plankton and nutrient movement, sedimentation patterns, and seasonal fish movements.

(9) Illinois should develop coastal and marine spatial planning guidelines to assist in the sustainable development of Lake Michigan. The National Oceanic and Atmospheric Administration (NOAA) and Bureau of Ocean Energy Management are developing a Multipurpose Marine Cadastre to produce maps and geographic information system (GIS) tools to support marine spatial planning and avoid use conflicts. Most east coast states are conducting coastal spatial planning to identify the best locations for offshore wind. New Jersey contracted a private consultant to conduct a baseline ecological study in its offshore waters to fill major data gaps for birds, sea turtles, marine mammals, and other natural resources to determine the current distribution and usage of the area. Data was collected on the distribution, abundance and migratory patterns over a 24-month period. These data, as well as existing (historical) data, were compiled and entered into digital format and geographic information system-compatible electronic files. Additionally, environmental sensitivity indexes for many Atlantic coastal states have been developed that include data collected during field studies, through a literature review, and from state and federal agencies. These indexes includes artificial reefs, marine protected areas, shoals, Habitat Areas of Particular Concern, Essential Fish Habitat, known obstructions, known shipwrecks, unexploded ordnance, shipping lanes, utility cables, commercial fishing grounds, recreational fishing grounds, and modeled avian, marine mammal, and sea turtle density data.

(10) Illinois should adopt an adaptive management and monitoring program to address evolving data needs and experienced-based evaluation. The Department's experience with on-shore wind projects has resulted in constantly evolving understanding and response to the potential impacts to natural resource from wind energy projects. The National Renewable Energy Laboratory summarized the need for adaptive management for offshore wind projects when it said:

> *A prudent, yet flexible, deployment strategy will need to integrate monitoring with adaptive management approaches and risk mitigation strategies identified through the NEPA process (DOI 2008; Williams, Szaro, and Shapiro 2007). The research approach will need to be one of learning through experience—it must also flexible enough to easily accommodate and integrate new information and improved risk knowledge as it becomes available. This approach can be*

[34] Id. at 151.
[35] Public Service Commission of Wisconsin, Harnessing Wisconsin's Energy Resources: An Initial Investigation Into Great Lakes Wind Development, 2009.

designed to involve universities and NGOs that function as centers of excellence in various regions. The United States can learn from European Before and After Construction Impact (BACI) study methods applied to several offshore wind plants. Cumulative effects will need to be considered within the context of a comparative approach relative to other energy sources. An integrative approach is needed to allow current techniques and methods to be used in a context of uncertainty, with an understanding that the onset of a serious unanticipated impact may require significant modifications to a project's site or design.

Our experience tells us that "obvious" impacts of today at particular sites may not actually be, and often are not, the showstoppers of tomorrow. A more systematic assessment that incorporates principles of adaptive management would allow a better understanding of the probabilities of impacts or consequences at widely separated sites and diverse marine environments—from the Great Lakes fresh water to the warm waters of the Gulf and across to the Mid-Atlantic. Estimating probabilities of the risk occurring may be just as central as the possible magnitude of the impacts and consequences. It also is a systematic approach to comparing risks, assessing priorities, and formulating management strategies rather than reacting to the fear of uncertainty or what a special interest group finds resonates with their constituency.[36]

(11) Using an adaptive management system, Illinois should continue to identify data needs for evaluating offshore wind energy projects. The Bird Conservation Network estimates 5 to 7 million birds fly through Chicago during migration season.[37] These migratory birds use and occupy both off-shore and shoreline areas of Lake Michigan. Even during winter months many species of waterfowl use off-shore areas of Lake Michigan for loafing and feeding.[38] Further study is especially important if off-shore wind development in the southern end of Lake Michigan induces the same avoidance behavior exhibited by some species as described in the Nysted and Horns Rev study. This type of avoidance behavior in the southern end of Lake Michigan could cause critical disruption of avian use of Lake Michigan. Many governmental and educational institutions recognize the need for additional study of the Great Lakes. In December 2011 the Department joined a project[39] to monitor and map avian resources in the nearshore and open waters of Lake Michigan, Erie and Huron. The project is coordinated by the U.S. Fish and Wildlife Service and the Great Lakes Wind Collaborative and includes participation by Michigan, Indiana, Illinois, Wisconsin Ohio and New York. The project will coordinate existing and new aerial surveys of pelagic birds during the spring and fall migration periods and make those data available through geographic information system software and mapping protocols. These and other data will be critical to correctly determine the extent of any exclusion zones and other regulatory controls necessary for sustainable development of off-shore wind in Lake Michigan.

[36] National Renewable Energy Laboratory, Large-Scale Offshore Wind Power in the United States, Assessment of Opportunities and Barriers, September 2010.
[37] The Bird Conservation Network, Minimizing The Impacts of Wind Turbines On Lake Michigan's Wildlife – A BCN Green Paper, 2009.
[38] Id.
[39] Monitoring and Mapping Avian Resources In The Nearshore And Open Waters Of Lakes Erie, Huron And Michigan As An Evaluation Tool For Potential Offshore Wind Development And Conservation Planning. Great Lakes Fish and Wildlife Restoration Act, Regional Project Proposal FY 2012.

Table 1. Criteria used by Michigan and Ohio to determine areas favorable, acceptable, and unacceptable for offshore wind energy

Criteria	Michigan	Ohio[40]
Engineering limitations/water depth	30 meters/45 meters	
Utility transmission lines	Excluded	
Power generation	.5 mile buffer	
State boundary	.5 mile buffer	On state line=0; county boundary intersected=2; within a 1 mile buffer=3; >1 mile=4
Recreational boating	6 mile buffer	
Harbors/marinas	5 mile buffer	
Large river mouths	5 mile buffer	
Cultural resources: underwater archaeology sites, shipwrecks	.5 mile buffer	Within confirmed area-1; within a 1 mile buffer=2; >1 mile buffer=3
Commercial fishing areas	.5 mile buffer	600-2,900 trap net lifts=1; 250-600=2; 32-250=3; 0-32=4; unknown=0 (research needed)
Recreational and charter fishing areas	6 mile buffer	106k-700k hours=1; 25k-106k hours=2; 4k-25k hours=3; 0-4k hours=4; unknown hours=0 (research needed)
Dredge disposal sites	.5 mile buffer	
Visual impacts	6 mile buffer	(distance from shore): 0-3 miles=0; 0-3 m from uninhabited islands=1; 3-6 miles=2; 6-10 miles=3; >10 miles=4
General fish habitat		Ranges from 1 to 3 depending on fish habitat (i.e. adult walleye) or depth (55-foot bathymetry depth contour=3)
Spawning areas/refuges	1 mile buffer	
T/E species habitat	5 mile buffer	Within record boundary=1 (because of some record ambiguity); outside observance area=2
Reefs/zones of high biological productivity/shoals	3 mile buffer	Within 1 mile= 0; >1 mile=1
Protected shorelines, parks (local, state, federal)	6 mile buffer; 13 mile buffer for national parks	Shoreline=0; open water=1
Bird migration routes	5 mile buffer	
Avian nesting areas, Important Bird Areas	5 mile buffer	Within IBA=1; outside IBA=3
Raptor nests		< ½ mile=0; ½ - 2 mi=1; >2 mi=2
Lakebed substrate		Bedrock, sand/gravel=1; sand/mud=2; glacial till=3; mud=4
Bathymetry	Used it for map	Used it for map
Federal Aviation Administration, air transportation	Excluded—defer to FAA	

[40] Ohio developed a process for evaluating areas for offshore wind energy development. Offshore areas are evaluated based on a weighted ranking of the attributes identified in Table 1. A higher score equates to an area more favorable for offshore wind development.

Navigation channels (dredged & buoyed)	Excluded—defer to Coast Guard	Within lane=0; within one-nautical mile buffer=2; >one mile=4
Aids to navigation (markers such as buoys, beacons)	Excluded—defer to Coast Guard	Within lane=0; within one-nautical mile buffer=2; >one mile=4
Recommended shipping course lanes	1 mile buffer either side	Within lane=0; within one-nautical mile buffer=2; >one mile=4
Coast Guard, homeland security	Excluded	
Military operations	Excluded—defer to Dept. of Defense	Within=0; outside area=1

Additional References in Appendix A

Identification of local, State, and federal authorities with permitting, siting, or other approval authority for wind power development in Lake Michigan. 20 ILCS 895/10(b)(6)

In addition to the substantial capital investment and years of study and planning necessary for offshore wind development, federal and state agencies and units of local government will need to grant permits or other authorizations before offshore wind development occurs in Lake Michigan. Offshore wind power developers are interested in improving the certainty, predictability and efficiency of the offshore wind siting and permitting process. This Report includes a recommendation that the relevant state agencies prepare and publish a toolkit for advising and guiding developers as to the regulatory and permitting process and coordinate to create a permitting process, including timelines and documentation requirements, that complements the federal permitting process for Great Lakes wind development and minimizes duplication and unnecessary delay.

The federal and state agencies, and units of local government, with permitting, siting and other jurisdictional authority are:

- Illinois Department of Natural Resources
    a. 615 ILCS 5/18 establishes a regulatory permitting program for any construction activity in Lake Michigan.
    b. 20 ILCS 801/1-20(b) grants the Department the power to lease land or property under its jurisdiction.
    c. 20 ILCS 805/805-235 grants the Department the power to lease lands for a consideration in money or in kind.
    d. 20 ILCS 805/805-260 grants the Department the power to grant licenses and rights-of-way within the areas controlled by the Department for water, sewage, telephone, telegraph, electric, gas, or other public services.
    e. 525 ILCS 30/17 and 520 ILCS 10/11(b) requires state agencies and units of local government to seek Department review of actions authorized, funded, or carried out by the state agency or unit of local government to determine if the actions are likely to destroy or adversely modify a natural area or other protected natural resource.
- Illinois Environmental Protection Agency
- Local governments and counties
- U.S. Army Corps of Engineers
- The United States Environmental Protection Agency
- The US Fish and Wildlife Service
- Federal Aviation Administration
- United States Coast Guard, Department of Homeland Security

- National Oceanic and Atmospheric Administration
- Illinois Power Agency
- Illinois Commerce Commission

Recommendations for needed State legislation and regulations governing offshore wind farm developments. 20 ILCS 895/10(b)(7)

The Council developed the following recommendations to examine the potential for continued development of offshore wind energy in Lake Michigan. If consideration of wind energy development in Lake Michigan is to continue, addressing the issues identified below will provide the necessary foundation for the State of Illinois to develop a carefully balanced regulatory system to protect natural resources and sustainable uses of Lake Michigan. The Illinois Power Agency reported the Illinois Renewable Portfolio Standards ("RPS") "appear to have enabled significant job creation and economic development opportunities as well as environmental benefits."[41] In order to continue to develop a sustainable wind energy industry in Lake Michigan that will contribute to achieving our RPS' goals in an environmentally and socially responsible manner, the State of Illinois must balance protection of natural resources and existing uses of Lake Michigan with the desire to expand use of renewable energy and its associated economic development and job creation. The State should develop a regulatory system that begins with the development of statutory standards and includes agency rulemaking designed to provide the necessary flexibility to address the rapid advance of technological change, economic conditions and an understanding of the natural resource impacts from off-shore wind power.

Recommendation: The State should fully evaluate public and economic policy options to address the power sales from any potential offshore wind project. Certain European countries have established feed-in-tariffs to encourage development of offshore wind whereas others have created structures akin to Renewable Energy Certificates. Domestically, Massachusetts, Rhode Island and Delaware have approved unique Power Purchase Agreements whereas New Jersey has established a complex Renewable Energy Certificate carve-out for offshore wind. Each country or state has established a policy that works within its existing, and unique, regulatory framework. The appropriate mechanism for Illinois requires an in-depth evaluation of options to arrive at the appropriate approach. The Council recommends a cross disciplinary task force to evaluate options and propose mechanisms for purchasing and selling power from any proposed projects.

Recommendation: The Department should develop a detailed offshore wind siting matrix that provides a clear process to identify which portions of Lake Michigan are acceptable for offshore wind development.

Recommendation: The Department, the Illinois Environmental Protection Agency, the Illinois Commerce Commission, the Illinois Power Agency, and the Department of Commerce and Economic Opportunity should prepare and publish a toolkit for advising and guiding developers as to the regulatory and permitting process, including a checklist of state permits and an overview of estimated timelines and likely areas of concern. The agencies should also coordinate to create a permitting process, including timelines and documentation requirements, that complements the federal permitting process for Great Lakes wind development and minimizes duplication and unnecessary delay.

Recommendation: Following further development of public and economic policy in Illinois, the legislature should adopt authorizing legislation that clarifies the authority of the Department to develop a phased approach to leasing the bed of Lake Michigan for offshore wind energy development. The legislation should clearly state whether public policy in Illinois supports offshore wind development and whether it is in the public interest to develop offshore wind energy in Lake Michigan in an environmentally sustainable and responsible manner. The legislation should provide the following:

[41] Illinois Power Agency, 2012 Annual Report: The Costs and Benefits of Renewable Resource Procurement in Illinois Under the Illinois Power Agency and Illinois Public Utilities Acts, (2012). The Annual Report continues with the following qualification… "[c]are must be taken, however, to not optimistically extrapolate these results without limit, as factors such as market prices for energy, transmission constraints, and uncertainty in the load serving responsibility will affect the cost-effectiveness of near term future additions to the renewable resource generation stock in Illinois. In particular, care must be taken to avoid the creation of new stranded costs through long-term contracts until such time as the effects of retail utility load shifts due to factors such as municipal aggregation can be assessed."

(1) The Department may enter into leases of submerged lands pertaining to the site assessment, construction, operation, and decommissioning of offshore wind energy facilities. Leases may be issued or entered into by the Department with qualified parties, and shall contain such terms, conditions, and requirements as the Department determines to be just and equitable and in conformance with the public trust. Applicants must demonstrate:

a. The proposed offshore wind energy facility is consistent with protection of the public trust in the waters and bottomlands of Lake Michigan;

b. There will be significant public benefits from the proposed offshore wind energy facility consistent with the protection of the public health, safety, and welfare;

c. The effects to the natural and cultural resources and public trust in the waters and bottomlands of the Great Lakes will not result in significant adverse impacts and will be mitigated to the extent reasonable and practicable.

d. The applicant must demonstrate, at minimum, the following:

i. Natural Resource Factors:

1. Visual Impacts. No unreasonable interference with residential, business, recreational, and tourism-related shoreline viewshed.
2. Avian Resources. No unreasonable impacts to avian or bat feeding, nesting, resting, and refuge areas, and the facility shall comply with Federal laws designed to protect migratory birds and bats.
3. Fish Spawning Areas/Refuges. No unreasonable impact on existing fish spawning areas or refuges.
4. Reef. No unreasonable impact on existing reef structures.
5. Threatened or Endangered Species. Compliance with State and Federal endangered species laws and other laws designed to protect specific natural resources.
6. Geology and Sediments. Suitable geologic resources exist to support the long-term installation of off-shore wind energy turbines and other associated equipment or facilities.
7. Littoral Zone. No unreasonable impacts to littoral zone erosion or accretion processes.
8. Benthic and Aquatic Habitats. No unreasonable impacts to benthic and aquatic species and their habitats.
9. Terrestrial Ecology. No unreasonable impacts to terrestrial species or their food, habitats, and reproduction.
10. Electrical and Magnetic Fields. No unreasonable impacts to people or to aquatic and benthic species and their habitats from electrical or magnetic fields.
11. Acoustic Impacts. No unreasonable acoustic impacts to people or to aquatic and benthic species and their habitats.

ii. Marine Factors:

1. Recreational Boating. No unreasonable impacts to recreational or commercial boating on Lake Michigan.
2. Historical/Archeological/Shipwrecks/Cultural Resources. Compliance with State and Federal cultural resource protection laws.
3. Sport and Commercial Fishing. No unreasonable impacts to sport and commercial fishing in Lake Michigan.

4. Other Existing Uses. No unreasonable impacts to other existing and lawful uses of Lake Michigan.

iii. Public Infrastructure:

1. Electrical Transmission. Transmission equipment must connect to the transmission grid in accordance with all federal, state and local laws, ordinances and other requirements.
2. Water Supply Infrastructure. No unreasonable interference with existing water supply infrastructure and equipment.
3. Other Public Infrastructure. No unreasonable impacts to existing public infrastructure and equipment.

iv. Transportation/Security:

1. Recommended Shipping Lanes - No unreasonable impacts to recommended shipping lanes.
2. Federal Aviation Administration/Air Transportation - Compliance with all State and federal air transportation laws and regulations.

e. Feasibility

i. Available Wind Resources. Suitable wind resources provide economic justification for installation of offshore wind energy facilities.

ii. Engineering. Construction and operation of the facility shall use acceptable and appropriate design and construction methodologies, equipment, and timeframes.

iii. Economic Analysis. Analysis demonstrating feasibility of operating economically sustainable facilities.

(2) Applicants must qualify as a bidder, lessee, assignee, or operator in accordance with the following:

a. Applicants must demonstrate their technical and financial capability to construct, operate, maintain, and terminate/decommission projects or activities for which they are requesting authorization.

b. Applicants must demonstrate general commercial liability and other insurance in amounts considered reasonable for the scope, scale and location of the project.

c. Applicants must provide financial assurance sufficient to complete decommissioning and removal of any offshore wind energy structures and facilities.

(3) The Department has the authority to determine which portions of the lakebed of Lake Michigan are available for lease.

(4) The Department will employ a transparent process, subject to competitive bidding and public notice and meetings, when leasing portions of the bed of Lake Michigan for offshore wind development. The Department shall screen prospective bidders to identify those qualified to apply for a lease.

(5) The Department will employ a multi-step leasing process that provides for site investigation, construction, operation and decommissioning.

a. Site assessment leases will be for a limited period of time and shall be subject to voidance or extension depending upon progress and data needs.

b. Construction and operation leases for the lifetime of the project.

c. Decommissioning and restoration following operation.

(6) Leaseholders must submit a comprehensive site assessment plan for Department review and approval that will demonstrate the investigation and collection of data and information necessary to demonstrate compliance with all applicable standards for issuance of a construction permit. The site assessment plan must evaluate the following:

a. The surface location and estimated water depth for all existing and proposed structures or facilities located on the lakebed, and the height or depth above or below the surface of such structures or facilities.

b. Baseline physical characterization surveys identify substrate characteristics and depths, reefs, and littoral and sediment transport.

c. Baseline natural and cultural resource surveys (potentially requiring multi-year data collection), including:

i. natural resource factors;

ii. marine factors;

iii. public infrastructure; and

iv. transportation and shipping.

d. Structural and project design, fabrication, and installation information for each type of structure or facility associated with the project.

e. Meteorological data.

(7) Applicants for a construction and operation permit must provide:

a. Potential impacts to all:

i. natural resource factors;

ii. marine factors;

iii. public infrastructure; and

iv. transportation and shipping.

b. Cross sectional and plan view drawing prepared by a professional land surveyor or professional engineer of the entire project area that shows, with geographic positioning system coordinates, the proposed location and estimated water depths of the all structures including but not limited to all submerged utility lines, meteorological towers, wind turbine towers, generating facilities, and all other project elements.

c. A plan view drawing showing the proposed location of each wind turbine in relation to any other offshore structure, including any other wind energy facility, within 10 miles of the proposed project area. A plan, to scale, that shows the outside limits of the permit and lease area, and the general location of all above-water structures in relation to the adjacent shoreline and nearby towns/cities, parks, roads and other physical features.

d. A description of the proposed activities and methods and schedules for proposed construction and operation.

e. Natural resource protections that include, at a minimum, the following:

i. Methods and equipment used for monitoring and evaluation of benthic, aquatic and avian wildlife behavior.

ii. Predicted impacts from the project during construction, operation and decommission.

iii. Methods for identifying and implementing remedial measures if monitoring identifies any adverse changes in fish or wildlife behavior or use of lake habitats.

f. A navigation safety plan to protect the recreational and commercial navigation.

g. An emergency response plan that provides for immediate shutdown and coordination with emergency responders.

h. Decommissioning plan that include removal of the project in its entirety and restoration of the project area to pre-lease condition as well as cost estimates for all decommissioning activities.

(8) The Department may place conditions or limitations on any lakebed lease.

(9) Application or other fees sufficient to provide adequate staffing and other resources necessary to implement a lakebed leasing program.

(10) The Department shall collect lease and royalty payments to be used for restoration of natural resources, marine infrastructure and Department operations.

(11) Assignment, renewal and termination of existing lakebed leases.

(12) Other information, evaluations or analysis as required by the Department.

(13) The Department may promulgate rules to implement legislation.

Appendix A
References

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Wind Turbine Placement Favorability Analysis Map, Ohio Department of Natural Resources, 2009

Appendix B
Written Comments

Between January 19, 2012 and June 5, 2012, this report was issued to the Lake Michigan Offshore Wind Energy Advisory Council in draft format on three separate occasions. Council members were given an opportunity to submit comments during an allotted time period. All comments have been documented and included below in chronological order.

Dear Mr. Main,

Having discussed this subject with wind turbine farmers, boaters appear to be their biggest fear in opposition to their initiatives because of their numbers. I estimate that number to be over 40,000. My survey reveals that the boaters' response appears more positive than negative, and again, I am asking all of you to decide whether we should allow this data to go readily into their hands or wait for a better time. Can we attain a better bargaining position by keeping this information on boaters' position closer to our vest? Additionally, break waters on some of our jumbo marinas, especially in Northpoint marina had been reported to have some decay and need attention. No funds are in sight to use for this purpose. Maybe some revenue coming from the wind turbine farms can be directed to nourish these breakwaters.

-Ned Dikman, Great Lakes Boating
December 24, 2011

Response to solicitation of draft report comments on January 19, 2012

Dear Mr. Ziri,

I have reviewed the draft report and in my opinion the approach you are taking is very helpful and thorough. The one area I would suggest more explicitly addressing is consideration of the impacts of a transmission interconnection. While there is a whole separate process undertaken within the federally-regulated MISO and PJM transmission planning and approval world, I can imagine that there could be environmental and ecological impacts associated with each of several alternative transmission interconnection pathways. You may want to explicitly enlarge the consideration to, not only the impacts of the wind towers, but to the underwater cable and on-shore interconnection facilities and specify that the permitting process should consider the electric reliability, economic cost and environmental impacts of the proposed transmission interconnection, and any alternative pathways considered, and shall be a factor in approving any permits.

John Procario could probably help you find the correct way to state this without appearing to overstep regulatory bounds.

I am interested in what State legislative changes you are thinking about and look forward to that part of the work in progress."

Thanks for considering my comments.

-Arlene Juracek, Illinois Power Agency
January 24, 2012

Dear Mr. Ziri,

Thank you so much for sending the draft copy of the Lake Michigan Offshore Wind Energy Advisory Council report. Overall I felt the draft report is thorough and concise. However, I am very concerned that the draft does not specify that environmental studies need to consider the impact wind turbines, placed in Lake Michigan, will have on bats. I have attached an article that discusses how the turbulence created by the turbines affects bats' lungs. The article also specifies that bats use the Lake's shoreline as a north-south flight path. I know at the last meeting there was a brief discussion of the importance of bats for controlling farm pests thereby offsetting the need for the use of more pesticides by farmers. Bats play an important ecological role in the Great Lakes area. Just as we need to consider the impact of the Turbines on birds, we need to make sure studies include the impact on bats.

file:///C:/Users/rachel.sudimack/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.Outlook/DKGNFNSD/Scientists%20hope%20to%20curb%20exploding%20bat%20lungs%20near%20Great%20Lakes%20wind%20turbines%20%20%20Great%20Lakes%20Echo.htm

As you requested, I am responding to the five issues you raised in your memo:

- Should the State provide additional or special setback (or other protection) for protected shorelines (fed/state/local parks, etc…); YES
- Should the report consider the impact of towers of different heights; YES. There is evidence that greater or lesser environmental damage is determined by the height of the turbines
- Should the State require recreational or commercial navigation setbacks; YES. Every effort should be made to protect against avoidable accidents.
- Should the State require cultural/historical resource setbacks; YES - especially submerged wreck sites.
- Should the State consider the creation of waterfowl or aquatic species refuges that would exclude offshore wind energy developments or other potential impacts? Yes.

-Patrice Bugelas-Brandt, Village of Winnetka
January 25, 2012

BIRD CONSERVATION NETWORK
1718 Sherman Avenue, #210 • Evanston, Illinois 60201
847-328-3910
www.bcnbirds.org

January 27, 2012

To: Lake Michigan Offshore Wind Energy Advisory Council members

Subject: 1/19/12 draft Lake Michigan Offshore Wind Energy Advisory Report

- The Bird Conservation Network carefully reviewed the subject draft. That review included consultation with experts from the American Bird Conservancy, with specific focus on the impact on birds of offshore wind turbines built and operated in Lake Michigan. Our answer to the question – "Should the State consider the creation of waterfowl or aquatic species refuges that would exclude offshore wind energy developments or other potential impacts?" – is an emphatic Yes!

We propose the following points be incorporated in the final Report:

- There is a clear need for a comprehensive assessment of how birds use the southern and southwestern Lake Michigan basin before considering any lease applications. Currently, we lack adequate knowledge on this subject (especially migrating passerine birds during the spring and fall migration periods, and migrating/wintering populations of waterfowl). We urge the adoption of a **minimum 3 year, thorough evaluation** (by wildlife professionals) of seasonal bird movements, to determine those locations least likely to adversely impact the native birds in this important seasonal flyway. To remove any potential for bias, we believe this assessment would best be carried out with specific IDNR oversight and involvement in the evaluation process. No lake bottom lease applications should be accepted for consideration until that review is complete.

- If leases are granted, appropriate stipulations based on the best available knowledge on prevention of bird collisions should be an integral part of the permit requirements. These stipulations would include, but not be limited to:
  1. Appropriate selection of navigation lighting – to prevent migrating birds from becoming confused/attracted to a light source during periods of fog, etc.
  2. The operational ability to promptly be able to 'turn off' wind turbines during major migration events, especially those accompanied by cloud cover or a low ceiling. The ongoing, mandated use of appropriate technology (Doppler radar, etc.) to augment the operational ability to determine when such events occur.
  3. A requirement that the turbine operator assess bird mortality around the turbines on a continuing basis.
  4. A requirement to retrofit turbines, should new data/technology produce a more effective collision avoidance method(s).

Attached is a BCN position paper **MINIMIZING THE IMPACT OF WIND TURBINES ON LAKE MICHIGAN'S WILDLIFE** published in 2009. It contains a more comprehensive (albeit not completely current) literature review, and additional details on the nature of our specific concerns on how turbines placed in Lake Michigan might harm the birds within the Great Lakes

BIRD CONSERVATION NETWORK
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Also attached is a petition for rulemaking submitted to the U.S. Fish and Wildlife Service by American Bird Conservancy that reveals the growing cumulative impacts of wind energy development on birds and their habitats.

We are hopeful that this first step in the search process for new offshore lake bottom locations for 'green energy' wind turbines will be made with thoughtful consideration of how to locate and design/engineer them to minimize harm to the birds using the lake. If you have questions about these comments, please contact Bob Fisher, 630-985-2956, BFisher928@aol.com. We look forward to participating in the production of the Final Report.

Sincerely,

Bob Fisher
Past President,
Bird Conservation Network

Donnie Dann
Chairman, Advocacy Committee,
Bird Conservation Network

Darin Schroeder
Vice President
American Bird Conservancy

Dear Mr. Ziri,

The Board of Citizens' Greener Evanston has not met since the draft report was circulated. Preliminary reaction is as follows:

- Overall it's a reasonable and logical listing but closing discussion is premature; the Council should meet again

- The report should begin with reiteration of the reason for the Council's work, i.e., the hypothesized large renewable energy resource

- Reference to what other jurisdictions have done should be up-fronted instead of at the very end (altho the text could be appended) so that it's stressed what Illinois is doing is not an outlier or pioneering

- More specific criteria rather than deferral to later DNR rulemaking would facilitate public acceptance and legislative passage

- The definitions of "unreasonable impact" need to be tightened up or clarified; the legal impact of the footnote 10 definition over-stresses "avoidability" with possibly unintended interpretation consequences

- Underwater wrecks are perhaps given too much importance; acknowledgement of existing law should suffice without additional restrictions

- The final report should give more concrete direction to the legislature as to what model legislation to follow (i.e. Michigan, or federal offshore leasing)

- The report should give some direction as to how the Public Trust Doctrine needs be addressed rather than just saying the legislature should mention it is its legislative preamble; care needs to be given that distinguishes a wind project from other possible uses running afoul of the Doctrine; it ought be stressed that the Doctrine is more likely to be satisfied if a public entity such as the Illinois Power Agency or a municipal consortium is partnered in the project

- Some of the draft criteria that say "any impact" as exclusionary are overbroad

- Comprehensive consideration of environmental impact needs to take into account environmental *benefits* to the state and its natural resources from the development of renewable energy

There are/were multiple stylistic/typo issues but no need to dwell on those now or in discussion.

-Jeff Smith, Citizens' Greener Evanston
February 3, 2012

Response to solicitation of draft report comments on April 2, 2012

Dear Mr. Ziri,

In reviewing this draft in advance of Thursday's meeting, we are disappointed to see that our extensive comments and rewrite, sent to Todd Main at Director Miller's request, seemed to have ended up on the 'cutting room floor'.

We'll be interested to learn why our rewrite, aimed at strengthening the document's protection of our native birds against the hazards of turbines on Lake Michigan, was not incorporated into this current draft.

We are surprised that we received no feedback from IDNR about our revisions to the draft, since it was clearly stated at the February 3 meeting that revisions, suggestions, comments on the draft were to be sent to IDNR after that meeting.

-Bob Fisher and Donnie Dann, Bird Conservation Network
April 3, 2012

Dear Mr. Ziri,

Overall, this latest version of the report is a much improved product and reads well. My comments are directed at pages 19-21, and offer insight from the perspective of the Illinois Power Agency.

First, at page 19, the recommendation at lines 39-48, while reporting what other jurisdictions are doing, fails to account for the Illinois Renewable Portfolio Standard and existing law and markets. Illinois already has a well-developed renewable resources strategy, which include targets (25% by 2025; 75% from wind for utilities and 60% from wind for alternate suppliers) and economic criteria (consumer rate impact limits). As far as electricity markets go, it does not matter if wind resources are located on land or on water. Water-based wind must economically compete with land-based wind, subject to the spending caps wisely imposed by the legislature. Given the complex environmental concerns associated with off-shore wind, any economic incentive to advantage offshore wind over land-based wind needs to be carefully considered. Furthermore, the Illinois competitive retail market means that the utilities such as Ameren and ComEd are only serving a small fraction of the total end-use load in the state. Any mandate for utilities to purchase off-shore wind must also include an equal mandate for all competitive retail suppliers. Finally, Illinois is served by two major Regional Transmission Organizations (PJM and MISO) which further opens up opportunities to sell the output of offshore wind to a market spanning roughly two dozen states. Looking only for Illinois Load Serving Entities (the utilities and alternate suppliers) to purchase offshore wind output fails to recognize the wide-scale market opportunities available to Lake Michigan-based wind generators.

My second comment is at the top of page 20. We are the Illinois Power Agency, not the Illinois Power Authority.

Finally, at page 21, the Feasibility discussion at lines 28-32, I would suggest adding a third point:

iii. An economic analysis of the feasibility to sell the output of the wind generators.

-Arlene Juracek, Illinois Power Agency
April 4, 2012

Dear Mr. Ziri,

Thank you and the Department for the careful most recent draft, which continues to improve upon previous work.

Attached are my comments, in the form of a redlined document, which include both minor catches and some more significant concerns.
The principal concern, which I know others share, is that deferral of more specific criteria to a later stage, and in particular contingent upon a threshold debate about the public trust doctrine, delays the entire possibility of enabling legislation by another session or more. This is not to minimize in any way the importance of the doctrine. The appropriate place for that debate should be within the context of the bill, not in a disconnected abstract.

I also feel that both the public and the Legislature would be more assured by a greater inclusion of specifics in the enabling legislation rather than deferral to later rulemaking. Benefits would include a lesser chance of obstructionism, and placing fewer resource demands upon the Department.

-Jeff Smith, Citzens' Greener Evanston
April 5, 2012

Response to solicitation of draft report comments on June 5, 2012

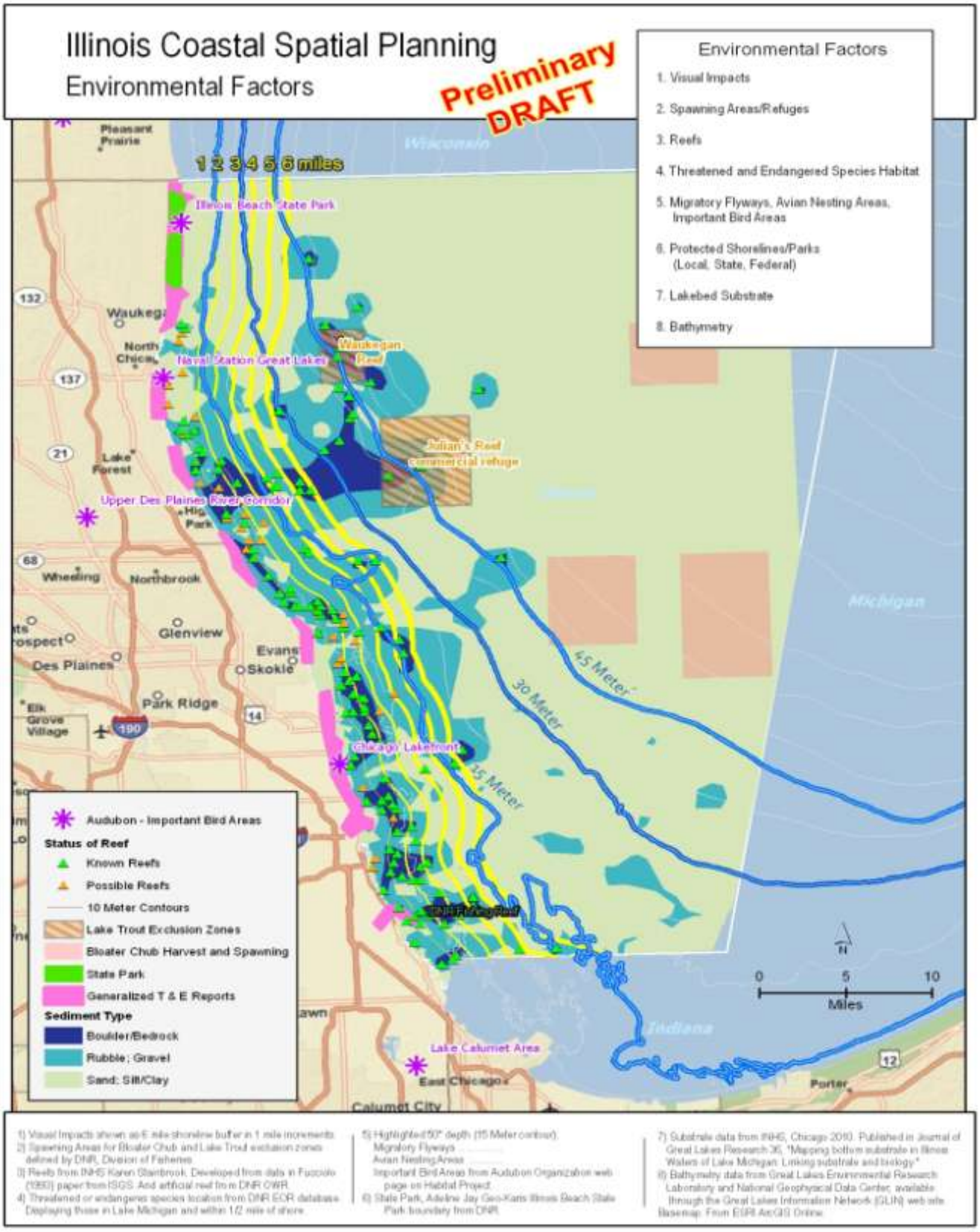
Dear Mr. Ziri,

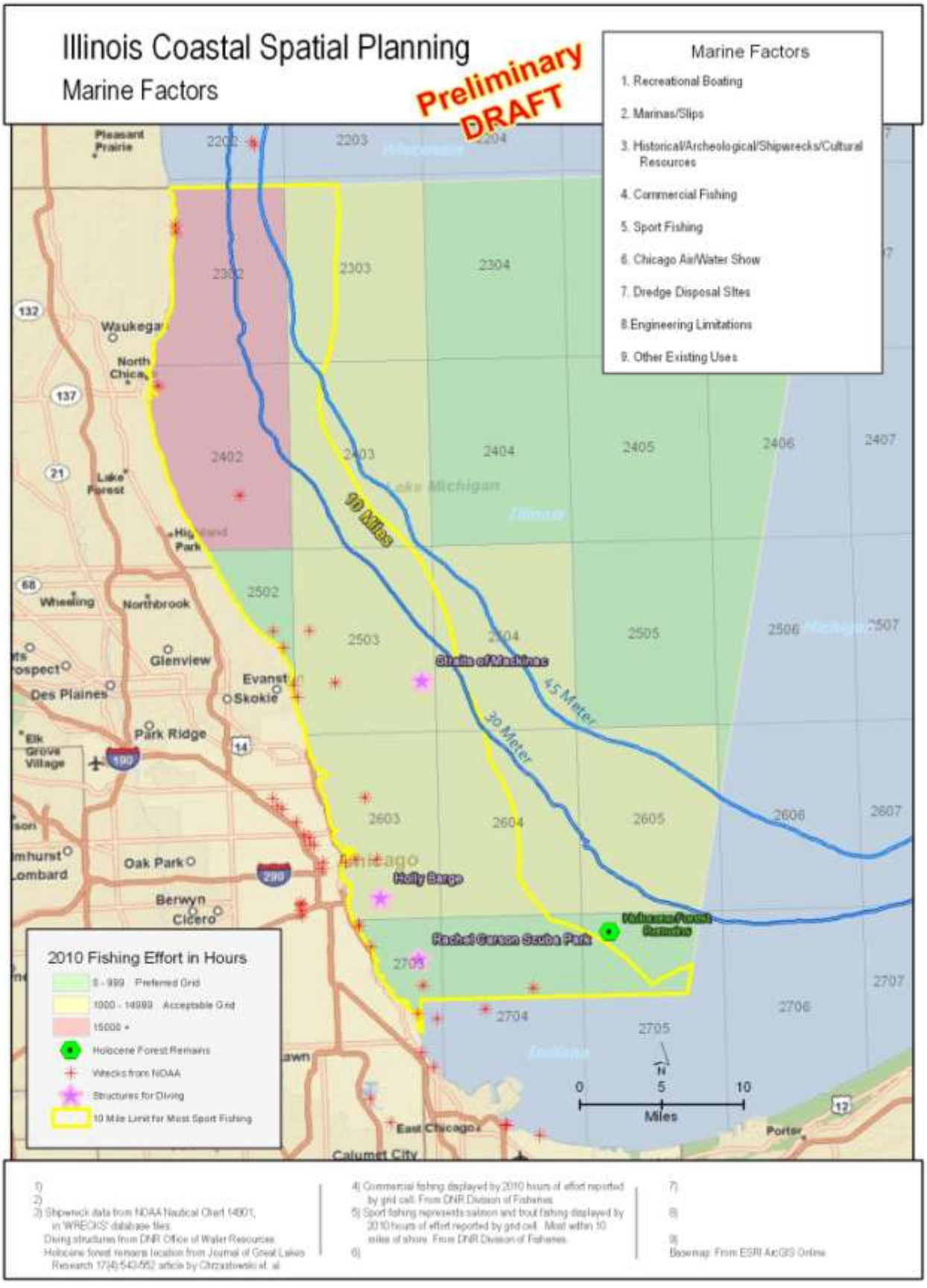
Other than the requirement that the IPA facilitate the purchase of renewable resources for utilities as part of its procurement planning and implementation process in accordance with 20 ILCS 3855/1-75(c); and other than its obligation under 220 ILCS 5/16-115D to provide the M-RETS and PJM GATS renewable resource registries with appropriate information to denote which resources are eligible for purposes of Alternate Retail Electric Suppliers meeting their Renewable Portfolio Standard requirements, the IPA has no permitting, siting or other approval authority for wind power development, including wind power development in Lake Michigan.

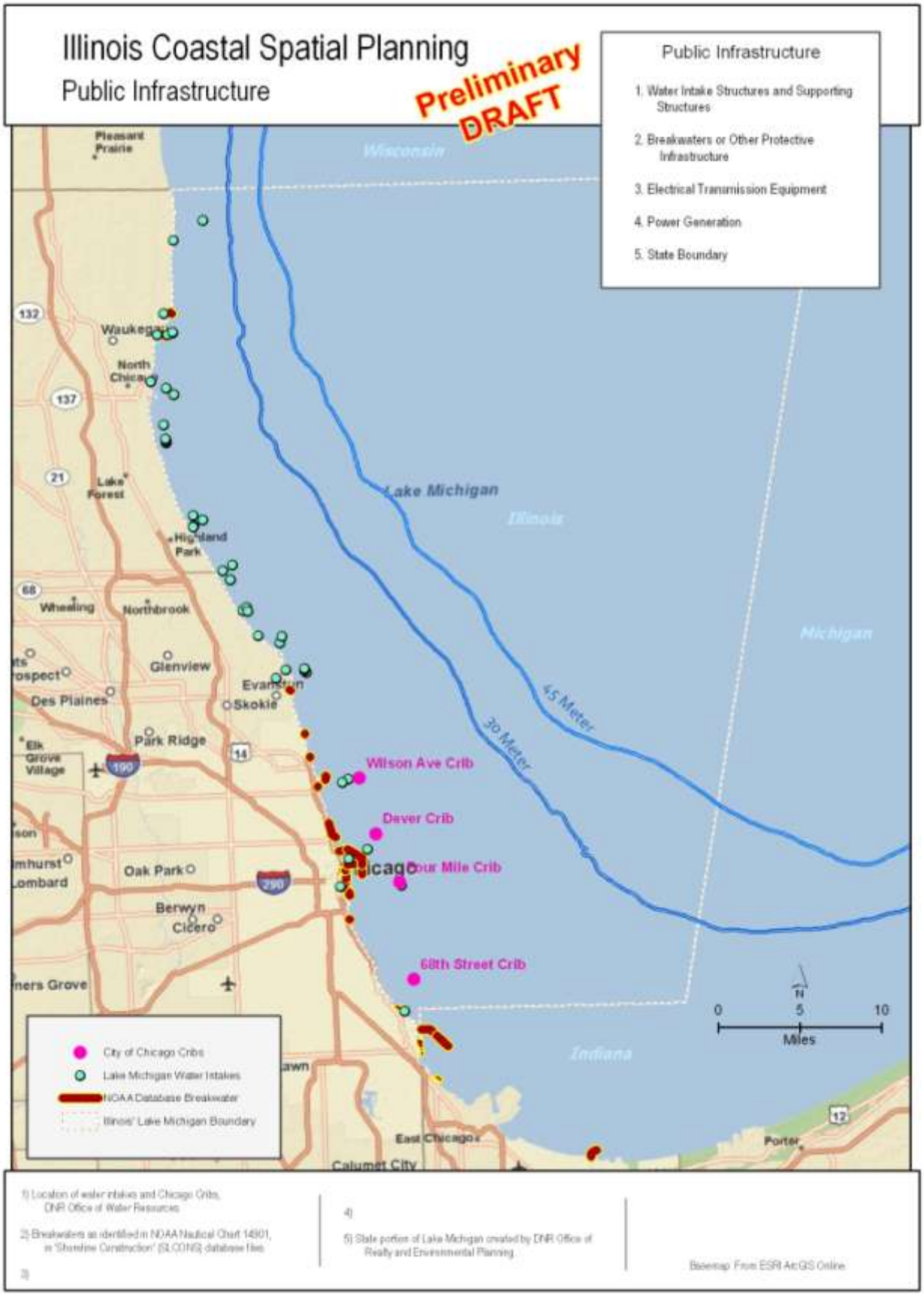
-Arlene Juracek, Illinois Power Agency
June 5, 2012

Appendix C
Maps

The following coastal spatial planning maps were prepared by the IDNR for the first Lake Michigan Offshore Wind Energy Advisory Committee meeting on April 5, 2012. Maps have not been subsequently revised since then and are included as an appendix to this report to provide a visual context for appropriate lakebed lease criterion factors.


Illinois Coastal Spatial Planning
Environmental Factors
Preliminary DRAFT
Environmental Factors
1. Visual Impacts
2. Spawning Areas/Refuges
3. Reefs
4. Threatened and Endangered Species Habitat
5. Migratory Flyways, Avian Nesting Areas, Important Bird Areas
6. Protected Shorelines/Parks (Local, State, Federal)
7. Lakebed Substrate
8. Bathymetry
1 2 3 4 5 6 miles
Illinois Beach State Park
Waukegan
Naval Station Great Lakes
Waukegan Reef
Julian's Reef Commercial refuge
Upper Des Plaines River Corridor
Chicago Lakefront
45 Meter
30 Meter
25 Meter
Lake Michigan
Indiana
Lake Calumet Area
East Chicago
Calumet City
Porter
Audubon - Important Bird Areas
Status of Reef
Known Reefs
Possible Reefs
10 Meter Contours
Lake Trout Exclusion Zones
Bloater Chub Harvest and Spawning
State Park
Generalized T & E Reports
Sediment Type
Boulder/Bedrock
Rubble; Gravel
Sand; Silt/Clay
0 5 10
Miles


Illinois Coastal Spatial Planning
Marine Factors
Preliminary DRAFT
Marine Factors
1. Recreational Boating
2. Marinas/Slips
3. Historical/Archeological/Shipwrecks/Cultural Resources
4. Commercial Fishing
5. Sport Fishing
6. Chicago Air/Water Show
7. Dredge Disposal Sites
8. Engineering Limitations
9. Other Existing Uses
Pleasant Prairie
Waukegan
North Chicago
Lake Forest
Highland Park
Wheeling
Northbrook
Glenview
Des Plaines
Evanston
Skokie
Park Ridge
Elk Grove Village
Oak Park
Berwyn
Cicero
Chicago
Holly Barge
Rachel Carson Scuba Park
Calumet City
East Chicago
Porter
Lake Michigan
Illinois
Michigan
Straits of Mackinac
90 Miles
45 Meter
30 Meter
2202
2203
2204
2302
2303
2304
2402
2403
2404
2405
2406
2407
2502
2503
2504
2505
2506
2507
2603
2604
2605
2606
2607
2704
2705
2706
2707
2010 Fishing Effort in Hours
0 - 999 Preferred Grid
1000 - 14999 Acceptable Grid
15000 +
Holocene Forest Remains
Wrecks from NOAA
Structures for Diving
10 Mile Limit for Most Sport Fishing
0
5
10
Miles
3) Shipwreck data from NOAA Nautical Chart 14901, in 'WRECKS' database files
Diving structures from DNR Office of Water Resources
Holocene forest remains location from Journal of Great Lakes Research 17(4):543-552 article by Chrzastowski et. al
4) Commercial fishing displayed by 2010 hours of effort reported by grid cell. From DNR Division of Fisheries
5) Sport fishing represents salmon and trout fishing displayed by 2010 hours of effort reported by grid cell. Most within 10 miles of shore. From DNR Division of Fisheries
9) Basemap: From ESRI ArcGIS Online


Illinois Coastal Spatial Planning
Public Infrastructure
Preliminary DRAFT
Public Infrastructure
1. Water Intake Structures and Supporting Structures
2. Breakwaters or Other Protective Infrastructure
3. Electrical Transmission Equipment
4. Power Generation
5. State Boundary
Wisconsin
Lake Michigan
Illinois
Michigan
Indiana
45 Meter
30 Meter
Pleasant Prairie
Waukegan
North Chicago
Lake Forest
Highland Park
Wheeling
Northbrook
Glenview
Evanston
Skokie
Des Plaines
Park Ridge
Elk Grove Village
Oak Park
Berwyn
Cicero
Chicago
Wilson Ave Crib
Diver Crib
Four Mile Crib
68th Street Crib
East Chicago
Calumet City
Porter
City of Chicago Cribs
Lake Michigan Water Intakes
NOAA Database Breakwater
Illinois' Lake Michigan Boundary
0 5 10
Miles
1) Location of water intakes and Chicago Cribs, DNR Office of Water Resources
2) Breakwaters as identified in NOAA Nautical Chart 14901, in 'Shoreline Construction' (SLCONS) database files
3)
4)
5) State portion of Lake Michigan created by DNR Office of Realty and Environmental Planning
Basemap From ESRI ArcGIS Online


Illinois Coastal Spatial Planning
Transportation/Security
Preliminary DRAFT
Transportation/Security
1. Recommended Shipping Lanes
2. Federal Aviation Administration/ Air Transportation
3. Coast Guard/Homeland Security
4. Military Operations
Pleasant Prairie
Waukegan
North Chicago
Lake Forest
Highland Park
Wheeling
Northbrook
Glenview
Evanston
Skokie
Des Plaines
Park Ridge
Elk Grove Village
Oak Park
Berwyn
Cicero
Calumet City
East Chicago
Porter
45 Meter
30 Meter
Lake Michigan
NOAA Shipping Lanes
Military Practice Area
Basemap: From ESRI ArcGIS Online
0 5 10
Miles

Arklow Bank Wind Park in Ireland. Photo credit: Chris Wissemam

For more information on the Lake Michigan Offshore Wind Energy Advisory Council, Public Act 97-0266, or council meetings, please visit:

http://www.dnr.illinois.gov/councils/LMOWEAC