AN ANALYSIS OF OFFSHORE WIND DEVELOPMENT:

A Non-market, Stated Preference Approach to Measure Community Perceptions and Opinions and Estimate Willingness to Pay in Two Lake Michigan Regions

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Submitted by

Lauren Knapp, B.S.[1]
Environmental Policy M.S. candidate 2013

Yiting Li, B.E.[2]
Sustainable Systems M.S. candidate 2013

Yufeng Ma, B.S.[3]
M.S. Sustainable Systems/M.A.E. candidate 2013

Matthew Rife, B.A.[4]
Sustainable Systems M.S. candidate 2013

[1] knlauren@umich.edu
[2] beren@umich.edu
[3] mayf@umich.edu
[4] mattrife@umich.edu

Acknowledgements

Research Advisement Team

Jarod Kelly, Ph.D. | University of Michigan
Craig Landry, Ph.D. | East Carolina University

Citizens' Greener Evanston (CGE)

Nicolai Schousboe
Nathan Kipnis
Jonathan Nieuwsma
Peter Athans

Great Lakes Commission - Great Lakes Wind Collaborative (GLWC)

John Hummer, Former Project Director
Victoria Pebbles, Project Director

CH2M HILL

Mark Bastasch, M.S., Environmental Engineer
Tom Priestly, Ph.D., Principal Technologist for Visual Resources

University of Michigan Center for Statistical Consultation and Research (CSCAR)

Brady West, Research Assistant Professor, ISR
Melissa Plegue, Statistical Consultant

External guidance

Bob Sullivan, Visual Impact Specialist - Argonne National Laboratory
Jeremy Firestone, Ph.D. | University of Delaware

Foresight Group Inc.

Jennifer Schwartz

Melissa Data

Allon Bieberman

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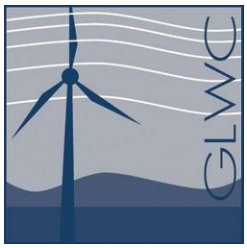

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Acronyms

CBA	Cost-benefit analysis
CCS	Carbon capture and sequestration
CV	Contingent valuation
CVM	Contingent valuation method
GLC/GLWC	Great Lakes Commission/Great Lakes Wind Collaborative
GLOW Council	Great Lakes Offshore Wind Council
KWh	Kilowatt-hour (energy)
NIMBY	"Not in my backyard"
NPV	Net present value
MW	Megawatt (power)
MWh	Megawatt-hour (energy)
SNRE	School of Natural Resources and Environment (The University of Michigan)
SP	Stated preference
WTA	Willingness to accept
WTG	Wind turbine generator
WTP	Willingness to pay

Abstract

What socioeconomic factors are indicative of support or opposition for offshore wind development? At some distance offshore, does the local community incur a social cost or benefit from building a wind farm as measured through non-market valuation? This contingent valuation method (CVM) case study was conducted to explore the socioeconomic dimensions of opinions regarding offshore wind development in Lake Michigan and estimate willingness to pay (WTP) in two regions: 1) Evanston, Rogers Park, and Wilmette, Illinois (N=2880; n=208) and 2) Mason and Oceana Counties, Michigan (N=952; n=122). Data was collected from November 2012 though February 2013 via online surveys after mailing invitations to systematic samples that received 7% and 13% response rates, respectively. Respondents were presented with three WindPro simulations of a 400 MW wind farm at three, six and ten miles from each region's respective shore along with one hypothetical (+ or -) monthly electricity price impact and then asked to vote 'for' or 'against' each scenario. Initial probit model results indicate that variables for the monthly increase/decrease in utility bill price, offshore wind farm siting distance, and liberal political ideology are statistically significant in determining the probability of support for the proposed offshore wind farm scenario; the logit analysis also suggests that individuals with a household income between $160,000 – $200,000/year are more likely to support the proposed offshore project relative to the most affluent respondents. Mean WTP calculations imply a negative WTP (social cost) from siting a wind farm 3 and 6 miles offshore but a positive WTP (social benefit) when setback 10 miles for the average respondent. Additional results indicate considerable uncertainty among respondents regarding not only current support for offshore wind development but also both the type and extent of subsequent impacts. These results could provide valuable insight regarding offshore wind development opinions and environmental economic implications for policymakers in coastal communities both with and without prior exposure to formalized development proposals.

1. Introduction

Wind power is poised to provide a clean, robust and renewable power generation source in the U.S. national energy portfolio. Unlike conventional fossil fuels, wind-derived electricity produces zero greenhouse gas emissions throughout its use phase and has the least life cycle environmental impact of any major sources of electricity generation (Kondili and Kaldellis 2012). Utilizing this inexhaustible resource creates vast opportunities to generate employment and create regional supply chains (Musial, Butterfield and Ram 2006). Moreover, wind power provides an opportunity to integrate renewable energy into the electricity generation mix, stimulate local and regional economies, and mitigate global climate change (Muradova and Veziroğlub 2008).

Wind project developers in the past several years have begun to focus more intently on offshore regions in the Great Lakes to expand wind development for various reasons (Scandia Wind 2009). First, more continuous wind, coupled with higher annual wind velocities, provides greater reliability in generation output. Also, increased distances from population centers offer opportunities to mitigate noise impacts on local residents and visual obstructions in day-to-day life (Pelc and Fujita 2002). The Department of Energy and National Renewable Energy Laboratory forecast that 54GW of power could come from offshore wind over the next 20 years, which accounts for 20% of the total anticipated wind capacity projected by 2030 (Musial and Ram 2010). Offshore wind projects have been deployed predominantly in the past two decades in developed European countries (Musial and Ram 2010) while various obstacles have stalled offshore wind deployment in the United States, and as of this writing, no offshore wind farm exists in domestic freshwater or saltwater areas. While there remains a myriad of factors that have arguably contributed to the lack of American offshore wind deployment from economic feasibility to permitting, this research project focuses on one of the key factors required for successful future offshore wind development: the determinants of individual support or opposition to local offshore wind development.

The aim of this study is to provide data on local stakeholders' opinions and perceptions regarding offshore wind power in two Lake Michigan regions. Analysis of this data allows for recommendations to encourage stakeholder participation and effectively educate the public regarding any development and permitting stages of future offshore wind development in the areas.

These findings are significant to state and local policymakers, private developers, community planners, community advocate groups, and other relevant stakeholders. Ultimately, this study's objective is to understand the current public opinion towards Great Lakes' offshore wind development through consideration of various social, demographic, and economic factors.

2. Motivations and Study Areas: Illinois and Michigan

During 2009 a Norwegian wind developer, Scandia, proposed a 500 MW (part of a 1 GW total project) offshore wind farm near Ludington and Pentwater, Michigan. Scandia selected this site largely due to the close proximity to the Ludington pumped storage facility, which can act as a "battery" to store the wind-generated power during off-peak hours when demand for electricity is low. This project, termed The Aegir wind farm, would have deployed 200 wind turbines but never reached fruition and was vehemently rejected by both communities with the concurrent formation of well-funded opposition groups. Subsequently, in the summer of 2010 both Mason (Ludington) and Oceana (Pentwater) Counties passed resolutions rejecting the Scandia proposal with Commissioner County Board votes of 9-1 and 4-2, respectively.[5] In addition to using anecdotal evidence from community publications and small group interviews, these events serve to create a prime opportunity to gather empirical evidence to better ascertain why the opposition formed and the occurrences unfolded.

In October 2010 around the same time as the Scandia proposal, Michigan's former Governor Jennifer Granholm's Great Lakes Offshore Wind (GLOW) Council published a report pertaining to offshore wind siting recommendations. Commissioned in 2009 to investigate issues surrounding offshore wind development within Michigan's Great Lakes, the council identified recommendations that would facilitate sound methods for evaluating proposals in a manner that encouraged public engagement in the process. Among the Council's key findings were the most and least appropriate sites for placement of offshore wind projects by using a set of 22 criteria that included bathymetry, biological importance, and scenic vistas among others (Great Lakes Offshore Wind Council 2009). While their report identified favorable locations for wind power deployment, the final siting recommendations are limited to the State of Michigan since the report did not assess the coastal suitability in neighboring states. Furthermore, the GLOW Council's recommendations for general permitting processes, public engagement and compensation have much broader applications (Great Lakes Offshore Wind Council 2009).

The Michigan GLOW Council's report states that "public opinion can be influenced by the perceived lack of opportunities for local input during the planning and development phase (DONG Energy et al. 2006,119); this suggests that a well-designed process for stakeholder participation, including local input, can improve the level of support and/or reduce opposition" (Great Lakes Offshore Wind Council 2009). These findings suggest that local input should be strongly encouraged with stakeholder education playing a core priority. But, effectively educating local stakeholders arguably requires a foundational understanding of their current ideologies, uncertainties and concerns regarding offshore wind development.

Moreover, Citizens' Greener Evanston (CGE), a non-profit based in the Evanston area located Northwest of Chicago, issued a request for information (RFI) on May 1, 2010 to build a wind farm located in Lake

[5] http://www.mlive.com/news/muskegon/index.ssf/2010/08/oceana_board_rejects_offshore.html

Michigan near Northwestern University.[6] CGE has board members and affiliates that served on the Lake Michigan Offshore Wind Energy Advisory Council. This ad hoc committee was created under the Illinois Department of Natural Resources between 2011-2012 to establish a siting criteria and key recommendations report regarding offshore wind development in Lake Michigan for the Illinois Governor and General Assembly.[7] Besides the RFI and ancillary meetings on the topic held by CGE, the Evanston community and surrounding areas have not seen any formalized proposal or permitting for a specific offshore wind farm project. Given how the events transpired in Pentwater and Ludington, CGE was interested in gauging the current community landscape in the Evanston area before unveiling any formalized proposal or community education process and therefore wanted to be involved in the current study.

As a report published by the U.S. Department of Energy in 2011 states, "since no wind turbines are installed in U.S. waters, there is a shortage of critical data on the environmental and [siting effects] of turbines ..." (U.S. Department of Energy 2011). The siting process for wind farms both offshore and onshore is an iterative one that inherently requires concurrent participation from local stakeholders. Before this process even begins, data on the perceptions, goals, and opinions of relevant community stakeholders can aid the initiation of public engagement on the front end.

Given this setting, this study focused on three primary areas within Lake Michigan. One is near Evanston, Illinois while the other two are located in near Ludington, and Pentwater, Michigan (Figure 1) and are referred to throughout the report as the 'Illinois' and 'Michigan' regions. As previously mentioned, there are currently no offshore wind farms anywhere within the United States; as a consequence, only a relatively recent body of research pertaining to public perceptions and perceived impacts of offshore wind development exists. Nonetheless, this study drew heavily upon leading research not only conducted in Europe but also in the United States near Delaware, Massachusetts, and along the East Coast.

The present study focused on individual-level offshore wind power perceptions by administering an online survey to a random, systematic sample of residents in Evanston, Wilmette and Rogers Park, Illinois and Mason and Oceana Counties, Michigan (Figure 1). Specifically, the key research objectives included identifying how information sources influence opinions concerning offshore wind development, estimating what associations exist between demographic factors and current opinions, and identifying a general sense of each region's responsiveness to hypothetical aesthetic and price impacts of offshore wind farms.

[6] http://www.cityofevanston.org/assets/EvanstonRFI_OffshoreWind_Final.pdf.
[7] Their final report can be found at http://www.dnr.illinois.gov/councils/LMOWEAC/Pages/default.aspx.

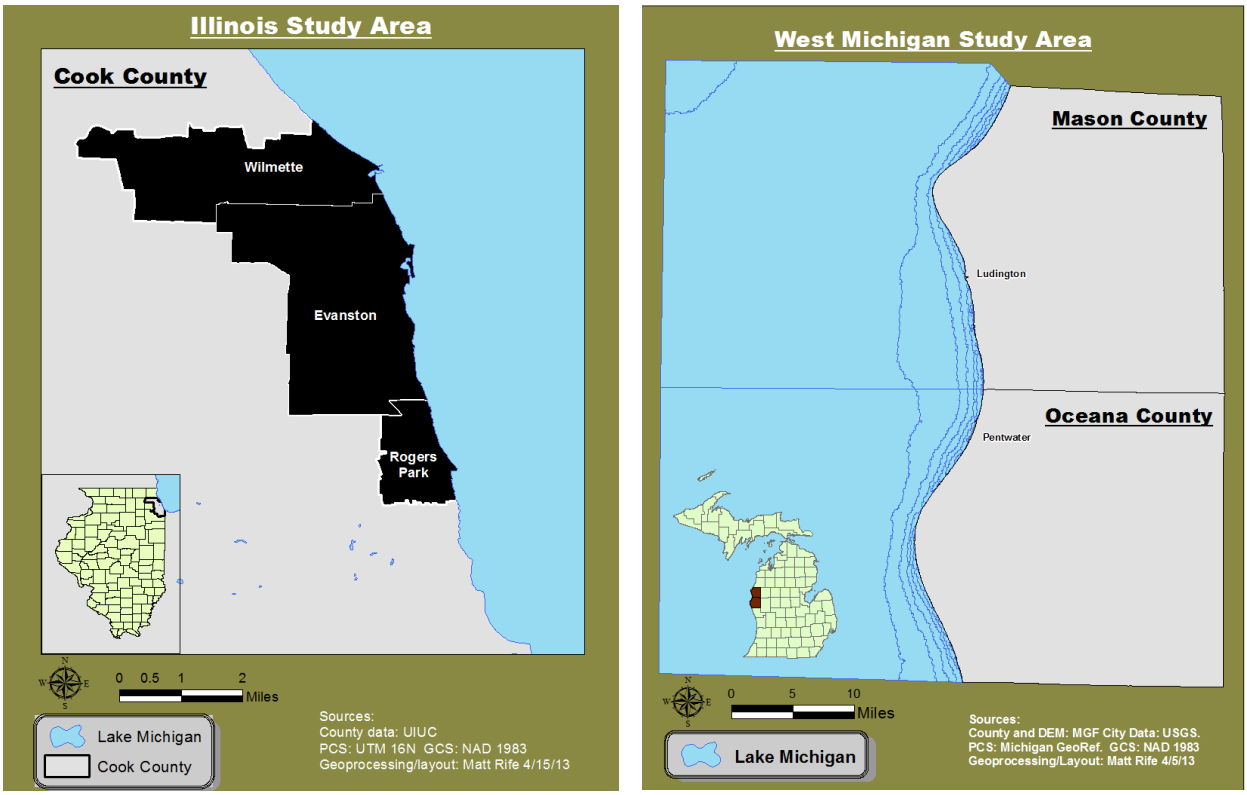


Figure 1. Offshore Wind Perception Study Regions in Illinois (Left) and Michigan (Right)

3. Literature Review

Perceptions regarding potential benefits and concerns as they relate to offshore wind development span a myriad of issues. The literature explores these key issues including: primary benefits; siting, aesthetics and the value of the viewshed; as well as environmental and economic impacts. In some cases individuals' perceptions do not always align in magnitude with the impacts that likely *could* result from this type of development and therefore some of the previous research compares and relates this difference of perceived versus likely impacts to overall opposition. Previous studies address these topic areas through different methodologies. Each issue category is addressed separately below.

3.1.Primary Benefits

Wind power is widely recognized as one of the most benign electricity generating sources whether compared with traditional sources or other renewable energy sources (Meyer 2003, Brittan Jr. 2002, Department of Trade and Industry 2003, Snyder and Kaiser 2009). Its independence from conventional fuel in power generation not only makes wind power immune to the price fluctuations of fossil fuels, but also reduces the carbon-intensity of the technology over its life cycle. In so far as it displaces the existing fossil fuel electricity generation, both onshore and offshore wind power technology create environmental benefits from the reduction of criteria air pollutants and greenhouse gases and a reduced

stress on water resources as is required in thermoelectric generation (National Academy of Sciences 2007, U.S. Department of Energy 2008, Jarvis 2005).

A life cycle assessment of wind farms found an energy payback time of 0.26 years for onshore wind projects (0.39 years for offshore wind projects), less than 2% of its 20-year service life (Schleisner 2000). In contrast, the energy payback time of solar PV is 2.5 - 4 years or 12.5%-20% of its 20-year service life (Alsema 2000). Assuming a 20-year service life and a total electricity production of 250GWh, the average emission level of offshore wind generated electricity over its entire life cycle was only 16.5g CO_2/kWh, 0.03g SO_2/kWh and 0.05g NO_x/kWh (9.7g CO_2/kWh, 0.02g SO_2/kWh and 0.03g NO_x/kWh for land-based wind farms) (Schleisner 2000).

Offshore wind power shares the benefits of onshore wind power, but also presents unique advantages and disadvantages. Offshore wind projects could be built in populous coastal areas thus avoiding connection and transmission loss over long distances from areas of great wind potential but little electricity demand (Snyder and Kaiser 2009, Musial, Butterfield and Ram 2006). Offshore wind turbines also operate with higher efficiency than onshore turbines due to greater and more uniform offshore wind velocity than onshore; additionally reduced turbulence minimizes stress on equipment (Pelc and Fujita 2002, Snyder and Kaiser 2009, Musial, Butterfield and Ram 2006). Visual impact and noise pollution of offshore wind farms are greatly reduced as a wind farm moves further from shore. When wind farms are sited at distances where they are not visible from shore, the visual and noise impacts can be negligible (Pelc and Fujita 2002).

Nonetheless, while onshore wind power is considered to be the most “cost-effective” form of renewable energy, offshore wind power brings new costs and challenges (Nazim Z. Muradova 2008, Snyder and Kaiser 2009). Due to its location on the water, costs for equipment, maintenance and insurance for an offshore wind farm all increase making the economics less favorable (Snyder and Kaiser 2009). Furthermore, although onshore wind power projects have met opposition, due to the price premiums associated with coastal views and the public ownership of the property, the issue of offshore wind projects becomes all the more contentious (Global Insight Inc 2008).

3.2. Aesthetics, Siting and Viewshed Valuation

Dr. Jeremy Firestone is one of the leading researchers of public perception regarding offshore wind in the U.S. He has conducted numerous studies relating to support and opposition of offshore wind projects off the Atlantic coast, including arguably the most highly contested offshore wind proposal in the U.S. to date – Cape Wind (Lilley, Firestone and Kempton 2010). Firestone found that the majority of respondents (72%) felt that the aesthetics of the ocean view would be negatively impacted (Firestone and Kempton 2007).

Dr. Craig Landry of East Caroline University, a co-advisor to this study, has conducted telephone and online surveys investigating North Carolina resident and tourist perceptions regarding impacts of hypothetical wind farm scenarios through conjoint methods. His research suggests that while residents

are averse to placement of wind turbines 1 mile off the coast, this aversion is no longer present at 4 miles (Landry, et al. 2012). Diminishing aversion as distance from the coast increases is consistent with other studies (Ladenburg and Dubgaard 2007, Ladenburg and Dubgaard 2009, Bishop and Miller 2007, Ladenburg 2009). However, 4 miles offshore is closer than other research suggests, and this acceptability appears to vary significantly by region. All of the 13,339 square miles identified by the GLOW Council as "most favorable" for wind development not only avoid shipping lanes, sensitive fish and wildlife habitats, but also were located at least six miles from the shoreline (Great Lakes Offshore Wind Council 2009). Additionally, Firestone's research found that six miles offshore was acceptable for the majority (78%) of Delaware residents, compared with only for 25% of residents in Cape Cod (Ladenburg and Dubgaard 2007, Firestone, Kempton and Krueger 2009).

Moreover, there exists a willingness to pay to decrease the visual disamenity of an offshore wind farm as shown in a study conducted in Denmark; respondents were willing to pay more when presented with an option to move the wind farm further away to sea. This study suggests that individuals place some value on the coastal view and that value can be economically estimated because they would pay money to move the wind farm further from view (Ladenburg and Dubgaard 2007). Another notable finding is that while some residents consider wind farms to have a negative visual impact, others actually consider them to add value to the viewshed (Landry, et al. 2012). While viewshed impacts are consistently among the top concerns of many opponents, results in Delaware and Cape Cod suggest that concerns regarding possible socioeconomic and environmental impacts outweigh concerns over aesthetics (Firestone, Kempton and Krueger 2009).

3.3. Environmental Issues

As Firestone and other researchers have noted, suggesting that the "not-in-my-backyard", or NIMBY, phenomenon alone accounts for all opposition is entirely too simplistic (Wolsink 2000, Devine-Wright 2005, Firestone and Kempton 2007, Kempton, et al. 2005, Swofford and Slattery 2010). One of the biggest arguments against wind farms, whether onshore or offshore, is that they pose a danger to bird and bat life due largely to collisions with the blades. While it is true that wind turbines can increase bird and bat fatalities, there is still uncertainty as to the true impact that large-scale deployment of wind power technology would have on fatality rates (National Academy of Sciences 2007, Erickson, Johnson and Jr. 2005, Drewitt and Langston 2008, Kunz, et al. 2007, Arnett, et al. 2008). Moreover, while wind power has received particular attention regarding this topic in recent years, this scrutiny must be placed in context with other anthropogenic causes of bird and bat fatalities such as the negative impacts associated with other electricity generation sources as well as collisions with other human structures (Erickson, Johnson and Jr. 2005, Lilley and Firestone 2008, Kunz, et al. 2007, Snyder and Kaiser 2009). Furthermore, research indicates that offshore wind developments may pose even less risk to avian fatalities than do the onshore counterparts (Desholm and Kahlert 2005, Lilley and Firestone 2008, Pettersson 2005, Kahlert, et al. 2004).

The impact of offshore wind power on aquatic life is even less certain. The limited number of studies on this issue focus almost exclusively on marine life since there are no fresh water offshore wind farms

anywhere in the world. This research suggests that the majority of impacts to marine life would be minor and occur mainly during the construction phase of development and would mostly subside in the operation phase, although, sound and vibrations from the turbine may also have an impact on nearby species (Snyder and Kaiser 2009, U.S. Department of Energy 2012). Some research has suggested that turbine foundations installed into the waterbed could have positive impacts by acting as artificial reefs or breeding grounds that provide benefits for fish and benthic communities (Snyder and Kaiser 2009, Musial, Butterfield and Ram 2006). Nonetheless, due to the paucity of research on the impacts of offshore wind farms on bird and bat mortality as well as aquatic species, further study and careful planning of all new developments are needed understand the breadth of these impacts (Fox, et al. 2006, Gill 2005, Hüppop, et al. 2006).

3.4. Economic Issues

Another argument against offshore wind farm development is that it may negatively impact tourism. Indeed, numerous studies have found respondents to be concerned about possible impacts on tourism (Firestone and Kempton 2007, Firestone, Kempton and Krueger 2009, Landry, et al. 2012, Frantal and Kunc 2010). This concern has been typically espoused by opposition groups in areas where developments have been proposed (P.O.W.E.R. Coalition 2011, The Alliance to Save the Nantucket Sound 2012). While the literature on impacts of offshore wind development is still somewhat limited, the debate for onshore wind farms' effects on tourism is settled. As Aitchison states it:

> *The clear consensus is that there has been no measurable economic impact, either positively or negatively, of [onshore] wind farms on tourism… Moreover, all of the studies that have sought to predict impact have demonstrated that any negative impact of wind farms on tourism will be more than outweighed by the increase in tourists that are attracted by wind farms, by the increase in employment brought about by the development of wind farms and/or by the continuing growth of tourism* (Aitchison 2012).

While Aitchison is not speaking specifically to the impacts of offshore wind on tourism, her conclusions are in line with current research on the subject. Studies have concluded that an offshore wind farm in domestic waters would have a minimal impact on beach visitation and in some cases respondents may actually be more inclined to visit beaches with offshore wind farms (Landry, et al. 2012, Firestone, Kempton and Krueger 2009, Global Insight Inc 2008, Snyder and Kaiser 2009).

Another common concern raised about wind development is the impact on property values. While there are very few studies identifying impacts of offshore wind farms on property values, the impacts of onshore wind farms are better documented. A study conducted by Sterzinger et al. in 9 counties around the United States found that in 8 out of 10 cases property values within the viewshed of a wind farm actually increased faster than the control group; furthermore, the property value increase in 9 of those cases occurred after the development of the wind farm (Sternzinger, Beck and Kosticu 2003). Another study, also assessing U.S. residential property prices in relation to onshore wind development, found

that neither visibility of nor proximity to a wind farm had any significant impact on home prices (Hoen 2010).

Because the economics of offshore wind are very site specific depending on wind resources, local electricity prices, and availability of transmission among other factors, it is difficult to determine how electricity prices may be affected by the development of a new project. One report, for example, estimated that after the Offshore Wind Economic Development Act went into effect in 2010, the electricity price of New Jersey residents would increase 2.1% by 2017 (Tuerck, Bachman and Murphy 2011). No specific empirical research on the real impacts of offshore wind on electricity rates was found. However, the structuring of electricity markets plays a great role in how prices will be impacted. For example, in Massachusetts, Cape Wind plans to bid on an hourly, market which would most likely lower electricity rates (Firestone and Kempton 2007).

In addition to potentially reducing electricity rates, offshore wind development would also have more concrete positive impacts on the local economy by creating both short-term construction jobs and long-term operation and maintenance jobs (Strachan and Lal 2004). In the Horns Rev wind project implemented in Denmark, over 1700 man-years of local construction jobs were created and approximately 500 man-years of local jobs were maintained over the 20-year service life of the project. (Musial, Butterfield and Ram 2006). While the numbers will vary from project to project, this is nonetheless one certain benefit.

3.5 Perceptions vs. Likely impacts

One common theme in the research into public perceptions of offshore wind power is the wide range of expectations of impacts from offshore wind projects and that these expectations can greatly affect the overall acceptance or rejection of a project. Research suggests that if the public had a better understanding of all of the positive and negative environmental impacts coupled with improved control planning and oversight, overall support for projects could be improved (Firestone and Kempton 2007, Koundouri, Yiannis and Kyriaki 2009). Other studies find that expectations of negative impacts and the discontent during the construction phase can lead to opposition of wind power projects onshore, but after operation begins public acceptance increases (Wolsink 2007, Devine-Wright 2005).

3.6 Methodologies

In order to understand the aforementioned issues as they pertain to offshore wind, perception research has been conducted through a myriad of qualitative and quantitative techniques but has yet to reach an overarching consensus on the optimal format as each study has exhibited slightly different motivations and objectives. While an increasingly diverse breadth of research has been undertaken, a subset of these studies and their approaches are discussed specifically below.

Grand Valley State University's Erik Nordman has conducted research on the perceptions of Lake Michigan coastal residents regarding proposed offshore wind turbines. One stark difference between Nordman's research and the work conducted by the GLOW council is that whereas the GLOW council

focused on general public engagement through public hearings and numerous public comment periods, Nordman deliberately sought out nonrandom samples through a *qualitative* research method known as the Delphi Inquiry (Nordman, et al. 2011). The purpose of this method is to select a diverse set of individuals with varying expertise. Although little consensus was ultimately reached in the focus groups, the method did facilitate discussion on this increasingly contentious issue (Nordman, et al. 2011).

Meanwhile, Firestone has used multiple quantitative techniques including mail-based and in-person surveys (Lilley, Firestone and Kempton 2010) while Kempton has utilized semi-structured qualitative interviews to analyze "values, beliefs and logic" of both offshore wind project proponents and opponents (Kempton, et al. 2005). While the interviews succeeded in identifying some factors that contributed to opposition among those volunteer participants, the method was limited in providing an adequate analysis of the broader suite of reasons contributing to the public perception toward offshore wind projects in general (Firestone and Kempton 2007).

In a successive study aimed to address this gap and better understand opinion formation, Firestone designed a sixty-two-question survey that underwent rigorous, local face-to-face and pilot mail pretesting. A (N=1500) stratified sample of adult residents were each mailed a survey packet containing a pre-survey letter; a booklet containing the survey instrument with instructions and return envelopes; and a reminder postcard. The survey introduction language avoided any "explicit reference to the subject matter" to mitigate response bias (Firestone, Kempton and Krueger 2009). The survey instrument consisted of five sections that requested information on: 1) current opinions, 2) perceived impacts, 3) factors that might drive a change in opinions, 4) decisions among multiple, visual scenarios and 5) demographics (Lilley, Firestone and Kempton 2010). Visual simulations were presented in the fourth section to test respondents' sensitivity to view changes at 1.5km, 10km, and 22km from shore in addition to an "out of sight" distance (Firestone, Kempton and Krueger 2009).[8] As a natural limitation inherent to paper-based surveys, the simulation display order was not randomized.

Both the qualitative and quantitative studies already implemented have facilitated the investigation of various offshore wind impact and perception objectives with varying degrees of inherent limitations. The present study was strongly influenced by much of the prior research discussed above and attempted to emulate their methodologies in order to not only follow prior literature convention but also provide ease for any future comparisons or meta-analyses.

4. Research Methodology

4.1. Research Questions

This study attempted to answer, address and explore the following overarching objectives:

[8] A previous study noted that vista occupancy decreases significantly for a wind farm sited from 1.5km to 10km off the shoreline (Global Insight Inc 2008).

- Assess current opinions regarding offshore wind development near Evanston, Rogers Park and Wilmette, Illinois and Mason and Oceana Counties, Michigan
- Test residents' decision-making processes to vote 'for' or 'against' hypothetical, offshore wind farm scenarios at varying distances via a contingent valuation method (CVM) survey
- Analyze the types of information sources in which individuals learn about offshore wind, demographic characteristics, and opinion variables that correlate with local opposition/support for offshore wind farm development, i.e. the CVM votes
- Estimate the non-market value of the lake shore viewshed impact of an offshore wind farm through stated preference, willingness to pay (SP WTP)

4.2. Survey Structure

For both regions, the survey was divided into five sections to group similar content and ease cognitive burden. The Evanston, Illinois area, Mason County, Michigan, and Oceana County Michigan survey instruments can be found in Appendices B.1, B.2 and B.3, respectively.

Section 1: Information Sources

- The first section introduced respondents to the survey, inquired about their information sources (that is, through which media they have learned about wind energy) and the extent to which they used these media sources to obtain information.

Section 2: Offshore Wind Opinions

- The second section recorded opinions about current support for offshore wind development in Lake Michigan and the perceived impacts regarding a wide array of pre-defined environmental, economic, and social impacts. For the Michigan region, respondents were asked how their opinions would change provided that the predefined impacts would be helped or harmed as a result of the offshore wind farm.[9]

Section 3: A Hypothetical Scenario

- The third section introduced the contingent valuation portion of the survey in which respondents were faced with a hypothetical scenario that an offshore wind project was proposed near their region's shoreline. Each respondent was presented with a scenario in which they had to "vote" for the proposed wind project at three offshore distances. A photograph of the current view of the local beach (Northwestern University Beach for Illinois, Ludington Beach in Mason County, MI and Charles Mears State Park in Oceana County, MI) was presented followed by three simulations of the hypothetical wind farm at 3, 6, and 10 miles offshore (Appendix A.1 – A.9). Respondents in the Illinois portion of the study saw each distance in ascending order starting with the 3-mile scenario. For the Michigan region respondents the scenarios were presented in a randomized order. Every respondent was also presented with a

[9] These same opinion questions concerning changes in perceived impacts were posed to the Illinois region respondents; unfortunately, due to a technical error in Qualtrics' online display logic, these questions did not appear properly and as a result, those answers were not recorded.

randomized, pre-defined price impact on monthly electricity rates that remained the same for all distances. The Contingent Valuation (CV) section, below, further discusses this section's methodology.

Section 4: Demographics

- General socio-economic and demographic questions were asked in this section including questions about age, income, education level, and employment.

Section 5: General Electricity Opinions

- The final section solicited opinions about support for renewable and conventional electricity generation sources and perceptions about which electricity generation sources were considered "clean."

4.3. Contingent Valuation (CV)

Environmental economists have employed a robust and diverse set of methodologies to estimate the value of numerous environmental resources through a broadly-defined mechanism called non-market valuation (Hanley and Barbier 2009). While there are several approaches to ascertain the value of a particular resource or environmental good that is neither bought nor sold in a defined market (such as the value of a species' preservation, the *Exxon Valdez* oil cleanup, or in this case, a change in a lake shore view), this study employed the stated preference contingent valuation method (Hanley and Barbier 2009).

In order to determine individual preferences and opinions, this study relies on the respondents to state them explicitly – a method called stated preference (SP) (Hanley and Barbier 2009). The fundamental assumption to SP is that respondents answer accurately and truthfully as it pertains to their overall preferences and opinions. Section three in the survey presents a scenario in which respondents vote for an offshore wind farm given changes in two variables: 1) the offshore wind farm's distance from shore and 2) a theoretical positive or negative impact on the respondents' monthly utility bill. Because of the hypothetical nature of this section, the SP approach is critical to determining how the respondents would react given the various changes in distance and price resulting from offshore development; this type of research is called contingent valuation (CV) (Hanley and Barbier 2009).

4.3.1. Payment Vehicle

The way in which CVM surveys elicit willingness to pay is through a mechanism called a "payment vehicle" that attaches a pre-defined price impact, or bid, to a mechanism to which respondents can relate (Hanley and Barbier 2009). For example, a payment vehicle often used is through telling respondents that they will either pay or be compensated $X on their annual property taxes. The purpose of the payment vehicle is to encourage respondents to make the most accurate choice possible given their budgetary constraints (Haab and McConnell 2002).

The payment vehicle used for this CVM survey was monthly electricity rates (USD) for two reasons. First, similar research employed this vehicle so that served as a model for this study in order to follow convention in other CV offshore wind studies (Koundouri, Yiannis and Kyriaki 2009). The second

motivation for selecting this vehicle was to account for the hypothetical nature of these scenarios and to create the greatest sense of realism; if it were ever to be built, it is reasonable to assume that a slight decrease or increase in electricity rates is one of the potential impacts that could actually result from a newly erected offshore wind farm (or any new electricity generation facility for that matter).

4.3.2 Elicitation Format

In order to collect data and estimates regarding an individual's price sensitivity to the environmental scenario, an elicitation format is used to present respondents with either a single, a set, or follow-up prices as well as varying levels of potential responses (Maler and Vincent 2005). A single-bounded (one price), dichotomous choice (either a "yes" or "no" response) with additional "unsure" option format was selected for the CV section to follow the National Oceanic and Atmospheric Administration's Contingent Valuation Blue Ribbon recommendation for questionnaire design (Arrow, et al. 1993). The willingness to pay (WTP) questions were followed with a certainty table in which respondents were asked to rate their relative certainty for each response (see Example 1 below). Researcher-selected electricity rate impacts ranged from (-60, -48, -36, -24, -12, 12, 24, 36, 48, 60) USD per month to evoke the most realistic responses for each individual. Each respondent was shown a theoretical price impact for all three distances, that price was internally constant (i.e. each respondent saw only one price, but differing respondents were shown different prices). Both positive and negative price bids were shown proportionately. That is, both positive (+) price increases on utility rates and negative (-) price reductions on utility rates were shown equally to respondents.

Example 1: Illinois Region

Given this distance from Northwestern University Beach in Evanston, would you support this wind farm if you knew you would have to...

Pay **$12 less per month**[10] on your electricity bill?

__Yes __No __Not sure

How sure are you of your previous answer given the impact on price?
Please select one number from 1 to 10, with 1 indicating "very unsure" and 10 indicating "very sure".

__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 __ 8 __ 9 __ 10

In the past, the hypothetical nature in contingent valuation has raised doubts on the accuracy of the estimated WTP which may be exacerbated by the elicitation format, known as the "elicitation effect" (Bohara, et al. 1998). However, studies have validated the (contingent) valuation of public goods in socioeconomic studies by suggesting that real life valuation is also sensitive to format and therefore also

[10] Each respondent saw the same randomized theoretical price impact for all offshore wind farm distances.

subject to the "elicitation effect" (Champ and Bishop 2006). The dichotomous choice (DC) elicitation format has been found to be one of the superior elicitation format approaches associated with less uncertainty as long as the proposed bid (i.e. theoretical price payment/compensation) levels were realistic (Bateman, et al. 1995). In conclusion, we considered the single-bounded and dichotomous choice question setting in the questionnaire design to be a valid approach to elicit willingness to pay figures while holding a consistent elicitation format across the Michigan and Illinois region questionnaires provided an opportunity for a cross-regional comparison of results.

4.4. Visualizations

An international engineering consulting firm, CH2M Hill, generated state-of-the-art visualizations for each scenario using WindPRO, a premiere software for this industry[11] (see Appendices A.1 – A.9). The base photographs[12] were taken at each location on a sunny afternoon in July and August 2012 for the Illinois and Michigan region questionnaires, respectively, using a level, compass, tri-pod, and a Canon DSLR camera. Special considerations were given to achieve eye-level height, fore and mid-ground visual references for scale, and bright afternoon lighting in order to meet rigorous visualization standards (Horner + Maclennan; Envision 2006). Also in accordance with these standards, GPS coordinates were obtained independently and cross-checked with GIS data supplied by the city of Evanston and the Michigan Geographic Framework (City of Evanston 2012, Michigan Department of Technology, Management and Budget 2013).

For the visualizations, the project nameplate power capacity, number of turbines, capacity of each turbine, and wind farm layout were selected to realistically portray a project's scale if one were to be constructed five to ten years in the future. Table 1 below shows the specifications of the hypothetical wind turbines utilized in the scenarios presented to respondents. Given that offshore wind farms in the United States do not exist, European development trends were used as a guide to establish the project size and scale. For example, most of the current projects in the United Kingdom range from 3.0 to 5.0 MW per turbine power capacity while facilities regularly deploy more than one hundred turbines per site (Sullivan, et al. 2012).

[11] We owe many thanks to the two CH2M engineers that generated the visualizations, Mark Bastasch and Tom Priestly, for their gracious flexibility and thorough dedication to this project.

[12] Base photographs are available upon request and were taken by Matthew Rife and Lauren Knapp.

Table 1. Specifications for Hypothetical Wind Farm Visualizations (Michigan and Illinois Regions)

Hypothetical Offshore Wind Farm Specifications			
		Hub height	*Rotor Diameter*
Wind turbine model and OEM	REpower 5M[13]	100 meter	61.5 meter
Wind turbine power capacity	5 MW		
Number of turbines	80		
Total facility power capacity	400 MW		

4.5. Controls for Potential Biases

Several approaches were taken to control for and limit potential biases to the greatest extent possible (Section 6. further discusses the implications of these biases and the survey's limitations).

1) **Self-selection sampling bias:** No mention of offshore wind farm development was made in any of the initial mailing materials to the respondent sample nor was it mentioned during subsequent follow-up reminder calls or postcards. This approach follows similar offshore research from the University of Delaware (Firestone and Kempton 2007, Firestone, Kempton and Krueger 2009). Instead, the invitation content referred to the survey broadly as an 'academic research regarding possible energy futures' (see survey priming letter language in Appendices B.4, B.9, and B.12).
2) **Hypothetical bias**: Survey-elicited opinions and 'votes' in the CV section are not the same as if respondents were acting in real life; respondents can sometimes overstate or understate opinions due to the hypothetical nature of presented questions (Maler and Vincent 2005, Hanley and Barbier 2009). To encourage the highest quality and most true-to-life responses as possible, the survey employed two widely accepted controls to limit this hypothetical bias phenomenon.
    a. 'Cheap talk' is an approach effective in eliminating the hypothetical bias phenomenon (Cummings and Taylor 1999). The purpose of cheap talk is to acknowledge that the survey is hypothetical in nature and to encourage respondents to vote or respond as if they had to make the decision today and with real dollars. Example 2 below shows the cheap talk language utilized in this survey.
    b. Another approach employed to control for hypothetical bias is through providing a certainty table following the vote and CV referendum (Cummings and Taylor 1999). Due to the theoretical nature of the CV scenarios and varying degrees of respondent knowledge, the main goal of the certainty table is to obtain additional data on the level of certainty of each respondent's vote. This additional data allows researchers to weight responses according to the respondents' relative certainty. Example 1, shown previously, displays the certainty table (also see Appendix B.1 – B.3)

[13] REpower has been deploying this model since 2008 in European installations across Germany and Belgium.

Example 2: Illinois and Michigan Regions

This scenario, along with the following price points, is purely hypothetical and was generated by researchers to elicit opinions. Given the hypothetical nature of this research, people sometimes unintentionally overestimate or underestimate their responses. Though this is a hypothetical scenario, please respond as if you were actually faced with this vote while keeping in mind your monthly budget.

5. Survey Implementation

For the Illinois region, the survey was completed by respondents in Evanston, Rogers Park, and Wilmette, starting in October 2012 through February 2013. For the Michigan region, respondents in Mason and Oceana Counties completed the survey throughout the months of January, February and March[14] 2013. The following section provides a detailed description of the data collection methods.

5.1. Address Data

Address data for both the Illinois and Michigan regions was purchased from Melissa Data, an online data clearinghouse. Addresses were selected based on the following demographics: single family residential dwellings, homes and apartments, property owners and rental classes.

5.2. Sampling Method

Sample population contact data was collected using a systematic approach along mail carrier routes to ensure a proportionate, geographic distribution across the communities (i.e. inland residents were sampled at the same frequency as residents near the shoreline) and to ensure cost effectiveness.

5.3. Contact Protocol

Due to relative time and resource constraints, five-contact and three-contact protocols[15] were utilized for sampling the Illinois and Michigan regions as described below and summarized in Tables 2 and 3:

Illinois Region: Evanston, Rogers Park and Wilmette

1. Initial priming letters (Appendix B.4) were mailed on September 26, and respondents received the letters within 3-10 business days.
2. Follow-up postcards (Appendix B.5) were mailed on October 1, 2012 to thank those that had already taken the survey and to gently remind those that had not yet taken the survey to do so by October 19, 2012. Postcards arrived within 3-5 business days.
3. Randomized calls (Appendix B.6) to the survey population took place throughout most of October and November. A total of 2,150 follow-up calls were completed.

[14] Only 1 respondent in the Michigan sample completed a survey in March.
[15] All mailings were carried out by the Foresight Group, Inc., Ann Arbor, Michigan.

4. Additional follow-up postcards (Appendix B.7) were mailed on January 18, 2013. Fewer follow-up contacts were made than in previous rounds due to time and resource constraints. Additionally, this follow-up contact list was suppressed to avoid re-contacting individuals from whom letters had been returned to sender, that had expressed no interest in taking the survey, or that had stated an inability to participate due to lack of Internet access.
5. Final follow-up postcards (Appendix B.8) were mailed on February 8, 2013 using the same suppression list as in step 4.

Table 2. Illinois Region Survey Contact Protocol and Response Rate

Contact Protocol	*First*	*Second*	*Third*	*Fourth*	*Fifth*	*Total number of Respondents*	*Response Rate*
Survey community	**Survey invitations**	**Follow-up postcards**	**Follow-up phone calls**	**2nd postcards**	**Final postcards**		
Evanston	1500	1500	-	1095	1095	-	-
Rogers Park	750	750	-	529	529	-	-
Wilmette	750	750	-	536	536	-	-
Total	**3,000** [16]	**3,000**	**2,150**	**2,160**	**2,160**	**n = 208**	**≈7%**

Michigan Region: Mason and Oceana Counties

1. Initial priming letters for Mason and Oceana Counties (Appendix B.9 and B.12, respectively) were mailed on January 7, 2013, and respondents received the letters within 3-5 business days. Unique IDs were assigned this time to each respondent to track which participant had completed the survey.
2. Follow-up postcards for Mason and Oceana Counties (Appendix B.10 and B.13, respectively) were mailed on January 16, 2013 to thank those that had already taken the survey and to gently remind those that had not yet taken the survey to do so by February 15, 2013. Postcards arrived within 3-5 business days.
3. Randomized calls (Appendix B.6) to the survey population took place throughout the month of February, 2013. A total of 800 follow-up calls were completed.
4. The second and final follow-up round of postcards for Mason and Oceana Counties (Appendix B.11 and B.14, respectively) were mailed on February 7, 2013. As in the Illinois region sample,

[16] 3,000 invitations were initially mailed; 120 mailings were returned to sender.

this follow-up contact was suppressed to avoid re-contacting individuals from whom letters had been returned to sender, that had expressed no interest in taking the survey, or that had stated an inability to participate due to lack of Internet access.

Table 3. Michigan Region Survey Contact Protocol and Response Rate

Contact Protocol	*First*	*Second*	*Third*	*Fourth*	*Total number of Respondents*	*Response Rate*
Survey community	**Survey invitations**	**Follow-up postcards**	**Follow-up phone calls**	**2nd postcards**		
Mason County	500		400		60	6%
Oceana County	500		400		62	6%
Total	**1000**[17]	**1000**	**800**	**930**	**n = 122**	**≈13%**

5.4. Incentive

All respondents were offered an incentive for their time to increase response rates. Each individual was presented with an option to record his or her email at the end of the survey for a chance to be entered into a $100 drawing. Each of the contact documents was color-printed with the University of Michigan logo to help it stand out from standard mail. In addition, the priming letter and postcard each contained a signature from the research team leader, Lauren Knapp, to add a personal feel to the documents. Finally, to the extent that they were available, respondent names were used on the priming letters and postcards for a personalized touch and to encourage responses.

6. Limitations

Although every effort was taken to ensure the most accurate responses, control for biases and achieve the highest number of completed surveys, the following issues represent possible limitations to this study. While some of the following limitations were impossible to avoid given resource and time constraints, others are inherent to this type of SP, CVM methodology.

[17] 1,000 invitations were initially sent; 48 were returned to sender.

6.1. Hypothetical Bias

Given the nature of hypothetical scenarios, respondents can sometimes overestimate or underestimate their responses due to the fact that they are stating their preferences based upon a hypothetical scenario. These responses do not provide a perfectly accurate depiction as to how they might vote; however, these can offer the next best alternative and a means to estimate the overall tendency of the sample population.

Furthermore, there might be some hypothetical bias that could not be controlled for among respondents that did not read the survey directions thoroughly. Explicit language was integrated into the survey to ensure that respondents knew the project was purely hypothetical.

Additionally, the wind farm project was selected by the study's research team in an attempt to portray what one might look like in the near future. The middle offshore distance (six miles) was based off findings from the GLOW Council's report and many aforementioned studies. Although the project's characteristics were selected on a conservative basis and based on previous research, they might not reflect the exact scale or particular siting for a project that, in reality, is best suited for this area.

6.2. Responses

In a perfect survey sample, all the individuals in a sample population will complete the survey. However, a 100% response rate is never obtained for a variety of reasons. While maximizing the size of the sample is important, the manner in which the sample is selected so as to limit the amount of inherent biases and the extent to which the sample is representative of the larger population are just as critical criteria to meet (UC Davis 2013).

6.2.1. Self-Selection Bias

In some cases, individuals may not respond to a survey because they do not hold passionate opinions about the issue. Likewise, the opposite effect can also occur; if individuals know the survey content and opt to respond, they tend to be motivated by the issue. This phenomenon can result in self-selection bias. If the majority of individuals that choose to respond to the survey tend to be highly motivated or passionate about the issue, that representation of extreme viewpoints can hinder the sample selection's randomization and bias overall response trends (EJ 1999, Manning, et al. 2011). In short, there is a possibility that this survey might have a stronger representation of the extreme views in these communities and not provide a representation of the communities' views as a whole on average. To avoid this sampling of extreme views, no mention of offshore wind development was made at any stage in the contact protocol and specific care was given to the wording of all communication to be deliberately general.

6.2.2. Timing

For some individuals, voluntary surveys can be burdensome and they do not wish to dedicate time toward an activity that comes with a high opportunity cost. This tendency may have been exacerbated by the 2012 presidential election campaign and associated polling which was highly active during the

survey solicitation; many Illinois respondents may have felt overwhelmed by the concurrent volume of campaign-related mail and telephone calls during this time and consequently less inclined to participate in the study.

Trying to reach respondents during the election was not a concern for the Michigan sample as all the contact mailings went out during the first three months of 2013. However, due to project time constraints and the seasonality of vacation homeowners' presence in the area, there is a chance that a portion the coastal or vacation property owners did not see the questionnaire contact mailings. The Michigan area response rate may be reflective of this timing, and it is reasonable to assume that the responses were overall were more representative of the full-time residents.

6.2.3. Technological Barriers

While online surveys carry a variety of benefits over traditional paper surveys, they are not without limitations. First, several respondents stated a lack of access to a personal computer equipped with Internet access during follow-up calls. Also, although security features were used to prevent participants from accessing the survey multiple times, there is a possibility that some respondents attempted to take the survey multiple times on different computers or electronic devices. For the Michigan sample, there was little possibility that this occurred because each respondent as assigned a unique ID that was cross-checked with their user IP address which was also recorded.

6.2.4. Accuracy of Address Data

Both the data clearinghouse that provided address data and the mailing house that distributed the surveys verified that the contact information was no more than 90-days old. Nonetheless, due to the nature of these information sources, it is difficult to ascertain the accuracy of the data. A simple error such as the misspelling of a participant's name on the priming letter could have provided enough reason for some respondents to disregard the survey invitation mailings. As previously mentioned, 48 mailings were returned from the Michigan region compared to 120 from the Illinois region.

6.3. Visualizations

While the visualizations employed in this research are state-of-the-art technological simulations, there are some inherent limitations to using any type of two-dimensional representation of three-dimensional objects that rotate and generate noise. The following issues present typical limitations associated with surveys, generally speaking, as well as with visually representing hypothetical wind farms with two-dimensional images, specifically.

6.3.1. Primacy Effect

It is a well-established phenomenon in academic studies that the order in which questions are asked, or the order in which answer options are presented, can influence the type or magnitude of responses. This phenomenon is called the primacy effect (Day, et al. 2012). There is a possibility that the order in which the hypothetical offshore wind farm distances (3, 6 and 10 miles from shore, consecutively) were presented could have impacted the respondents' WTP estimates for the Illinois region. However, the

ordering of the offshore distances were randomized for each Michigan respondent after the research team learned that the online survey platform had the capability to randomize the orders in which blocks of the questionnaire were displayed. The order in which the offshore distances were displayed to each respondent was controlled for in the statistical analyses and is discussed later in the report.

6.3.2. Static Images

One of the inherent difficulties with representing wind turbines, both onshore and offshore, in 2-D images relates to the aspect of movement (Sullivan, et al. 2012). The images employed in this study were stationary and therefore could not capture the viewers' attention in the same way that an oscillating blade might. Furthermore, no static, 2-D image is able to represent all of the various positions of a turbine as it rotates to face prevailing winds.

6.3.3. Simulation Viewing Distance

In order to provide the most accurate representation of a hypothetical wind farm, both the size of the image presented and the viewer's distance from the image should be controlled when presenting hypothetical imagery. While the respondents were advised to only view the survey on a standard computer screen, there was no way to control for a standardized viewing experience.

6.3.4. Differing Conditions

Ideally, visual simulations represent a range of differing conditions in order to compare how the impact may change over time (Horner + Maclennan; Envision 2006). Such temporal variations include not only daily lighting fluctuations, but also inter-seasonal differences. Furthermore, variations in atmospheric conditions, beach congestion, or seascape congestion (e.g. boat activity) may also affect viewing experience (Sullivan, et al. 2012, Horner + Maclennan; Envision 2006). Budgetary constraints as well as concern for overall survey length restricted the beach condition to that of a summer afternoon and did not allow for a complete enumeration of all possible representations.

7. Results and Interesting Findings

Of the 2,880 households in the Illinois region selected to participate in this study, 208 individuals completed the survey resulting in a response rate of approximately 7%; of the 952 households selected to participate in the Michigan region, approximately 122 individuals completed the survey resulting in a response rate of approximately 13%. The following sections detail results and key findings for each section from the survey.

7.1. Information Sources

Where residents' obtain information about offshore wind development can influence opinions and perceptions. The overwhelming majority of survey respondents in the Illinois region reported that they had learned or heard about offshore wind farms through the following top three main media sources: local newspapers, word-of-mouth from friends and the Internet (Figure 2); meanwhile, the Michigan sample responded similarly for their top two media sources but listed public hearings and meetings as

their third key source of information (Figure 3). Respondents were offered an 'other' category and a blank to fill in media or avenues in which they learned about local offshore wind development. For the Illinois participants that selected this response, "other" information sources included: email, City of Evanston newsletter/email, politicians, broadcast and city council meetings, SEA mailings, neighborhood association newsletter, "not sure", alderman, in-person communication from the mayor, and city council. Michigan participants that selected the 'other' category listed that patients, local governments, yacht club, negative roadside signs, and community activists were their sources of information.

Given that the Michigan respondents have had opportunities to attend public meetings/hearings pertaining to Scandia's Aegir proposal, it makes sense intuitively that this avenue would provide a considerable amount of information to these Mason and Oceana County respondents. It is also worthwhile to note that "friends" as an information source is acknowledged by almost double the amount of respondents in the Michigan sample compared to the Illinois sample, which could relate to the opposition groups and social networks that subsequently formed as a backlash against the Aegir wind farm proposal.

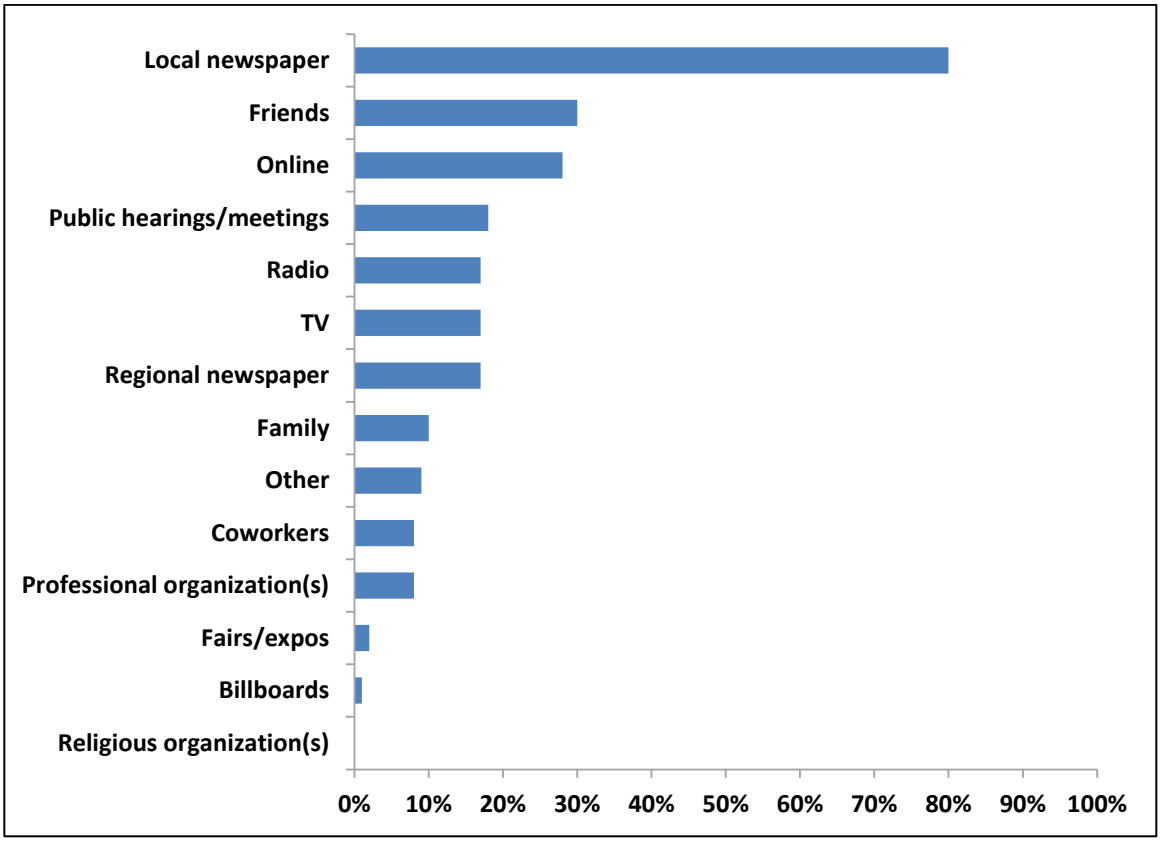


Figure 2. Illinois Region: Respondents' Primary Media and Information Sources Regarding Offshore Wind (n = 208)

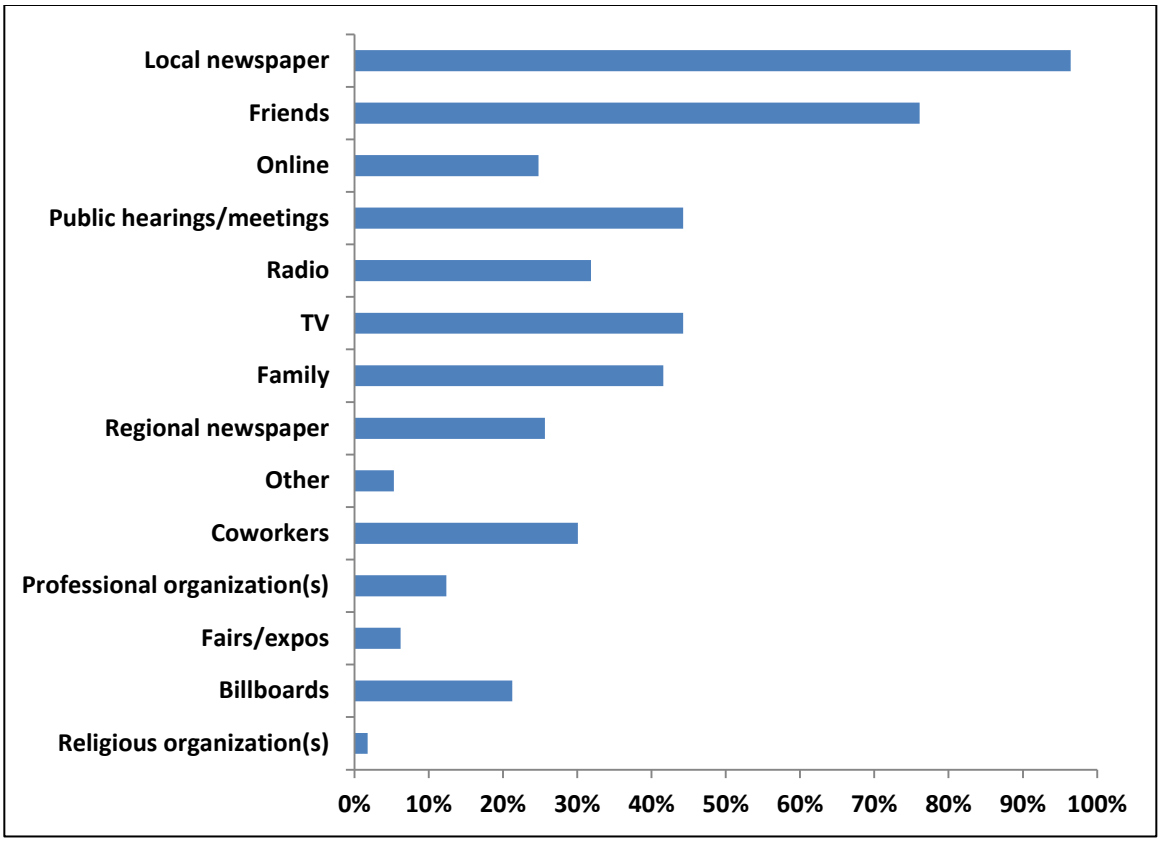


Figure 3. Michigan Region: Respondents Primary Media and Information Sources Regarding Offshore Wind (n = 122)

After selecting the media through which they learned about offshore wind, respondents were then asked to rate the extent to which each source provided them with information. Figures 4 and 5 illustrate the relative impact of each source for the Illinois and Michigan respondents, though it should be reiterated that respondents were only asked to evaluate the specific information sources that they had previously identified as relevant to their situation. Public hearings and meetings, professional organizations, and online websites had a significant impact on some Illinois respondents. TV and fairs/expos had moderate impact on the Illinois recipients who selected them while there was no extent of information gained from religious groups because no one selected this avenue as an information source. As for the Michigan respondents, public hearings/meetings and religious organizations were acknowledged as providing the most information; however, the apparent high impact of religious groups and organizations in providing information is not representative due to the limited sample size for this category (n=2). Billboards provided the least amount of information regarding offshore wind for those that had selected this media as a source of information for both regions.

In general, Michigan respondents stated that they received more information from each identified information source. This trend could be attributed to the fact that Michigan respondents' had more solidified opinions regarding offshore wind development and previous exposure to an offshore wind

farm proposal. In contrast, Illinois region respondents have not yet been exposed to any offshore wind farm proposal so education and outreach still remain in its infancy.

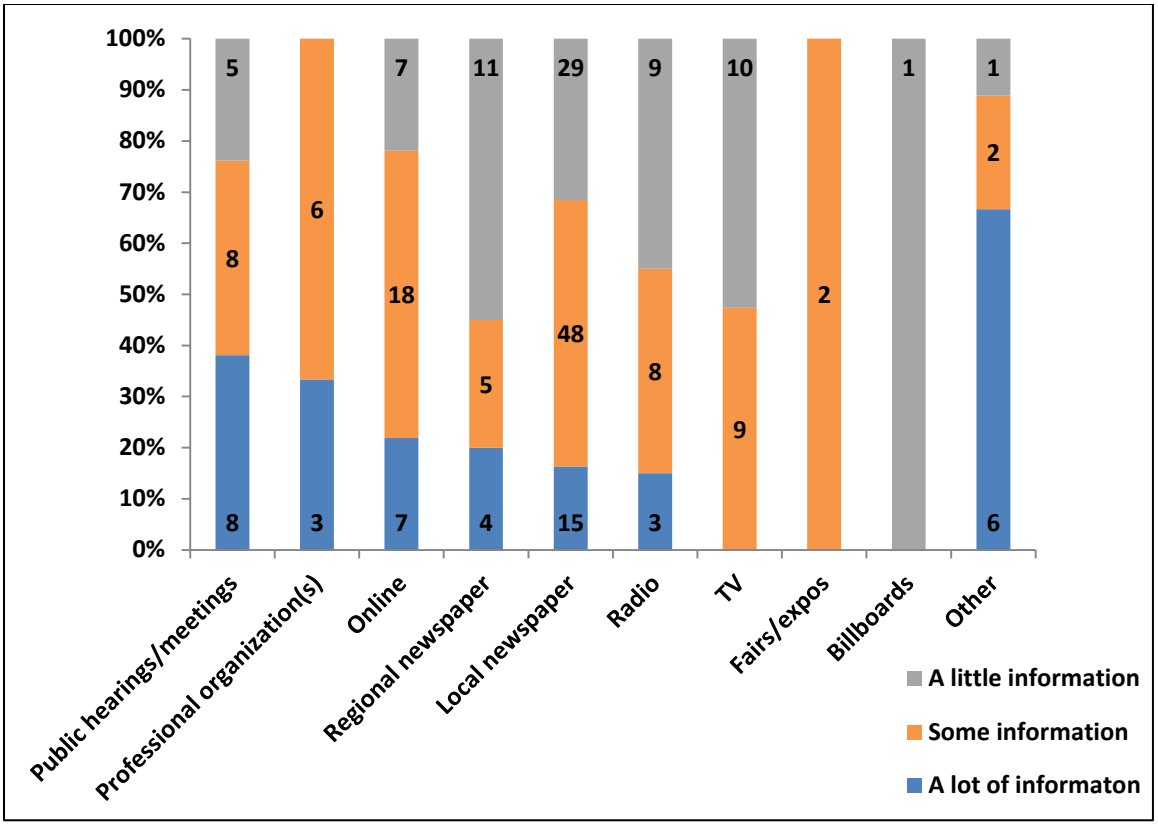


Figure 4. Illinois Region: Extent of Information Obtained from Each Information Source (n = 208) Relative number of responses are indicated in each category.

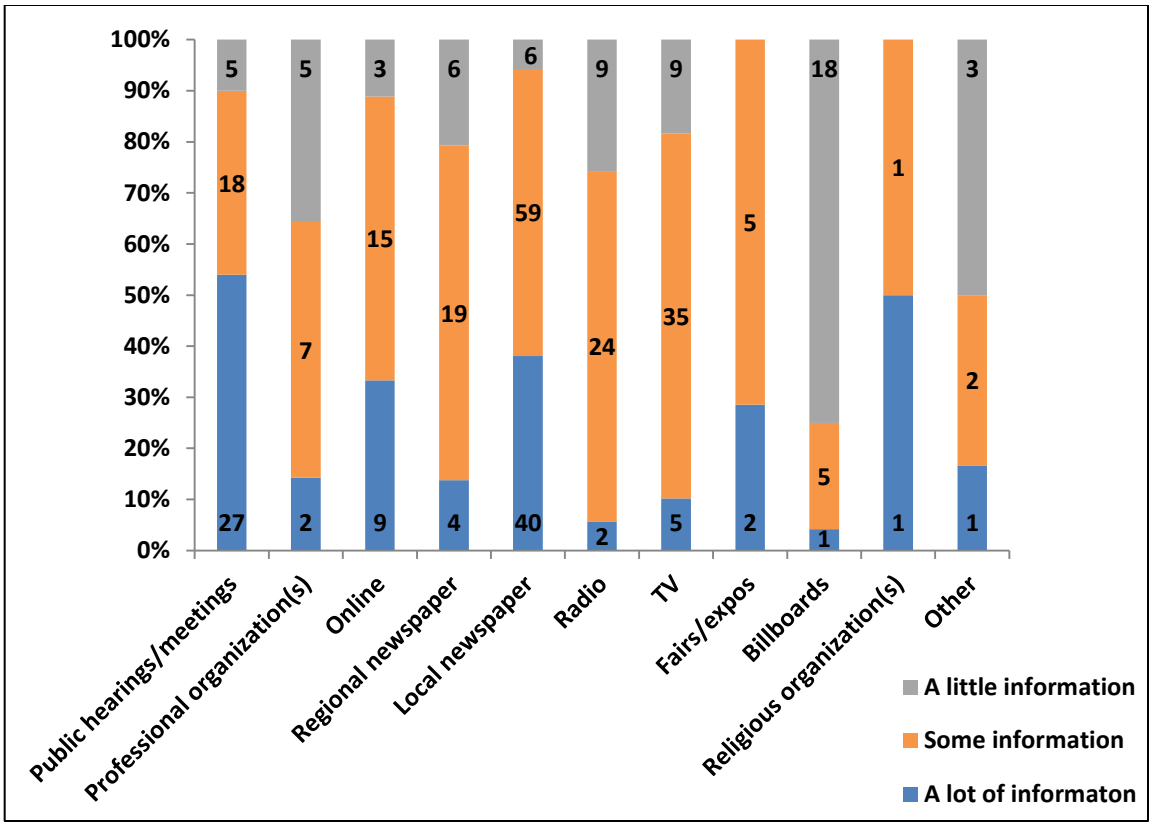


Figure 5. Michigan Region: Extent of Information Obtained from Each Information Source (n = 122) Relative number of responses are indicated in each category.

7.2. Offshore Wind Impacts: Current Perceptions

Respondents were asked to estimate the potential impacts of building an offshore wind farm with respect to some of the most relevant issues to the lake and their own lives. As both Figure 6 and 7 show, the majority of both Illinois (60%) and Michigan (≈40%) respondents believe that employment and the local economy would improve as a result. Conversely, a significant portion of Illinois respondents indicated that they expected a decline in the aesthetic lake view as well as increased danger to bird life if an offshore wind farm were developed while the majority of Michigan's respondents were most concerned about community harmony and aesthetics. Much more of Illinois respondents felt an offshore wind farm would improve (i.e. reduce) electricity rates than hurt them.

One important point to note is the considerable degree of uncertainty among Illinois respondents regarding offshore wind development's potential impacts; this ambiguity could be expected for this area given that the topic has yet to be marketed locally. Illinois respondents were the most uncertain about potential impacts on aquatic life (≈40%) and community harmony (≈35%). Interestingly, Michigan respondents were also most unsure (30%) about the impacts on aquatic life (Figure 7). Prior research suggests that the communication of these potential or perceived impacts can significantly shape overall support or opposition for a project (Firestone and Kempton 2007, Koundouri, Yiannis and Kyriaki 2009).

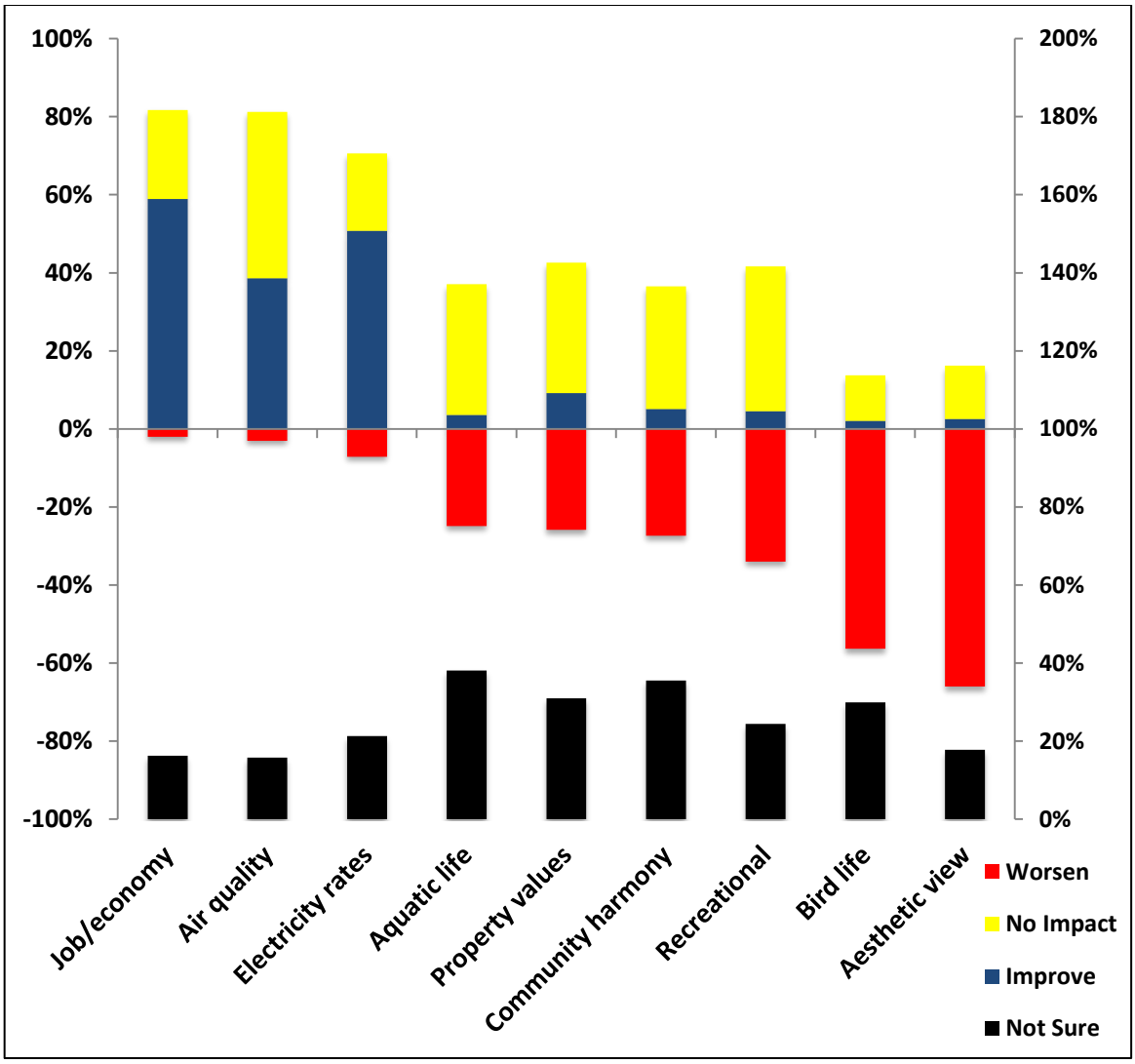


Figure 6. Illinois Region: Perceived Impacts from Offshore Wind Development (n = 208)

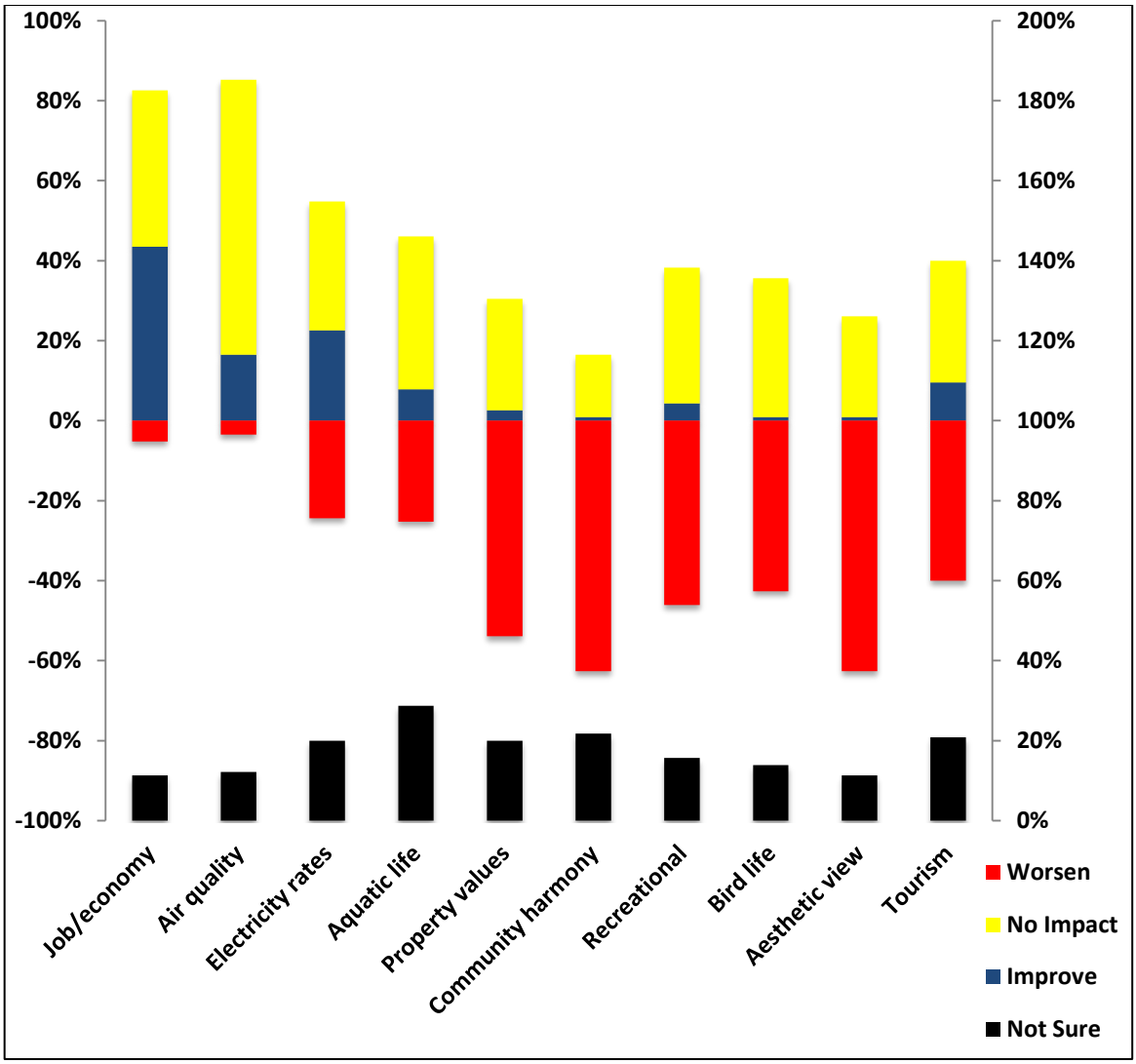


Figure 7. Michigan Region: Perceived Impacts from Offshore Wind Development (n = 122)

7.3. Offshore Wind Impacts: Change in Perceptions in Michigan Region

After gauging current perceptions concerning potential offshore wind farm impacts, respondents were asked "Given your current knowledge, how would your opinion change if you knew that offshore wind development in [Evanston, Ludington or Pentwater] would [harm or improve]..." to understand the sensitivity of their opinions about these issues given the new information.[18] When presented with the set of offshore wind issues and the manner in which each would be impacted, respondents were requested to indicate the degree in which their support or opposition for development would change across a five level Likert scale from "much more favorable," "more favorable," "unchanged," "less

[18] As previously mentioned, due to a glitch in the Qualtrics questions display order, these questions were not displayed properly to the Illinois sample so that region's change in perceived impacts is not reported.

favorable," to "much less favorable." Topics spanned improvements in social (local electricity generation, local job creation), economic (electricity prices, property values, and tourism) and ecological/environmental (bird life, aquatic life and local air quality) aspects along with their counterfactuals, resulting in 16 choices. To control for survey length, each respondent was only presented with 3 randomly selected factors in the "improved" or "harmed" groups. [19]

Of the aspects tested to see if opinions would improve, the highest majority (≈65%) of Michigan respondents reported that their opinion towards offshore wind farm development would either improve or strongly improve as a result of decreased electricity rates and local electricity generation, the highest out of all aspects in this group (Figure 8). This suggests that both community use and individual, economic gain regarding the wind farm's electricity can procure support. Interestingly, the least sensitive favorable change in opinion (≈40%) occurred when respondents were told that the offshore wind farm would "increase coastal property values" (Figure 8). Respondents' inelastic change in opinion due to improved coastal property values might be due to skepticism that this would in fact occur or that these respondents do not own coastal property values so they do not feel not be directly benefitted.

In terms of how perceptions would change as a result of negative impacts, the overwhelming majority (90%) Michigan respondents' opinions would be less favorable or much less favorable if they knew that an offshore wind farm would "seriously harm aquatic life" (Figure 9), indicating that Michigan respondents feel attached to the natural integrity and health of Lake Michigan. Michigan respondent opinions were also negatively sensitive to possible impacts on bird life and the local economy, again suggesting a sense of altruism toward the Lake's ecosystem health and also the community economic impact. Interestingly, when told the offshore wind farm would not improve local air quality, the smallest extent of negative opinion change occurred (30-40%) with the highest degree of unchanged opinion (Figure 9) indicating the opinion on this issue is already solidified or that residents' are skeptical that an offshore wind farm would in reality hurt local air quality.

One notable trend is that Michigan respondent opinions were more sensitive, and thus opposed, to new, harmful information compared to their counterfactual as a response to improvements. Also, this overall magnitude of negative opinion change was significantly higher than the magnitude of increased support spurred by the beneficial aspects. Additionally, the current, perceived impact that offshore wind farms would have on aquatic life was marginally recognized by respondents in both regions, yet it served as the largest aspect to spur opposition when given new information, suggesting respondents would be strongly deterred if they perceived the wind farm would harm the aquatic health of Lake Michigan.

[19] Share of opinions reported in this section refers to the percentage of respondents that were randomly assigned that certain factor, not the entire Michigan sample.

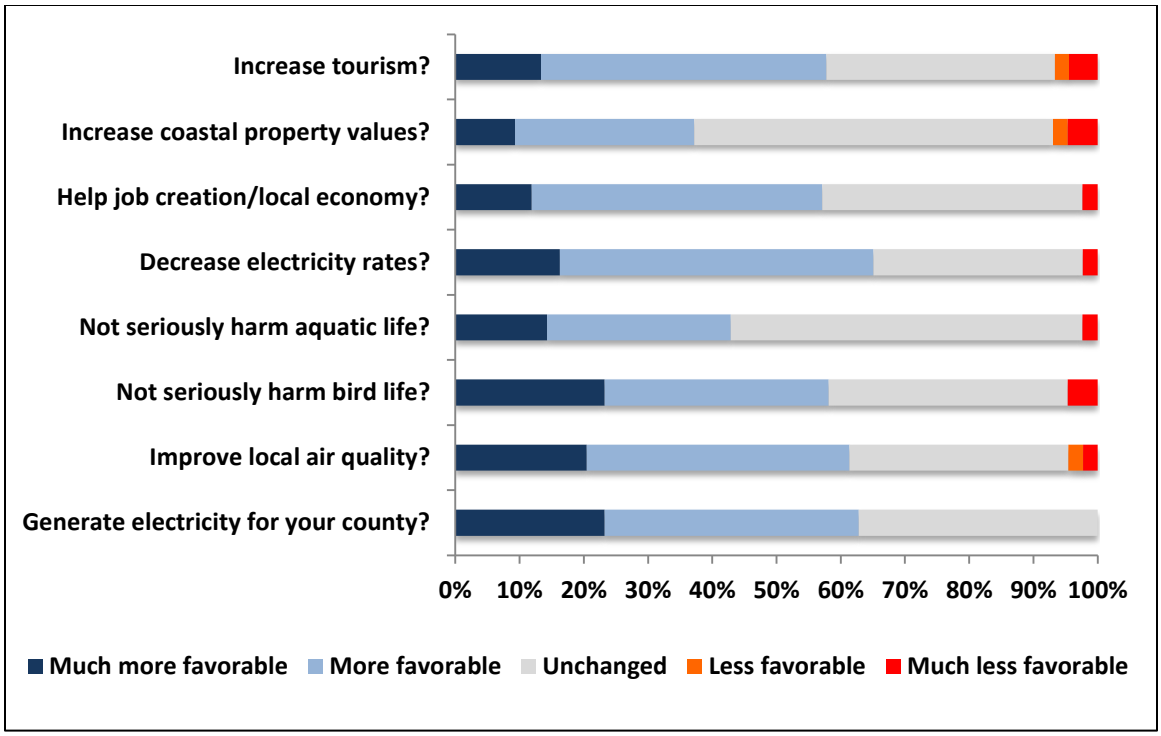


Figure 8. Michigan Region: Change in Perceptions as a Result of Positive Impacts

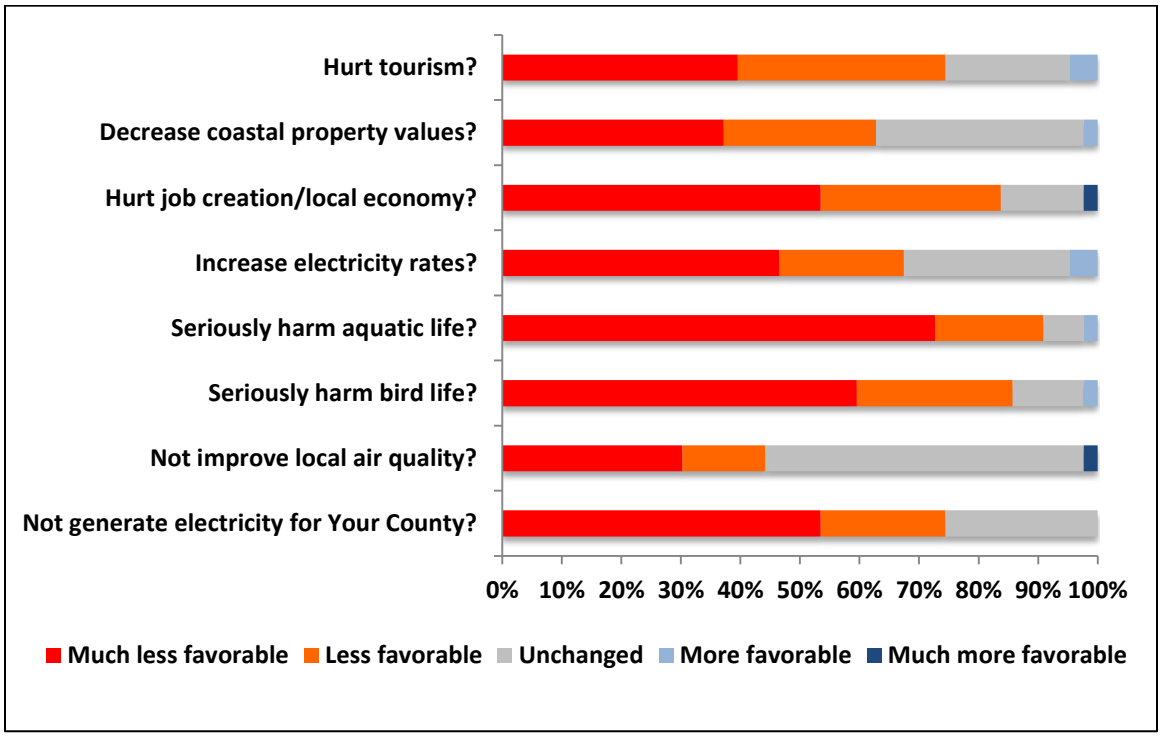


Figure 9. Michigan Region: Change in Perceptions as a Result of Negative Impacts

7.4. Opinions Regarding Other Electricity Sources

To compare offshore wind power perceptions with other sources for electricity generation, respondents were asked to state the degree to which they support other electricity alternatives (Figures 10 and 11). Solar received the highest level of support in both regions of all the electricity sources (60% and ≈45%, Figure 10 and 11). In the Illinois region, onshore wind received the second highest level of support: close to 80% of respondents either strongly support or support this technology. Oppositely, Illinois respondents were most highly opposed to traditional coal power (70% either strongly opposed or opposed) followed closely by hydraulic fracturing. Meanwhile, offshore wind was the most opposed electricity generation source among Michigan respondents, more opposed than nuclear – the close second highest opposed technology.

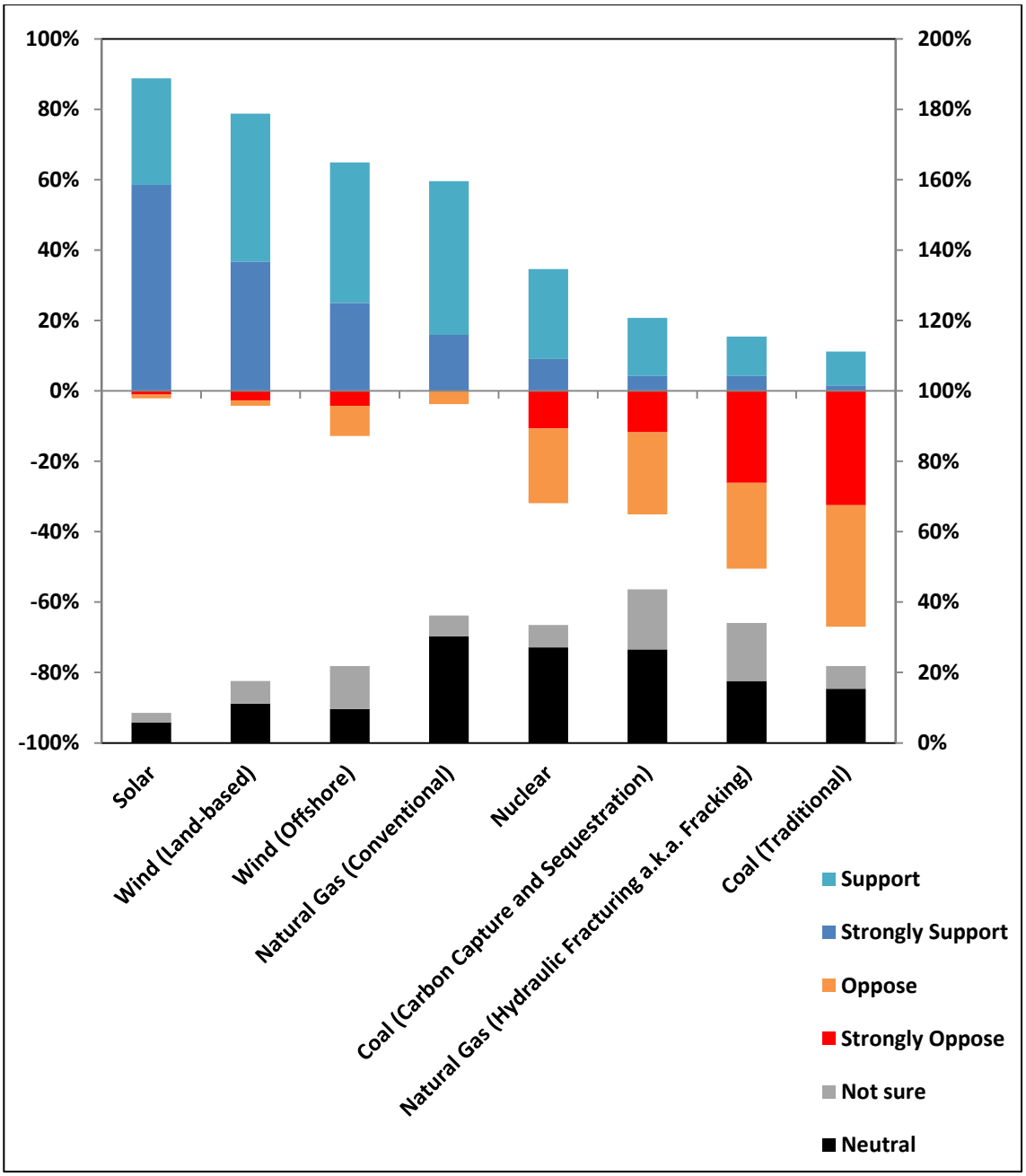


Figure 10. Illinois Region: Respondents' Level of Support for Varying Sources of Electricity Generation (n=208)

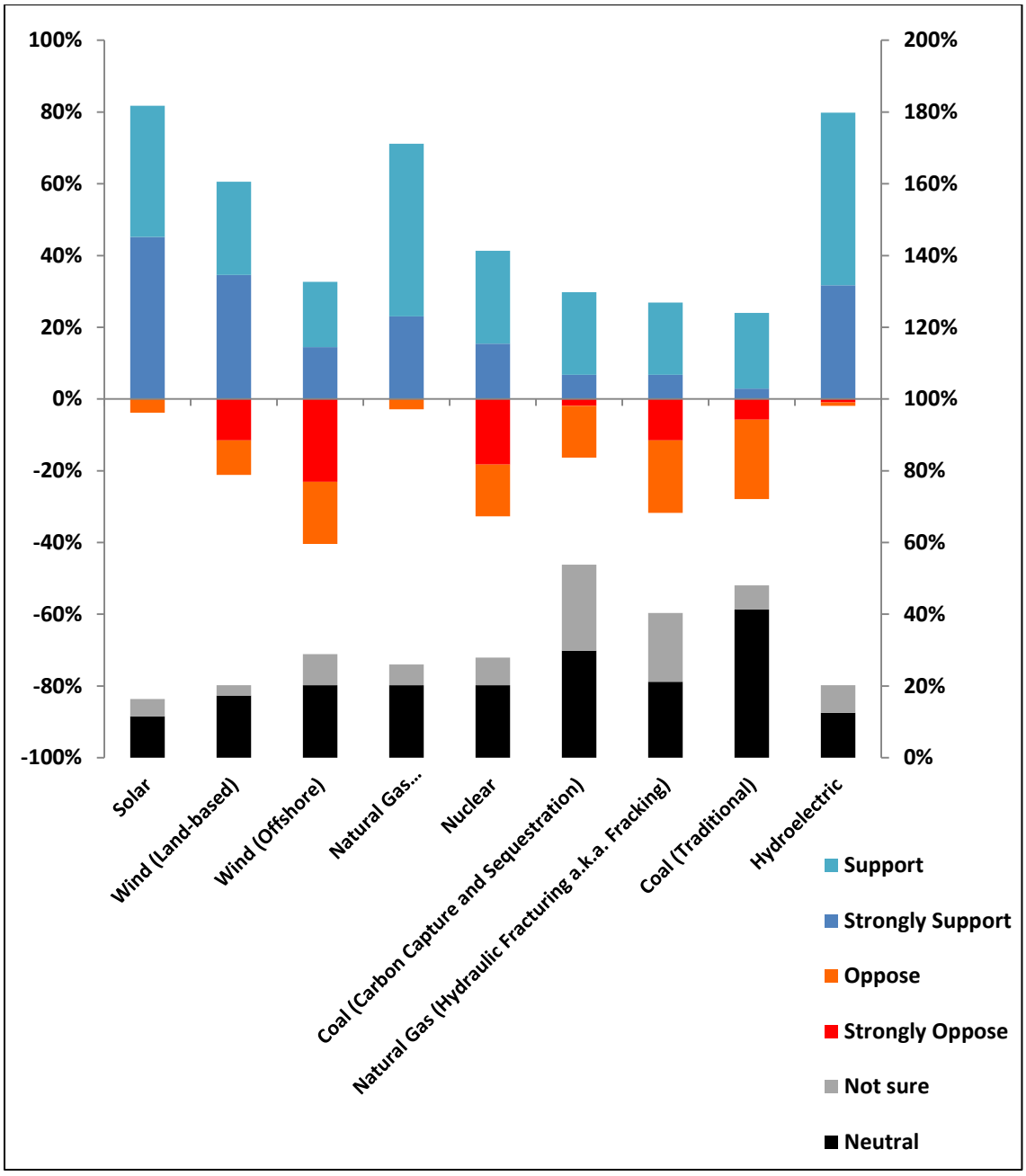


Figure 11. Michigan Region: Respondents' Level of Support for Varying Sources of Electricity Generation (n=122)

Respondents were then asked to evaluate whether various sources of electricity generation were "clean". As Figures 12 and 13 show, renewable sources were considered to be "clean." The top two "cleanest" sources of electricity for both regions were solar followed by onshore wind energy. However, the two regions then diverge in that Michigan ranked offshore wind power as the third "clean" source of electricity generation while Illinois' third cleanest technology was hydropower. Minorities in both regions considered hydraulic fracturing and coal generation to be clean sources of electricity generation.

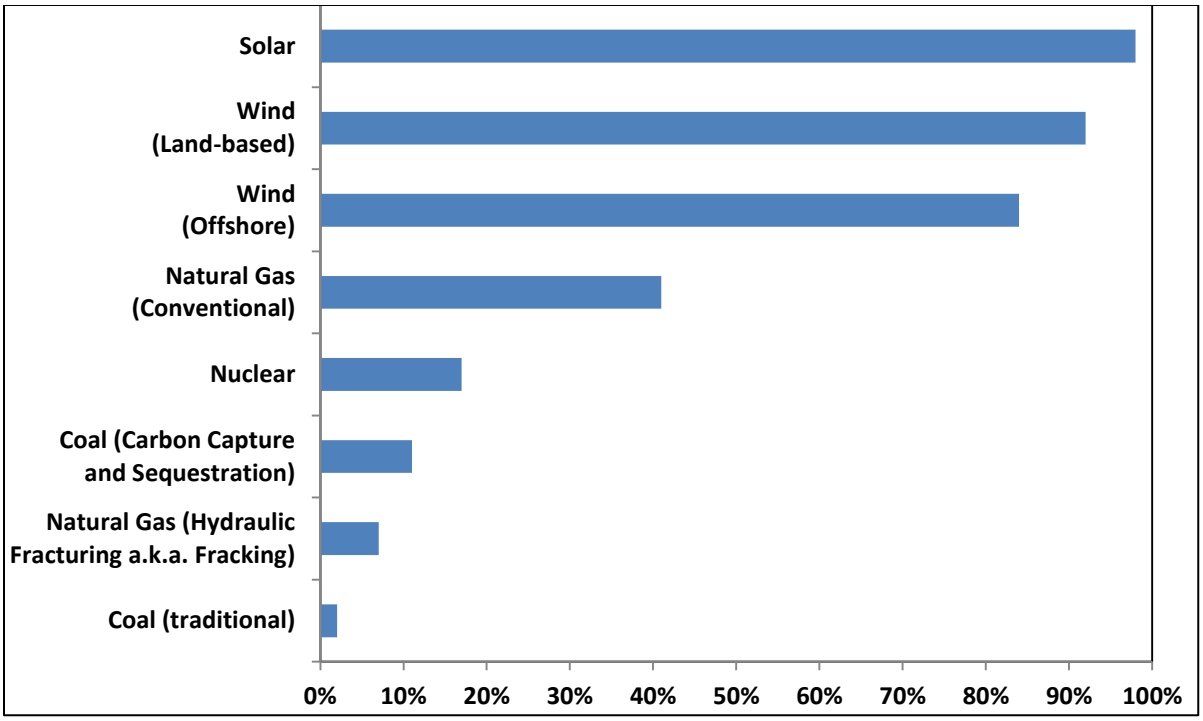


Figure 12. Illinois Region: Technology Types that Respondents Consider as "Clean" Sources of Electricity Generation (n=208)

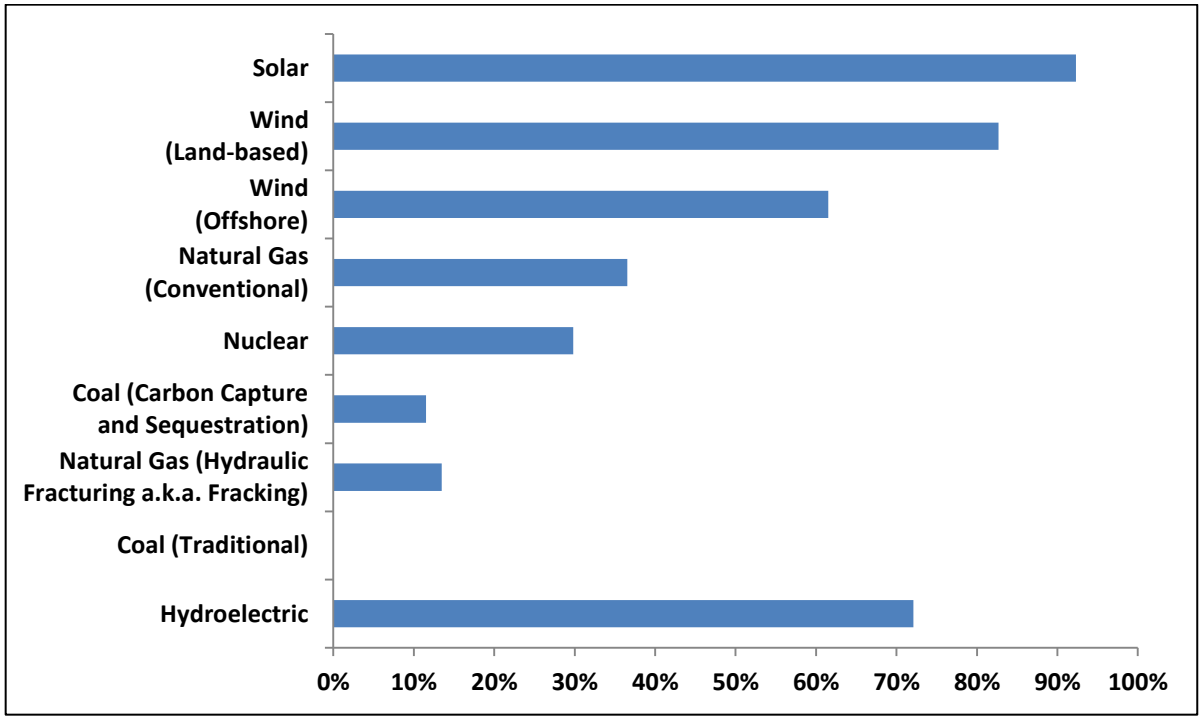


Figure 13. Michigan Region: Technology Types that Respondents Consider as "Clean" Sources of Electricity Generation (n=122)

7.5. A Hypothetical Scenario

Respondents were presented with a baseline scenario along with three hypothetical wind farm scenarios for Northwestern University Beach in the Illinois region. For the Michigan region, Mason County respondents were presented with a set of a baseline scenario and three hypothetical wind farm distances off of Ludington Beach while Oceana County residents were shown a baseline scenario and three hypothetical distances off of Charles Mears State Park Beach in Pentwater (Appendices A.1. – A.9.). Respondents were then asked whether they would support such a development based on a pre-defined, randomly presented price increase or decrease to his/her monthly electricity bill. Each distance scenario is discussed below.

7.5.1. Three-Mile Scenario

When presented with an offshore wind farm three miles from their local beach, the majority of respondents in both regions reported that they would not support the wind farm regardless of price impacts on monthly electricity rates. The small fraction of respondents who stated they would support the wind farm were generally offered hypothetical utility price reductions (Figures 14 and 15). The highest percentage of respondents that said they would vote 'yes' for the proposed three-mile distance in the Illinois region was approximately 35% of the sample given a $36 *decrease* in monthly electricity bills. Meanwhile, a $60 *decrease* on an individual's monthly electricity bill was associated with 45% 'yes' vote from the Michigan respondents.

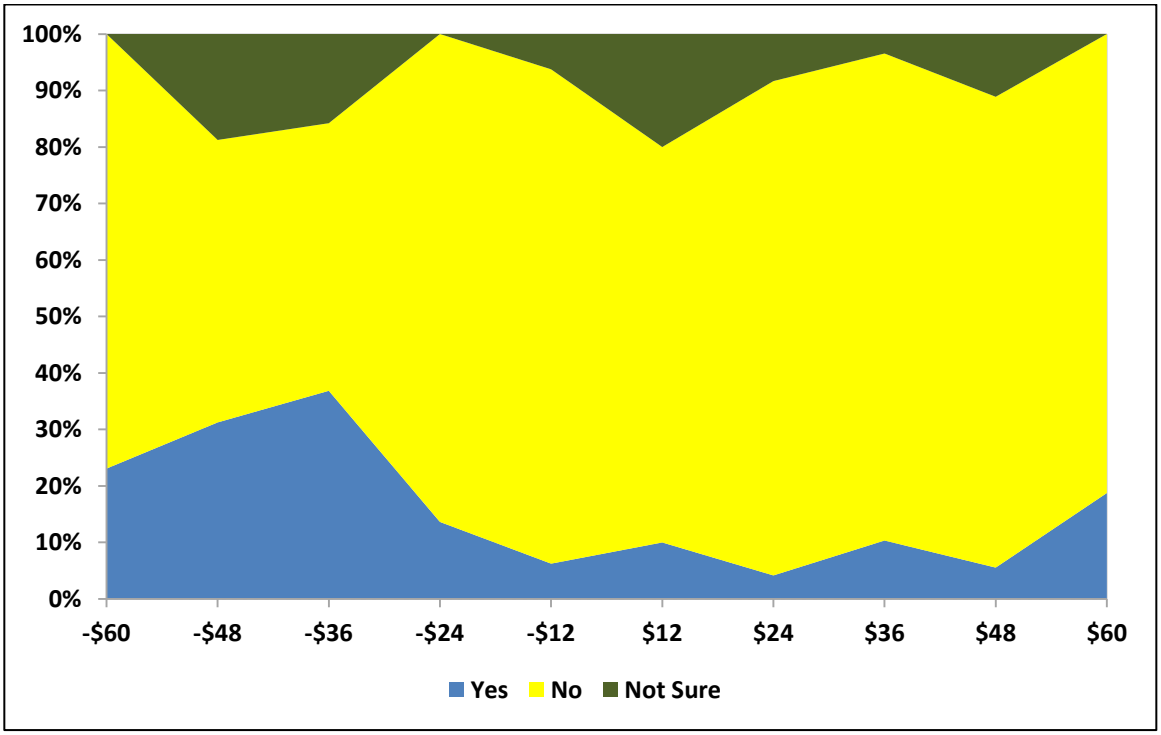


Figure 14. Illinois Region: Share of Support for Offshore Wind Farm Development (3 miles)

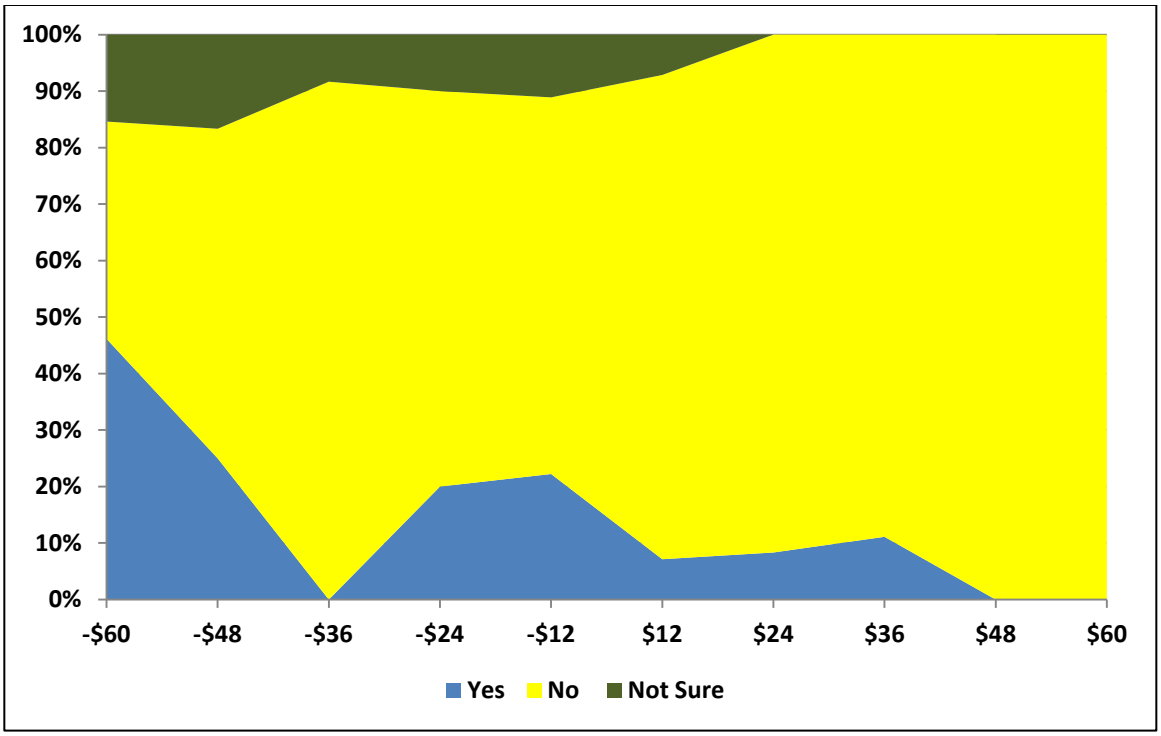


Figure 15. Michigan Region: Share of Support for Offshore Wind Farm Development (3 miles)

7.5.2. Six-Mile Scenario

When presented with an offshore wind farm six miles from his or her local beach, the majority of respondents stated that they would still oppose the development. However, the proportion of those who stated they would vote in favor of the project increased relative to the three-mile scenario (Figures 16 and 17). The highest percentage of Illinois respondents that said they would vote 'yes' for the proposed wind farm at six miles distance from the shoreline was approximately 70% given a $36 *decrease* in monthly electricity bills, and approximately 30% of Illinois respondents indicated that they would vote 'yes' for the project at six miles given a $12 *increase* in monthly electricity rates.

Michigan respondents remained less supportive than Illinois respondents across all hypothetical price impacts. None of the price impacts received a share of votes that would result in over 50% respondent support for building the project. The price level that saw the highest share of support remained the same as the 3-mile scenario: roughly 45% of the sample would support the development given a $60 monthly electricity bill *decrease*. Only a small share (20%) of respondents voted 'yes' in support given the lowest additional $12 monthly charge.

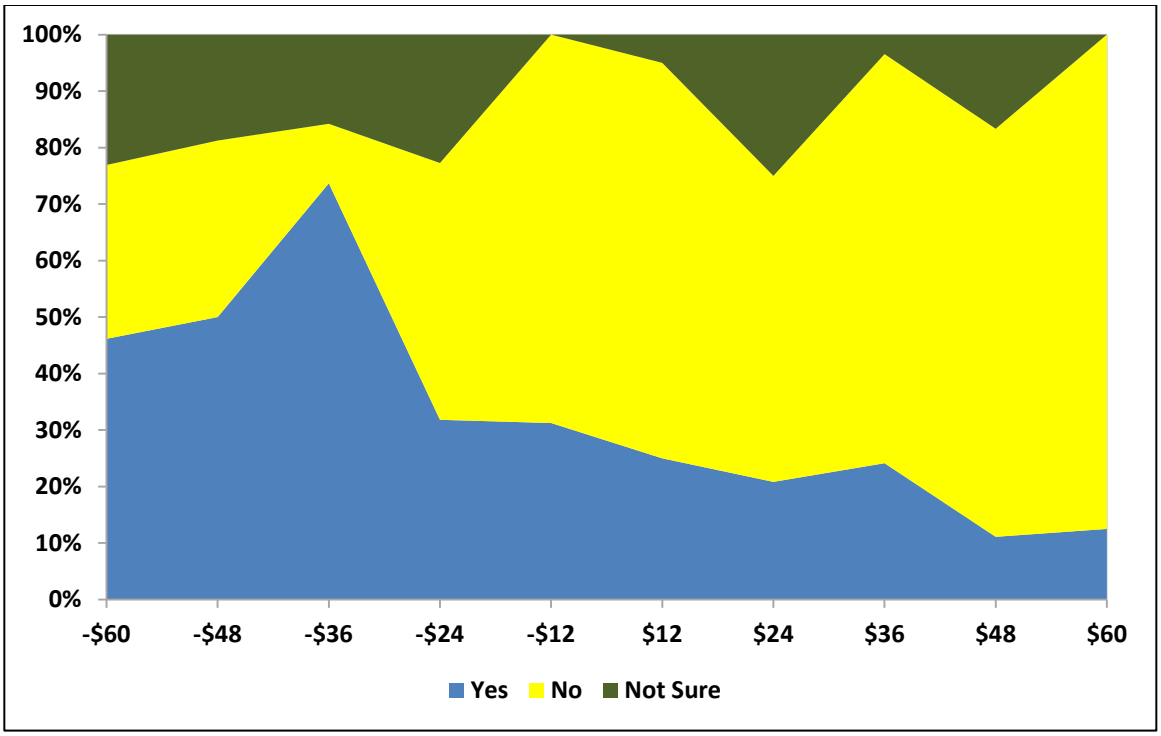


Figure 16. Illinois Region: Share of Support for Offshore Wind Farm Development (6 miles)

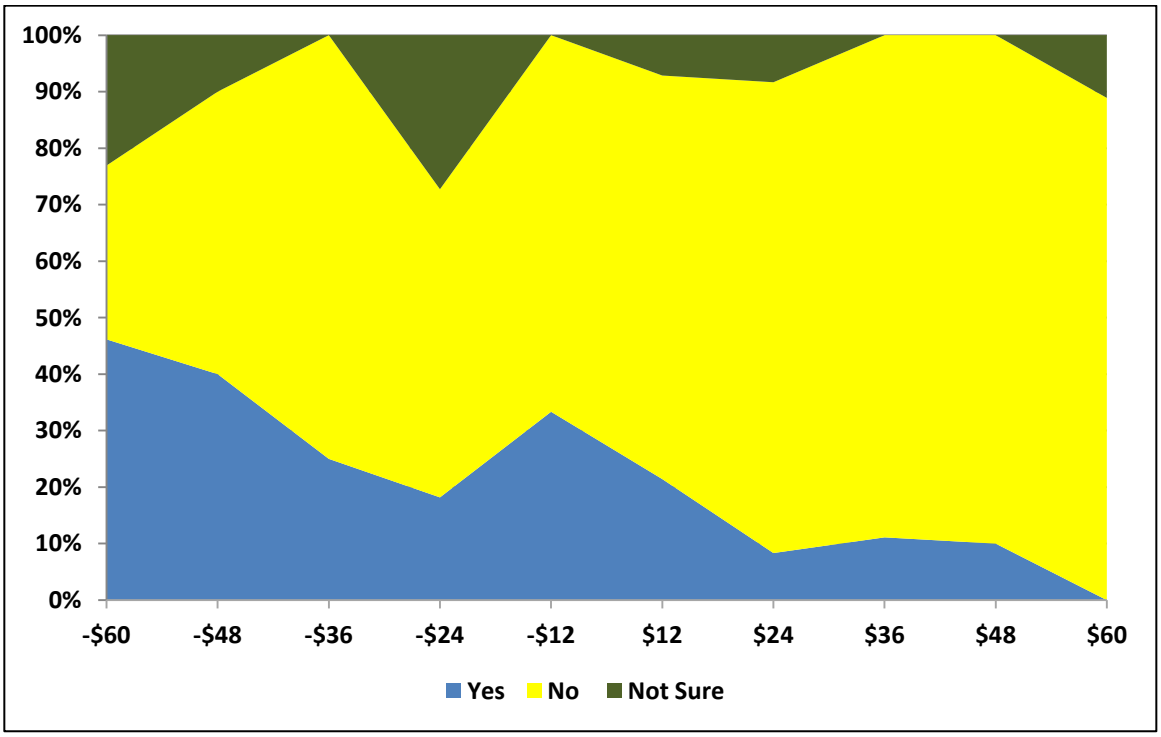


Figure 17. Michigan Region: Share of Support for Offshore Wind Farm Development (6 miles)

7.5.3 Ten-Mile Scenario

When presented with an offshore wind farm ten miles from local beach, many of the Illinois respondents would support the wind farm whether they were shown utility price reductions or increases. The largest share would also support the wind farm if there were monthly rate reductions associated with this distance (Figure 18). Again among all Illinois respondents, the highest percentage of respondents that said they would vote 'yes' for the proposed ten-mile offshore wind farm was ≈80% given a $36 dollar *decrease* in monthly electricity bills. Approximately 30% responded that they would vote 'yes' for the proposed wind farm at ten miles from the shoreline given anywhere from a $12, $36 or $48 *increase* in monthly electricity rates. However, respondents in the Michigan region were less willing to support the scenario given increased electricity bill, and the highest percentage of voting "yes", given an increased electricity bill, was observed at the $12 level (≈30%) (Figure 19).

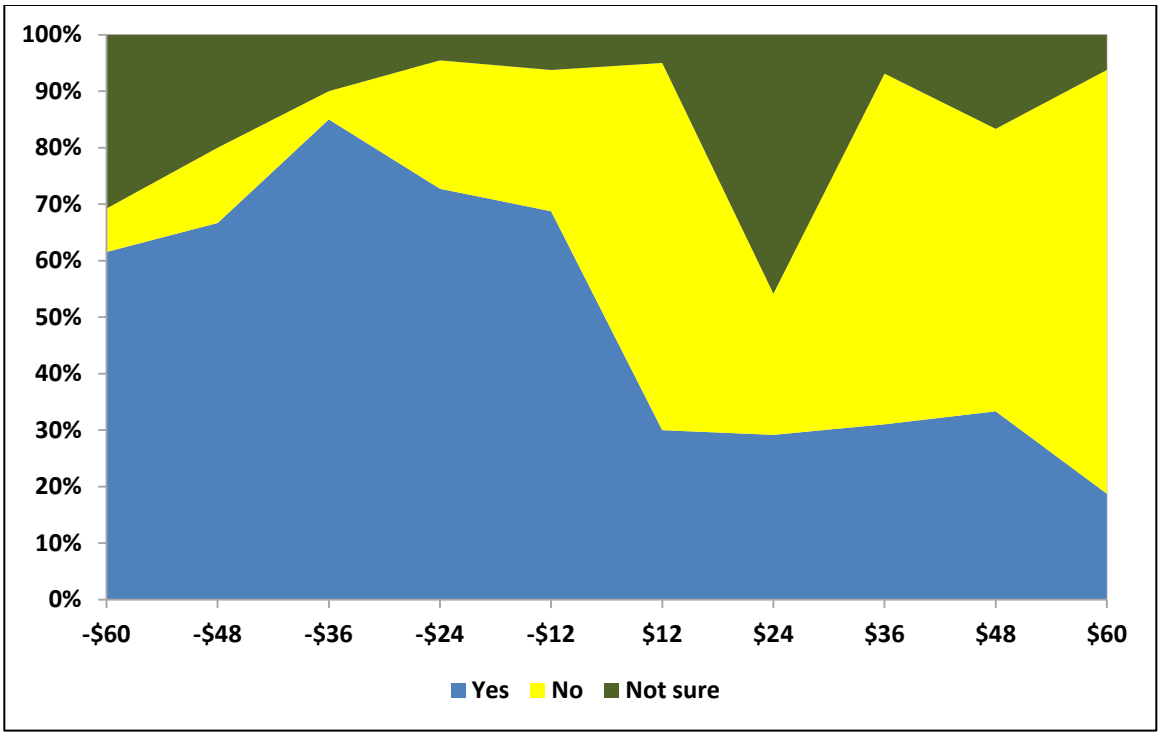


Figure 18. Illinois Region: Share of Support for Offshore Wind Farm Development (10 miles)

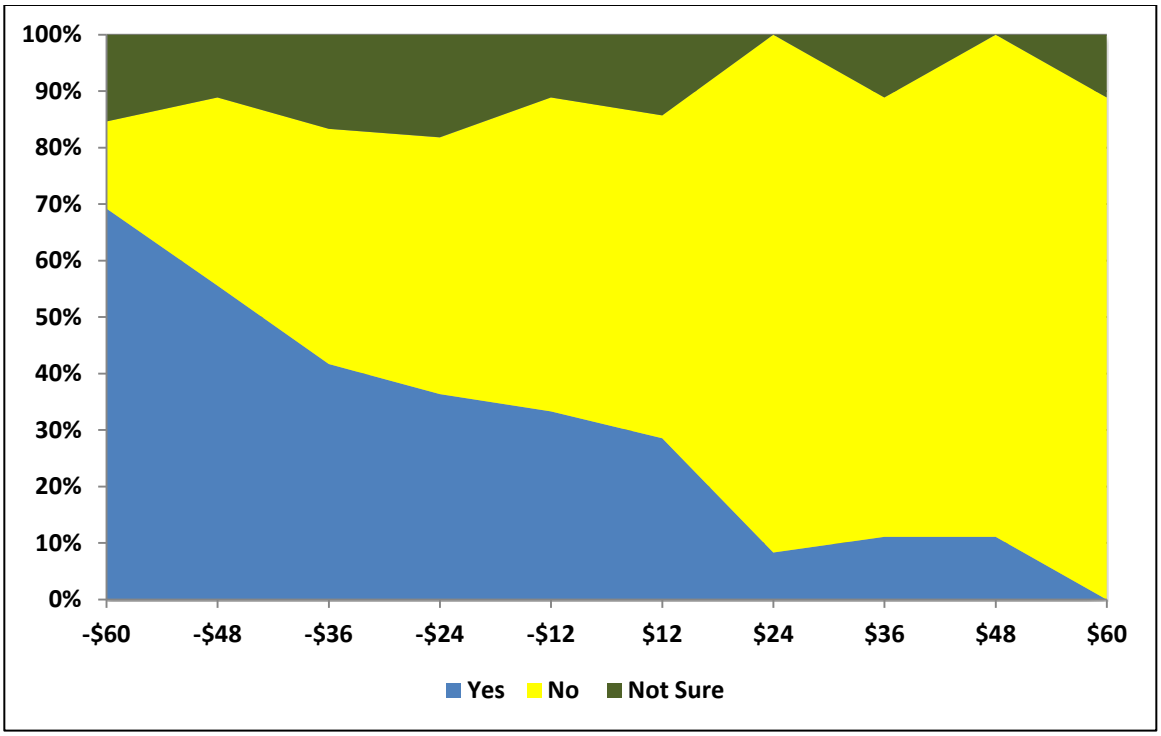


Figure 19. Michigan Region: Share of Support for Offshore Wind Farm Development (10 miles)

7.5.4. 'Yes' votes across distances

For both regions, the majority of 'yes' votes were selected for price decreases at ten miles offshore (Figure 20 & 21). However, a notable share of Illinois respondents would also vote 'yes' at various distances even with hypothetical rate increases. For example, approximately 35% of respondents stated they would vote 'yes' even with a perceived $12 increase in monthly electricity rates. Michigan respondents were more price-sensitive, and the $60 decrease in monthly electricity received high level of support across all three distances (46%, 46%, 69% for 3, 6 and 10 miles correspondingly).

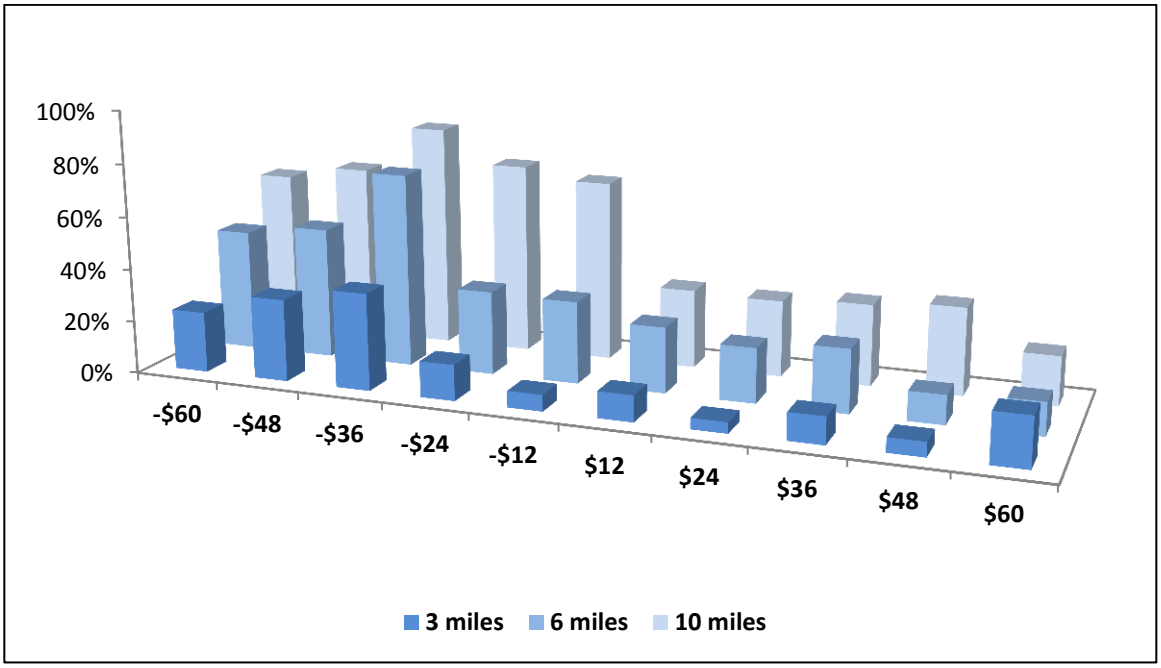


Figure 20. Illinois Region: Share of 'Yes' Votes across Three Offshore Distances (n = 208)

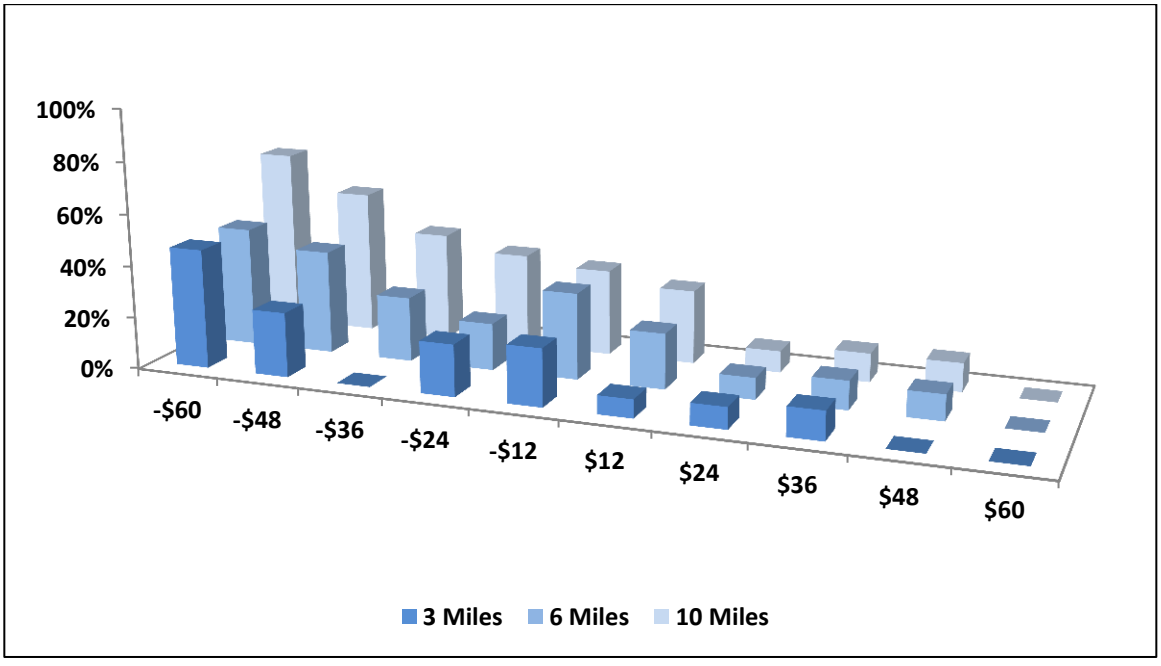


Figure 111. Michigan Region: Share of 'Yes' Votes across Three Offshore Distances (n = 122)

7.6. Demographics

Respondents were prompted for general demographic information regarding household income, gender, age, race, and education level, among other variables.[20] The Illinois region's sample is similar to the results for Evanston from the 2010 Census, although the high-educated (bachelor or higher) population is overrepresented and minorities are underrepresented (see Appendix C.1. for comparisons between the Illinois sample and U.S. Census Bureau results (United States Census Bureau 2012)). Older participants (age 65 or older), female participants and higher educated individuals are overrepresented in the Michigan sample, while the rest of the sample stays consistent with the 2010 Census data of the two counties (United States Census Bureau 2013, United States Census Bureau 2013).

Figure 22 shows the breakdown of respondents' political affiliation; the majority (71%) of the Illinois sample population define themselves as either liberal or moderately liberal. This result is consistent with results from the 2010 general elections in which a Democratic senator, congresswoman and governor were all elected with between 75-80% of the electorate (Cook County Clerk 2010). The survey respondents' political ideology is conducive to the support for renewable energy because it aligns with one of the key 2012 campaign issues of the Democratic Party.

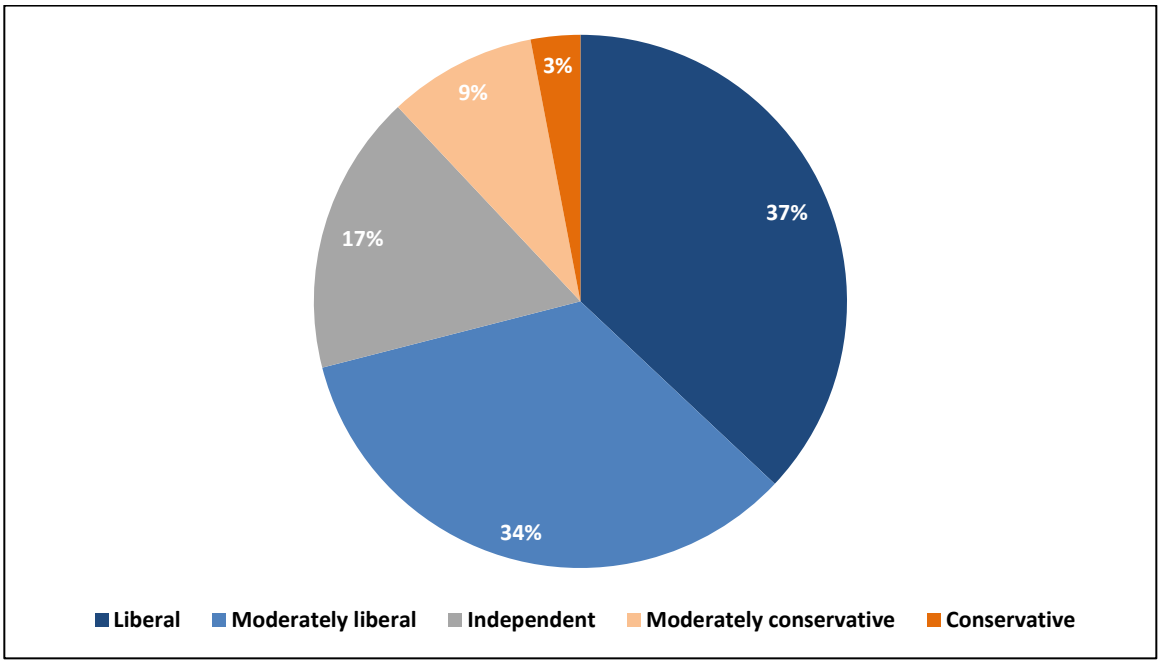


Figure 22. Illinois Region: Respondents' Political Affiliation (n = 208)

With 35% of the total respondents reported to be political independent, almost twice as many as in the Illinois region, the political affiliation map in Michigan presents a totally different view. A much larger share of respondents in the Michigan sample listed themselves as conservative or moderately

[20] These responses were not weighted for census data for the regions.

conservative, 40% (Figure 23) compared with only 12% in Illinois. 25% of the respondents reported themselves as liberal/moderately liberal (Figure 23), respectively, which was in consistent with the 2010 general election result that 67% of the votes went to the republican and 31% of the votes went to the democratic (Michigan Secretary of State 2011).

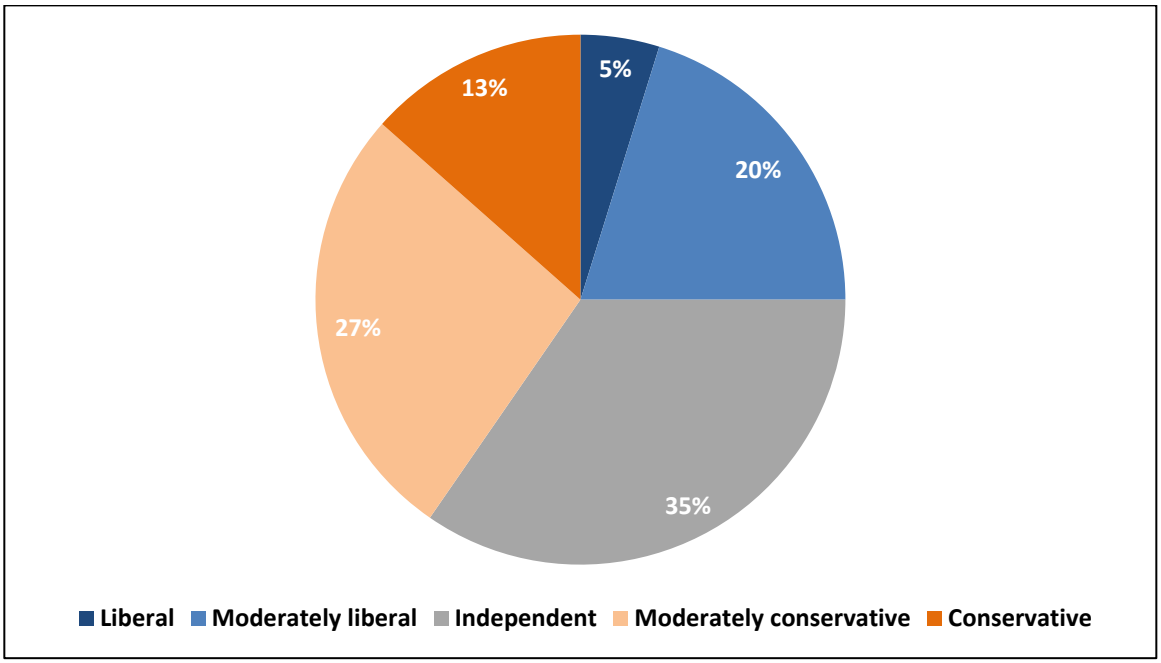


Figure23. Michigan Region: Respondents' Political Affiliation (n = 122)

When Illinois respondents were asked if they thought they would be able to see an offshore wind farm from their house, the large majority (86%) selected 'No' (Figure 24). This response satisfies an intuitive understanding for the Illinois region because only a small percentage of homes in Evanston, Rogers Park and Wilmette are physically situated on the shoreline. A much larger share of respondents in the Michigan sample felt that they would be able to see an offshore wind farm from their house at 19% (Figure 25). It is unclear if this level of response is because 19% (or close to it) of the sample actually owns a home on or in near proximity to the coastline or if concern is largely driving the level of response. In reality, 10%, 19% and 34% of the Michigan respondents that provided their location live within 0.5, 1 or 2 miles of the Michigan shoreline while 28%, 60% and 92% of Illinois respondents that provided their location live within 0.5, 1 or 2 miles of the Illinois shoreline.[21]

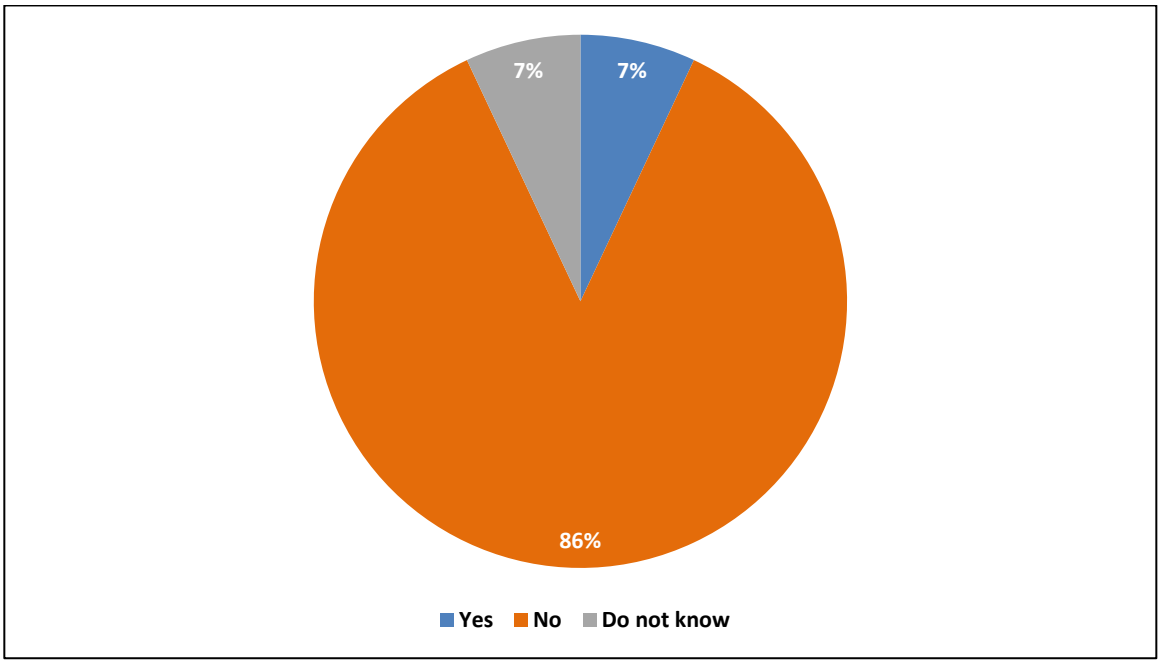


Figure 24. Illinois Region: Respondents That Think They Would Be Able to See an Offshore Wind Farm from Their Homes (n = 208)

[21] Obtained using ArcGIS. Digital elevation model was not used, only proximity to shoreline.

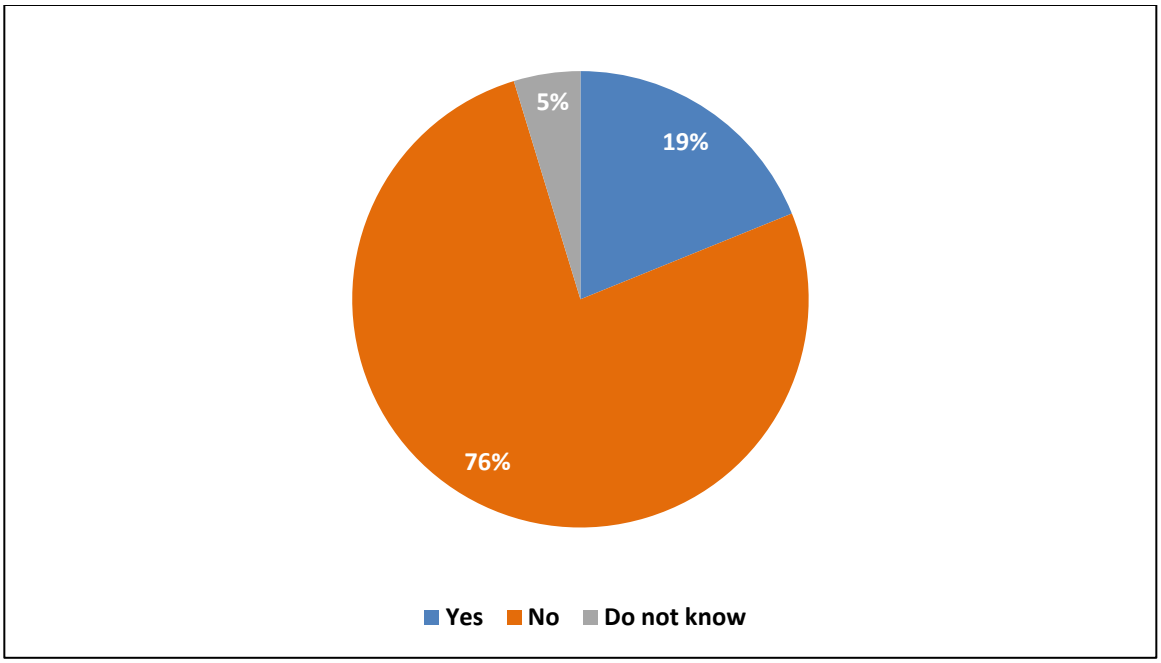


Figure 25. Michigan Region: Respondents That Think They Would Be Able to See an Offshore Wind Farm from Their Homes (n = 122)

On the other hand, roughly one-third (35%) of the Illinois respondents thought they would be able to see an offshore wind farm in their daily routine (Figure 26). The majority of these individuals that do not work in Evanston (68%) work in Chicago[22], so it is reasonable to assume that they think an offshore wind project would be visible on their daily commute to Chicago or the nearby northwest suburbs. There are no stark differences in the proportion of respondents from the Michigan sample that think they would be able to see an offshore wind farm on their daily routine (Figure 27).

[22] 67 out of 98 Illinois region respondents that selected they do not work in Evanston stated that they work in Chicago.

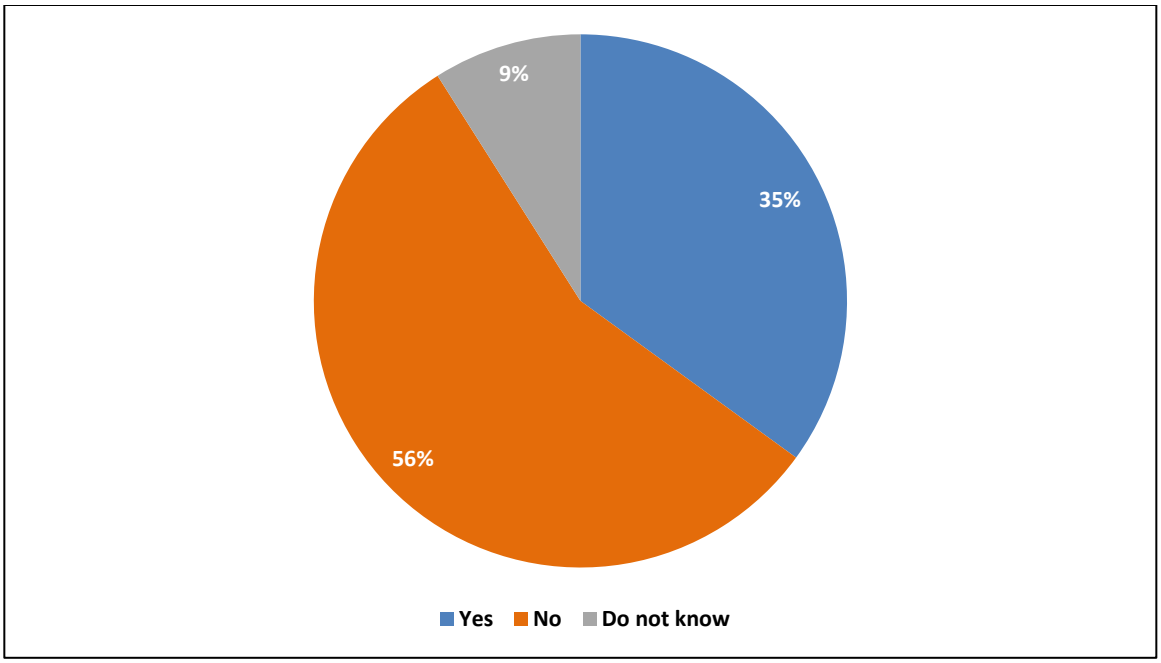


Figure 26. Illinois Region: Respondents That Think They Would Be Able to See an Offshore Wind Farm During Their Daily Routine (n = 208)

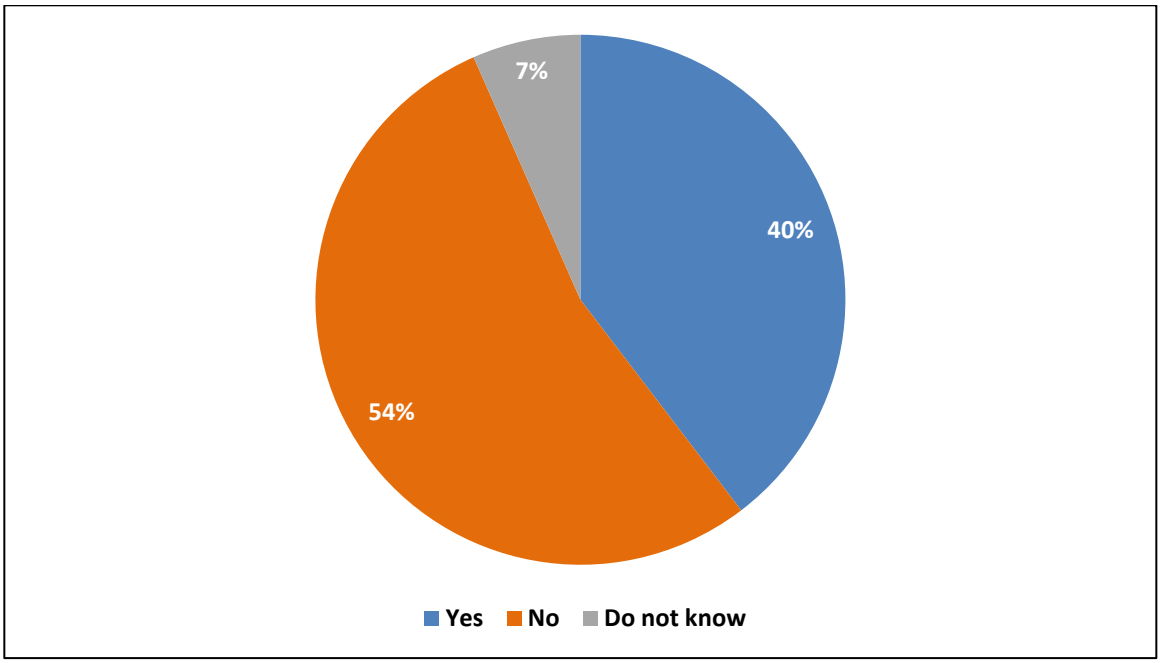


Figure 27. Michigan Region: Respondents That Think They Would Be Able to See an Offshore Wind Farm During Their Daily Routine (n = 122)

7.7. Analysis: Binary Logistic Regression

7.7.1 Model 1: Determinants of the likelihood of supporting a hypothetical offshore wind scenario across the Illinois and Michigan regions

In order to explore the underlying factors that influence the likelihood of support for an offshore wind development scenario across both regions, a binary logistic regression was employed. This binary logit model was used to analyze a binary dependent outcome of the likelihood that a respondent would vote 'yes' for the hypothetical wind farm scenario as a function of the wind farm distance, the proposed theoretical impact on electricity rates, and respondent demographic characteristics. This model employs a binary (or dichotomous) outcome as a function of a vector of explanatory, independent variables, also known as a binary logit.

To explore how significantly residents' opinions are determined by each underlying factor, we reclassified each respondent's answer of voting 'yes' or 'no' regarding his or her support for a wind farm dichotomously based on the selected certainty level at a 7 threshold on the 0-10 Likert answer certainty scale. That is, a positive answer (yes) with a certainty level equal to or higher than 7 was coded as 1, and any other answer response with a certainty less than 7 was coded as 0. This dependent variable was therefore named "cut7." There is no academic consensus for establishing a certainty level threshold and it varies across disciplines; some studies have treated a respondent's certainty greater than or equal to an 8 as a 'yes' in data coding (Champ and Bishop 2001, Samnaliev, Steven and More 2003) while in others, only a certainty level of 10 was considered a 'yes' answer (P. A. Champ, R. C. Bishop and T. C. Brown, et al. 1997). Ultimately an answer certainty level of "7" was selected as the lower bound for a 'yes' vote since we anticipated a considerable degree of uncertainty among respondents which was confirmed later in their opinions concerning perceived impacts.

Thus, the binary logit regression was employed to model the correlation between the dependent variable "cut7" with other independent variables such as the wind farm scenario's distance from shoreline, the proposed theoretical impact on electricity rates, and respondent demographic characteristics. The ultimate inference from this binary logit model would be the likelihood that a respondent would vote 'yes' with a high certainty (7, 8, 9 or 10 out of 10) for the hypothetical wind farm scenario as a function of other factors. The binary logit mathematic expressions are shown as follows:

$$\text{Prob}(\text{Y} = 1 =' \text{ yes}') = \pi = \frac{e^{\alpha+\beta_1 X_1+\beta_2 X_2 \ldots\ldots}}{1+e^{\alpha+\beta_1 X_1+\beta_2 X_2 \ldots\ldots}} = \frac{e^{\boldsymbol{\theta} X_i}}{1+e^{\boldsymbol{\theta} X_i}}$$

$$\log\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta X_1 + \beta_2 X_2 \ldots\ldots = \boldsymbol{\theta} X_i$$

In the equation above, $\boldsymbol{\theta}$ is a vector of explanatory variable coefficients that were estimated using the statistical software Stata. The dependent variable is set equal to one (Y = 1) if a respondent selected 'yes' to voice his/her support the hypothetical offshore wind scenario with a confidence greater than or equal to 7 on their vote response certainty Likert scale. Prior literature suggests that education, income,

and age (among other variables) are significantly related to the stated or revealed preference for renewable electricity (Ek 2004, Firestone and Kempton 2007), which guided the selection of independent variables to test in the logit model to see if they were statistically significant explanatory variables. The independent variables tested in the model along with variable coefficient interpretations and discussions are detailed below.

7.7.2. Illinois and Michigan Region: Model 1 Results

Only statistically significant variables contribute to explaining a respondent's likelihood in voting for or against the offshore wind farm scenario. In the constrained model (Table 4) that accounts for socioeconomic and demographic characteristics, all bolded variables are statistically significant at varying levels of confidence (see Appendix C.2. for independent variable descriptions and coding parameters). For those variables that are statistically significant, the *sign* on each variable's estimated coefficient can be directly interpreted to determine the direction of the relationship; that is, a (+) sign on a coefficient (Table 4, Column 2) implies that the variable of interest *encourages* the likelihood of support for the offshore wind project while a (-) sign on a coefficient implies that the variable of interest *discourages* the likelihood of support for the offshore wind project. While each variable's sign on the coefficient shows the direction of the variables' relationship on the likelihood of supporting an offshore wind farm, the extent, or magnitude, of the relationship appears through the absolute value of coefficients. Note that the convention for interpreting the extent, or magnitude, of each variable's relationship is to examine the coefficient converted into odds ratios (Table 4, Column 3).

For any independent variable X_i, its coefficient β_i means that holding other variables constant, 1 unit increase in the X_i leads to increase of β_i in the log of the odds:

$$\log\left(\frac{\pi}{1-\pi}\right)$$

It is straightforward to interpret the change in the likelihood of voting yes from the odds ratio:

$$\frac{Odds_i}{Odds_0} = \frac{\left(\frac{\pi_i}{1-\pi_i}\right)}{\left(\frac{\pi_0}{1-\pi_0}\right)} = e^{\beta_i}$$

Statistically significant variables included those tested in the CV section (i.e. the presented electricity rate impact, or bid, and the wind farm's distance from shore), a dummy variable for 'high' annual household income, whether the respondent affiliated with the environmental community, and political ideology.[23] The bid price is interpreted differently than the rest of the variables in the model given that it was treated as a continuous variable while all other variables were treated as dichotomous, or binary. For example, the odds ratio (Column 3, Table 4) indicates that as the perceived electricity price rate increases by $1 per month, the odds that a respondent will support the project decrease by about 2%,

[23] A description of variable coding parameters can be found in Appendix C.2.

ceteris paribus (p<0.001). Binary variables are interpreted against that variable's alternative, called the reference or omitted category. Thus, the odds that an individual will support the offshore wind farm scenario increase by approximately 2.4 times (238%) if the wind farm is located 6 miles compared to 3 miles offshore, holding all other variables constant (p<0.001). Similarly, the odds that an individual will support the offshore wind farm scenario increase by approximately 5 times (506%) if the wind farm is located 10 miles offshore compared to a 3 mile offshore distance, holding all other variables constant (p<0.001).

Additionally, respondents with a 'high' annual household income ($160,000—$200,000) were roughly 3.4 times (335%) more likely to support the offshore wind farm scenario than those respondents with a household income greater than $200,000 per year (p<0.10). Moreover, respondents with a leaning liberal or liberal political ideology were approximately 3 times (295%) more likely to support the offshore wind farm scenario than their politically independent counterparts. Finally, those that were environmental organization members were approximately 2 times (208%) more likely to support the offshore wind farm scenario than those respondents that were not environmental organization members, holding all other variables constant (p<0.05).

Table 4. Illinois and Michigan Regions: Constrained Logistic Regression of Factors Influencing Support for CV Scenario (Negative Coefficients Indicate Factors Increasing Opposition) (n = 546 with Repeated Measures Adjusted for Respondent Cluster ID)

Variables	Coefficient	Odds ratio	Standard error (robust)	p-value
Bid ($/month)	**-0.021*** **	**0.980**	**(0.005)**	**0.000**
Distance (6 miles)	**0.867*** **	**2.379**	**(0.206)**	**0.000**
Distance (10 miles)	**1.621*** **	**5.058**	**(0.256)**	**0.000**
Illinois	0.170	1.186	(0.447)	0.703
Age	0.005	1.005	(0.016)	0.768
Highschool associate	0.274	1.315	(0.586)	0.640
Bachelors	0.427	1.532	(0.368)	0.246
Lowest income	0.624	1.866	(0.616)	0.312
Low income	0.758	2.133	(0.571)	0.185
Mid income	0.056	1.058	(0.559)	0.920
High mid income	0.342	1.408	(0.716)	0.632
High income ($160-$200k/yr)	**1.208***	**3.348**	**(0.721)**	**0.094**
Conservative	0.100	1.105	(0.554)	0.858
Liberal (mod. liberal/liberal)	**1.082** **	**2.950**	**(0.472)**	**0.022**
Environmental org. member	**0.731** **	**2.078**	**(0.366)**	**0.046**
Male	-0.203	0.816	(0.326)	0.533
See from home	0.444	1.559	(0.581)	0.445
See from routine	-0.322	0.725	(0.338)	0.341
Attached to Great Lakes	-1.099	0.333	(0.797)	0.168
Caucasian	-0.799	0.450	(0.604)	0.186
Constant	-1.868	0.154	(1.399)	0.182

Statistically significant *** p<0.01, ** p<0.05, * p<0.1

Log pseudolikelihood = -262.334; Wald $x^2(20)$ = 70.87; Probability > x^2 = 0.0000; Pseudo R^2= 0.1900.

7.8. Analysis: Binary Probit Regression

The dataset was also combined to see if any overall trends exist across both regions. Observations for both Michigan and Illinois regions were combined to increase the size of the dataset. For this analysis, a random effects probit model was employed to control for unobserved heterogeneity between the two regions, to calculate marginal effects, and to estimate the elasticity of the bid price.

Probit model is built upon a latent variable:

$$Y^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots + \varepsilon, \varepsilon \sim N(0, \sigma^2)$$

The true dependent variable is Y:

$$\mathrm{Y} = 1 \text{ or } 0$$

And,

$$\Pr(\mathrm{Y} = 1|\boldsymbol{X}_i) = \Pr(Y^* > 0|\,\boldsymbol{X}_i) = \Pr[\varepsilon > -(\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots)]$$
$$= \Pr\left(\frac{\varepsilon}{\sigma} > \frac{-(\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots)}{\sigma}\right)$$
$$= \Phi\left(\frac{-(\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots)}{\sigma}\right), \text{Which is a cumulative distribution function.}$$

Similarly,

$$\Pr(\mathrm{Y} = 0|\boldsymbol{X}_i) = 1 - \Phi\left(\frac{-(\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots)}{\sigma}\right)$$

In Stata output, the coefficient of an independent variable β_i means that a 1% increase in X_i is associated to the increase in the z-score of Pr(Y=1) by β_i. For simplicity, Table 5 also reports the elasticity of bid price, which directly link the coefficient with the probability of voting yes.

To control for location effects in the combined probit model, a dummy variable for Illinois was included to differentiate the observations for each region. Dummy variables were also included to control for each offshore wind simulation ordering combination in the contingent valuation scenario and test if the order in which the offshore distances were shown had a positive or negative effect that on the probability that a respondent would support the CVM scenario.

Insignificant explanatory variables that were tested in the probit model (not reported in Table 5) included variables for: age, income, education, whether or not respondent thought he/she could see a wind farm on daily routine, whether or not respondent thought he/she could see a wind farm from house, race/ethnicity, visualization display ordering effects, etc. There appeared to be no ordering effects, however, and those dummy variables were removed or "back stepped" from the model.

Table 5. Michigan and Illinois Regions: Significant Explanatory Variables, Marginal Effects, Elasticity and Standard Errors for Entire Sample (n = 659)

Significant Explanatory Variable	Coefficient (Standard Error)	Marginal Effects	Elasticity
Bid price ($/month)	-0.023	-0.006	-0.021
	(0.005)		
Shoreline distance (6 miles)	1.018	0.236	
	(.237)		
Shoreline distance (10 miles)	1.791	0.805	
	(.267)		
Liberal (omitted category = independent)	1.317	0.479	
	(.513)		

Log pseudolikelihood = -236.972; Wald $\chi 2$ (22) = 59.71; Probability > $\chi 2$ = 0.0000

Some of the key probit model interpretations include the following:

- A 1% increase in bid price is associated with a 2% decrease in the probability of voting yes (Column 4).
- On average, respondents had a 23.6% higher probability of voting yes for the wind farm scenario sited 6 miles offshore compared to 3 miles offshore, holding all other variables constant.
- On average, respondents had a 80.5% higher probability of voting yes for the wind farm scenario sited 10 miles offshore compared to 3 miles offshore, holding all other variables constant.
- On average, liberal respondents had a 47.9% higher probability of voting yes than respondents that stated they were politically independent, holding all other variables constant.

7.9. Analysis: Willingness to Pay (WTP)

According to (Hanemann, 1984), the mean willingness to pay (WTP) was calculated using the coefficients, otherwise known as parameter estimates, and means of each variable in the probit model using this relationship:

$$\text{WTP} = -(\frac{B_0}{\beta_1})$$

Where β_1 is the coefficient of the variable 'bid', and B_0 is the sum of the intercept and the products of the coefficients of all other variables (not including distances) and their respective means. The result is the WTP of respondents given the baseline offshore distance (3 miles). The coefficients for the remaining distance variables (6 and 10 miles) were incorporated to estimate the WTP of individuals given a wind farm further from shore.

The mean WTP was calculated to determine how much the average respondent would need to be compensated, or would be willing to pay, on his/her monthly utility bill ($/month) in order to achieve a 50% probability of supportive ('yes') votes for the scenario at each offshore distance. That is, the WTP is defined as the minimum the respondents would need to be compensated (in the case of a negative WTP) or would be willing to pay (positive WTP) in order to achieve a 50% supportive vote for the CVM scenario at a particular distance. Table 6 below shows the WTP for both the Michigan and Illinois regions broken out by the hypothetical wind farm's distance from shoreline.[24]

Table 6. Illinois and Michigan Regions: Full Sample Mean Willingness to Pay (WTP) for Each Offshore Distance (n=659)

Wind Farm Distance	Mean Willingness to Pay ($/Month)
3 miles offshore	-$49.50
6 miles offshore	-$4.84
10 miles offshore	$29.08

The negative mean WTP for both 3 miles and 6 miles offshore indicate that in order to achieve 50% supportive vote for the wind farm sited at 3 and 6 miles offshore, the average respondent would need to be compensated. Conversely, the positive mean WTP for a wind farm sited 10 miles offshore suggests respondents would *pay a premium* and support the wind farm project. That is:

- To achieve 50% supportive vote for the wind farm sited 3 miles offshore, the average respondent would need to be **compensated ≈$49.50 per month.**
- To achieve 50% supportive vote for the wind farm sited 6 miles offshore, the average respondent would need to be **compensated ≈$4.84 per month.**
- To achieve 50% supportive vote for the wind farm sited 10 miles offshore, the average respondent would be **willing to pay ≈$29 per month.**

8. Discussion and Recommendations

8.1. Discussion

One ultimate objective for this research was to collect data and identify trends that will help inform policy evaluation concerning offshore wind power development. The analysis results are significant in

[24] Recognizing that each region is unique in terms of socioeconomic characteristics and differ prior exposure to an offshore wind farm proposal, the research team broke the WTP further down by region but did not report the results here. Limitations in the total sample size and the non-randomization of simulation imagery restricted the efficacy of analyzing these regions separately, thus the pooled region WTP estimates were reported in Table 6.

that the WTP estimates could be incorporated into a broader cost benefit analysis (CBA) for future offshore wind proposals in the study regions. While there are other accepted criteria that can be utilized when evaluating whether to build an offshore wind farm (namely, a cost-effectiveness analysis), the CBA is arguably one of the most widely-employed policy formation and decision-making tools used to determine whether or not to build any large infrastructure or electricity generation project. According to this framework, the project would be a valuable asset to society and should be built as long as the net present value (NPV) of the benefits outweighs the costs given a pre-determined discount rate for a future stream of costs and benefits.

For example, a relevant non-market, offshore wind valuation study mentioned in the literature review section took their WTP estimates one step further and conducted a CBA. Their analysis retained a *positive* NPV under all three discount rate sensitivity scenarios that incorporated estimates for the costs and benefits through the life of the facility, indicating that the project should be built as it would increase social welfare (Koundouri, Yiannis and Kyriaki 2009). While the present study's WTP estimates for the pooled regions suggest a positive WTP (i.e. a social benefit to the local community) at the 10-mile scenario, incorporation of those figures into a comprehensive CBA would also require other estimates for the 400 MW wind farm's benefits and costs. Costs for an offshore wind farm include items such as upfront capital for the wind turbines and recurring equipment maintenance. Calculating a CBA was outside the scope of this project not only due to constraints in this graduate student team's expertise, but also because the hypothetical nature of the scenarios presented left the project's true-to-life costs unknown.

Respondents in both regions expected an offshore wind project to carry a variety of social, economic and environmental costs. While a greater percentage of Michigan respondents in general expected negative outcomes from an offshore wind project, nearly a quarter or more of all respondents expected negative impacts in the areas of bird and aquatic life, aesthetics, property values, community harmony, recreational boating, and tourism.[25] Interestingly, a strong majority of Michigan respondents indicated that such a project would be more favorable if it were found to have positive impacts on these categories (nearly 60% of respondents for six out of the eight categories). Another striking finding is that over 60% of all respondents expected an offshore wind farm to have a negative impact on the aesthetic view, although it should be noted that respondents were asked to predict the impacts of a generic offshore wind development prior to seeing any simulations. The importance of distance from shoreline cannot be overstated. Consistent with other literature previously discussed, the 3-mile scenario was largely unacceptable to respondents. Siting the wind farm at six and ten miles from the shoreline increased the likelihood of support by 2.4 and 5 times, respectively, when compared to an offshore distance of three miles, holding all other variables constant.

[25] Tourism impacts were not assessed for the Illinois region.

Survey respondents in both regions stated that the top three expected *positive* impacts from offshore wind development would be 1) improved job creation/local economy, 2) reduced electricity rates, and 3) improved air quality, though admittedly few Michigan region respondents expected to see these positive impacts. Nonetheless, as indicated in the perception change section (7.3), improvements in these three areas would make offshore wind power more favorable for around 55%, 65% and 60% of Michigan respondents, respectively. Whether the electricity would be generated for the respondents' county also made the technology for favorable for a majority (60%) of respondents. Given the stated importance of electricity impacts and the fact that price change in monthly electricity bill were found to be statistically significant in predicting support for offshore wind development in both the Illinois and Michigan regions, the issues related to electricity rate impacts must be thoroughly addressed for any new offshore wind farm proposal. Furthermore, because offshore wind power does pose a potential for increased costs as compared with onshore technology, we urge a credible, transparent review process to evaluate the electricity rate impacts of any new proposal which should be widely available to the public.

Due to the large degree of uncertainty associated with the technology in general and the far-sweeping extent of its potential impacts, it is imperative that any proposal be preceded by a careful and thorough assessment to determine any actual costs that could possibly result from such a development. For example, the issue of tourism was very important to Michigan residents; a travel cost method survey conducted at potentially affected beaches could be an effective way of assessing tourist preferences and estimating likely impacts on tourism rates.

The next step following such analyses would be the targeted dissemination of information to the coastal communities. We do not suggest or advocate for educational outreach from a particular entity (local units of government, developer, state governments). However, this research does provide some insight into the ways in which information has been transferred in the study regions.

For both regions the local newspaper and friends were the most important source of information both in terms of reaching a large audience as well as the depth of information provided. In general the Michigan region identified more information sources than the Illinois region, which is unsurprising given its previous experience with a formal offshore wind project proposal. Public hearings and meetings were the second most important source of information and word-of-mouth communication between friends was far more relied on in the Michigan region.

Although this research did not test the effectiveness of information sources, our results suggest that educational materials regarding offshore wind farm development could be distributed through these selected channels to reach a wide target audience; however, different sources might require unique communication tools. For example, in the Michigan region where local opposition groups and social networks exert more influence, it may be more productive to start a dialogue with active group leaders in the forms of face-to-face conversations or other available communication vehicles. In the Illinois region with a much larger portion of undecided respondents, local stakeholders could be educated in

more unidirectional ways through local newspaper sections or online webpages. Additionally, given the success of public hearings in the Michigan region, this may be an effective way of engaging and informing large amounts of the community in the Illinois region if it is ever faced with a formal proposal.

8.2. Recommendations

While this study provides a narrow view of offshore wind energy perceptions in two Lake Michigan regions, further studies should try to achieve a higher response rate and/or larger sample size within the study area's coastal communities. Public input across additional communities along the Lake Michigan shoreline could also provide interesting comparisons. Most of the onshore utility-scale wind development in Michigan has occurred in the "thumb" region of the state, so testing their opinions to offshore wind development given their prior experience with wind power technology might provide a different view.

We suggest accounting for the present study's limitations in future surveys. Specifically, while budgetary constraints confined the presentation of the wind farm scenarios to 2-D imagery, a video would provide a more realistic experience and therefore might increase the accuracy of the responses for the CV section. Project time constraints also restricted sampling to the winter season, so we suggest addressing the timing limitation by mailing future related study contacts during high tourist season in order to reach more seasonal residents. Many mailings were delivered to the Illinois region during the 2012 Presidential election, so avoiding any similar major events in the future would be ideal and might increase response rates.

9. Conclusion

This study set out to establish a comprehensive understanding of public perceptions concerning offshore wind development in Lake Michigan. We sought to identify mediums through which residents acquire information about offshore wind power and the socioeconomic factors that correlate with support or opposition for this technology. By presenting coastal residents with hypothetical wind farm scenarios, we were able to garner valuable insight into residents' preference sensitivity to the project's setback distance and electricity rate impacts. Those opposition and support responses were translated into WTP figures and estimates for policymakers of the economic value that a wind farm might incur on the coastal lake view.

Consistent with other academic research, our initial results indicate that the likelihood or probability that a respondent would support a proposed offshore wind project scenario in Lake Michigan is dependent on not only the project's distance from the shoreline, but also other various demographic variables such as environmental membership, political ideology and household income.

While this study found tentative initial support for the idea of offshore wind development near Evanston, approximately half of the Illinois region respondents classified themselves as 'undecided' on the issue. It is reasonable to assume this uncertainty is linked to the substantial lack of information and sheer

unfamiliarity regarding potential community-wide impacts that could result from this type of development. Given the considerable amount of uncertainty not only surrounding offshore development in general, but also potential subsequent impacts, there remains a significant opportunity to involve and educate local community stakeholders prior to the start of any development process.

The Michigan region on the whole presented a far less inchoate view of opinion formation. These more solidified positions along with the wider range of information sources found in this sample are testament to fact that this is a region with previous exposure to an offshore wind power proposal. Respondents indicated receiving an extensive amount of information from local newspapers and public hearings yet when asked about perceived impacts of an offshore wind development, there was still a considerable degree of uncertainty. However, a majority of Michigan respondents did indicate they would find offshore wind power 'more' or 'much more' favorable if it were to have a beneficial impact on a variety of variables. This could represent an opportunity to inform residents about the impacts of offshore wind development, but that first requires site specific research to approximate the magnitude and extent of the social, economic and ecological effects which are likely to ensure as a result of development.

Amongst all the respondent, scientific, and issue impact uncertainty, one overarching takeaway is clear: there remain many more details to be explored regarding offshore wind development perceptions before it is likely that a utility-scale wind farm will be deployed anywhere in domestic coastal or freshwater areas.

Appendix A.1. Illinois WindPro Visualization, 3 Miles Offshore (Northwestern University Beach, IL)

Appendix A.2. Illinois WindPro Visualization, 6 Miles Offshore (Northwestern University Beach, IL)

Appendix A.3. Illinois WindPro Visualization, 10 Miles Offshore (Northwestern University Beach, IL)

Appendix A.4. Oceana County WindPro Visualization, Three Miles Offshore (Charles Mears State Park, Pentwater, MI)

Appendix A.5. Oceana County WindPro Visualization, Six Miles Offshore (Charles Mears State Park, Pentwater, MI)

Appendix A.6. Oceana County WindPro Visualization, Ten Miles Offshore (Charles Mears State Park, Pentwater, MI)

Appendix A.7. Mason County WindPro Visualization, Three Miles Offshore (Ludington Beach, Ludington, MI)

Appendix A.8. Mason County WindPro Visualization, Six Miles Offshore (Ludington Beach, Ludington, MI)

Appendix A.9. Mason County WindPro Visualization, Ten Miles Offshore (Ludington Beach, Ludington, MI)

Appendix B.1. Survey Instrument: Evanston, Rogers Park & Wilmette, Illinois

[Exported from Qualtrics: March 7, 2013]

FINAL CVM Mail-Out Survey (Evanston, IL)

Age Are you at least 18 years of age?

- ❍ Yes (1)
- ❍ No (2)

If No Is Selected, Then Skip To End of Survey

Local Do you live in Evanston or an adjacent community either seasonally or full-time?

- ❍ Yes (1)
- ❍ No (2)

If No Is Selected, Then Skip To End of Survey

Intro Introduction: Thank you for your interest in this survey! Your thoughts, opinions, and perceptions are valuable to us and will contribute to a broader, regional body of research regarding possible energy futures for some of Lake Michigan's coastal communities. Upon full survey completion, you will be offered the option to record your email to be entered into a $100 drawing as a thank-you for your participation. In addition, you will also be offered the voluntary option to record your email if you wish to receive follow-up questions regarding this study. As we stated in our introductory letter, your participation is voluntary and you may opt out at any time. If you agree to participate, please click the >> button below to start the survey.

Background: There have been informal discussions about offshore wind farm development in this area to generate electricity from wind. To an extent, the impact on local communities from installing an offshore wind farm here is uncertain. Your answers will contribute to a broader research study that will estimate possible economic and social impacts, if any, in this area. Your opinions are important to us!

Part A: Information Sources

A1 Have you heard anything about offshore wind development in Evanston?

- ❍ Yes (1)
- ❍ No (2)

Answer If Have you heard anything about an offshore wind farm being... Yes Is Selected

A2 Where have you heard about offshore wind farms? Please select all that apply.

- ❑ Local newspaper (1)
- ❑ Regional newspaper (2)
- ❑ TV (3)
- ❑ Radio (4)
- ❑ Online (5)
- ❑ Billboards (6)
- ❑ Public hearings/meetings (8)
- ❑ Fairs/expos (9)
- ❑ Professional organization(s) (10)
- ❑ Religious organization(s) (11)
- ❑ Coworkers (12)
- ❑ Friends (13)
- ❑ Family (14)
- ❑ Other (please specify) (7) _____

Answer If Have you heard anything about offshore wind development i... Yes Is Selected

A3 Please indicate the extent of the information you obtained from each source.

	A little information (1)	Some information (2)	A lot of information (3)
Local newspaper (1)	❍	❍	❍
Regional newspaper (2)	❍	❍	❍
TV (3)	❍	❍	❍
Radio (4)	❍	❍	❍
Online (5)	❍	❍	❍
Billboards (6)	❍	❍	❍
Public hearings/meetings (7)	❍	❍	❍
Fairs/expos (8)	❍	❍	❍
Professional organization(s) (13)	❍	❍	❍
Religious organization(s) (14)	❍	❍	❍
Friends (10)	❍	❍	❍
Family (11)	❍	❍	❍
Other (please specify) (9)	❍	❍	❍

Part B: Offshore Wind Opinions in Evanston

B1 Have you formed an opinion about offshore wind farm development in Evanston?

- ❍ I support the idea (1)
- ❍ I oppose the idea (2)
- ❍ I have not yet made up my mind (3)

Answer If Have you formed an opinion about developing an offshore w... I have not yet made up my mind Is Selected

B2 Even though you have not yet made up your mind, which way are you leaning?

- ❍ To support the idea (1)
- ❍ To oppose the idea (2)
- ❍ Need more information (3)

B3 Given what you know currently, do you think that offshore wind farm development in Evanston would have a positive impact (improve), no impact, or a negative impact (worsen) on the following:

	Improve (1)	No Impact (2)	Worsen (3)	Not Sure (4)
Electricity rates (1)	❍	❍	❍	❍
Job creation/local economy (2)	❍	❍	❍	❍
Air quality (3)	❍	❍	❍	❍
Property values (5)	❍	❍	❍	❍
Aesthetics of the lake view (6)	❍	❍	❍	❍
Aquatic life (7)	❍	❍	❍	❍
Bird life (8)	❍	❍	❍	❍
Recreational boating and fishing (9)	❍	❍	❍	❍
Community harmony (10)	❍	❍	❍	❍
Other (please specify) (11)	❍	❍	❍	❍

B4 Imagine that a wind farm were developed off the coast of Evanston in the next few years. Generally speaking, if this project were to be successful and led to more projects in Lake Michigan and/or in the Great Lakes in the future, what kind of impacts do you think all of these projects taken together would have on the following?

	Improve (1)	No Impact (2)	Worsen (3)	Not Sure (4)
U.S. independence from foreign energy sources (1)	❍	❍	❍	❍
Effects of global climate change (2)	❍	❍	❍	❍

B5 In deciding whether you support or oppose offshore wind development in Evanston, please write in the three aspects you consider to be the most important, ranked in order of importance #1, #2, and #3, with aspect #1 having the highest importance. Examples could include, but aren't limited to the following: energy independence, ecological impact, pollution reduction, noise, aesthetic value, etc.

Aspect #1 (1)
Aspect #2 (2)
Aspect #3 (3)

B6 Given your current knowledge, how would your opinion change if you knew that offshore wind development in Evanston would...

	Much less favorable (1)	Less favorable (2)	Unchanged (3)	More favorable (4)	Much more favorable (5)
Generate electricity for Evanston? (1)	❍	❍	❍	❍	❍
Improve local air quality? (2)	❍	❍	❍	❍	❍
Have no serious harm to bird life? (3)	❍	❍	❍	❍	❍
Have no serious harm to aquatic life? (4)	❍	❍	❍	❍	❍
Decrease electricity rates? (5)	❍	❍	❍	❍	❍
Help job creation/local economy? (6)	❍	❍	❍	❍	❍
Increase coastal property values? (7)	❍	❍	❍	❍	❍

B7

	Much less favorable (1)	Less favorable (2)	Unchanged (3)	More favorable (4)	Much more favorable (5)
Not generate electricity for Evanston? (1)	❍	❍	❍	❍	❍
Hurt job creation/local economy? (2)	❍	❍	❍	❍	❍
Not improve local air quality? (3)	❍	❍	❍	❍	❍
Seriously harm bird life? (4)	❍	❍	❍	❍	❍
Seriously harm aquatic life? (5)	❍	❍	❍	❍	❍
Increase electricity rates? (6)	❍	❍	❍	❍	❍
Decrease coastal property values? (7)	❍	❍	❍	❍	❍

E2 On average, how much does your household spend on electricity each month?

$/month in the Summer (1)
$/month in the Winter (2)

C Part C: A Hypothetical Scenario

Please first note the current coastal view at Evanston's University Beach:

Possible Distances Now, please consider three visual simulations of a hypothetical, offshore wind farm at three distances in Evanston's coastal waters. Please note: No decisions have been made yet about placing wind farms anywhere in Evanston or Lake Michigan!

Images for: Three miles from shoreline, Six miles from shoreline, Ten miles from shoreline

Q85 Please consider this purely hypothetical scenario: Suppose Evanston and the surrounding areas are facing a vote to approve or deny a permit to build an offshore wind farm off of Evanston's University Beach. It is time to make your "vote" with the information and opinions you currently hold. This hypothetical wind farm would contain approximately 80 wind turbines and contain a total capacity of approximately 400 megawatts (MW) of power. In other words, a project of this size could power between 96,000 to 120,000 households per year. The closer the wind farm is to the coast, the following trends are likely to occur: lower construction costs because of shorter transmission lines, more tax revenue gains to local area, and reduced impact on electricity rates. The opposite effect for each category would occur as the wind farm is sited further away from the coast.

Q107 This scenario, along with the following price points, is purely hypothetical and was generated by researchers to elicit opinions. Given the hypothetical nature of this research, people sometimes unintentionally overestimate or underestimate their responses. Though this is a hypothetical scenario, please respond as if you were actually faced with this vote while keeping in mind your monthly budget.
Image: Three miles from shoreline

C1a Given this distance from University Beach in Evanston, would you support this wind farm if you knew you would have to....

	Yes (1)	No (2)	Not Sure (3)
pay $60 less per month on your electricity bill? (1)	❍	❍	❍
pay $48 less per month on your electricity bill? (2)	❍	❍	❍
pay $36 less per month on your electricity bill? (3)	❍	❍	❍
pay $24 less per month on your electricity bill? (4)	❍	❍	❍
pay $12 less per month on your electricity bill? (5)	❍	❍	❍
pay $12 more per month on your electricity bill? (6)	❍	❍	❍
pay $24 more per month on your electricity bill? (7)	❍	❍	❍
pay $36 more per month on your electricity bill? (8)	❍	❍	❍
pay $48 more per month on your electricity bill? (9)	❍	❍	❍
pay $60 more per month on your electricity bill? (10)	❍	❍	❍

C1b How sure are you of your previous answer given the impact on price? Please select a number from 1 to 10, with 1 indicating “very unsure” and 10 indicating “very sure”.

- ❍ Very Unsure (1) (1)
- ❍ 2 (2)
- ❍ 3 (3)
- ❍ 4 (4)
- ❍ 5 (5)
- ❍ 6 (6)
- ❍ 7 (7)
- ❍ 8 (8)
- ❍ 9 (9)
- ❍ Very sure (10) (10)

Image: Six miles from shoreline

Q114 Given this distance from University Beach in Evanston, would you support this wind farm if you knew you would have to....

	Yes (1)	No (2)	Not Sure (3)
pay $60 less per month on your electricity bill? (1)	❍	❍	❍
pay $48 less per month on your electricity bill? (2)	❍	❍	❍
pay $36 less per month on your electricity bill? (3)	❍	❍	❍
pay $24 less per month on your electricity bill? (4)	❍	❍	❍
pay $12 less per month on your electricity bill? (5)	❍	❍	❍
pay $12 more per month on your electricity bill? (6)	❍	❍	❍
pay $24 more per month on your electricity bill? (7)	❍	❍	❍
pay $36 more per month on your electricity bill? (8)	❍	❍	❍
pay $48 more per month on your electricity bill? (9)	❍	❍	❍
pay $60 more per month on your electricity bill? (10)	❍	❍	❍

C2b How sure are you of your previous answer given the impact on price? Please select a number from 1 to 10, with 1 indicating “very unsure” and 10 indicating “very sure”.

- ❍ Very Unsure (1) (1)
- ❍ 2 (2)
- ❍ 3 (3)
- ❍ 4 (4)
- ❍ 5 (5)
- ❍ 6 (6)
- ❍ 7 (7)
- ❍ 8 (8)
- ❍ 9 (9)
- ❍ Very sure (10) (10)

Image: Ten miles from shoreline

Q113 Given this distance from University Beach in Evanston, would you support this wind farm if you knew you would have to....

	Yes (1)	No (2)	Not Sure (3)
pay $60 less per month on your electricity bill? (1)	❍	❍	❍
pay $48 less per month on your electricity bill? (2)	❍	❍	❍
pay $36 less per month on your electricity bill? (3)	❍	❍	❍
pay $24 less per month on your electricity bill? (4)	❍	❍	❍
pay $12 less per month on your electricity bill? (5)	❍	❍	❍
pay $12 more per month on your electricity bill? (6)	❍	❍	❍
pay $24 more per month on your electricity bill? (7)	❍	❍	❍
pay $36 more per month on your electricity bill? (8)	❍	❍	❍
pay $48 more per month on your electricity bill? (9)	❍	❍	❍
pay $60 more per month on your electricity bill? (10)	❍	❍	❍

C3b How sure are you of your previous answer given the impact on price? Please select a number from 1 to 10, with 1 indicating “very unsure” and 10 indicating “very sure”.

- ❍ Very Unsure (1) (1)
- ❍ 2 (2)
- ❍ 3 (3)
- ❍ 4 (4)
- ❍ 5 (5)
- ❍ 6 (6)
- ❍ 7 (7)
- ❍ 8 (8)
- ❍ 9 (9)
- ❍ Very sure (10) (10)

Part D: About You – Demographics: Now please answer some questions to help us interpret the data.

D1 How old are you?

- ❍ Age (1) _____
- ❍ Prefer not to say (2)

D3 What is your gender?

- ❍ Male (1)
- ❍ Female (2)
- ❍ Prefer not to say (3)

D4 What is your relationship status?

- ❍ Single (1)
- ❍ Married (2)
- ❍ Divorced (3)
- ❍ Prefer not to say (4)

D5 What is your race?

- ❍ Caucasian (1)
- ❍ African American (2)
- ❍ Hispanic (3)
- ❍ Asian (4)
- ❍ American Indian (5)
- ❍ Pacific Islander (6)
- ❍ Other (7) _____

- ❍ Prefer not to say (8)

D6 Please select your household income after taxes last year:

- ❍ $0-$19,999 (1)
- ❍ $20,000 - 39,999 (2)
- ❍ $40,000 - 59,999 (3)
- ❍ $60,000 - 79,999 (4)
- ❍ $80,000 - 99,999 (5)
- ❍ $100,000 - 119,999 (6)
- ❍ $120,000 - 139,999 (7)
- ❍ $140,000 - 159,999 (8)
- ❍ $160,000 - 179,999 (9)
- ❍ $180,000 - $200,000 (10)
- ❍ > $200,000 (11)
- ❍ Prefer not to say (12)

D7 What is your highest level of education completed?

- ❍ Some High School (7)
- ❍ High school (1)
- ❍ Some college (2)
- ❍ Associate's degree (2 year) (3)
- ❍ Bachelor's degree (4 year) (4)
- ❍ Graduate degree (5)
- ❍ Prefer not to say (6)

D8 Generally speaking, where would you place yourself in the political spectrum?

- ❍ Liberal (3)
- ❍ Moderately liberal (4)
- ❍ Independent (5)
- ❍ Moderately conservative (6)
- ❍ Conservative (7)

D10 Are you employed?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Retired (4)
- ❍ Prefer not to say (3)

Answer If Are you employed? Yes Is Selected Or Are you employed? Retired Is Selected

D11 Which industry best describes your field of work? Please check one:

- ❍ Automotive/transportation (1)
- ❍ Construction/building (6)
- ❍ Consulting (18)
- ❍ Education (8)
- ❍ Energy (4)
- ❍ Financial (16)
- ❍ Food services (3)
- ❍ Health care (10)
- ❍ Insurance (17)
- ❍ Non-profit (14)
- ❍ Public service (7)
- ❍ Real estate (9)
- ❍ Retail/service (11)
- ❍ Student (12)
- ❍ Tourism (2)
- ❍ Other (15) _____

Answer If Are you employed? Yes Is Selected

D12 Do you work in Evanston?

- ❍ Yes (1)
- ❍ No (2)

Answer If Do you work in Evanston? No Is Selected And Are you employed? Yes Is Selected

D13 Where do you work?

- ❍ City: (1) _____

D14 Do you own a residence in Evanston?

- ❍ Yes (1)
- ❍ No, but I rent in Evanston (2)
- ❍ No, I live in an adjacent community (3)

Answer If Do you own a residence in Evanston? No, I don't live there Is Selected

D15 Where is your primary residence?

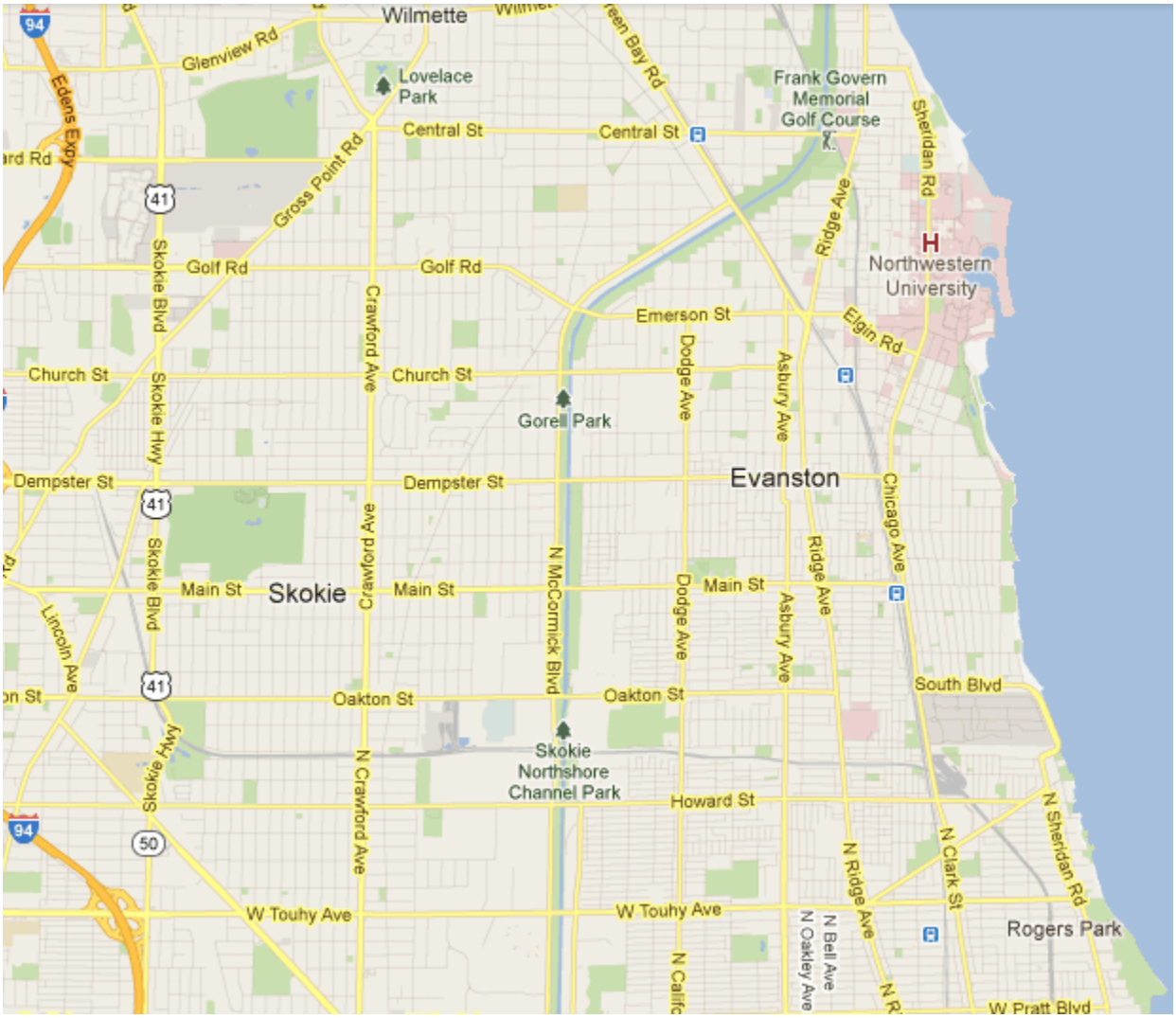
- ❍ Rogers Park (2)
- ❍ Wilmette (4)

Q109 How long have you lived there?

- ❍ < 1 year (1)
- ❍ 1-5 years (2)
- ❍ 5-10 years (3)
- ❍ 10-20 years (4)
- ❍ More than 20 years (5)

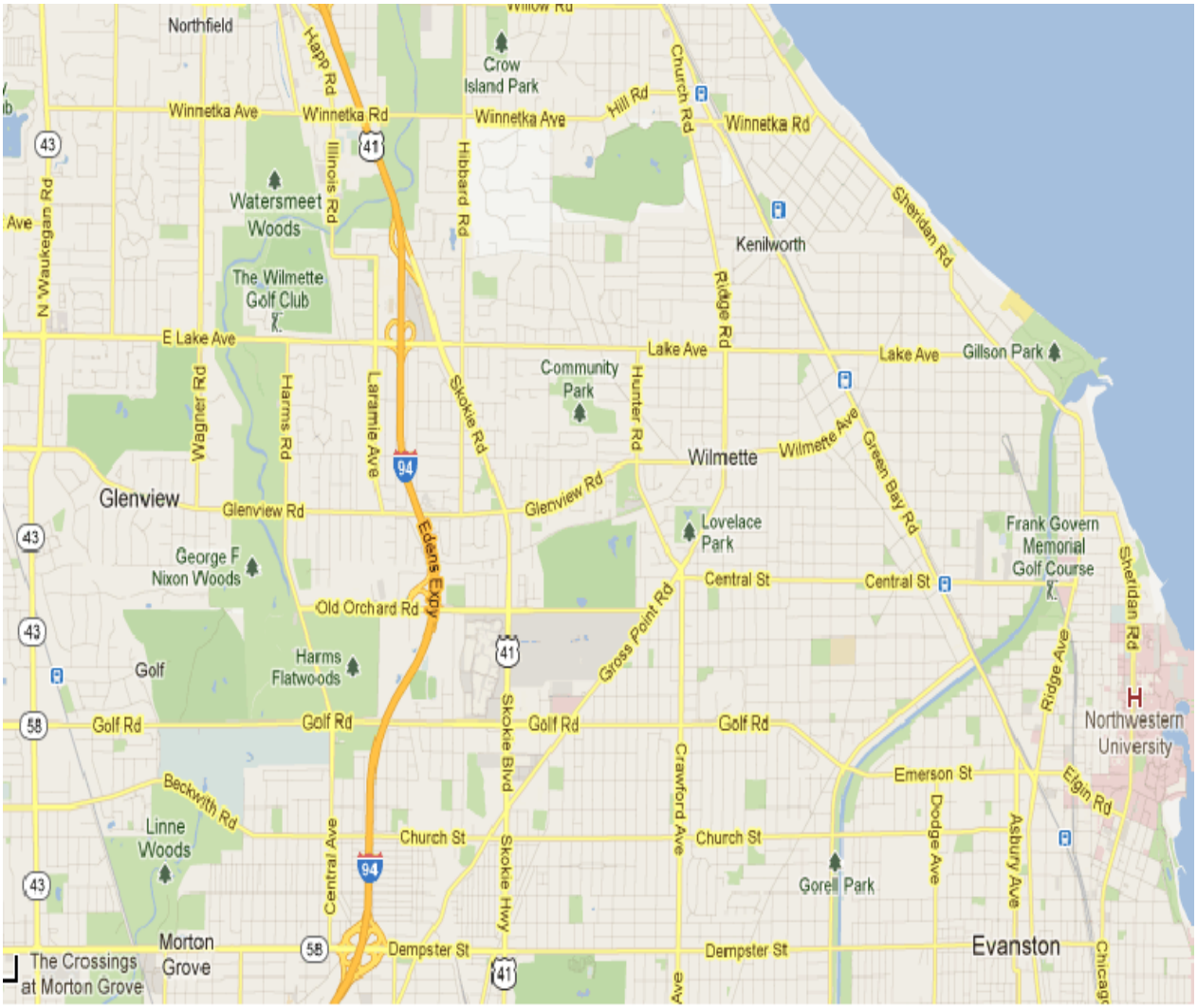
Answer If Do you own a residence in Evanston? Yes Is Selected

D16 Please click the mouse on the general area of your primary residence in Evanston. This information will be kept completely confidential.



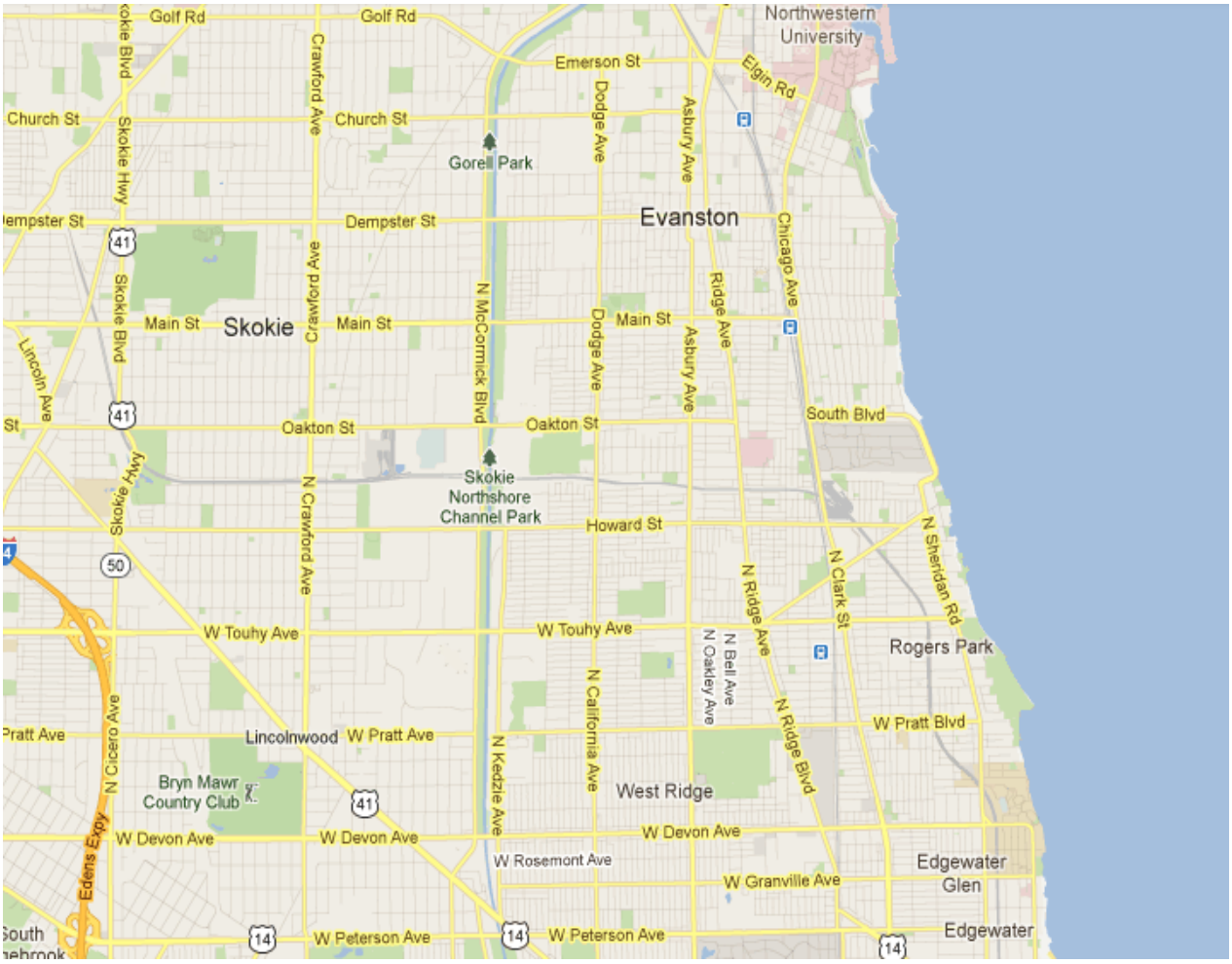
Answer If Where is your primary residence? Wilmette Is Selected

D18 Please click the mouse on the general area of your primary residence in Wilmette. This information will be kept completely confidential.



Answer If Where is your primary residence? Rogers Park Is Selected

D19 Please click the mouse on the general area of your primary residence in Rogers Park. This information will be kept completely confidential.



D20 Are you a member of an environmental organization?

- ❍ Yes (4)
- ❍ No (3)

D22 Do you think you would be able to see an Evanston offshore wind farm from your primary residence?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Do not know (3)

D24 Do you think you would be able to see an Evanston offshore wind farm during your day-to-day routine?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Do not know (3)

Part E: Final Section We would like to understand your general opinions regarding electricity.

E1 Have you ever seen an operational wind turbine (or wind farm) in person before?

- ❍ Yes (1)
- ❍ No (2)

E3 How do you think your household's average electricity usage compares with the average household usage in Evanston? I think my electricity usage is...

- ❍ Lower (1)
- ❍ About the same (3)
- ❍ Higher (4)

E4 Where do you buy your electricity? (ARES stands for an Alternative Retail Electric Supplier, i.e. any entity that supplies your electricity that is not a utility).

- ❍ ComEd (1)
- ❍ Community Choice Aggregation (CCA) (2)
- ❍ ARES - standard mix of conventional/renewable energy sources (3)
- ❍ ARES - 100% renewable energy generation (4)
- ❍ Other (5) _____
- ❍ Not sure (6)

E5 What is your overall stance on each of the following sources of electricity generation?

	Strongly Oppose (1)	Oppose (2)	Neutral (3)	Support (4)	Strongly Support (5)	Not sure (6)
Coal (Traditional) (7)	❍	❍	❍	❍	❍	❍
Coal (Carbon Capture and Sequestration) (8)	❍	❍	❍	❍	❍	❍
Natural Gas (Conventional) (2)	❍	❍	❍	❍	❍	❍
Natural Gas (Hydraulic Fracturing a.k.a. Fracking) (3)	❍	❍	❍	❍	❍	❍
Nuclear (1)	❍	❍	❍	❍	❍	❍
Solar (6)	❍	❍	❍	❍	❍	❍
Wind (Land-based) (4)	❍	❍	❍	❍	❍	❍
Wind (Offshore) (5)	❍	❍	❍	❍	❍	❍

E6 In your opinion, which of the following would you classify as a "clean electricity" generation source? Please select all that apply.

- ❑ Coal (traditional) (7)
- ❑ Coal (Carbon Capture and Sequestration) (8)
- ❑ Natural Gas (Conventional) (2)
- ❑ Natural Gas (Hydraulic Fracturing a.k.a. Fracking) (3)
- ❑ Nuclear (1)
- ❑ Solar (6)
- ❑ Wind (Land-based) (4)
- ❑ Wind (Offshore) (5)

E8 If an offshore wind farm were built in Evanston, would you take a boat tour of the facility?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Maybe (3)

E7 I feel a personal attachment to the Great Lakes.

- ❍ Strongly Agree (1)
- ❍ Agree (2)
- ❍ Neither Agree nor Disagree (3)
- ❍ Disagree (4)
- ❍ Strongly Disagree (5)

Is there anything you would like to express that you feel has not been covered by this survey? Also, we will be conducting follow-up interviews with interested stakeholders to further explore the subject, if you would like to participate please record your email address below.

Email Optional: Please record your email address if you would like to be entered into a $100 gift card drawing as a thank-you for your time. Like your survey answers, your email address will remain confidential.

Appendix B.2. Survey Instrument: Mason County, Michigan

Mason Energy Survey

[Exported from Qualtrics: April 6, 2013]

Q219 Welcome to the University of Michigan's energy survey for Mason County! Please type in your unique ID printed on your letter or postcards. If you have trouble finding your unique ID, please email umenergystudy@gmail.com for help or alternatively you may enter your first and last name as your identifier. All responses will be completely confidential.

Age Are you at least 18 years of age?

- Yes (1)
- No (2)

If No Is Selected, Then Skip To End of Survey

Local Do you live in Mason County either seasonally or full-time?

- Yes (1)
- No (2)

If No Is Selected, Then Skip To End of Survey

Intro Introduction Thank you for your interest in this survey! Your thoughts, opinions, and perceptions are valuable to us and will contribute to a broader, regional body of research regarding possible energy futures for some of Lake Michigan's coastal communities. Upon full survey completion, you will be offered the option to record your email to be entered into a $100 drawing as a thank-you for your participation. In addition, you will also be offered the voluntary option to record your email if you wish to receive follow-up questions regarding this study. As we stated in our introductory letter, your participation is voluntary and you may opt out at any time. If you agree to participate, please click the >> button below to start the survey.

Q76 Background Mason County has passed an ordinance banning offshore wind development in Lake Michigan. However, academic researchers are interested in understanding community opinions regarding offshore wind farm development in this area. To an extent, the impact on local communities of installing an offshore wind farm is uncertain. Your answers will contribute to a broader research study that will estimate possible economic and social impacts, if any, resulting from wind farm development. Your opinions are important to us!

Part A: Information Sources

A1 Have you heard anything about offshore wind development in Ludington?

- Yes (1)
- No (2)

A2 Where have you heard about offshore wind farms? Please select all that apply.

1) Local newspaper (1)
2) Regional newspaper (2)
3) TV (3)
4) Radio (4)
5) Online (5)
6) Billboards (6)
7) Public hearings/meetings (8)
8) Fairs/expos (9)
9) Professional organization(s) (10)
10) Religious organization(s) (11)
11) Coworkers (12)
12) Friends (13)
13) Family (14)
14) Other (please specify) (7) _____

A3 Please indicate the extent of the information you obtained from each source.

	A little information (1)	Some information (2)	A lot of informaton (3)
Local newspaper (1)	•	•	•
Regional newspaper (2)	•	•	•
TV (3)	•	•	•
Radio (4)	•	•	•
Online (5)	•	•	•
Billboards (6)	•	•	•
Public hearings/meetings (7)	•	•	•
Fairs/expos (8)	•	•	•
Professional organization(s) (13)	•	•	•
Religious organization(s) (14)	•	•	•
Friends (10)	•	•	•
Family (11)	•	•	•
Other (please specify) (9)	•	•	•

B Part B: Offshore Wind Opinions in Ludington

B1 Have you formed an opinion about offshore wind farm development in Ludington?

- I support the idea (1)
- I oppose the idea (2)
- I have not yet made up my mind (3)

B2 Even though you have not yet made up your mind, which way are you leaning?

- To support the idea (1)
- To oppose the idea (2)
- Need more information (3)

B3 Given what you know currently, do you think that offshore wind farm development in Ludington would have a positive impact (improve), no impact, or a negative impact (worsen) on the following:

	Improve (1)	No Impact (2)	Worsen (3)	Not Sure (4)
Electricity rates (1)	•	•	•	•
Job creation/local economy (2)	•	•	•	•
Air quality (3)	•	•	•	•
Property values (4)	•	•	•	•
Aesthetics of the lake view (5)	•	•	•	•
Aquatic life (6)	•	•	•	•
Bird life (7)	•	•	•	•
Recreational boating and fishing (8)	•	•	•	•
Community harmony (9)	•	•	•	•
Tourism (10)	•	•	•	•
Other (please specify) (11)	•	•	•	•

B4 Imagine that a wind farm were developed off the coast of Ludington in the next few years. Generally speaking, if this project were to be successful and led to more projects in Lake Michigan and/or in the Great Lakes in the future, what kind of impacts do you think all of these projects taken together would have on the following?

	Improve (1)	No Impact (2)	Worsen (3)	Not Sure (4)
U.S. independence from foreign energy sources (1)	•	•	•	•
Effects of global climate change (2)	•	•	•	•

B5 In deciding whether you support or oppose offshore wind development in Ludington, please write in the three aspects you consider to be the most important, ranked in order of importance #1, #2, and #3, with aspect #1 having the highest importance. Examples could include, but aren't limited to the following: energy independence, ecological impact, pollution reduction, noise, aesthetic value, etc.

Aspect #1 (1)
Aspect #2 (2)
Aspect #3 (3)

B6 Given your current knowledge, how would your opinion change if you knew that offshore wind development in Ludington would...

	Much less favorable (1)	Less favorable (2)	Unchanged (3)	More favorable (4)	Much more favorable (5)
Generate electricity for Mason County? (1)	•	•	•	•	•
Improve local air quality? (2)	•	•	•	•	•
Not seriously harm bird life? (3)	•	•	•	•	•
Not seriously harm aquatic life? (4)	•	•	•	•	•
Decrease electricity rates? (5)	•	•	•	•	•
Help job creation/local economy? (6)	•	•	•	•	•
Increase coastal property values? (7)	•	•	•	•	•
Increase tourism? (8)	•	•	•	•	•

Q108

	Much less favorable (1)	Less favorable (2)	Unchanged (3)	More favorable (4)	Much more favorable (5)
Not generate electricity for Mason County? (1)	•	•	•	•	•
Not improve local air quality? (2)	•	•	•	•	•
Seriously harm bird life? (3)	•	•	•	•	•
Seriously harm aquatic life? (4)	•	•	•	•	•
Increase electricity rates? (5)	•	•	•	•	•
Hurt job creation/local economy? (6)	•	•	•	•	•
Decrease coastal property values? (7)	•	•	•	•	•
Hurt tourism? (8)	•	•	•	•	•

E2 On average, approximately how much does your household spend on electricity each month?

$/month in the Summer (1)
$/month in the Winter (2)

Q85 Please consider this purely hypothetical scenario: Imagine that the wind farm ordinance were removed and Ludington and the surrounding areas were facing a vote to approve or deny a permit to build an offshore wind farm off Ludington's beach. It is time to make your "vote" with the information and opinions you currently hold. This hypothetical wind farm would contain approximately 80 wind turbines and contain a total capacity of approximately 400 megawatts (MW) of power. In other words, a project of this size could power between 96,000 to 120,000 households per year. The closer the wind farm is to the coast, the following trends are more likely to occur: lower construction costs because of shorter transmission lines, more tax revenue gains to local area, and a reduced impact on electricity rates. The opposite effect for each category would occur as the wind farm is sited further away from the coast.

Q226 This scenario, along with the following price points, is purely hypothetical and was generated by researchers to elicit opinions. Given the hypothetical nature of this research, people sometimes unintentionally overestimate or underestimate their responses. Though this is a hypothetical scenario, please respond as if you were actually faced with this vote while keeping in mind your monthly budget.

Q221 Please consider the current view from Ludington's beach:

Now please consider this hypothetical wind farm scenario: Three miles from shoreline

C1a Given this distance from Ludington's beach, would you support this wind farm if you knew you would have to....

	Yes (1)	No (2)	Not Sure (3)
pay ${e://Field/Price} on your monthly electricity bill? (1)	•	•	•

C1b How sure are you of your previous answer given the impact on price? Please select one number from 1 to 10, with 1 indicating "very unsure" and 10 indicating "very sure".

- Very Unsure (1) (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- Very sure (10) (10)

Q223 Please consider the current view from Ludington's beach:

Now please consider this hypothetical wind farm scenario: Six miles from shoreline

Q114 Given this distance from Ludington's beach, would you support this wind farm if you knew you would have to....

	Yes (1)	No (2)	Not Sure (3)
pay ${e://Field/Price} on your monthly electricity bill? (1)	•	•	•

C2b How sure are you of your previous answer given the impact on price? Please select a number from 1 to 10, with 1 indicating “very unsure” and 10 indicating “very sure”.

- Very Unsure (1) (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- Very sure (10) (10)

Q224 Please consider the current view from Ludington's beach:

Now please consider this hypothetical wind farm scenario: Ten miles from shoreline

Q113 Given this distance from Ludington's beach, would you support this wind farm if you knew you would have to....

	Yes (1)	No (2)	Not Sure (3)
pay ${e://Field/Price} on your monthly electricity bill? (1)	•	•	•

Q115 How sure are you of your previous answer given the impact on price? Please select a number from 1 to 10, with 1 indicating “very unsure” and 10 indicating “very sure”.

- Very Unsure (1) (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- Very sure (10) (10)

Part D: About You - Demographics

Now please answer some questions to help us interpret the data.

D1 How old are you?

- Age (1) _____
- Prefer not to say (2)

D3 What is your gender?

- Male (1)
- Female (2)
- Prefer not to say (3)

D4 What is your relationship status?

- Single (1)
- Married (2)
- Divorced (3)
- Prefer not to say (4)

D5 What is your race?

- Caucasian (1)
- African American (2)
- Hispanic (3)
- Asian (4)
- American Indian (5)
- Pacific Islander (6)
- Other (7) _____
- Prefer not to say (8)

D6 Please select your household income after taxes last year:

- $0-$19,999 (1)
- $20,000 - 39,999 (2)
- $40,000 - 59,999 (3)
- $60,000 - 79,999 (4)
- $80,000 - 99,999 (5)
- $100,000 - 119,999 (6)
- $120,000 - 139,999 (7)
- $140,000 - 159,999 (8)
- $160,000 - 179,999 (9)

- $180,000 - $200,000 (10)
- > $200,000 (11)
- Prefer not to say (12)

D7 What is your highest level of education completed?

- Some high school (7)
- High school (1)
- Some college (2)
- Associate's degree (2 year) (3)
- Bachelor's degree (4 year) (4)
- Graduate degree (5)
- Prefer not to say (6)

D8 Generally speaking, where would you place yourself in the political spectrum?

- Liberal (3)
- Moderately liberal (4)
- Independent (5)
- Moderately conservative (6)
- Conservative (7)

D10 Are you employed?

- Yes (1)
- No (2)
- Retired (4)
- Prefer not to say (3)

D11 Which industry best describes your field of work? Please check one:

- Agriculture (33)
- Automotive/transportation (1)
- Construction/building (6)
- Consulting (18)
- Education (8)
- Energy (4)
- Financial (16)
- Food services (3)
- Health care (10)
- Insurance (17)
- Legal (32)
- Non-profit (14)

- Public service (7)
- Real estate (9)
- Retail/service (11)
- Student (12)
- Tourism (2)
- Other (15) _____

D12 Do you work in Mason County?

- Yes (1)
- No (2)

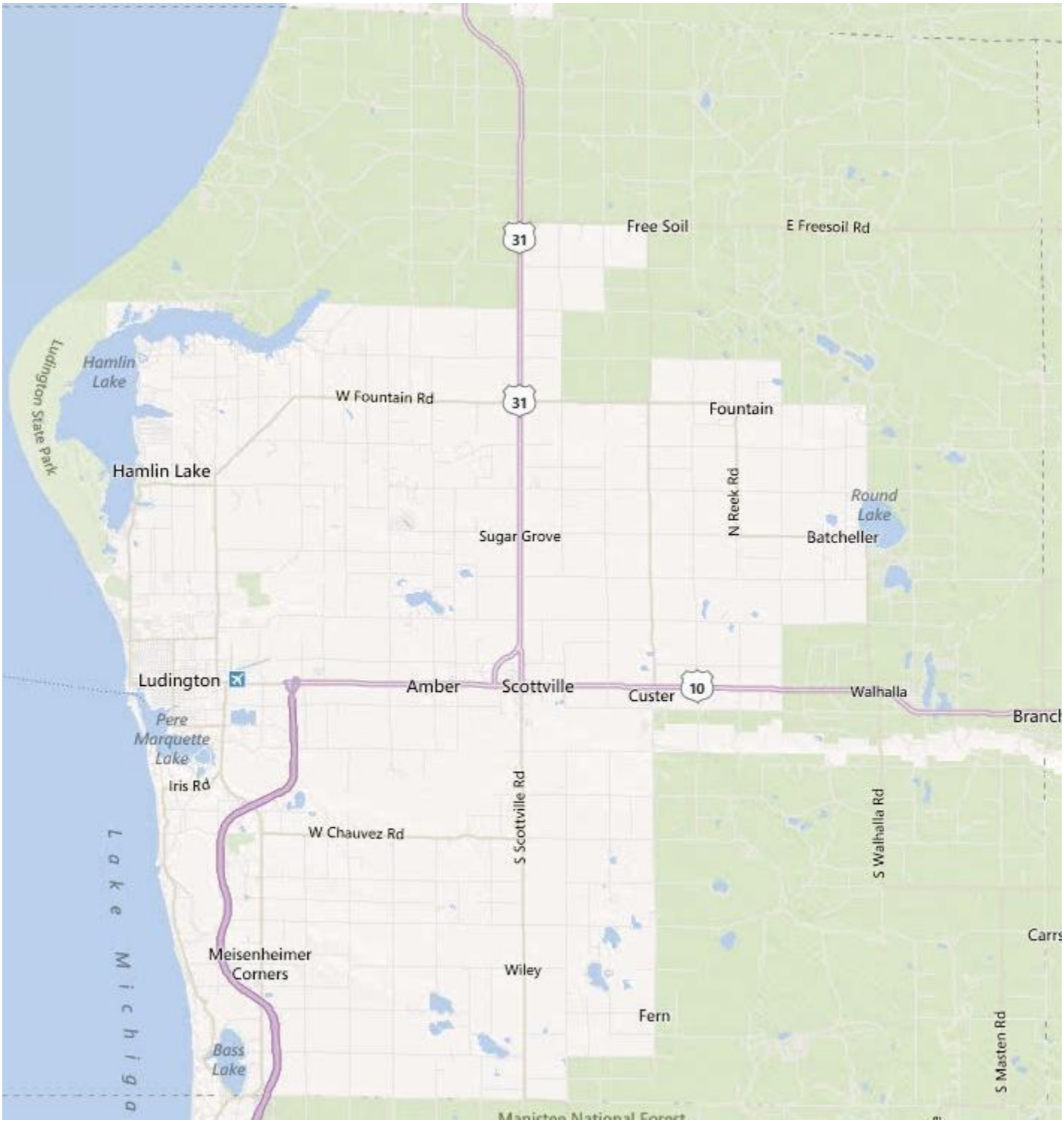
D14 Do you own a residence in Mason County?

- Yes (1)
- No, but I live in Mason County (2)

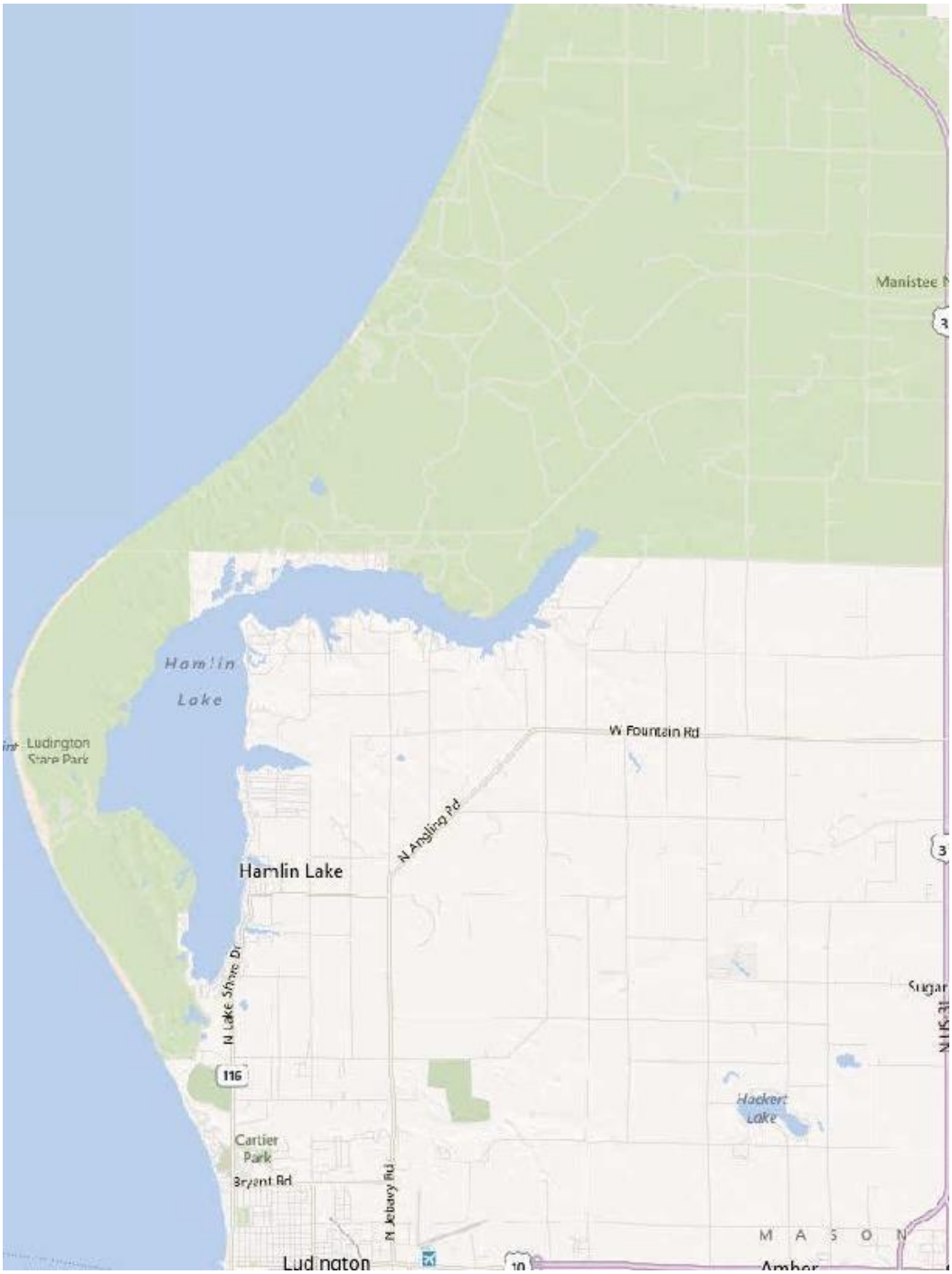
Q109 How long have you lived there?

- < 1 year (1)
- 1-5 years (2)
- 5-10 years (3)
- 10-20 years (4)
- More than 20 years (5)

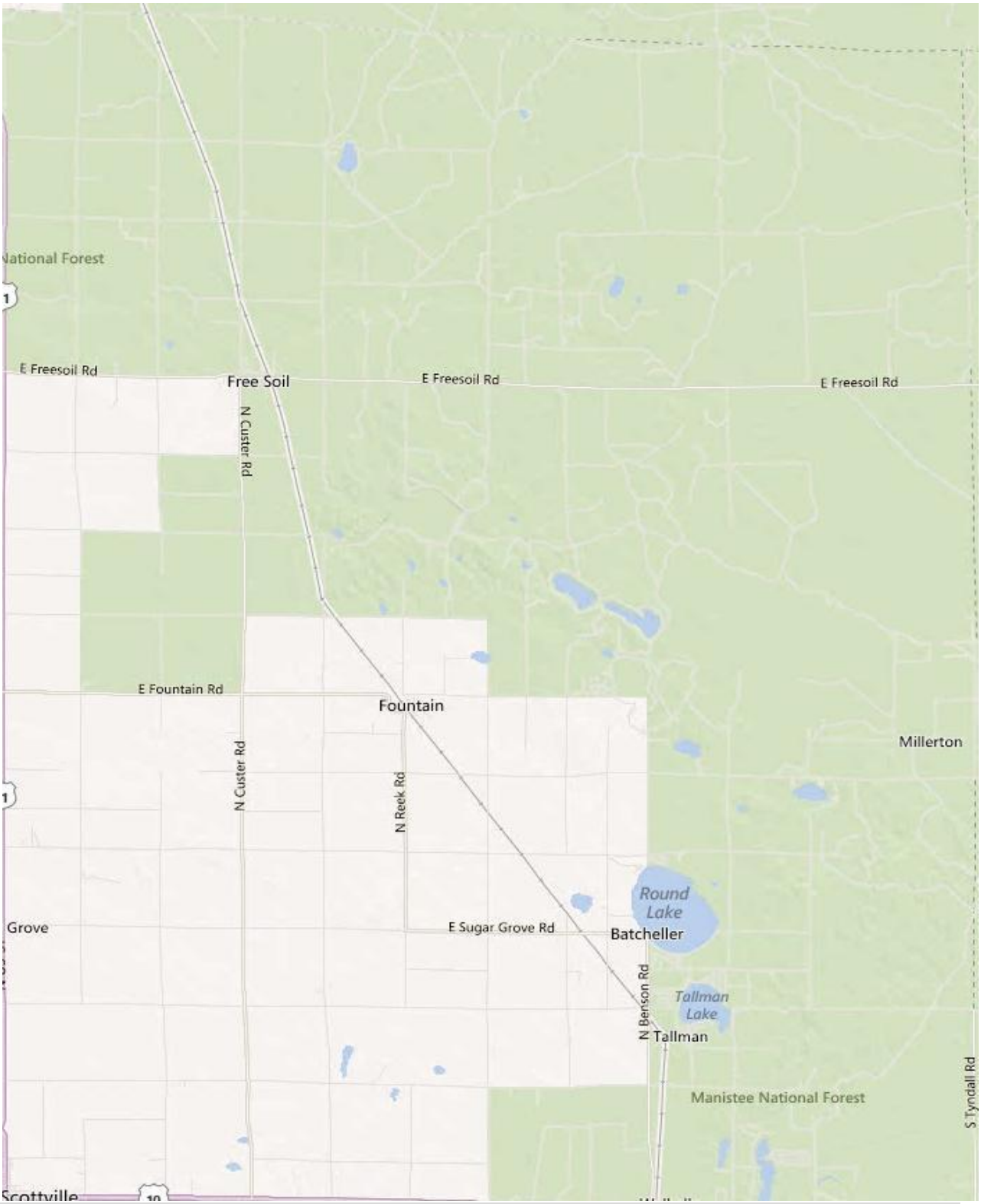
D16 Please click the mouse on the general area of your primary residence in Mason County:



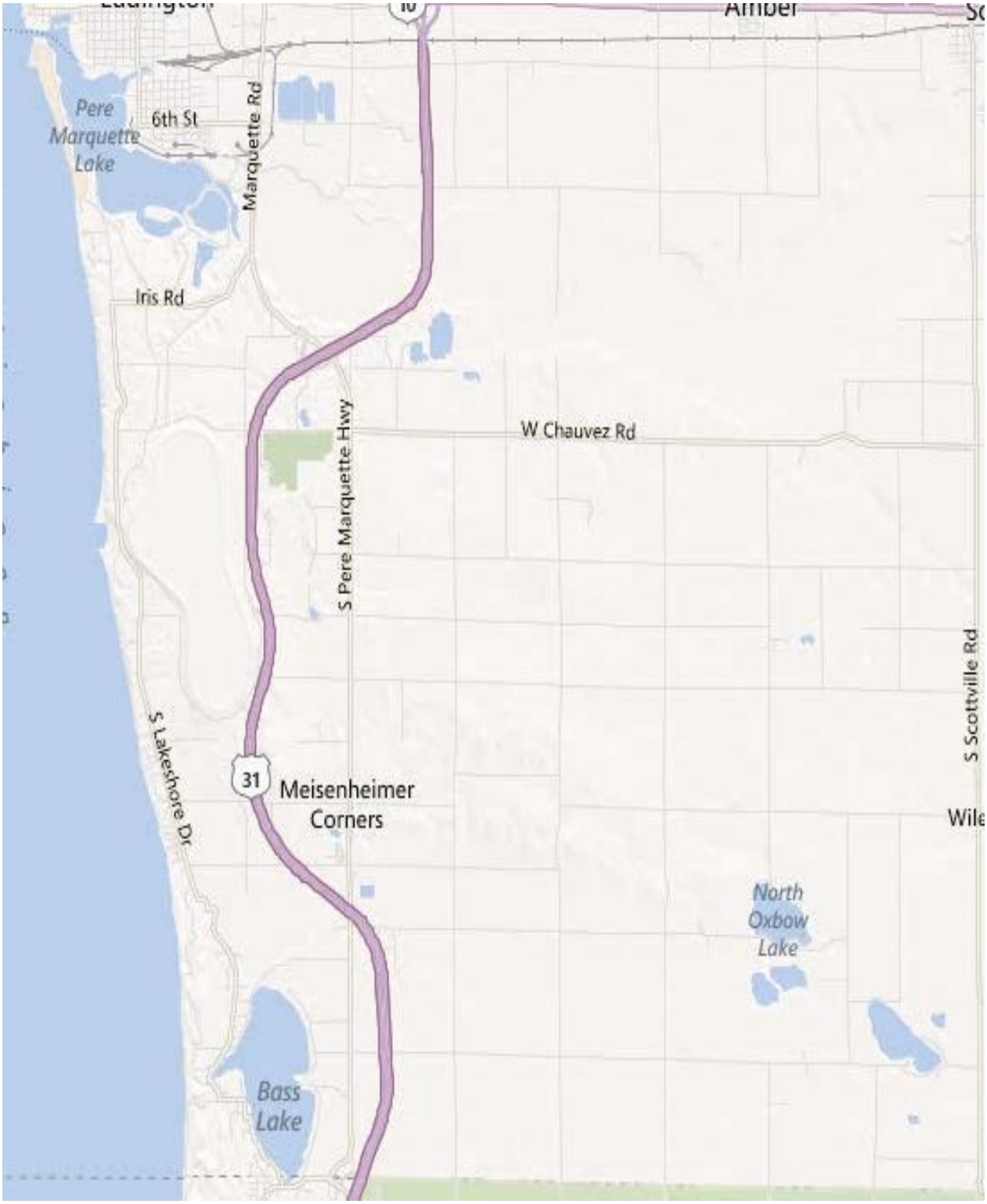
D18 Could you please be more specific about your location in Mason County? This information will be kept completely confidential.



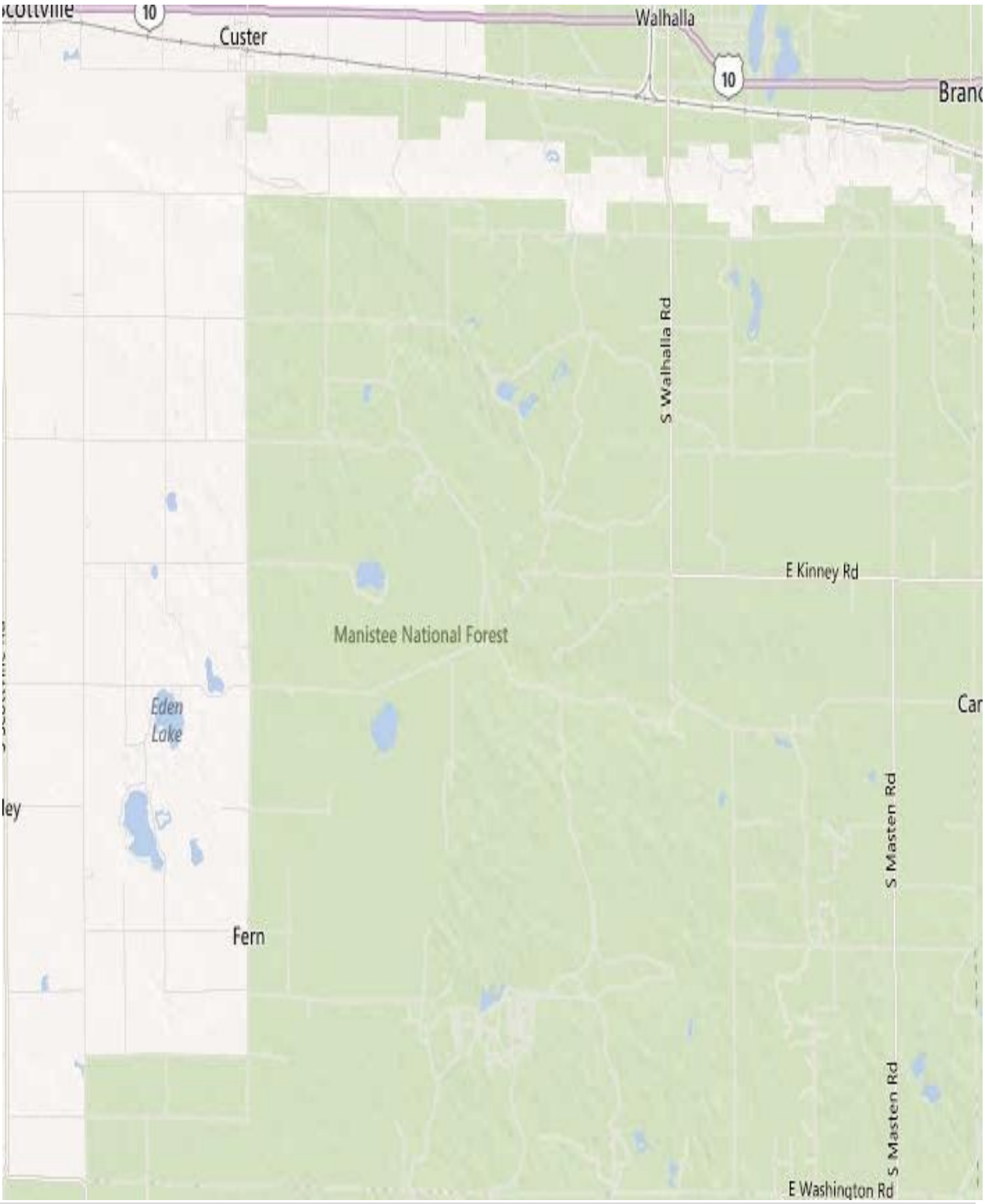
Q116 Could you please be more specific about your location in Mason County? This information will be kept completely confidential.



Q117 Could you please be more specific about your location in Mason County? This information will be kept completely confidential.



D19 Could you please be more specific about your location in Mason County? This information will be kept completely confidential.



D20 Are you a member of an environmental organization?

- Yes (4)
- No (3)

D22 Do you think you would be able to see an offshore wind farm from your primary residence?

- Yes (1)
- No (2)
- Do not know (3)

D24 Do you think you would be able to see an offshore wind farm during your day-to-day routine?

- Yes (1)
- No (2)
- Do not know (3)

Part E: Final Section We would like to understand your general opinions regarding electricity.

E1 Have you ever seen an operational wind turbine (or wind farm) in person before?

- Yes (1)
- No (2)

E4 Where do you buy your electricity?

- Consumers Energy - Standard (1)
- Consumers Energy - Renewable energy surcharge (2)
- Great Lakes Energy (4)
- Other (6) _____
- Not sure (5)

E5 What is your overall stance on each of the following sources of electricity generation?

	Strongly Oppose (1)	Oppose (2)	Neutral (3)	Support (4)	Strongly Support (5)	Not sure (6)
Coal (Traditional) (7)	•	•	•	•	•	•
Coal (Carbon Capture and Sequestration) (8)	•	•	•	•	•	•
Hydroelectric (15)	•	•	•	•	•	•
Natural Gas (Conventional) (2)	•	•	•	•	•	•
Natural Gas (Hydraulic Fracturing a.k.a. Fracking) (3)	•	•	•	•	•	•
Nuclear (1)	•	•	•	•	•	•
Solar (6)	•	•	•	•	•	•
Wind (Land-based) (4)	•	•	•	•	•	•
Wind (Offshore) (5)	•	•	•	•	•	•

E6 In your opinion, which of the following would you classify as a "clean electricity" generation source? Please select all that apply.

15) Coal (Traditional) (7)
16) Coal (Carbon Capture and Sequestration) (8)
17) Hydroelectric (15)
18) Natural Gas (Conventional) (2)
19) Natural Gas (Hydraulic Fracturing a.k.a. Fracking) (3)
20) Nuclear (1)
21) Solar (6)
22) Wind (Land-based) (4)
23) Wind (Offshore) (5)

E8 If an offshore wind farm were built in Ludington, would you take a boat tour of the facility?

- Yes (1)
- No (2)
- Maybe (3)

E7 I feel a personal attachment to the Great Lakes.

- Strongly Agree (1)
- Agree (2)
- Neither Agree nor Disagree (3)
- Disagree (4)
- Strongly Disagree (5)

Q227 Is there anything you would like to express that you feel has not been covered by this survey? Please feel free to share all your thoughts, opinions and suggestions with us.

Q229 Also, we will be conducting follow-up interviews with interested stakeholders to further explore the subject, if you would like to participate please record your email address below.

Email Optional: Please record your email address if you would like to be entered into a $100 drawing as a thank-you for your time. Like your survey answers, your email address will remain confidential.

Appendix B.3. Survey Instrument: Oceana County, Michigan

Oceana Energy Survey

[Exported from Qualtrics April 6, 2013]

Q219 Welcome to the University of Michigan's energy survey for Oceana County! Please type in your unique ID printed on your letter or postcards. If you have trouble finding your unique ID, please email umenergystudy@gmail.com for help or alternatively you may enter your first and last name as your identifier. All responses will be completely confidential.

Age Are you at least 18 years of age?

- Yes (1)
- No (2)

If No Is Selected, Then Skip To End of Survey

Local Do you live in Oceana County either seasonally or full-time?

- Yes (1)
- No (2)

If No Is Selected, Then Skip To End of Survey

Introduction: Thank you for your interest in this survey! Your thoughts, opinions, and perceptions are valuable to us and will contribute to a broader, regional body of research regarding possible energy futures for some of Lake Michigan's coastal communities. Upon full survey completion, you will be offered the option to record your email to be entered into a $100 drawing as a thank-you for your participation. In addition, you will also be offered the voluntary option to record your email if you wish to receive follow-up questions regarding this study. As we stated in our introductory letter, your participation is voluntary and you may opt out at any time. If you agree to participate, please click the >> button below to start the survey.

Q76 Background Oceana County has passed an ordinance banning offshore wind development in Lake Michigan. However, academic researchers are interested in understanding community opinions regarding offshore wind farm development in this area. To an extent, the impact on local communities of installing an offshore wind farm is uncertain. Your answers will contribute to a broader research study that will estimate possible economic and social impacts, if any, resulting from wind farm development. Your opinions are important to us!

Part A: Information Sources

A1 Have you heard anything about offshore wind development in Pentwater?

- Yes (1)
- No (2)

A2 Where have you heard about offshore wind farms? Please select all that apply.

24) Local newspaper (1)
25) Regional newspaper (2)
26) TV (3)
27) Radio (4)
28) Online (5)
29) Billboards (6)
30) Public hearings/meetings (8)
31) Fairs/expos (9)
32) Professional organization(s) (10)
33) Religious organization(s) (11)
34) Coworkers (12)
35) Friends (13)
36) Family (14)
37) Other (please specify) (7) _____

A3 Please indicate the extent of the information you obtained from each source.

	A little information (1)	Some information (2)	A lot of information (3)
Local newspaper (1)	•	•	•
Regional newspaper (2)	•	•	•
TV (3)	•	•	•
Radio (4)	•	•	•
Online (5)	•	•	•
Billboards (6)	•	•	•
Public hearings/meetings (7)	•	•	•

Fairs/expos (8)	•	•	•
Professional organization(s) (13)	•	•	•
Religious organization(s) (14)	•	•	•
Friends (10)	•	•	•
Family (11)	•	•	•
Other (please specify) (9)	•	•	•

B Part B: Offshore Wind Opinions in Pentwater

B1 Have you formed an opinion about offshore wind farm development in Pentwater?

- I support the idea (1)
- I oppose the idea (2)
- I have not yet made up my mind (3)

B2 Even though you have not yet made up your mind, which way are you leaning?

- To support the idea (1)
- To oppose the idea (2)
- Need more information (3)

B3 Given what you know currently, do you think that offshore wind farm development in Pentwater would have a positive impact (improve), no impact, or a negative impact (worsen) on the following:

	Improve (1)	No Impact (2)	Worsen (3)	Not Sure (4)
Electricity rates (1)	•	•	•	•
Job creation/local economy (2)	•	•	•	•
Air quality (3)	•	•	•	•
Property values (4)	•	•	•	•
Aesthetics of the lake view (5)	•	•	•	•
Aquatic life (6)	•	•	•	•
Bird life (7)	•	•	•	•
Recreational boating and fishing (8)	•	•	•	•
Community harmony (9)	•	•	•	•
Tourism (10)	•	•	•	•
Other (please specify) (11)	•	•	•	•

B4 Imagine that a wind farm were developed off the coast of Pentwater in the next few years. Generally speaking, if this project were to be successful and led to more projects in Lake Michigan and/or in the Great Lakes in the future, what kind of impacts do you think all of these projects taken together would have on the following?

	Improve (1)	No Impact (2)	Worsen (3)	Not Sure (4)
U.S. independence from foreign energy sources (1)	•	•	•	•
Effects of global climate change (2)	•	•	•	•

B5 In deciding whether you support or oppose offshore wind development in Pentwater, please write in the three aspects you consider to be the most important, ranked in order of importance #1, #2, and #3, with aspect #1 having the highest importance. Examples could include, but aren't limited to the following: energy independence, ecological impact, pollution reduction, noise, aesthetic value, etc.

Aspect #1 (1)
Aspect #2 (2)
Aspect #3 (3)

B6 Given your current knowledge, how would your opinion change if you knew that offshore wind development in Pentwater would...

	Much less favorable (1)	Less favorable (2)	Unchanged (3)	More favorable (4)	Much more favorable (5)
Generate electricity for Oceana County? (1)	•	•	•	•	•
Improve local air quality? (2)	•	•	•	•	•
Not seriously harm bird life? (3)	•	•	•	•	•
Not seriously harm aquatic life? (4)	•	•	•	•	•
Decrease electricity rates? (5)	•	•	•	•	•
Help job creation/local economy? (6)	•	•	•	•	•
Increase coastal property values? (7)	•	•	•	•	•
Increase tourism? (8)	•	•	•	•	•

Q108

	Much less favorable (1)	Less favorable (2)	Unchanged (3)	More favorable (4)	Much more favorable (5)
Not generate electricity for Oceana County? (1)	•	•	•	•	•
Not improve local air quality? (2)	•	•	•	•	•
Seriously harm bird life? (3)	•	•	•	•	•
Seriously harm aquatic life? (4)	•	•	•	•	•
Increase electricity rates? (5)	•	•	•	•	•
Hurt job creation/local economy? (6)	•	•	•	•	•
Decrease coastal property values? (7)	•	•	•	•	•
Hurt tourism? (8)	•	•	•	•	•

E2 On average, approximately how much does your household spend on electricity each month?

$/month in the Summer (1)
$/month in the Winter (2)

Q85 Please consider this purely hypothetical scenario: Imagine that the wind farm ordinance were removed and Pentwater and the surrounding areas were facing a vote to approve or deny a permit to build an offshore wind farm off Pentwater's beach. It is time to make your "vote" with the information and opinions you currently hold. This hypothetical wind farm would contain approximately 80 wind turbines and contain a total capacity of approximately 400 megawatts (MW) of power. In other words, a project of this size could power between 96,000 to 120,000 households per year. The closer the wind farm is to the coast, the following trends are more likely to occur: lower construction costs because of shorter transmission lines, more tax revenue gains to local area, and a reduced impact on electricity rates. The opposite effect for each category would occur as the wind farm is sited further away from the coast.

Q226 This scenario, along with the following price points, is purely hypothetical and was generated by researchers to elicit opinions. Given the hypothetical nature of this research, people sometimes unintentionally overestimate or underestimate their responses. Though this is a hypothetical scenario, please respond as if you were actually faced with this vote while keeping in mind your monthly budget.

Q221 Please consider the current view from Pentwater's beach:

Now please consider this hypothetical wind farm scenario: Three miles from shoreline

C1a Given this distance from Pentwater's beach, would you support this wind farm if you knew you would have to....

	Yes (1)	No (2)	Not Sure (3)
pay ${e://Field/Price} on your monthly electricity bill? (1)	•	•	•

C1b How sure are you of your previous answer given the impact on price? Please select one number from 1 to 10, with 1 indicating "very unsure" and 10 indicating "very sure".

- Very Unsure (1) (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- Very sure (10) (10)

Q223 Please consider the current view from Pentwater's beach:

Now please consider this hypothetical wind farm scenario: Six miles from shoreline

C2a Given this distance from Pentwater's beach, would you support this wind farm if you knew you would have to....

	Yes (1)	No (2)	Not Sure (3)
pay ${e://Field/Price} on your monthly electricity bill? (1)	•	•	•

C2b How sure are you of your previous answer given the impact on price? Please select a number from 1 to 10, with 1 indicating “very unsure” and 10 indicating “very sure”.

- Very Unsure (1) (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- Very Sure (10) (10)

Q224 Please consider the current view from Pentwater's beach:

Now please consider this hypothetical wind farm scenario: Ten miles from shoreline

Q113 Given this distance from Pentwater's beach, would you support this wind farm if you knew you would have to....

	Yes (1)	No (2)	Not Sure (3)
pay ${x} on your monthly electricity bill? (1)	•	•	•

Q115 How sure are you of your previous answer given the impact on price? Please select a number from 1 to 10, with 1 indicating “very unsure” and 10 indicating “very sure”.

- Very Unsure (1) (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- Very sure (10) (10)

Part D: About You - Demographics Now please answer some questions to help us interpret the data.

D1 How old are you?

- Age (1) _____
- Prefer not to say (2)

D3 What is your gender?

- Male (1)
- Female (2)
- Prefer not to say (3)

D4 What is your relationship status?

- Single (1)
- Married (2)
- Divorced (3)
- Prefer not to say (4)

D5 What is your race?

- Caucasian (1)
- African American (2)
- Hispanic (3)
- Asian (4)
- American Indian (5)
- Pacific Islander (6)
- Other (7) _____
- Prefer not to say (8)

D6 Please select your household income after taxes last year:

- $0-$19,999 (1)
- $20,000 - 39,999 (2)
- $40,000 - 59,999 (3)
- $60,000 - 79,999 (4)
- $80,000 - 99,999 (5)
- $100,000 - 119,999 (6)
- $120,000 - 139,999 (7)
- $140,000 - 159,999 (8)
- $160,000 - 179,999 (9)
- $180,000 - $200,000 (10)

- > $200,000 (11)
- Prefer not to say (12)

D7 What is your highest level of education completed?

- Some high school (7)
- High school (1)
- Some college (2)
- Associate's degree (2 year) (3)
- Bachelor's degree (4 year) (4)
- Graduate degree (5)
- Prefer not to say (6)

D8 Generally speaking, where would you place yourself in the political spectrum?

- Liberal (3)
- Moderately liberal (4)
- Independent (5)
- Moderately conservative (6)
- Conservative (7)

D10 Are you employed?

- Yes (1)
- No (2)
- Retired (4)
- Prefer not to say (3)

D11 Which industry best describes your field of work? Please check one:

- Agriculture (33)
- Automotive/transportation (1)
- Construction/building (6)
- Consulting (18)
- Education (8)
- Energy (4)
- Financial (16)
- Food services (3)
- Health care (10)
- Insurance (17)
- Legal (32)
- Non-profit (14)
- Public service (7)

- Real estate (9)
- Retail/service (11)
- Student (12)
- Tourism (2)
- Other (15) _____

D12 Do you work in Oceana County?

- Yes (1)
- No (2)

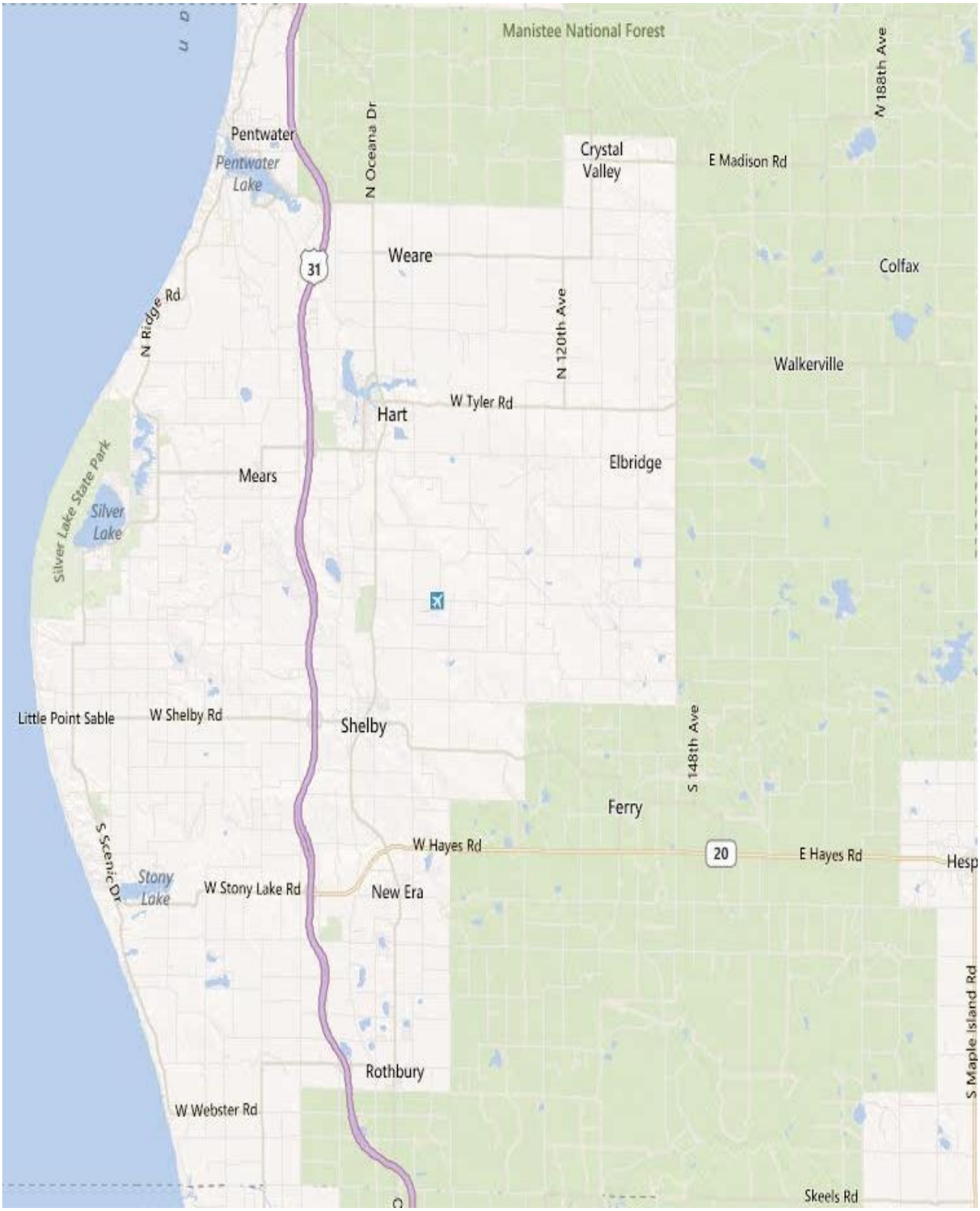
D14 Do you own a residence in Oceana County?

- Yes (1)
- No, but I live in Oceana County (2)

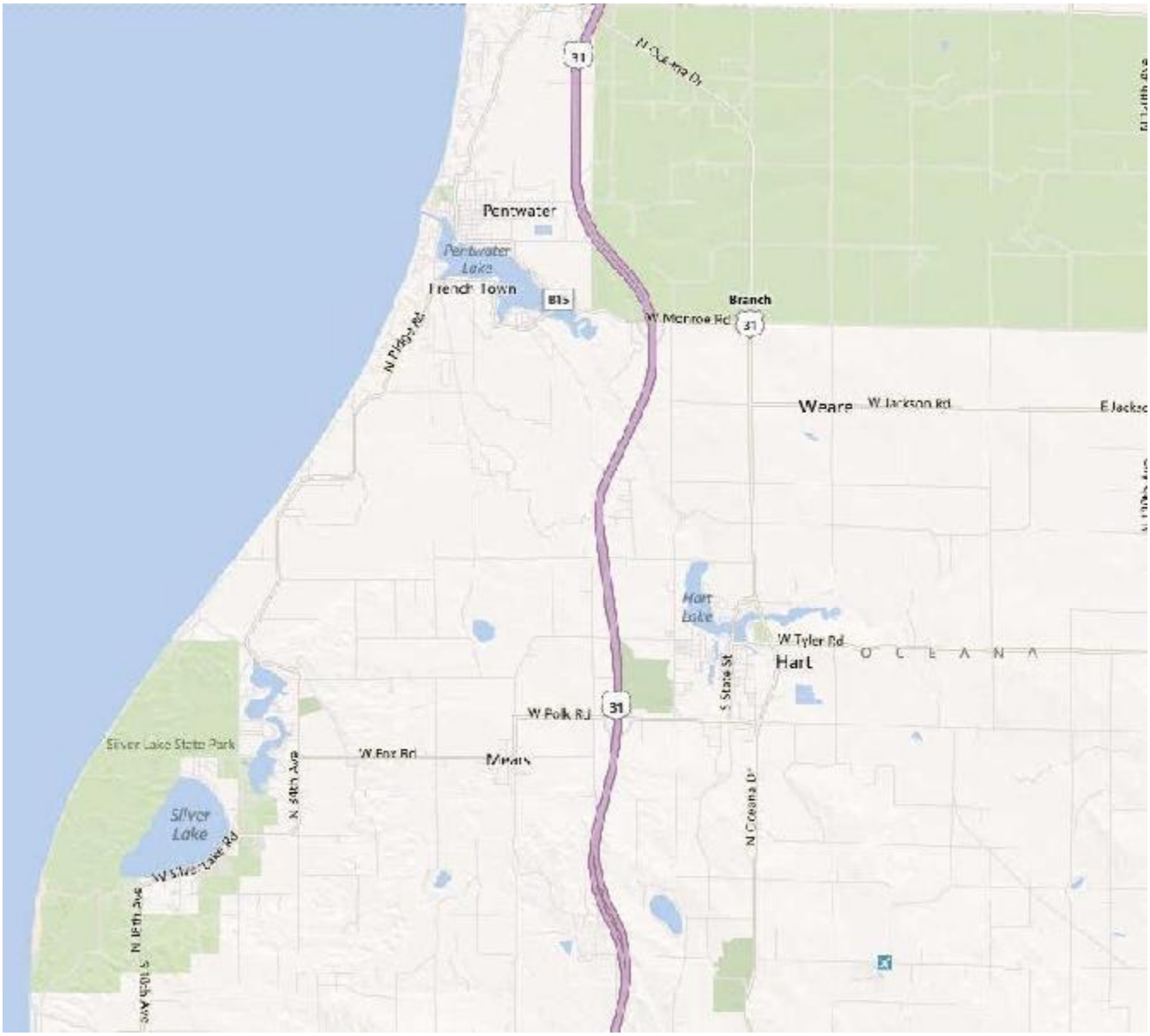
Q109 How long have you lived there?

- < 1 year (1)
- 1-5 years (2)
- 5-10 years (3)
- 10-20 years (4)
- More than 20 years (5)

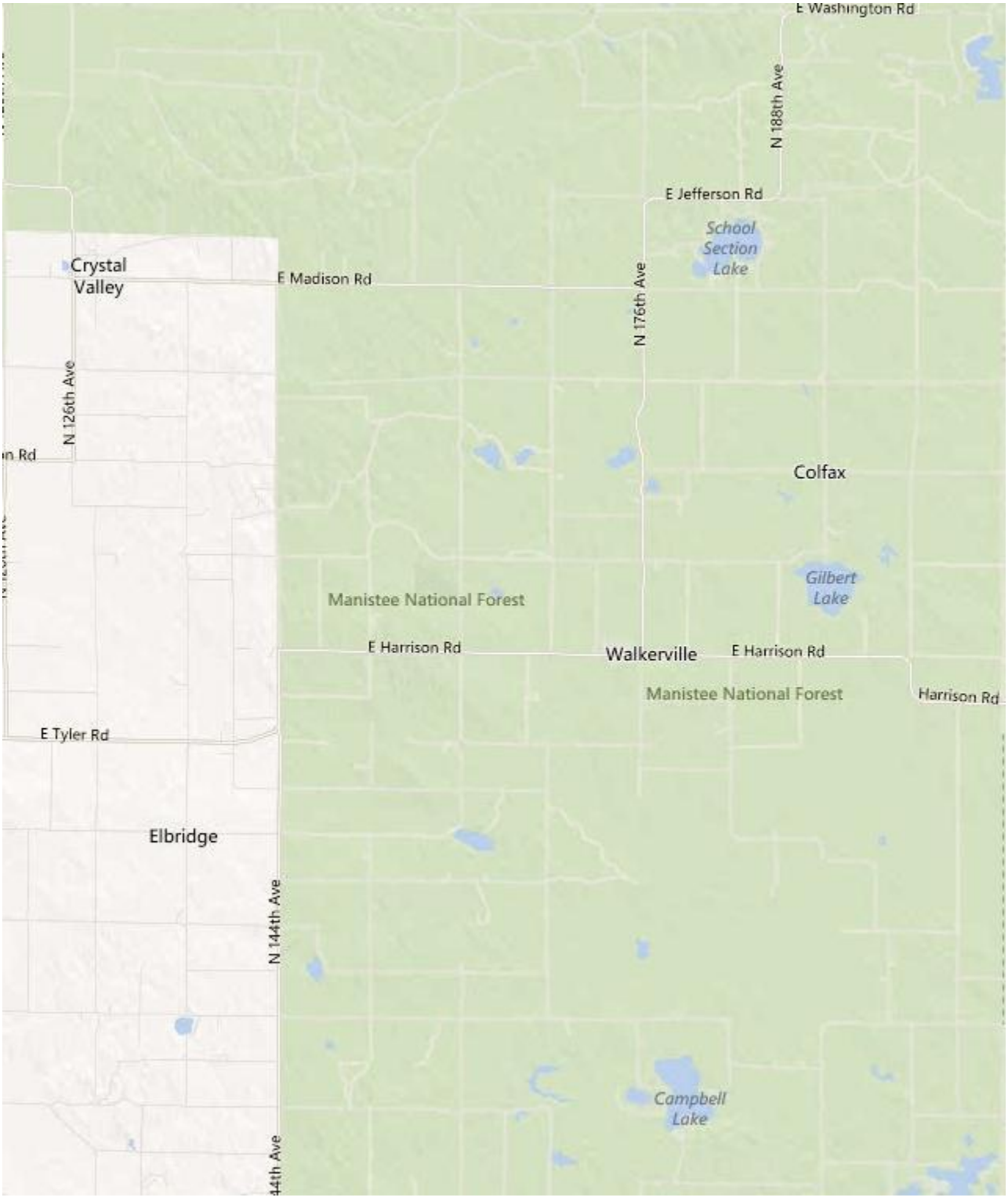
Q228 Please click the mouse on the general area of your primary residence in Oceana:



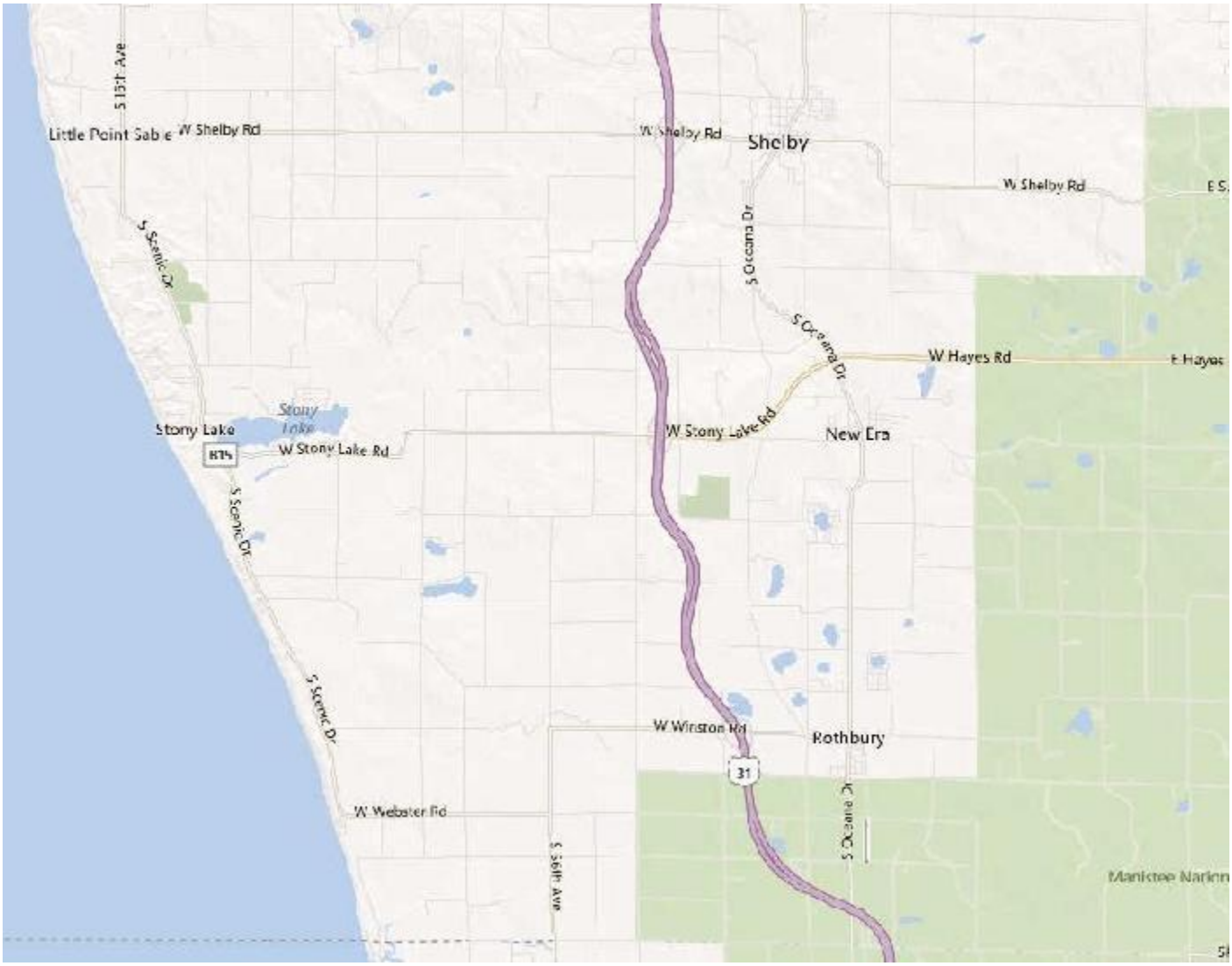
Q230 Could you please be more specific about your location in Oceana County? This information will be kept completely confidential.



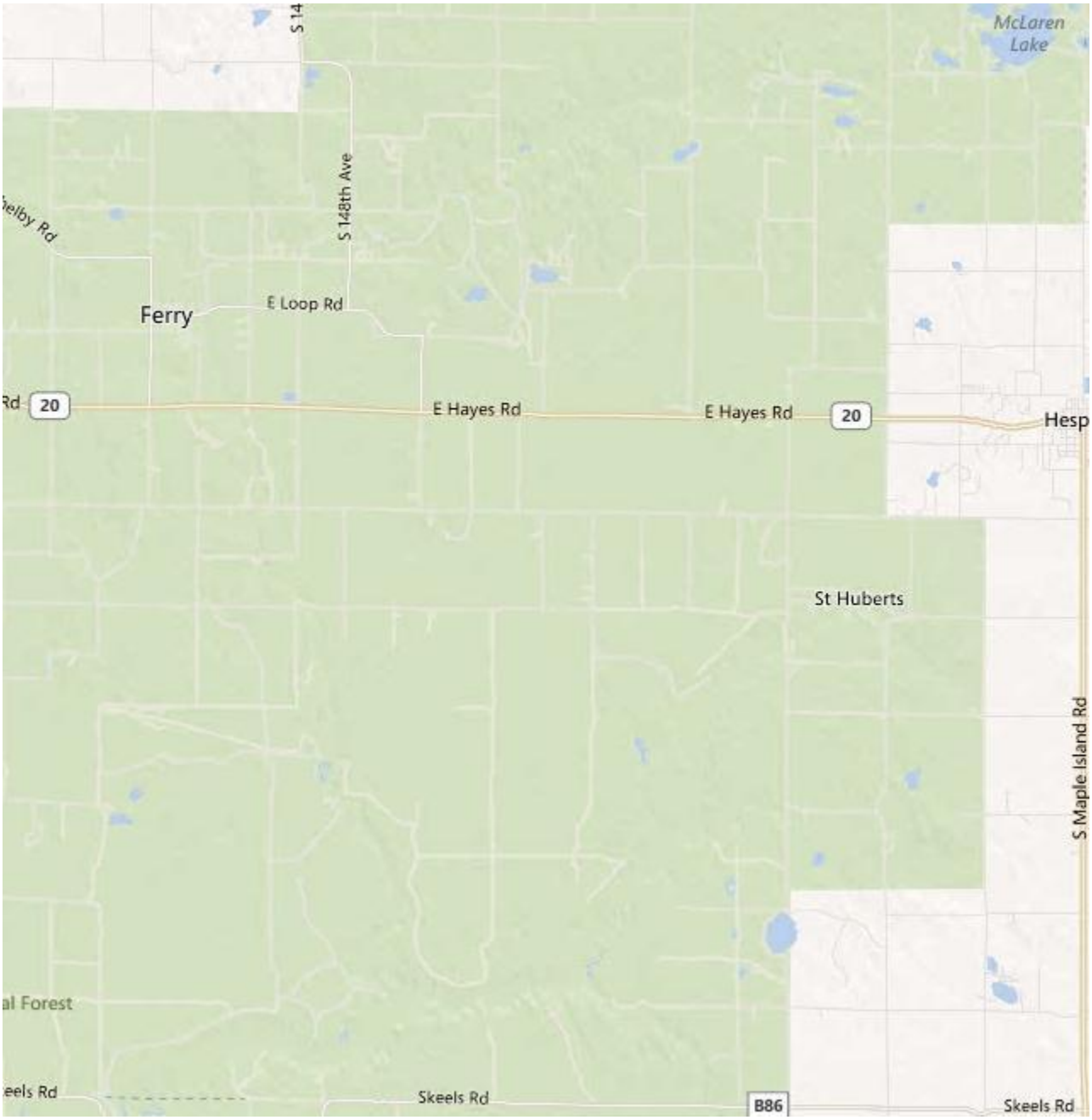
Q232 Could you please be more specific about your location in Oceana County? This information will be kept completely confidential.



Q234 Could you please be more specific about your location in Oceana County? This information will be kept completely confidential.



Q236 Could you please be more specific about your location in Oceana County? This information will be kept completely confidential.



D20 Are you a member of an environmental organization?

- Yes (4)
- No (3)

D22 Do you think you would be able to see an offshore wind farm from your primary residence?

- Yes (1)
- No (2)
- Do not know (3)

D24 Do you think you would be able to see an offshore wind farm during your day-to-day routine?

- Yes (1)
- No (2)
- Do not know (3)

Part E: Final Section We would like to understand your general opinions regarding electricity.

E1 Have you ever seen an operational wind turbine (or wind farm) in person before?

- Yes (1)
- No (2)

E4 Where do you buy your electricity?

- Consumers Energy - Standard (1)
- Consumers Energy - Renewable energy surcharge (2)
- Great Lakes Energy (4)
- Other (6) _____
- Not sure (5)

E5 What is your overall stance on each of the following sources of electricity generation?

	Strongly Oppose (1)	Oppose (2)	Neutral (3)	Support (4)	Strongly Support (5)	Not sure (6)
Coal (Traditional) (7)	•	•	•	•	•	•
Coal (Carbon Capture and Sequestration) (8)	•	•	•	•	•	•
Hydroelectric (15)	•	•	•	•	•	•
Natural Gas (Conventional) (2)	•	•	•	•	•	•
Natural Gas (Hydraulic Fracturing a.k.a.	•	•	•	•	•	•

Fracking) (3)						
Nuclear (1)	•	•	•	•	•	•
Solar (6)	•	•	•	•	•	•
Wind (Land-based) (4)	•	•	•	•	•	•
Wind (Offshore) (5)	•	•	•	•	•	•

E6 In your opinion, which of the following would you classify as a "clean electricity" generation source? Please select all that apply.

38) Coal (Traditional) (7)
39) Coal (Carbon Capture and Sequestration) (8)
40) Hydroelectric (15)
41) Natural Gas (Conventional) (2)
42) Natural Gas (Hydraulic Fracturing a.k.a. Fracking) (3)
43) Nuclear (1)
44) Solar (6)
45) Wind (Land-based) (4)
46) Wind (Offshore) (5)

E8 If an offshore wind farm were built in Pentwater, would you take a boat tour of the facility?

- Yes (1)
- No (2)
- Maybe (3)

E7 I feel a personal attachment to the Great Lakes.

- Strongly Agree (1)
- Agree (2)
- Neither Agree nor Disagree (3)
- Disagree (4)
- Strongly Disagree (5)

Is there anything you would like to express that you feel has not been covered by this survey? Please feel free to share all your thoughts, opinions and suggestions with us.

Q232 Also, we will be conducting follow-up interviews with interested stakeholders to further explore the subject, if you would like to participate please record your email address below.

Email Optional: Please record your email address if you would like to be entered into a $100 drawing as a thank-you for your time. Like your survey answers, your email address will remain confidential.

Appendix B.4. Illinois Region Priming Letter

September 21, 2012

Dear Joe Smith:

My name is Lauren Knapp, and I am part of a graduate research team from the University of Michigan. On behalf of my colleagues, I would like to invite you to participate in a brief, voluntary online survey. Your thoughts, opinions, and perceptions are valuable to us and will contribute to a broader, regional body of research regarding possible energy futures for Lake Michigan's coastal communities. You can access the survey at the following link and password:

Survey link:	**http://tinyurl.com/UM-study**
Password:	**energystudy2012**

Your responses will be kept completely confidential. Each survey is assigned a unique identifier, and only that will be recorded. This identifier will only be used to examine different demographic factors in relation to your responses. Moreover, the survey is voluntary; at any time you have the option to discontinue it. Finally, you will not result in loss of benefits or penalty if you choose not to complete the survey. Once the survey is completed, **you will be offered the option to record your email address to be entered into a $100 drawing**. We request that you complete the survey by **Monday, October 1, 2012.** The survey contains visualizations, so please take it on a **standard computer screen** if possible.

If you have any questions regarding this study, please do not hesitate to contact me at:

The University of Michigan, School of Natural Resources and Environment,
440 Church St., Ann Arbor, MI 48109-1041, (847) 440-4250, umenergystudy@gmail.com

The University of Michigan Institutional Review Board Health Sciences and Behavioral, Sciences has determined that this study is exempt from IRB oversight.

Thank you in advance for your time and willingness to offer valuable feedback to this research study!

Warm Regards,

Lauren A. Knapp, B.S.
Master's Graduate Student
School of Natural Resources and Environment
University of Michigan

Appendix B.5. Illinois Region: Follow-up Postcard (1 of 3)

Hello!
You were recently sent an invitation to take a voluntary, online questionnaire regarding possible energy futures for your coastal Lake Michigan community. If you have already completed the questionnaire, **thank you**!

If you have not had a chance yet to complete the online questionnaire, there is still time. Please respond by 10/19/2012. Your opinions are extremely valuable to us and will contribute to a regional research study.

Survey link: http://tinyurl.com/UM-study
Password: energystudy2012

Sincerely,

Lauren Knapp
Master's Graduate Student
umenergystudy@gmail.com

NATURAL RESOURCES AND ENVIRONMENT
UNIVERSITY OF MICHIGAN

University of Michigan
School of Natural Resources and Environment
440 Church St.,
Ann Arbor, MI 48109-1041

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**********AUTO**5-DIGIT 60091
Dennie Freeman
1630 Sheridan Rd Unit 2H
Wilmette, IL 60091-1836

Appendix B.6. Follow-up Phone Call Script (Both Regions)

Researcher: Good morning/afternoon/evening. My name is Matt Rife/Lauren Knapp/Beren Li/Russell Ma, I am a master's student at the University of Michigan. Is (participant's name) available to speak?

>>If no,

1. **Subject:** I'm sorry they aren't in now.
2. **Researcher:** Is there a better time when we could reach him/her?
3. **Subject:** No, call back later.../no...
4. **Researcher:** Wonderful, thank you very much for your time. Good bye.
5.

>>If yes, **Subject:** Yes, this is she/he.

Researcher: Terrific. I am calling on behalf of my research team to follow-up on a letter we sent you last week regarding as study we're conducting. We would like to remind him/her/you that we would greatly appreciate his/her/your voluntary participation in our study regarding possible energy futures for Lake Michigan communities. Do you still have the letter? Can I mail you a follow-up letter?

You have been randomly selected to participate in a survey. The purpose of the survey is to gain a better understanding of public perceptions relating to energy futures in the Great Lakes region. We just wanted to remind you that your opinion is very valuable to us, and we would really appreciate it if you could take 10 minutes to complete it online. As a thank-you for your participation, you will be offered an option to record your email at the end of the survey to be entered into a drawing for $100.

If you have any difficulties accessing the survey, would like another introduction letter, would prefer to not receive further contact, or have any further questions, please feel free to contact me at (231) 742 8384 [or by email at umenergystudy@gmail.com].

Voicemail Follow-up Call Script

Hello [JOE SMITH], my name is Lauren Knapp/Matthew Rife/Yufeng Ma/Beren Li, and I am a graduate student at the University of Michigan. I'm following up on a letter I recently mailed you requesting your participation in a voluntary survey regarding possible energy futures for your community.

I wanted to remind you that your opinion is very valuable, and I would really appreciate it if you could take 10 minutes of your spare time to complete the online survey. And as a thank-you for your participation, you will be offered an option to record your email for a $100 drawing. You can access the survey at **Tinyurl.com/um-study (password: energystudy2012).**

If you have any questions, please feel free to contact me at (231) 742 8384 or by email at umenergystudy@gmail.com.

Thank you very much for your time! Have a great day! Bye bye.

Appendix B.7. Illinois Region Follow-up Postcard (2 of 3)

Hello!

You were mailed an invitation in November to take a voluntary, online survey regarding possible energy futures for your coastal Lake Michigan community. If you have already completed the questionnaire, **thank you**!

If you have not had a chance to complete the questionnaire, there is still time given. **The extended, final deadline is February 11, 2013 if you wish to be entered into the $100 drawing.** This postcard is your last mailing contact regarding this study.

Thank you in advance for your time and attention to this survey!

Sincerely,

Lauren Knapp
Master's Graduate Student
umenergystudy@gmail.com

NATURAL RESOURCES AND ENVIRONMENT
UNIVERSITY OF MICHIGAN

University of Michigan
School of Natural Resources and Environment
440 Church St.,
Ann Arbor, MI 48109-1041

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*******AUTO**5-DIGIT 60091
Mr Allen Abrams
2216 Schiller Ave
Wilmette, IL 60091-2328

Appendix B.8. Illinois Region: Follow-up Postcard (3 of 3)

Hello!

Our academic study regarding possible energy futures for your community is nearly complete. However, in response to numerous requests, we would like to provide the survey link and password one last time for your convenience.

Survey link: www.tinyurl.com/um-study
Password: energystudy2012

In order to accommodate all potential participants, we will also extend the suggested deadline. **If you have not done so already, please complete the survey by February 25, 2013 to be eligible for the $100 drawing.**

Anyone interested in the final results of the study may send a request to umenergystudy@gmail.com.

Thank you for your dedicated time and attention to this study!

Sincerely,

Lauren Knapp
Master's Graduate Student

NATURAL RESOURCES AND ENVIRONMENT
UNIVERSITY OF MICHIGAN

University of Michigan
School of Natural Resources and Environment
440 Church St.,
Ann Arbor, MI 48109-1041

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**********AUTO**5-DIGIT 60091
Mr Allen Abrams
2216 Schiller Ave
Wilmette, IL 60091-2328

Appendix B.9. Michigan Region: Mason County Priming Letter

NATURAL RESOURCES AND ENVIRONMENT
UNIVERSITY OF MICHIGAN

January 1, 2013

**********AUTO**3-DIGIT 494
Jane Smith 437 3
7985 N Stephens Rd
Free Soil, MI 49411-9694

Dear Jane Smith:

My name is Lauren Knapp, and I am part of a graduate research team from the University of Michigan. On behalf of my colleagues, I would like to invite you to participate in a brief, voluntary online survey. Your thoughts, opinions, and perceptions are valuable to us and will contribute to a broader, regional body of research regarding possible energy futures for Lake Michigan's coastal communities. You can access the survey at the following link using your Unique ID presented below:

Survey link:	**www.masonstudy.com**
UniqueID:	**MA104**

Your responses will be kept completely confidential. Each survey is assigned a unique identifier, and only that will be recorded. This identifier will only be used to examine different demographic factors in relation to your responses and limit unnecessary further reminders once you complete the survey. Moreover, the survey is voluntary; at any time you have the option to discontinue it. Finally, you will not result in loss of benefits or penalty if you choose not to complete the survey. Once the survey is completed, **you will be offered the option to record your email address to be entered into a $100 drawing**. We request that you complete the survey by **Friday, February 15, 2013** in order to be eligible for the drawing. Later responses will still be accepted. The survey contains visualizations, so please take it on a **standard computer screen** if possible.

If you have any questions regarding this study, please do not hesitate to contact me at:

The University of Michigan, School of Natural Resources and Environment,
440 Church St., Ann Arbor, MI 48109-1041, (231) 742-8384, umenergystudy@gmail.com

The University of Michigan Institutional Review Board Health Sciences and Behavioral, Sciences has determined that this study is exempt from IRB oversight.

Thank you in advance for your time and willingness to offer valuable feedback to this research study!

Lauren A. Knapp, B.S.
Master's Graduate Student
School of Natural Resources and Environment
University of Michigan

Appendix B.10. Michigan Region: Mason County Follow-up Postcard (1 of 2)

Hello!

You were recently mailed an invitation to take a voluntary, online questionnaire regarding possible energy futures for your coastal Lake Michigan community. If you have already completed the questionnaire, **thank you**!

If you have not had a chance yet to complete the online questionnaire, there is still time. **Please complete it by February 15, 2013 in order to be eligible for the $100 drawing.** Your opinions are extremely valuable to us and will contribute to a regional research study.

Survey link: www.masonstudy.com
Unique ID: MA104

Sincerely,

Lauren Knapp
Master's Graduate Student
umenergystudy@gmail.com

NATURAL RESOURCES AND ENVIRONMENT
UNIVERSITY OF MICHIGAN

University of Michigan
School of Natural Resources and Environment
440 Church St.,
Ann Arbor, MI 48109-1041

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**********AUTO**3-DIGIT 494
Jane Smith 437 3
7985 N Stephens Rd
Free Soil, MI 49411-9694

Appendix B.11. Michigan Region: Mason County Follow-up Postcard (2 of 2

Hello!

You were recently mailed an invitation to take a voluntary, online questionnaire regarding possible energy futures for your coastal Lake Michigan community. If you have already completed the questionnaire, **thank you**!

If you have not had a chance yet to complete the online questionnaire, there is still time. **Please complete it by February 15, 2013 in order to be eligible for the $100 drawing.** Your opinions are extremely valuable to us and will contribute to a regional research study.

Survey link: www.masonstudy.com
Unique ID: MA104

Sincerely,

Lauren Knapp
Master's Graduate Student
umenergystudy@gmail.com

NATURAL RESOURCES AND ENVIRONMENT
UNIVERSITY OF MICHIGAN

University of Michigan
School of Natural Resources and Environment
440 Church St.,
Ann Arbor, MI 48109-1041

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**********AUTO**3-DIGIT 494
Jane Smith 404 2
7985 N Stephens Rd
Free Soil, MI 49411-9694

Appendix B.12. Michigan Region: Oceana County Priming Letter

NATURAL RESOURCES AND ENVIRONMENT
UNIVERSITY OF MICHIGAN

January 1, 2013

**********AUTO**3-DIGIT 494
Steven Hegedus 438 3
307 Lincoln St
Hart, MI 49420-1115

Dear Steven Hegedus:

My name is Lauren Knapp, and I am part of a graduate research team from the University of Michigan. On behalf of my colleagues, I would like to invite you to participate in a brief, voluntary online survey. Your thoughts, opinions, and perceptions are valuable to us and will contribute to a broader, regional body of research regarding possible energy futures for Lake Michigan's coastal communities. You can access the survey at the following link using your Unique ID presented below:

Survey link:	**www.oceanastudy.com**
UniqueID:	**UM001**

Your responses will be kept completely confidential. Each survey is assigned a unique identifier, and only that will be recorded. This identifier will only be used to examine different demographic factors in relation to your responses and limit unnecessary further reminders once you complete the survey. Moreover, the survey is voluntary; at any time you have the option to discontinue it. Finally, you will not result in loss of benefits or penalty if you choose not to complete the survey. Once the survey is completed, **you will be offered the option to record your email address to be entered into a $100 drawing**. We request that you complete the survey by **Friday, February 15, 2013** in order to be eligible for the drawing. Later responses will still be accepted. The survey contains visualizations, so please take it on a **standard computer screen** if possible.

If you have any questions regarding this study, please do not hesitate to contact me at:

The University of Michigan, School of Natural Resources and Environment,
440 Church St., Ann Arbor, MI 48109-1041, (231) 742-8384, umenergystudy@gmail.com

The University of Michigan Institutional Review Board Health Sciences and Behavioral, Sciences has determined that this study is exempt from IRB oversight.

Thank you in advance for your time and willingness to offer valuable feedback to this research study!

Lauren A. Knapp, B.S.
Master's Graduate Student
School of Natural Resources and Environment
University of Michigan

Appendix B.13. Michigan Region: Oceana County Follow-up Postcard (1 of 2)

Hello!

You were recently mailed an invitation to take a voluntary, online questionnaire regarding possible energy futures for your coastal Lake Michigan community. If you have already completed the questionnaire, **thank you**!

If you have not had a chance yet to complete the online questionnaire, there is still time. **Please complete it by February 15, 2013 in order to be eligible for the $100 drawing.** Your opinions are extremely valuable to us and will contribute to a regional research study.

Survey link: www.oceanastudy.com
Unique ID: UM001

Sincerely,

Lauren Knapp
Master's Graduate Student
umenergystudy@gmail.com

NATURAL RESOURCES AND ENVIRONMENT
UNIVERSITY OF MICHIGAN

University of Michigan
School of Natural Resources and Environment
440 Church St.,
Ann Arbor, MI 48109-1041

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307 Lincoln St
Hart, MI 49420-1115

Appendix B.14. Michigan Region: Oceana County Follow-up Postcard (2 of 2)

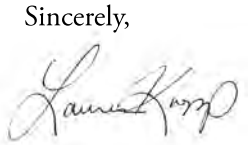
Hello!

You were recently mailed an invitation to take a voluntary, online questionnaire regarding possible energy futures for your coastal Lake Michigan community. If you have already completed the questionnaire, **thank you**!

If you have not had a chance yet to complete the online questionnaire, there is still time. **Please complete it by February 15, 2013 in order to be eligible for the $100 drawing.** Your opinions are extremely valuable to us and will contribute to a regional research study.

Survey link: www.oceanastudy.com
Unique ID: UM001

Sincerely,



Lauren Knapp
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Appendix C.1. U.S. Census Bureau Statistics and Descriptive Statistics

Demographics		2010 U.S. Census (Evanston, IL)	2010 U.S. Census (Mason County, MI)	2010 U.S. Census (Oceana County, MI)	2010 U.S. Census (Mason & Oceana Counties, MI)	Sample Population (Evanston, Rogers Park, Wilmette)	Sample Population (Mason & Oceana Counties, MI)
Age	**(65 or above)**	12.20%	19.60%	17.50%	18.59%	11.46%	24.53%
	Prefer not to Say	-	-	-	-	12.50%	8.50%
Gender	***Male***	47.60%	49.30%	50.20%	49.73%	45.79%	43.00%
	Prefer not to Say					3.16%	2.80%
Race	***White***	65.60%	96.10%	96%	96.05%	84.74%	91.58%
	Black	18.10%	0.70%	0.70%	0.70%	2.63%	0.00%
	Asian	8.60%	0.50%	0.40%	0.45%	1.58%	0.00%
	Hispanic	9.00%	4.00%	14.00%	8.81%	2.10%	0.94%
	Other	0.20%	2.70%	2.90%	2.80%	2.63%	0.00%
	Prefer not to Say	-	-	-	-	6.84%	7.48%
Median household income		$68,107	$40,683	$40,422	$40,558	$40,000 - 59,999	$40,000 - 59,999
Education (bachelor or higher)		65.60%	19.50%	14.80%	17.24%	92.06%	43.00%
Prefer not to say		-	-	-	-	1.59%	2.80%
Population		74,785	28,705	26,570	55,275		

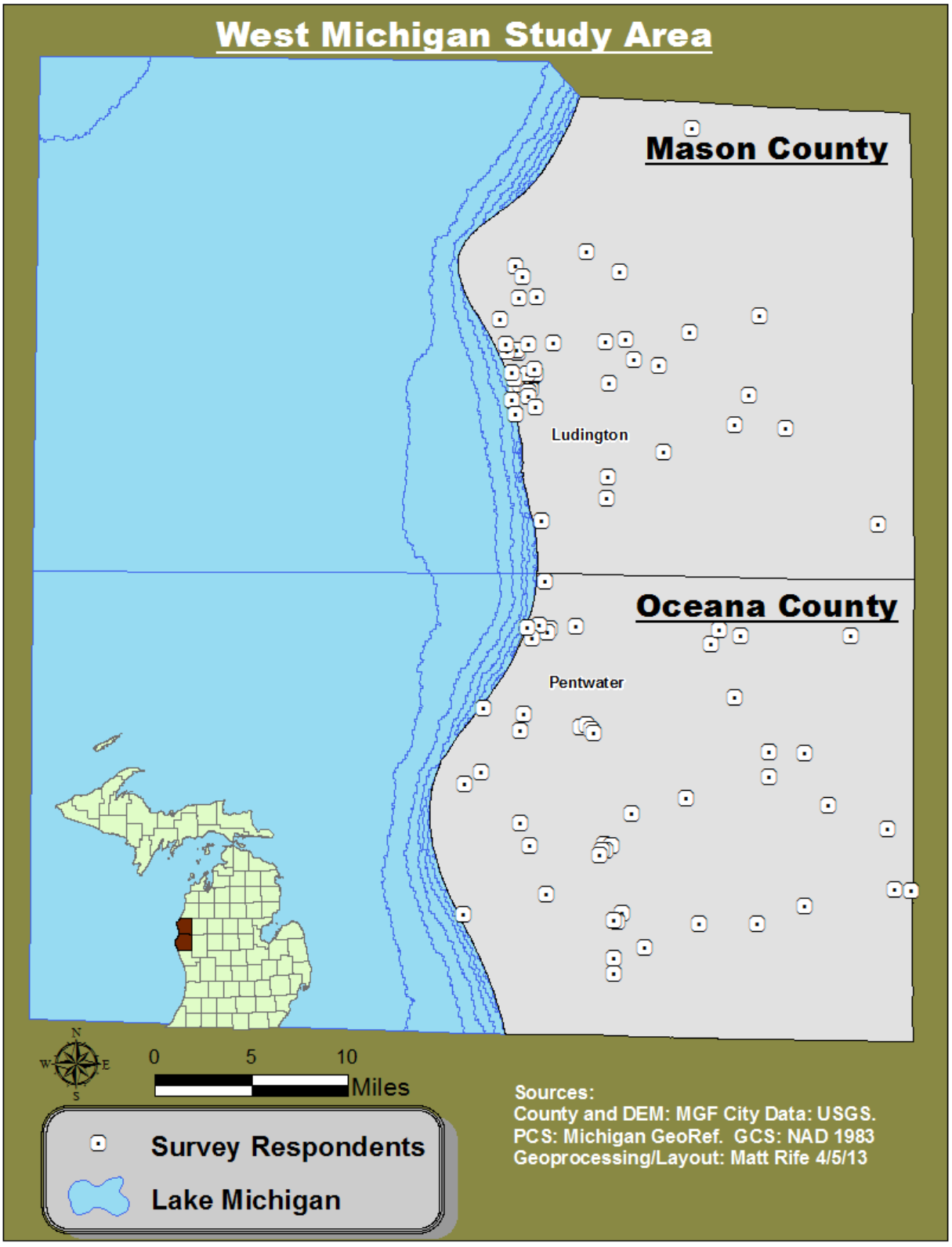
Appendix C.2. Binary Logistic Regression: Variable Descriptions

Model 1: Description of variables in binary logistic regression for likelihood of CVM scenario support

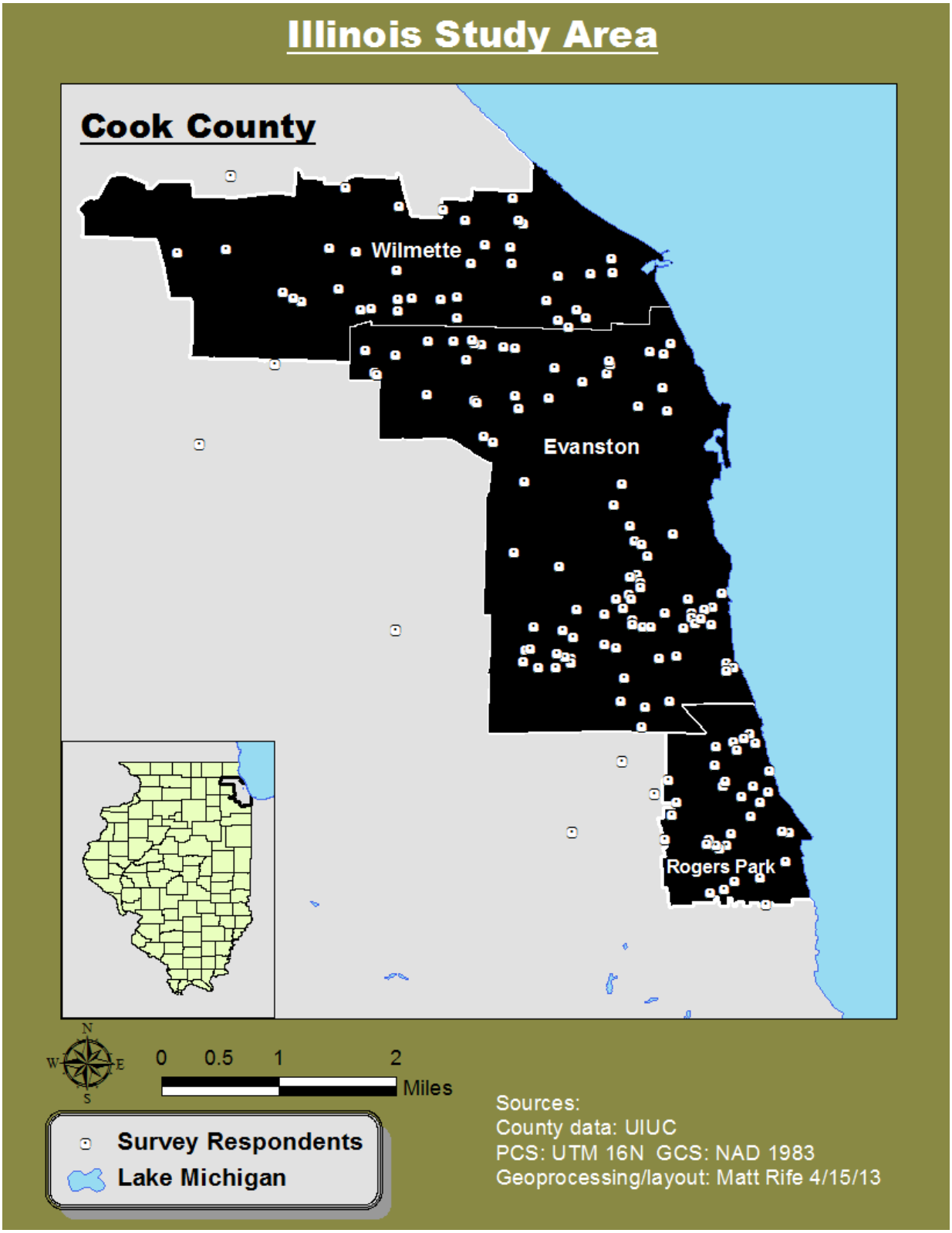
Variable name	Units	Coefficient description
Bid price	(+/-)$	Theoretical price impact on monthly electricity rates
Distance (3 miles)	*Miles*	*Categorical variable for offshore wind farm distance from shoreline (omitted, reference category)*
Distance (6 miles)	Miles	Categorical variable for offshore wind farm distance from shoreline
Distance (10 miles)	Miles	Categorical variable for offshore wind farm distance from shoreline
Illinois	0-1	Dummy variable for Illinois region respondent; "0" if Michigan region respondent
Age	Years	Continuous variable for respondent's age
Highschool_associate	0-1	Dummy variable assigned a "1" if high school graduate, some college, or associate's degree; "0" if otherwise
Bachelors	0-1	Dummy variable assigned a "1" if college graduate; "0" if otherwise
Graduate	*0-1*	*Dummy variable assigned a "1" if graduate or professional degree (omitted, reference category)*
Lowest_inc	0-1	Dummy variable assigned a "1" if annual household income is $0-39,999
low_inc	0-1	Dummy variable assigned a "1" if annual household income is $40,000-$79,999
mid_inc	0-1	Dummy variable assigned a "1" if annual household income is $80,000-$119,999
highmid_inc	0-1	Dummy variable assigned a "1" if annual household income is $120,000-$159,999
high_inc	0-1	Dummy variable assigned a "1" if annual household income is $160,000-$200,000
Highest_inc	*0-1*	*Dummy variable assigned a "1" if annual household income > $200,000 (omitted, reference category)*
Conservative	0-1	Dummy variable assigned a "1" respondent is slightly conservative or conservative; "0" otherwise
Liberal	0-1	Dummy variable assigned a "1" if respondent is slightly liberal or liberal; "0" otherwise
Independent	*0-1*	*Dummy variable assigned a "1" if respondent is independent; "0" otherwise (omitted category)*
Enviro. org. member	0-1	Dummy variable assigned a "1" if member of environmental organization
Male	0-1	Dummy variable assigned a "1" if male; "0" if female
See from home	0-1	Dummy variable assigned a "1" if respondent thinks he/she could see Evanston offshore wind farm from home; "0" if not
See from routine	0-1	Dummy variable assigned a "1" if respondent thinks he/she could see Evanston offshore wind farm on daily routine; "0" if not
Attached to Great Lakes	0-1	Dummy variable assigned a "1" if respondent stated he/she is strongly attached or attached to the Great Lakes ; "0" if he/she is not attached
Caucasian	0-1	Dummy variable assigned a "1" if Caucasian; "0" otherwise

*Unless otherwise stated, "prefer not to respond," "not sure," and missing answers were coded as '.'.

Appendix C.3. Geographic Distribution of Michigan Respondents



Appendix C.4. Geographic Distribution of Illinois Respondents



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