Appendix A-2
Draft EA Public Comment Documents

Summary Table of Responses to Draft EA Comments

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Topic of Concern	Comment Summary	Response Number	Response
OPSB	Commenters expressed concern that the original OPSB application was rejected, and any/all comments submitted as part of it are now lost or not addressed.	1	The Ohio Power Siting Board (OPSB) review is a separate approval process from the U.S. Department of Energy's (DOE's) National Environmental Policy Act (NEPA) review of the Proposed Project. Because the NEPA review process is separate from the OPSB review, this concern should be addressed directly with OPSB.
Public Trust Doctrine	Commenters are concerned that the project does not meet the standards of the Public Trust Doctrine.	2	The Ohio Department of Natural Resources (ODNR) Submerged Lands lease program considers the public trust doctrine. The DOE's environmental assessment (EA) considers the potential environmental impacts of the Proposed Action. The public trust doctrine is not part of the NEPA review process.
Icebreaker Ownership	Commenters are concerned about the ownership of the proposed project (non-profit to for profit, conflict of interest).	3	The DOE's EA is intended to provide evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact. The ownership of the Proposed Project does not meaningfully inform the analysis of potential impacts to the human environment; therefore, it is not included in the EA.
Project Description	*Efficiency*: Commenters question the accuracy of the stated efficiency. "Preliminary analysis indicates that the turbines would operate for approximately 8,200 hours annually and have an approximate capacity factor (CF) of 41.4%."	4	The analyses presented in Section 2.2.2.2, Wind Turbine Design, are based on 10 years of meteorological data collected at the Cleveland Water Intake Crib 50-meter meteorological mast located 4 miles into Lake Erie. The work was performed by an independent renewable energy consultancy and products provider in accordance with International Electrotechnical Commission (IEC) 614000:12-1 and IEC 614000:11. The conservative estimates quoted account for energy losses from wakes, grid availability, electrical efficiency, potential turbine sub-optimal performance, wind flow uncertainties, wind hysteresis, blade soiling, icing degradation and shutdown, extreme temperature shutdown, extreme wind shutdown, potential site access limitations, and curtailment.
	Design: Commenters expressed concern about the proposed project design described in the EA: The wind turbine generators are proposed to be erected on foundations constructed on the Lake Erie lakebed. Commenters believe this is not true as the foundations would merely rest on the lake bottom and would not be secured in any way to bedrock.	5	The foundations would be embedded into the sediment up to a depth of 40 feet. The Mono Bucket (MB) acts like a gravity foundation and captures sediment inside the bucket. As discussed in Section 2.2.2.1, Foundation Design, a turbine erected on a MB foundation has been in service with a 3-megawatt (MW) wind turbine since 2002 with no degradation of foundation performance. This foundation has been continuously monitored to assess associated engineering parameters related to verticality, soil consolidation, stress, strain, pore pressure, vibration, and natural frequency. Other MBs installed in the North Sea have been subjected to forces from 70-foot (21-meter) waves, more severe than conditions in Lake Erie, and which would be in excess of any potential force from ice loading.
	Design: Commenters stated concern about the proposed project design: MB foundation has not been tested in fresh water (ice).	6	EA Section 2.2.2.1, Foundation Design, discusses design information, including waves and ice loads. Lake Erie Energy Development Corporation (LEEDCo) worked with multiple designers and engineers to research estimated dynamic ice forces and their significance in the fatigue limit design of the turbine foundations. The Proposed Project foundation was designed to withstand Lake Erie ice loadings.
	Design: Commenters stated concern about the proposed project design: Ability for the Mono Bucket to maintain 0.5 degree verticality.	7	LEEDCo retained DNV GL as a third party independent verifier who has reviewed and approved the site conditions (which includes but is not limited to wind, waves, ice, seismic, and unusual events) and the design criteria for the MB. MBs that have been installed to date have been installed within 0.25 degree of vertical and most are within 0.1 degree of vertical. During the operation of each foundation, the verticality has been maintained well below 0.5 degree despite being subjected to 70-foot waves, which are a force more extreme than Lake Erie waves or from ice loading.
	Design: Commenter questioned that the maintenance of turbines and turbine parts lifespan discussed in the EA does not match current studies.	8	The maintenance discussed in Section 2.2.8, Operations and Maintenance, is supported by field performance of installed turbines worldwide.
	Design: Commenter noted that wake formation was not analyzed.	9	In Section 3.1.9, Wake Effect, the topic was evaluated and dismissed from detailed analysis because of negligible environmental impacts considering the optimized design and small number of turbines.
	Scheduled Maintenance: Commenter suggested defining more specifically the planned frequency of inspections of the underwater structures and lakebed.	10	EA Section 2.2.8.2, Scheduled Maintenance, discusses maintenance. Inspections of the underwater structures and lakebed would be performed periodically throughout the life of the Proposed Project. Inspections would occur annually or on an as-needed basis.
	Commenter notes that the project description states 6 wind turbines but Figure 2-1 depicts 7 wind turbines.	11	The Proposed Project consists of six wind turbines. Refer to footnote 2 within Section 2.2.1, Description of the Proposed Project, which explains the seventh turbine site depicted in Figure 2-1 is an alternate site. The legend of Figure 2-1 also notes the alternate turbine site. The alternate site would only be used if an unforeseen problem was encountered at a primary site.

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NEPA process	Commenters believe an EIS is warranted. The USFWS states in their comment letter: "We stated, starting on page 7, that this project had three attributes that typically require an Environmental Impact Statement (EIS) according to CEQ regulations. This included (1) that possible effects on the human environment are uncertain and (2) that the project is precedent setting since it is the first proposed off-shore wind facility in freshwater and that it is intended as a demonstration project. Finally, (3) there is uncertainty regarding the potential impacts of this project, which may be understandable and acceptable for a demonstration project; however, given the lack of defined robust pre- and post-construction studies, there is likely to be little more certainty of biological impacts after the project is constructed and operating than is currently available."	12	The DOE's determination that an EA was the appropriate level of NEPA review was based on the categories of actions defined in Appendix C to 10 Code of Federal Regulations (CFR) 1021, Classes of Actions that Normally Require EAs but not Necessarily EISs, specifically, C12: Siting, construction, operation, and decommissioning of energy system demonstration actions (including, but not limited to, wind resource, hydropower, geothermal, fossil fuel, biomass, and solar energy, but excluding nuclear). For purposes of this category, ''demonstration actions'' means actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment. Per Council on Environmental Quality (CEQ) NEPA regulations, Section (§) 1501.4 and DOE's Implementing Procedures, § 1021.321, DOE is completing this EA to determine whether an EIS is required. Per CEQ regulations (§1508.27), significance is determined based on a combination of context and intensity. In the CEQ regulations, these are some, but not all, of the elements that contribute to the intensity of adverse impacts. These factors will be considered in DOE's determination of whether an EIS is required after the EA. To address the U.S. Fish and Wildlife Service's (USFWS's) three specific points: 1) DOE concurs that exact impacts are uncertain. The EA is developed to determine whether potential impacts are significant. An agency may be able to determine whether an impact is significant or not significant even with some uncertainty regarding the impacts. USFWS acknowledges that the uncertainty is acceptable for a demonstration-scale project in the third point. 2) DOE's decision whether to fund this demonstration scale project would be intended to result in information and data that would be beneficial to the offshore wind industry in general, not specifically fresh water projects or the Great Lakes. If DOE decides to provide funding in support of the Proposed Project, DOE is not establishing a precedent or deciding with respect to any future offshore wind project. 3) Pre- and post-construction monitoring protocols are being developed by the LEEDCo in cooperation with the ODNR (in coordination with USFWS) and would be incorporated into the funding agreement if DOE provides funding in support of the Proposed Project. Because of incorporating these pre- and post-construction monitoring protocols into the DOE funding agreement, the federal funding would be contingent on LEEDCo implementing the monitoring protocols. DOE coordinated with USFWS to effectively address the comments provided on the Draft EA. Through this coordination, DOE and USFWS came to a general understanding that an EA is the appropriate level of NEPA review for the Proposed Action.
	Commenter asked if the EPA was an interested or involved agency, if the EPA was completing an EIS, or if the EPA had provided a letter.	13	The U.S. Environmental Protection Agency (EPA) provided comments on the Proposed Project during the public scoping period and on the Draft EA.
	Commenter expressed concern that USFWS comments submitted during the public scoping period were not addressed in the EA.	14	The USFWS provided comments on the Draft EA. Responses to these comments are provided in the EA and as part of the DOE's NEPA review process.
	Commenter stated the proposed project's compliance with state/federal laws, specifically laws protecting birds and bats, should be mentioned in the EA as a prerequisite for approval and DOE financing.	15	Refer to Section 2.6, Applicant Committed Measures, and more specifically to Section 2.6.2, Birds and Bats, which states that the commitments made by LEEDCo and any additional measures identified through permitting or Memoranda of Understanding (MOU), such as the Bird and Bat Conservation Strategy, implementation of USFWS recommended lighting strategies, or commitment to adaptive management measures, if necessary, would be incorporated and binding through the DOE financial assistance award. Additionally, LEEDCo is required to comply with relevant laws including the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.
Purpose and Need	*Purpose*: Commenters do not believe the proposed project meets the goals (levelized cost of energy) of the DOE Advanced Technology Demonstration Projects.	16	This topic was discussed in the EA. As stated in Section 1.2, Background, DOE is using projects selected under Funding Opportunity Announcement (FOA) Number DE-FOA-0000410 to assess progress towards the Advanced Technology Demonstration Projects national-scale goals.
	Need: Commenter questioned the need for the proposed project doubting the reliability, efficiency, and claim of reduction of emissions.	17	The Energy Policy Act of 2005, per 42 U.S. Code (USC) (a)(2)(B)(ii), specifically directed DOE to include offshore wind energy in its renewable energy programs. Refer to Section 1.4.1, DOE Purpose and Need, which explains that in carrying out the statutory mandate, DOE identified a need to overcome key challenges to the development and deployment of offshore wind technology. Specifically, there is a need to reduce the cost of energy through technology development to ensure competitiveness with other electrical generation sources and to reduce deployment timelines and uncertainties limiting U.S. offshore wind project development.

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Project Alternatives	Commenters questioned alternatives analysis, specifically, the lack of other locations (lakes, oceans). USFWS states in their comment letter: "Except for the Proposed Alternative, this document does not fully analyze any additional alternatives as called for in 40 C.F.R. § 1502.14. The Service recommends an alternative where a complete set of detailed pre- and post-construction studies for impacts to birds and bats are presented and required, along with a robust adaptive management plan to address impacts, should they be greater than anticipated."	18	This comment references a section of the CEQ regulations that applies to EISs. The reference that is applicable to EAs is 40 CFR 1508.9, which refers then to NEPA, as amended, section 102(2)(E): “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.” The Proposed Action does not involve unresolved conflicts concerning alternative uses of available resources. The Proposed Action as it is written and considered in the EA includes requirements for pre- and post-construction monitoring and adaptive management, to be defined in coordination with ODNR. These requirements are described in Section 2.6, Applicant Committed Measures. Alternatives to the specific Proposed Project were considered during the design phase, including alternative project locations, turbine layouts, foundation design, substation location, and cable routes. Criteria considered in evaluating alternatives included potential impacts on the human environment. Refer to Section 2.4, Alternatives Considered by LEEDCo.
	The USFWS comment letter states that an alternative with robust pre-and post-construction monitoring and adaptive management would clearly help eliminate uncertainties and mitigate risk, as per the goals of funding the demonstration project, better than an alternative with a to-be-determined method of monitoring, as currently proposed.	19	The Proposed Action as it is written and considered in the EA includes requirements for pre- and post-construction monitoring and adaptive management, to be defined in coordination with ODNR. These requirements are described in Section 2.6, Applicant Committed Measures. An adaptive management approach allows for the future inclusion of monitoring methods not yet developed if such methods become viable as opposed to requiring that all monitoring methods be identified up front. Additional monitoring and mitigation measures not identified in the Draft EA can be found in EA Section 2.6, Applicant Committed Measures.
	The commenter states that a dated 2009 feasibility study does not take into account the designation of the Central Basin of Lake Erie as a Globally Important Bird Area and that LEEDCo used bird and bat risk assessments as late as 2016, after the Global IBA designation; therefore, this constitutes a failure of meeting the criterion of utilizing the most recent information.	20	The Central Lake Erie basin was designated by National Audubon Society as an Important Bird Area (IBA) in 2014; therefore, the 2009 Icebreaker feasibility study does not discuss it. The area's designation as an IBA was considered in the 2016 risk assessment and EA Section 3.4.1.3, Birds and Bats, identified the Lake Erie Central Basin as an IBA, although it did not specify global designation. The EA has been updated to clarify the global IBA designation. The clarification of the designation within the EA does not alter the remainder of the EA analysis for birds, which was based on current best available data and resources. LEEDCo is coordinating with the USFWS and ODNR to develop a Bird and Bat Conservation Strategy, which considers that Proposed Project activities would take place within an IBA.
Permitting	The commenter states that the EA contends that no “conservation lands” are involved in this project and suggests that the Global IBA designation meets that definition and should be addressed.	21	EA Section 2.5.1, USACE Permitting – Public Interest Review Factors (33 CFR 320.4(a)(1)), describes the general regulatory policies of the USACE for evaluating permit applications. The Conservation of Natural Resources review factor was not further evaluated in the EA because the Proposed Project would not result in the conservation of additional land or the use of lands conserved for other purposes. The global IBA designation and the use of the Proposed Project by migrating birds were evaluated in Sections 3.4.1.3 and 3.4.2.3, Birds and Bats.
Applicant Committed Measures	*Birds/Fish*: Commenter questioned the strength of the MOUs with ODNR to accurately collect post construction data, and if negative data is collected, how it will be used.	22	For a full response to this comment, refer also to the DOE Response to USFWS Comments document found in Appendix A-2. In addition to the MOUs between LEEDCo and the ODNR, LEEDCo is working on a Bird and Bat Conservation Strategy in coordination with the ODNR and USFWS that includes post-construction monitoring and adaptive management measures. Collecting and evaluating post-construction monitoring data would inform continued operations of the Proposed Project and implementation of adaptive management measures. LEEDCo’s coordination with USFWS and ODNR, as well as compliance with agreed upon measures, would be required as a condition of the DOE financial assistance award. The commitment includes an acknowledgment that the specific technology and protocol would be selected in the future based on ongoing evaluation of emerging technologies in this rapidly evolving field. As a demonstration project, adaptable protocols may be beneficial and help to ensure sound scientific data collection.
Physical Resources	*Lake-based Sediments*: Commenters expressed concern for disturbance to lake bed sediments and the sediment quality (PCBs, carcinogens, hexavalent chromium, mercury) including disturbance to identified Areas of Concern in the lake.	23	Disturbance to lakebed sediment and sediment quality was analyzed as part of the EA. Refer to Sections 3.2.1.2 and 3.2.2.2, Lake-based Geology and Sediments. The nearest EPA Area of Concern to the Proposed Project would be the Cuyahoga River, and no impacts to sediments within the Cuyahoga River are anticipated. Since the publication of the Draft EA, LEEDCo had further discussions with Cleveland Water and Section 2.6.8, Applicant Committed Measures - Water Quality, has been updated in the EA to include this information.

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	Lake-based Sediments: Commenter expressed concern that the export cable could be exhumed or disturbed by ship anchors or ice keels following decommissioning when it is no longer in use or being monitored, if it remains buried.	24	During decommissioning, the cables would be de-energized and rendered inactive. The cables are heavy (more than 15 pounds per foot) and would not be expected to migrate to the surface of the lakebed. It is anticipated that they would continue to self-bury over time. Following decommissioning, there would be no risk to the environment if they are disturbed by anchors or keels because no fluids or materials would be released. In addition, the cables would pose no hazard to the vessels themselves because they would be de-energized and would not have an electric current. EA Section 3.2.2.2, Lake-Based Geology and Sediments – Decommissioning, has been updated with additional information on the decommissioning of the export cable.
	Seismicity: Commenter referenced Appendix F-2 page 5, noting that earthquakes of moderate to low intensity have been recorded in the area, and stated concern for how the turbines will remain vertical within 0.5 degree.	25	Seismicity was analyzed in the EA. Refer to Sections 3.2.1.2 and 3.2.2.2, Lake-Based Geology and Sediments, which identified seismic hazard in the area as low and determined that impacts because of seismic activity are not anticipated. As part of the design phase for the Proposed Project, a seismic modeling analysis was performed on the turbine tower and foundation model to evaluate the structure subjected to extreme event seismic accelerations. The analysis was used to determine potential seismic loads and accelerations on the structure by evaluating loading contribution from all relevant modes of vibration during an earthquake. The response spectra for such seismic analyses are defined in accordance with the Basis of Design and international codes, as well as the Ohio building code. The analysis showed that the structure is designed to respond in accordance with the Ohio building code.
	Micro-climate: Commenter stated the proposed project's potential to create ice free zones as a result of affecting the local micro-climate and the resulting impact on birds was not discussed.	26	Ice-free zones that may result from the impact of the Proposed Project on the local micro-climate and their potential to attract birds were discussed in EA Section 3.4.2.3, Birds and Bats - Operation and Maintenance - Collision Effects.
Water Resources	*Lake Water Quality*: Commenters expressed concerns about potential spills (oil, gas, cement) during construction and operation; the requirement for large volumes of oil, gas, and lubricants; and asked for clarification of the 'appropriate measures' as referenced in Section 2.2.8, *Operations and Maintenance, Unscheduled Maintenance.*	27	The potential for spills was analyzed as part of the EA. Refer to Section 2.6.3, Spill Prevention, Control, and Countermeasure Plan; Section 3.3.2.1, Lake Water Quality; and Section 3.5.2, Environmental Impacts Related to Health and Safety. Section 2.2.8, Operations and Maintenance, has been updated in the EA to provide clarification of the “appropriate measures.”
	Lake Water Quality: Commenter stated a concern that cables transmitting electricity may leak insulating fluids when damaged by outside forces (anchor strikes).	28	The proposed inter-array and export cables do not contain any fluid. There would be no risk to the environment if they are disturbed by anchors or keels because no fluids or materials would be released. Section 3.3.2.1, Lake Water Quality - Operations and Maintenance and Decommissioning, has been updated in the EA with this information.
	Lake Water Quality: Commenter asked if the DOE notified the IJC, and requested the IJC letter stating they weren't involved with the project.	29	Please refer to footnote 6 within Section 3.3.1, Water Resources – Affected Environment, which notes that the U.S. State Department and Global Affairs Canada determined that further action with the International Joint Commission (IJC) would not be required.
	Drinking Water: Commenters expressed concern for disturbance to lake bed sediments and potential for impact to drinking water quality. Commenter specifically noted use of mass flow excavation for cable laying as discussed in App. D pages 19-20.	30	This topic was analyzed as part of the EA. Refer to Sections 3.3.1.1 and 3.3.2.1, Lake Water Quality, and Sections 3.3.1.2 and 3.3.2.2, Drinking Water Supply and Quality. Since the publication of the Draft EA, LEEDCo had further discussions with Cleveland Water. Section 2.6.8, Applicant Committed Measures - Water Quality, has been updated in the EA to reflect the agreements reached on measures that LEEDCo would commit to take to ensure the safety of water quality. About the mass flow excavation technique noted in the comment, refer to Section 2.2.4, Submerged Electric Collection Cable Route and Installation, which discussed that the cable installation will be completed using a simultaneous lay burial technique. Mass flow excavation is not proposed. Appendix D, Substation and Cable Route Design Report, was included in the EA as a reference for the selection of the cable route based on the five routes considered.
	Drinking Water: Commenter suggested LEEDCo contact Cleveland Water Department.	31	Since the publication of the Draft EA, LEEDCo had further discussions with Cleveland Water. Section 2.6.8, Applicant Committed Measures - Water Quality, has been updated in the EA to include a summary of these discussions.
Biological Resources	*Fish*: Commenters expressed concerns for the health of fish from disturbance of potentially contaminated sediment (mercury).	32	This topic was analyzed as part of the EA. Please refer to Sections 3.2.1.2 and 3.2.2.2, Lake-based Geology and Sediments, for background on potentially contaminated sediment and Section 3.4.2.2, Fish Resources, for potential impacts to fish.

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	Fish: Commenters thought the frequency of fish and benthos studies was limited, lacked detail, and was meaningless when completed by contractors of LEEDCo. Commenters expressed caution in drawing conclusions about potential impact of turbines on aquatic resources based on the first year of data collected prior to turbine installation (conclusions about potential impacts would require comparative analysis of both pre- and post-construction data).	33	This topic was analyzed as part of the EA. Refer to Section 3.4.1.1, Benthos; Section 3.4.2.1, Environmental Impacts Related to Benthos; and Sections 3.4.1.2 and 3.4.2.2, Fish Resources. Sections 3.4.1.1 and 3.4.1.2 have been updated in the EA to include survey data collected in 2017. The EA is developed to determine whether potential impacts would be significant. DOE analyzed and characterized the significance of potential impacts to fish and benthos based on the current studies and the size of the Proposed Project. The DOE's NEPA Implementing Procedures (10 CFR 1021) require that DOE independently evaluate and verify the accuracy of information received from an applicant in accordance with CEQ's NEPA Regulations 40 CFR 1506.5(a). Accordingly, DOE has independently evaluated and verified the accuracy of all information provided by LEEDCo and contractors hired by LEEDCo.
	Fish: Commenter stated concern that infrasound, low frequency noise generated by the wind turbines, will repel and injure fish.	34	It is likely that the wind turbines would produce low-level continuous underwater sound (infrasound); however, there is no scientific consensus of potential effects to finfish because of infrasound and operational noise. While some species such as salmon, demersal flatfish, and elasmobranchs may be able to detect operational noise through pressure waves or particle motion, the levels are not expected to result in injury or mortality and finfish may become habituated to the operational noise (Thomsen et al., 2006; Bergström et al., 2014). In a recent marine study, the abundance of four of the most commonly occurring marine species, cod, eel, shorthorn sculpin, and goldsinny wrasse, were found to be higher near wind turbines, indicating potential noise effects from operation did not override the “reef effect.” Avoidance of wind turbines was not observed in the Bergström et al. (2014) study. Andersson (2011) found that while sound pressure sensitive species may be able to detect operational noise from a distance, that particle-motion sensitive species would only detect operational noise at approximately a 32-foot (10-meter) distance and sound levels would only be high enough to potentially cause a behavioral reaction within proximity of the turbines. This topic was analyzed as part of the EA. Refer to Section 3.4.2.2, Fish Resources - Construction (Noise Disturbance) and Operation and Maintenance (Noise Disturbance). Overall, long-term adverse impacts to fish species from noise disturbance during operations and maintenance of the Proposed Project would be minor.
	Fish: Commenter provided clarification that the hypoxic zone and associated aquatic habitat is inter-and intra-annually dynamic with multiple factors influencing the extent and distribution of the hypoxic zone.	35	Sections 3.4.1.1, Benthos, and 3.4.1.2, Fish Resources, have been updated in the EA providing clarification on the hypoxic zone and its effect on aquatic habitat.
	Birds: Commenters expressed concern that current studies were completed by contractors of LEEDCo and not independently reviewed. Design and execution of environmental studies need to be coordinated with state and provincial environmental agencies, environmental organizations, USFWS, and Canadian counterparts.	36	The DOE's NEPA Implementing Procedures (10 CFR 1021) require that DOE independently evaluate and verify the accuracy of information received from an applicant in accordance with CEQ's NEPA Regulations 40 CFR 1506.5(a). Accordingly, DOE’s biological and technical experts have independently evaluated and verified the accuracy of all information provided by LEEDCo and contractors hired by LEEDCo.
	Birds – Migratory Birds: Commenter suggests the EA makes an inaccurate statement which must be changed when stating the location of the Proposed Project provides minimal or negligible habitat for anything other than migratory transit. The commenter notes that considerable flyover, stopover, roosting, and feeding occurs for many species in the project area. The commenter also requested the addition of the term “global” to the IBA designation description.	37	The text quoted from Section 3.4.1.3, Birds and Bats – Migratory Birds, is supported by studies cited in the EA including 2 years of fall-spring aerial survey data gathered by the ODNR that encompassed the vicinity of the Proposed Project site. Section 3.4.1.3, Birds and Bats - Migratory Birds, has been updated in the EA clarifying that the Lake Erie Central Basin IBA is a globally designated IBA.
	Birds – Bald and Golden Eagles: Commenter states that the EA fails to mention trading flights that occur regularly between Ohio and Ontario and that the EA does not address important parts of the bald eagle life cycle and how it utilizes habitats of the area.	38	Section 3.4.1.3, Birds and Bats - Bald and Golden Eagles, provides an overview of bald and golden eagles and their protection under the Bald and Golden Eagle Protection Act. Subsequent EA sections provide additional details of eagles, including preferred habitat, general foraging and migrating patterns, and the potential risks to eagles. DOE and DOE’s subject matter experts believe that the term “trading flights” was a typographical error in the comment as “trading flights” is not a known common term or scientific term involving bald and golden eagles.

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	Birds – Project Area Studies: Commenter provided the following questions/concerns: NEXRAD is not capable of estimating numbers or risk over Lake Erie and does not measure flight altitude; questionable whether the Diehl et al. (2003) study supported that there are more than 2 times the number of birds over land than water along Lake Erie as indicated in the EA, and that there was no statistical significance between land and water due to small sample size; the location of the sample areas for the Diehl and WEST NEXRAD studies; the graphs reproduced by WEST from the ODNR aerial survey data were misleading and represent low estimates of bird abundance as the ODNR study had considerable variability in bird locations and abundance, no data were collected during winter, and only covered diurnal movement; and the poor design of the Tetra Tech studies.	39	For a full response to this comment, refer also to the DOE Response to USFWS Comments found in Appendix A-2. Section 3.4.1.3, Birds and Bats, describes the existing environmental resources associated with the Proposed Project for birds and bats, and the Project Studies subsection discusses various studies cited in the EA to establish the potential bird and bat resources within the affected area (Proposed Project area). The numbers discussed in the EA for the Diehl et al. (2003) study, are derived from the bird densities reported in Table 1, which report mean bird densities in birds per cubic kilometer for the entire spring and fall seasons of 2000 for each of the pairwise land-water comparisons they analyzed. The numbers cited in the EA refer to the pairing of land-water sites from NEXRAD station KCLE, which is in the central Lake Erie basin, and is the most relevant for the Proposed Project. Table 1 in Diehl et al. (2003) also indicates that according to the sign tests they performed, the observed differences in bird density in this central Lake Erie basin land-water pairing were statistically significant (P=0.0002) for the fall season, and "near significant" (P = 0.0625) for the spring season. As stated in Section 3.4.1.3, Birds and Bats - Project Area Studies, the Diehl et al. (2003) study analyzed the central Lake Erie basin, which is in the vicinity of the Proposed Project. The sampling area for the WEST 2017 NEXRAD analysis (depicted in Appendix J Figure 2a) includes the Proposed Project area as completely as possible. The graphs depicted in Section 3.4.1.3, Birds and Bats - Project Area Studies, were reproduced directly from the ODNR report within the WEST risk assessment (Appendix J) and were provided to discuss results of the ODNR study, a spring and fall aerial survey. The graphs show a relationship between bird abundance and distance to shoreline. The limitations of the ODNR study are acknowledged in the WEST risk assessment (Appendix J), and this information was only used to infer bird risk within the temporal scope of the survey effort. The Tetra Tech studies included a range of different studies which varied in their methodology, taxonomic scope, objectives, and relevance for a risk assessment, and were referenced where relevant within the EA.
	Birds – Project Area Studies – Raptors and Eagles: Commenter questions use of Appendix L (WEST Summary of Risks to Birds and Bats) as support for the conclusion that the Proposed Project poses little or no risk to raptors and eagles. Commenter stated that there is movement between Ohio and Ontario by resident eagles, peregrine falcons have been found on the Cleveland Crib, neither the boat survey (Tetra Tech) nor ODNR aerial survey were designed to account for this group of species and therefore should not be cited in support of “no activity”, and migrating raptors are known to be attracted to offshore wind farms in Europe (Skov et al. 2016).	40	The Skov et al. (2017) study was published after the publication of WEST’s risk assessment. Section 3.4.2.3, Birds and Bats – Operation and Maintenance – Behavioral Avoidance/Attraction Effects and Collision Effects - Raptors and Eagles, have been updated in the EA to include the Skov et al. (2017) study. This new information, while providing information about raptor migrations in the vicinity of European offshore wind farms, does not change the conclusions of the risk assessment discussed in the EA because the risk remains low because of the small size of the Proposed Project. EA Section 3.4.1.3, Birds and Bats – Raptors and Eagles, acknowledges that small numbers of raptors may occur at the Proposed Project site. The ODNR and Tetra Tech surveys are cited here for the information they add to support the conclusions regarding level of raptor use of the Proposed Project area even if the surveys were not designed specifically for documenting raptor activity.
	Birds – Project Area Studies - Songbirds: Commenter questions the interpretation of the Diehl et al. (2003) study in Appendix L related to songbirds and states that the data do not support low risk to migrating birds. The commenter states that the conclusion of the EA is contrary to the recent USFWS advanced radar studies and that Appendix J does not support the EA conclusions.	41	For a full response to this comment, refer also to the USFWS comment response summary document and the previous response to Birds - Project Area Studies. The Diehl et al. (2003) study used a single snapshot of NEXRAD data for each night that they included in their analysis. That snapshot was selected as the closest image to 2330 hours, which they selected because at that time, migration is near peak intensity and birds have had ample time to migrate over water. Diehl et. al (2003) analyzed all nights between April 20 and May 21 in spring 2000, and between September 1 and 30 in fall 2000, excluding nights dominated by weather echoes, radar artifacts, weak migration, or widespread insect activity. The intent was to gather a sufficiently large and representative sample of peak migration periods from enough nights in both spring and fall to make an inference regarding the overall concentration of nocturnal migration activity over the water versus over the land in the Great Lakes region. That is the context in which the data are cited in the risk assessment and EA. In Diehl et al.'s (2003) report, they state “In both spring and fall 2000, mean bird densities over land were always greater than or approximately equal to those over water. Ratios of land bird to water bird densities varied from 1.3 to 3.9.”

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	Birds – Project Area Studies - Graphs: –Commenter states that use of the ODNR graphs were taken out of context and are inappropriate for the purpose of this EA.	42	For a full response to this comment, refer also to the response related to the use of the Diehl et al. (2003) study, WEST NEXRAD study, Tetra Tech studies, and ODNR aerial survey data. Seasonal and diurnal timing of the surveys and other variability (i.e. typical and maximum per-survey counts) are acknowledged and interpreted within appropriate limits in the EA. Species-specific data from the ODNR survey was analyzed comprehensively in the risk assessment (using Appendix C of the ODNR report) and summarized within the EA. Where relevant, the risk assessment refers both to broad-scale patterns from the entire survey and finer-scale patterns from the immediate vicinity of the Proposed Project site, as represented in Appendix C of the ODNR report. The transect pattern shows even coverage of the entire U.S. portion of Lake Erie.
	Birds – Project Area Studies – Waterfowl and Waterbirds: Commenter states that the EA misuses the ODNR scientific data to develop a list of bird species likely to occur in the vicinity of the proposed project. The commenter provides examples and concludes that the EA grossly underestimates the potential risk to birds.	43	For a full response to this comment, refer also to the responses related to the use of the Diehl et al. (2003) study, WEST NEXRAD study, Tetra Tech studies, and ODNR aerial survey data and to the use of ODNR graphs. The species-specific and spatially explicit data, presented separately for each year of the survey effort in Appendix C of the ODNR report, show a pattern of widespread but low-density occurrence of common loon and horned grebe in the offshore environments of Lake Erie, with abundance in the vicinity of the Proposed Project similar to that in most of the offshore environment of the lake in both years. A similar pattern is apparent for Bonaparte's Gull, but with slightly higher abundances in the offshore environment than the previous two species. The species information from the ODNR study is appropriately cited in the risk assessment and EA. Refer to Section 3.4.2.3, Birds and Bats – Operation and Maintenance – Collision Effects, for discussion of the potential for turbines to attract water birds under ice conditions.
	Bats – Project Areas Studies - Bats: Commenter questions the EA conclusion that the project will be of low risk to bats.	44	For a full response to this comment, refer also to the USFWS comment response summary document. The Tetra Tech 2010 bat study was analyzed in detail by WEST for the 2016 risk assessment, and results are relevant to and informative for the risk assessment and EA. The sampling limitations of the study are acknowledged and cited appropriately within these limitations in the EA. The risk assessment and EA are conservative in interpreting the acoustic data regarding risk. These documents do not rest on any assumptions regarding the value of acoustic data for predicting collision risk. The assumption on which the conclusion of low bat impacts rests in the risk assessment and EA is that per-turbine fatality rates are likely to fall somewhere (anywhere) within the range of rates that have been reported at land-based facilities in the Great Lakes region. The placement of all offshore detectors on the Cleveland water intake crib for this study poses a limitation on the scope of the inference that can be made from this study, but this inference is appropriately limited within the risk assessment and EA. LEEDCo is aware of the yet unpublished data showing bat movements across Lake Erie from the MOTUS Wildlife Tracking System studies coordinated by Bird Studies Canada. We have seen video presentation of the data, and note that the MOTUS studies have shown a strong tendency for migrating bats to follow the Lake Erie shoreline, suggestive that they prefer to avoid flying over the lake if possible, and that as with raptors, migration is likely to be concentrated around shorelines and across "pinch points". Much lower concentration of migration activity appeared to occur across the open lake environments, particularly at relatively wide areas with no north-south peninsulas on either lake shore, such as the central Lake Erie basin.
	Insects: –Commenter states that the EA does not make a conclusion on risk to migrating monarch butterflies and that this assessment needs to be addressed in the EA.	45	The risk to migrating monarch butterflies is discussed in EA Section 3.4.2.4, Insects. The EA concluded that the potential impacts to the monarch butterfly migration is likely negligible because of the small scale of the Proposed Project, variability in flight heights of the migrating monarch butterfly, and limited time in which the monarch butterfly migrates through the area.
	Aquatic and Terrestrial Protected Species – Federal listed or protected species: Commenter indicates that the EA incorrectly states that there are no candidate or proposed listed species in the project area. Commenter uses the Golden-winged warbler and Kirtland’s warbler as examples and cites recent studies to support the occurrence of Kirtland’s warbler in the project area.	46	The Golden-winged warbler is not considered a candidate species or species proposed to be listed by the USFWS. The Golden-winged warbler is considered as part of the general discussion on migratory birds in Sections 3.4.1.3 and 3.4.2.3, Birds and Bats. Section 3.4.1.5, Aquatic and Terrestrial Protected Species - Kirtland’s Warbler, and Section 3.4.2.5, Aquatic and Terrestrial Protected Species – Operation and Maintenance - Kirtland’s warbler, have been updated to include the Cooper et al. (2017) study of Kirtland's Warblers. The inclusion of this information does not negate the 2013 Kirtland's warbler collision risk modeling exercise by Kerlinger and Guarnaccia in 2013. In Kerlinger and Guarnaccia's modeling exercise, they used a conservative assumption that 10 percent of the global population may cross the Proposed Project each migratory season. Cooper et al. (2017) showed that in spring, very few Kirtland's warblers are likely to cross Lake Erie. Even in fall, the assumption that 10 percent of the global population may pass across the Proposed Project is conservative because the Proposed Project site accounts for far less than 10 percent of the east-west length of the central Lake Erie basin, let alone the entire lake. For this reason, the analysis of collision risk to Kirtland's Warbler performed by Kerlinger and Guarnaccia in 2013 is still valid in light of Cooper et al.'s (2017) data.

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			The USFWS cited and considered the Cooper et al. (2017) study in their concurrence with the conclusions of the Biological Assessment for the Proposed Project that it is not likely to adversely affect the federally listed threatened and endangered species. EA Section 3.4.2.5, Aquatic and Terrestrial Protected Species, has been updated with the USFWS concurrence.
	Aquatic and Terrestrial Protected Species – Indiana Bat: Commenter disagrees with EA conclusion that there is low risk to Indiana bat and cites shortcomings of the Tetra Tech studies.	47	Section 3.4.1.5, Aquatic and Terrestrial Protected Species Construction and Operation and Maintenance – Indiana Bat and Northern Long-Eared Bat, cites multiple sources of available information, including the best available scientific information regarding the geographic range of Indiana bat, as well as aspects of this species' biology to determine the potential for Indiana bats to occur in the vicinity of the Proposed Project.
	Aquatic and Terrestrial Protected Species – Kirtland's Warbler: Commenter states that the EA used extremely dated information on bird migratory movements, resulting in inadequate picture of potential risk to this species. Commenter indicates that information in Cooper et al. (2017) shows a substantial portion of the population passes through the Central Basin during fall migration.	48	See response number 46 of this response matrix.
	Aquatic and Terrestrial Protected Species – Piping Plover: Commenter states that the EA fails to demonstrate support of low risk for this species.	49	Section 3.4.1.5, Aquatic and Terrestrial Protected Species – Federally-Listed or Protected Species - Piping Plover, cites multiple sources of available information, including the best available scientific information regarding the geographic range of the Piping Plover, as well as aspects of this species' biology to determine the potential for Piping Plovers to occur in the vicinity of the Proposed Project.
	Aquatic and Terrestrial Protected Species – Rufa Red Knot: Commenter states that the EA relies on Tetra Tech studies that have inadequate sample design to support the conclusion of low risk to this species.	50	Section 3.4.1.5, Aquatic and Terrestrial Protected Species – Federally-Listed or Protected Species - Rufa Red Knot, cites multiple sources of available information, including the best available scientific information regarding the geographic range of the Rufa Red Knot, as well as aspects of this species' biology to determine the potential for Rufa Red Knot to occur in the vicinity of the Proposed Project.
	Aquatic and Terrestrial Protected Species – State Listed Species: Commenter states that the EA provides no data on this list of species and LEEDCo studies performed are inadequate to make risk statements for these species.	51	Section 3.4.1.5, Aquatic and Terrestrial Protected Species – State-Listed Species, recognizes that migrating species such as birds and bats may pass through the Proposed Project area. The studies that have been used to develop the risk assessment and EA are collectively comprehensive regarding state-listed species, as the state-listed bird and bat species fall within categories that were sampled and considered (e.g., bobolink falls within the category of nocturnal migrant songbirds; peregrine falcon is a migratory raptor).
	Birds and Bats: Commenter states that the EA does not provide scientifically supported evidence of low risk to bird and bat resources and that a full EIS is therefore required for this project.	52	See response numbers 12, 13, 14 and 15 of this comment matrix.
	Birds and Bats - Displacement Effects: Commenter states that the EA makes assumptions that are not supported by the science. Commenter pointed to the failure to address bird life cycles, nocturnal movements, and daily bird activities, and references the work of Masden (2009).	53	The risk assessment and EA did consider the results of Masden (2009), temporal limitations of the ODNR survey data on which this section of the EA was based, and information on species' biology (e.g. feeding activities) as needed to address the potential for bird or bat species to experience displacement effects as a result of the Proposed Project.
	Birds and Bats - Behavioral Avoidance: Commenter states that the EA makes unsubstantiated assumptions to support low risk to birds and bats and that no supportive data from the project area were included in the EA.	54	In the Masden et al. (2009) study, it was demonstrated that even if substantial behavioral avoidance occurs, the additional energetic expenditure required by migrating birds to fly around, rather than through offshore wind farms on their migratory journeys, would be negligible. The Proposed Project with six turbines would occupy a small footprint for migratory birds to avoid. The EA and risk assessment discuss the potential for certain diurnal water birds to be attracted to the turbines as foraging or roosting sites. Section 3.4.2.3, Birds and Bats – Operation and Maintenance – Behavioral Attraction/Avoidance Effects, has been updated to include the potential attraction of migrating birds to platform lights on the turbine bases and potential measures to minimize this attraction. The potential for icing patterns to attract certain birds is discussed in Section 3.4.2.3, Birds and Bats – Operation and Maintenance – Collision Effects – Raptors and Eagles.

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	Birds and Bats - Collision Effects: Commenter states that the EA bases its conclusions of low risk minor impacts primarily off of Appendix L and cites shortcomings of that. The commenter states that the EA ignores the key principle of the MBTA and that it fails to provide scientific support of low impact and therefore an EIS is necessary.	55	Section 2.6.2, Applicant Committed Measures – Birds and Bats, provides DOE's guidance to LEEDCo regarding the Migratory Bird Treaty Act (MBTA) and LEEDCo's coordination with the USFWS for a Bird and Bat Conservation Strategy. LEEDCo is required under the Terms and Conditions of the DOE funding agreement to meet all permitting and regulatory requirements including all requirements of the MBTA; failure to do so would be non-compliance with the DOE award. Any federal funding from DOE would be contingent on LEEDCo implementing these requirements. See, also, response numbers 12, 13, 14, 15, 59, 60, 61, and 62 of this comment response matrix.
	Birds and Bats - Collision Effects - Raptors and Eagles: Commenter states that the study design used in the EA is not appropriate to draw any conclusions on risk to eagles and other raptors and that it provides no documentation to support the conclusion that it would be unlikely for the turbine sites to provide an ice-free environment.	56	See response number 40 of this comment response matrix for the addition of the Skov et al. (2017) study. This section discussed the potential for open ice around the turbines attracting raptors and eagles and notes that other ice-free areas are likely to be closer to the shore.
	Birds and Bats - Collision Effects -Songbirds (paragraph 1): Commenter states that the EA has not supplied any documentation of bird use of the study area in inclement weather and that radar studies conducted were confined to "clear air" conditions.	57	See response number 54 of this comment matrix for an analysis of potential attraction by platform lights on the turbine bases. The conclusions of the risk assessment and EA for potential songbird collision are based on the small size of the Proposed Project and the per-turbine fatality rates of songbirds that have been documented in multiple publicly available studies of bird fatality patterns at land-based wind farms in the Great Lakes region.
	Birds and Bats - Collision Effects -Songbirds (paragraph 2): Commenter states that the EA misrepresents the findings of the Diehl report and that both the Diehl study and the 2017 WEST analysis fail to provide project area-specific data to form conclusions on bird or bat risk. The proposed project is at the boundary or beyond the effective distance for the NEXRAD radars used in the EA. The commenter suggests bird risk is likely greater than what is indicated in the EA.	58	For a full response to this comment, see response numbers 39, 40, 41, 42, 43, and 44 as well as the DOE Response to USFWS Comments found in Appendix A-2. The Proposed Project would be located approximately 14 miles from the KCLE NEXRAD station, an appropriate distance from the detector, as such analyses are commonly performed at distances in excess of 30 miles from NEXRAD weather stations within peer-reviewed technical radar ornithology literature.
	Birds and Bats - Collision Effects -Songbirds (paragraph 3): The commenter states that the EA makes several assumptions in Appendix L that are not supported by data or scientific rigor and provides several examples.	59	Johnson et al. (2016) compared various recent analytical techniques and assumptions that have been used to generate recent peer-reviewed and published estimates of bird fatality rates at U.S. wind farms and concluded that "Despite variation in the three approaches, resulting estimates were reasonably similar." The volume of birds potentially at risk in the Proposed Project area would be smaller than the land sites that were presented for comparative purposes in the risk assessment, because the Proposed Project area would be smaller than most land-based wind energy facilities in the Great Lakes region, and as terrestrial sites have higher bird abundance and species richness than what has been documented in the vicinity of the Proposed Project area, based on ODNR survey data and NEXRAD analyses. Fatality rates at land-based wind facilities have been peer reviewed multiple times, as in the published, peer-reviewed sources cited and reviewed in Johnson et al.'s 2016 analysis and study. Scientific consensus is that the national wind-related bird fatality rates described by these sources are scientifically valid and robust, with minor variation between them. Section 3.4.2.3, Birds and Bats – Operation and Maintenance – Collision Effects - Songbirds, has been revised to clarify the range of per-turbine or per-megawatt bird fatality rates documented at land-based facilities in the region. The conclusions regarding risks to birds contained within the EA are based on the limited size of the Proposed Project.
	Birds and Bats - Collision Effects -Songbirds (paragraph 4): Commenter states that data presented in the EA and the supporting document in Appendix L do not support the EA's conclusions.	60	For a full response to this comment, see response numbers 12, 13, 14, 15, and 54 as well as the DOE Response to USFWS Comments found in Appendix A-2
	Birds and Bats - Collision Effects – Waterfowl and Waterbirds: Commenter states that the relationship of bird numbers by distance from shore is irrelevant and that the EA should address only the risk to birds in the project area	61	The ODNR study, by showing the distinct drop off in waterfowl abundance in the first several miles from shore, demonstrates that bird abundance and bird risk are not homogenously distributed across the entire central Lake Erie basin Global IBA. Red-breasted Merganser is an example of a species that exhibits a distinct tendency to concentrate within the first few miles of shore and that occurs at very low abundance in the vicinity of the Proposed Project, as shown by ODNR survey data. Several species are more abundant in the Proposed Project area than near shore, as shown for at least two species in the

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	or any potential areas to be developed in the future. The commenter also points out other issues with Appendix L and concludes that Appendix L does not provide the scientific rigor needed to support risk assessments made in the EA.		ODNR survey data set (Common Loon, Horned Grebe). However, the overall bird abundance and species richness are far lower at the Proposed Project area than in near shore waters, and the abundance of Common Loon and Horned Grebe are very low in the vicinity of the Proposed Project, as shown by ODNR data and discussed in the risk assessment. The risk assessment and EA consider the potential risks associated with waterfowl flight, referencing European literature that shows a strong tendency for waterfowl to avoid flying through offshore wind farms. The conclusion of low waterfowl collision risk from the Proposed Project is further supported by the small size of the Proposed Project.
	Birds and Bats - Collision Effects – Bats: Commenter points out issues with Appendix L and provides examples where the EA has made conclusions based on false assumptions or made definitive statements with inadequate information. The commenter states that the EA provides no support for the conclusion that impacts to bats would be minor.	62	For a full response to this comment see the DOE Response to USFWS Comments found in Appendix A-2. Per-turbine or per-megawatt bat fatality rates used in the EA and risk assessment were within the range of rates that have been documented at land-based facilities in the region.
	Aquatic and Terrestrial Protected Species - Collision Effects - Kirtland's Warbler: Commenter states that the EA uses dated information on the Kirtland's Warbler in the project area and that the EA does not include recent telemetry data for the species that supports the project area as a primary migration pathway.	63	See response number 46 in this comment matrix. Since the publication of the Draft EA, the USFWS has concurred with the Biological Assessment that the Proposed Project is not likely to adversely affect the federally listed threatened and endangered species discussed in Sections 3.4.1.5 and 3.4.2.5, Aquatic and Terrestrial Protected Species. EA Section 3.4.2.5 has been updated to reflect the USFWS concurrence.
	Birds and Bats: Appendix J (WEST 2017 NEXRAD Analysis): Commenter raised concerns on the uncertainty of what the NEXRAD results may actually imply. For more details on the specific concerns refer to the Black Swamp Bird Observatory Comments (pages 18-20) within Appendix A-2 of the EA.	64	See response numbers 41 and 58 in this response matrix as well the DOE Response to USFWS Comments found in Appendix A-2. The view of the airspace over the Proposed Project area from the KCLE NEXRAD beam is not obstructed by physical structures. The seven sampling areas selected for the analysis contained suitable data that passed two levels of screening to filter out unusable data, such as would be produced by physical obstruction of the radar signal. The screening procedure is described in the "data selection, downloading, and pre-processing" section of the WEST NEXRAD report. The location of the KCLE NEXRAD radar station above lake water level has minimal effect on the analysis and interpretation of the NEXRAD data presented within the report, because the maximum altitudinal variation it could produce would be on the order of 50 meters, given the topography of Cleveland, which would not qualitatively alter the interpretation or conclusions of the report. The inclusion of comparison areas from the KBUF NEXRAD station in Buffalo, New York is valid as performed in the study, as differing distances to shore and orientations from the radar unit do not diminish the value of the comparisons these sites offer. The comparison areas are the same size and distance from the radar detectors as is the Proposed Project sampling area from the KCLE radar detector, and all the same nights of data were analyzed. Sampling parameters of the WEST NEXRAD study, including the selection of the period from 30 minutes after sunset to 30 minutes before sunrise, and the exclusion of nights for which weather events rendered the NEXRAD data unusable for bird analysis follow standard best scientific practice in published, peer-reviewed studies of NEXRAD-based radar ornithology. The limitations have been considered in the report. Migration directions as shown by WEST's NEXRAD analysis were presented fully within the report as they pertain to the key question of nocturnal migrant bird passage. The difference between reflectivity between the 0.5- and 1.5-degree bands does not suggest that the site was too far from the radar for effective analysis of migrant birds. It is a common, accepted practice in radar ornithology to study migrant bird concentration patterns in zones up to twice the distance from the radar units as were the sampling sites studied by WEST, with Diehl et al.'s 2003 NEXRAD study being an example. The assumption regarding wind speed and direction used in the WEST 2017 NEXRAD analysis follows standard and accepted practice in radar ornithology and is likely to have resulted only in minor loss of precision with respect to inferred bird concentrations, similar to a level that also would occur in most other peer-reviewed, published NEXRAD ornithology papers. It is a natural assumption to make with a coarse-scale, landscape-level data set, and does not diminish the overall value of the data for conducting the landscape-level analyses for which it is typically applied. The inability to distinguish individual targets does not preclude making conclusions regarding migrant bird density or intensity. This is common practice in radar ornithology, including within the Diehl et al. (2003) study.

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	Birds and Bats: *Appendix K (Tetra Tech 2010 Bird and Bat studies)*: Commenter provided detailed comments on Appendix K. Refer to the Black Swamp Bird Observatory Comments within Appendix A-2 of the EA.	65	For a full response to this comment, see also the DOE Response to USFWS Comments found in Appendix A-2, as well as all comments on birds and bats within this matrix. The Tetra Tech studies included a range of different studies which varied in their methodology, taxonomic scope, objectives, and relevance for a risk assessment, and were referenced where relevant within the EA and risk assessment. Call rates are calculated as calls/detector/night, so the call rates should not be influenced even if the offshore detectors were located in close proximity to one another. Therefore, the quantitative comparisons in bat call rates between offshore and onshore environments are appropriate as presented by Tetra Tech, and as referenced in the 2016 risk assessment and EA.
	Birds and Bats: *Appendix L (WEST 2016 Bird and Bat Risk Assessment)*: Commenter provided detailed comments on Appendix L. Refer to the Black Swamp Bird Observatory Comments within Appendix A-2 of the EA.	66	For a full response to this comment, see also the DOE Response to USFWS Comments found in Appendix A-2., as well as all comments on birds and bats within this matrix. Furthermore, the references to crude mean abundances from the ODNR survey data is the most appropriate way to cite the data, as precise statistics are not presented for individual species, years, or locations within the ODNR report. This limitation does not diminish the value of this extensive and robust data set for providing a well-developed characterization of water bird abundance and species richness patterns in the vicinity of the Proposed Project and in relation to other zones of Lake Erie, for the seasonal periods covered by the survey effort. The scope of the risk assessment and EA are limited to the proposed demonstration project and do not extend to possible future buildout scenarios.
Health & Safety	*Safety*: Commenters expressed concerns related to the safety of project components and design (fires, lightning strikes, collapse).	67	Public health and safety was analyzed in the EA. Please refer to Sections 3.5.1.3 and 3.5.2, Environmental Impacts Related to Health and Safety. More specifically, the proposed turbines would be equipped with smoke detection systems connected to the turbine safety system. The proposed turbines would also have lightning protection systems consisting of lightning receptors, down conducting system, protection against overvoltage and overcurrent, shielding against magnetic and electrical fields, and an earthing system.
	Waste Management: Commenter suggested LEEDCo commit to recycling construction and demolition debris.	68	LEEDCo has committed to recycling to the greatest extent possible. Refer to Section 3.5.2, Environmental Impacts Related to Health and Safety – Construction, Operations and Maintenance, and Decommissioning - Waste Management.
Air Quality	Commenter stated concern that the proposed project will increase emissions.	69	Please refer to Section 3.6.2, Environmental Impacts Related to Air Quality.
	Commenter recommended including a commitment to implement relevant construction-related emission reduction measures listed on *EPA's Construction Emission Control Checklist*.	70	LEEDCo would commit to implementing relevant construction-related emission reduction measures listed on the EPA's Construction Emission Control Checklist. Section 2.6.9, Air Quality, has been added to the Applicant Committed Measures noting LEEDCo's commitment to the Construction Emission Control Checklist.
Climate Change	*Ice*: Commenter questioned the text describing ice cover in the lake, the reference to Appendix Q, and the conclusion that the proposed project turbine design would be able to withstand Lake Erie ice loadings.	71	EA Sections 2.2.2.1, Foundation Design; 3.7.2.2, Effects of Climate Change on Project; and 3.9.2.1, Lake Transportation - Operation and Maintenance (Potential Ice Hazard), have been updated to clarify potential ice cover and the design of the proposed turbines in relation to ice loads.
Traffic & Transportation	*Ice*: Commenter stated concern regarding ice-ridge formation (Appendix Q) and the erection of wind turbines in Lake Erie.	72	Refer to Sections 2.2.2.1, Foundation Design, and 3.9.2.1, Lake Transportation – Operation and Maintenance - Potential Ice Hazard. Both sections have been updated in the EA to better clarify potential ice hazards.
Aesthetics and Visual Resources	*Visuals*: Commenter stated concern for the visual impacts of the proposed project at 7-10 miles offshore and provided an article ("Off-shore Wind Turbine Visibility and Visual Impact Threshold Distances").	73	Refer to Section 3.11, Aesthetics and Visual Resources. The article cited by commenter was reviewed as part of the analysis. Refer to Sullivan et al. (2013), in Section 3.11.1.1, Visual Study Area.
Noise	*Noise*: Commenter suggested setbacks from land in terms of migration patterns, shorebird gathering and nesting areas, and human residences.	74	Refer to Section 3.12.2.1, Above Water Sound.

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Economics & Socioeconomics	*Costs to Ratepayers*: Commenters are concerned electric rates will be higher.	75	Project Icebreaker would be a small demonstration project; therefore, prices would be higher than if it were a larger project in a mature industry. The cost impact of the relatively small amount of electricity produced by the Proposed Project when considered in the context of the total amount of electricity sold in northeast Ohio, and all of Ohio, would be insignificant.
	Costs to Taxpayers: Commenters concerned of high project costs to taxpayers.	76	The primary goals of DOE's Advanced Technology Demonstration Projects are to install innovative offshore wind systems in U.S. waters in the most rapid and responsible manner possible and expedite the development and deployment of innovative offshore wind energy systems with a credible potential for lowering the levelized cost of energy. DOE is proposing to provide funding in support of Project Icebreaker to help eliminate uncertainties, mitigate risks, and support the private sector in creating a robust U.S. Offshore Wind Energy Industry. DOE would be providing partial funding for the proposed demonstration project, leveraging funds from the private sector to help achieve these national goals.
	Jobs: Commenter questioned the creation of green jobs by the proposed project, and loss of jobs to fishermen.	77	Refer to Section 3.4.2.2, Fish Resources, and Section 3.13.2.5, Commercial and Recreational Fisheries. The EA concludes that there would be negligible to no impact to fish resources; therefore, loss of jobs to fisherman is not expected. The EA discusses potential employment impacts (Section 3.13.2.2, Employment), but does not specify creation of green jobs.
	Cost Benefit Analysis: Commenter questioned why a cost-benefit analysis wasn't completed.	78	The Energy Policy Act of 2005, per 42 USC (a)(2)(B)(ii), specifically directed that the DOE renewable energy programs must include offshore wind energy. DOE is providing support for regionally diverse advanced technology demonstration projects through collaborative partnerships to comply with this statutory mandate and to support the National Offshore Wind Strategy (a collaborative effort of DOE and the U.S. Department of the Interior). The goal of the National Offshore Wind Strategy, and the Proposed Action, is to help create a robust U.S. Offshore Wind Energy Industry. Offshore wind energy can help the nation reduce its greenhouse gas emissions, diversify its energy supply, provide cost-competitive electricity to key coastal regions, and stimulate revitalization of key sectors of the economy, which aligns with the objectives provided in the Energy Policy Act of 2005, 42 USC 16231(a)(1). The DOE's support of the proposed demonstration-scale project would help overcome the challenges of the offshore wind industry by verifying innovative designs and technology developments and validating full performance and cost under real operating and market conditions.
Cumulative Impacts	*Cumulative Impacts*: Commenters expressed concern that the demonstration project would lead to larger scale wind projects in the lake. The USFWS comment letter explains that the EA states that "by providing funding, technical assistance, and government coordination to accelerate deployment of these demonstration projects, DOE can help eliminate uncertainties, mitigate risks, and support the private sector in creating a robust U.S. Offshore Wind Energy Industry." USFWS concludes that one of the cumulative effects of funding the project could be the accelerated development of utility-scale wind power in the offshore waters of Lake Erie.	79	Per CEQ regulations (Section 1508.7), "cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time. DOE is providing support for regionally diverse Advanced Technology Demonstration Projects through collaborative partnerships to support DOE's and the U.S. Department of the Interior's National Offshore Wind Strategy. Refer to Section 1.4.1, DOE Purpose and Need. The goal of the National Offshore Wind Strategy, and the proposed action, is to help create a robust U.S. Offshore Wind Energy Industry. There are no identified reasonably foreseeable actions or proposed projects in Lake Erie or the Great Lakes region. DOE knows of no proposed offshore wind projects in the Great Lakes region, no offshore land leases for wind projects, and no proposals or requests for any permits (be they from state or federal authorities) for such projects. In the absence of an actual proposal, there is not a reasonably foreseeable future action to evaluate as part of the cumulative impacts assessment.
	Commenter stated concern that the offshore wind industry's use of natural resources for project components (rare earth metals, coal burned to produce steel and cement…) produces more environmental impacts.	80	These types of impacts are not exclusive to the offshore wind industry and are not a part of the EA scope.
General	39 commenters provided general support of the proposed project.	81	
	16 commenters provided general opposition of the proposed project.	82	

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Summary Table of Responses to Comments Submitted to the USACE (not submitted directly to DOE)

Summary Table of Responses to Comments Submitted to the USACE (not submitted directly to DOE)

Topic	Public Interest Review Factor	Comment Summary	Response
Project Description	General Environmental Concerns	Commenter stated that in other wind projects, underwater cables are often required to be reburied (i.e., concrete pads have been placed on the cable sections in some areas, but not feasible for all areas)	The Applicant (LEEDCo) has inspection procedures in place to monitor the cables during installation, post-installation, and over the life of the Proposed Project to ensure that the cable remains embedded in the subsurface sediments.
Project Description	General Environmental Concerns	Commenter stated concern with the decommissioning of the Project	Decommissioning is a standard part of the project life cycle and permitting process. It has been addressed in EA Section 2.2.9, Decommissioning.
Climate Change	General Environmental Concerns; Energy Needs	Commenters stated that the Project will not result in the shutdown of any other electric generating plants (e.g., coal).	Comment noted.
Project Alternatives	Economics	Commenter expressed concern that environmental and cost factors were not analyzed for the different arrays	Alternatives to the specific Proposed Project were considered during the design phase, including alternative project locations, turbine layouts, foundation design, substation location, and cable routes. Criteria considered in evaluating alternatives included potential impacts on the environment. Refer to EA Section 2.4, Alternatives Considered by LEEDCo.
General Environmental Concerns	General Environmental Concerns	Commenter thought ecological impact, noise, and traffic impact studies for the construction and operational phases of the Project were lacking	These resource areas and potential impacts were evaluated in EA Section 3, Affected Environment and Environmental Impacts.
Water Resources	Water Quality	Commenter expressed concern regarding impacts of solvents used to clear the blades of bugs	No solvents would be used to clean the wind turbine blades. When blades are cleaned (based on inspection and typically every 3 to 5 years) a cleaning system would be selected that is biodegradable and approved for use in drinking water systems. Examples of these systems include: high-pressure distilled water and low-pressure detergents similar to boat wash. EA Section 2.2.8, Operations and Maintenance, discusses procedures to be followed during maintenance of the turbines.
Water Resources	General Environmental Concerns; Recreation; Water Supply and Conservation; Water Quality; Navigation; Fish and Wildlife Values	Commenter stated that officials from some groups expressed concern about water pollution from lubricants and oils, ecological disturbance to wildlife (birds, bats, fish), and restricted access for boaters	EA Section 2.2.2.2, Wind Turbine Design, discusses that there are three levels of containment to minimize the risk of any fluid discharges. Section 3.3.2.1, Lake Water Quality, addresses potential impacts to water quality, and Section 3.8.2, Environmental Impacts Related to Lake Use, discusses use of the lake by boaters.
Water Resources	Navigation; Economics; recreation: Water Quality; Water Supply and Conservation	Commenter expressed concern that the proposed Project would be detrimental to navigation, water commerce, fishing, recreational activities and drinking water	Potential impacts to these resource areas were evaluated in the EA (Section 3.9.2, Environmental Impacts Related to Traffic and Transport, Section 3.8.2, Environmental Impacts Related to Lake Use, and Section 3.3.2.2, Drinking Water Supply and Quality).
Water Resources	Water Quality; Safety; General Environmental Concerns	Commenter questioned where the was a protocol for movement of contaminants over waters	Procedures to be employed to avoid, minimize, and remediate potential environmental impacts that could result from a spill or an inadvertent return of drilling fluids are addressed in EA Section 2.6, Applicant Committed Measures.
Water Resources	Safety; Water Quality	Commenter expressed concern over who would recover toxic or non-recyclable turbine elements at end of the Project life.	EA Section 2.2.9, Decommissioning, addresses disposal of Proposed Project elements at the end of the Proposed Project's life.
Wildlife Resources	General Environmental Concerns; Fish and Wildlife Values	Fish: Commenter expressed concern that the impact of noise to aquatic species was not adequately demonstrated.	Potential impacts related to noise were evaluated in EA Section 3.4.2.2, Fish Resources, and Section 3.12.2, Environmental Impacts Related to Noise. Because of the use of the Mono Bucket, the foundation installation does not require pile driving, minimizing noise impacts.

Topic	Public Interest Review Factor	Comment Summary	Response
Wildlife Resources	Fish and Wildlife Values	*Fish:* Commenter concerned that insufficient data has been collected on the impacts to aquatic life from electric and magnetic fields.	Potential impacts to aquatic life from electric and magnetic fields were evaluated in EA Section 3.4.2.2, Fish Resources – Operation and Maintenance - Electric and Magnetic Fields.
Wildlife Resources	Fish and Wildlife Values	*Birds and Bats:* Commenter expressed concerns over potential high level of bird and bat mortality and who will quantify avian mortality.	EA Section 3.4.2.3, Birds and Bats, evaluated the potential impacts to birds and bats. A Bird and Bat Conservation Plan is being developed including investigating technologies that can be used to detect bird and bat mortality.
Wildlife Resources	Fish and Wildlife Values	*Birds and Bats:* Commenters expressed concern regarding impacts to threatened and endangered species.	As noted in EA Section 3.4.2.5, Aquatic and Terrestrial Protected Species, a Biological Assessment was prepared. The USFWS concurred with the Biological Assessment that the Proposed Project is not likely to adversely affect federally listed threatened or endangered species.
Wildlife Resources	Fish and Wildlife Values	*Birds and Bats:* Commenter expressed concern over impacts to bats and raptors protected under the Migratory Bird Treaty Act.	Refer to EA Sections 3.4.1.3 and 3.4.2.3, Birds and Bats.
Wildlife Resources	Fish and Wildlife Values	*Birds and Bats:* Commenter expressed concern regarding siting the Project in well-known migration routes of the lakes.	Refer to EA Sections 3.4.1.3 and 3.4.2.3, Birds and Bats.
Wildlife Resources	Fish and Wildlife Values	*Birds and Bats:* Commenter expressed concern that post-construction monitoring is ineffective, that avian mortality would be difficult to track, and that there aren't mitigation measures capable of stopping bird mortality.	Refer to EA Section 2.6.2, Applicant Committed Measures. A Bird and Bat Conservation Plan is being developed including investigating technologies that can be used to detect bird and bat mortality. Researchers have developed some new technologies to detect bird and bat mortality that are currently being tested at onshore and offshore wind energy facilities, including the use of sensors that detect vibrations when collisions occur and high-definition cameras (including thermal imaging) to detect and identify if the collision was bird or bat. The Bird and Bat Conservation Plan also details mitigation and adaptive management measures to be implemented if actual impacts exceed expectations.
Wildlife Resources	Fish and Wildlife Values	*Birds and Bats:* Commenter expressed concern that boat surveys monitoring birds appear to be biased relative to the acoustic surveys.	All survey methods have limitations and potential biases. Boat monitoring surveys for birds was one type of survey used to inform potential risk from the Project. Refer to EA Section 3.4.1.3, Birds and Bats – Project Area Studies.
Wildlife Resources	Fish and Wildlife Values	*Birds and Bats:* Commenters expressed concern that more birds use the Project area than presented in the application, resulting in a potential high level of bird and bat mortality.	Refer to EA Sections 3.4.1.3 and 3.4.2.3, Birds and Bats. Because of the small size of the Proposed Project, impacts to birds and bats would be minor.
Wildlife Resources	Fish and Wildlife Values	*Birds and Bats:* The commenter expressed concern that bad weather would reduce visibility and cause birds to fly at lower altitudes, thus increasing collision risk.	Bad weather that results in reduced visibility and low clouds can result in birds flying at low altitudes when weather events occur during periods of bird migration. Less is known regarding bat migration. A “worst case” combination of weather events has resulted in large numbers of birds dying while crossing the Great Lakes because of exhaustion and inability to fly across the lake. The rare nature of these events limits the potential large mortality events. A Bird and Bat Conservation Strategy is being developed for the Proposed Project that would include measures used to mitigate bird mortality if such events occur, such as shutting down the turbines if large numbers of collisions are detected.
Wildlife Resources	Fish and Wildlife Values	*Birds and Bats:* Commenter expressed concern that eagles, ospreys, and hawks will be attracted to the turbines and that bird impact studies did not consider these species	Refer to EA Section 3.4.2.3, Birds and Bats – Operation and Maintenance – Behavioral Avoidance/Attraction Effects.

Topic	Public Interest Review Factor	Comment Summary	Response
Wildlife Resources	Fish and Wildlife Values	*Birds and Bats:* Commenter expressed concern over the high population levels and potential impact to red-breasted mergansers around Lake Erie	Refer to EA Section 3.4.2.3, Birds and Bats. Because of the small size of the Proposed Project, the impacts to birds are expected to be minor and unlikely to have population-level impacts.
Transportation	Navigation; Economics	Commenter questioned if there would be upgrades to Ohio ports.	Refer to EA Section 2.2.6, Construction Laydown Areas, regarding use of the Port of Cleveland.
Health and Safety	Navigation; Recreation; Safety	Commenter expressed concern that boaters may be restricted and there would be an increased danger to boaters during high winds and at nighttime.	This was considered in EA Sections 3.8.2, Environmental Impacts Related to Lake Use, and 3.9.2.1, Lake Transportation. There are no restricted areas surrounding the turbines. The wind turbines will be appropriately marked and illuminated according to U.S. Coast Guard (USCG) regulations for both day and night operation.
Health and Safety	Safety; Navigational Risks	Commenter expressed concern that turbines could affect radar communications.	Potential for interference with radar communications is discussed in EA Section 3.9.2.2, Terrestrial Transportation. This analysis was performed by the National Telecommunications and Information Administration (NTIA) and the finding was that there are no radar communication issues.
Health and Safety	Navigation; Safety; Recreation	Commenter expressed concern regarding the impact of ice throw, blade shear, and turbine failure (blade and gearbox failure, fires, fatigue of turbine shafts, collapses).	These factors have been considered in the EA.
Socioeconomics	Economics; Needs and Welfare of the People	Commenter expressed concern that there is no community benefits package, no property tax payments, no payments in lieu of taxes.	Details regarding economic benefits are discussed in EA Section 3.13.2, Environmental Impacts Related to Economics and Socioeconomics.
Socioeconomics	Economics	Commenter expressed concern that Ohio is known for its bird abundance and tourism.	Comment noted.
Socioeconomics	Economics	Commenter stated that any jobs would be temporary construction related.	Refer to EA Section 3.13.2.2, Employment.
Socioeconomics	Economics; Needs and Welfare of the People	Commenter questioned the accuracy of job creation projections for this Project and future offshore wind energy in Lake Energy.	Comment noted.
Socioeconomics	Economics; Safety; General Environmental Concerns; Water Quality	Commenter questioned who would monitor turbines (for fatigue, damage, oil spills/leakage) and pay for maintenance?	Refer to EA Section 2.2.8, Operations and Maintenance.

DOE Response to USFWS Comments

Summary Response to U.S. Fish and Wildlife Comments on the Draft Environmental Assessment

The U.S. Fish and Wildlife Service (USFWS) provided comments to the Department of Energy (DOE) on the draft Environmental Assessment (EA) for the Lake Erie Energy Development Corporation's (LEEDCo's) Project Icebreaker (the Proposed Project) in a letter dated October 4, 2017. The USFWS draft EA comment letter and attachments are included in their entirety in Appendix A-2. Concerns provided in comment letter from the USFWS fell into four categories:

1. Characterizing bird and bat use of the Proposed Project Area;
2. Evaluating collision mortality of birds and bats from the operating project;
3. Monitoring to inform items 1 and 2; and
4. Compliance with the National Environmental Policy Act (NEPA).

This comment response summary is organized based on these four categories. DOE coordinated with USFWS to effectively address the comments provided by USFWS on the draft EA. Through this coordination, DOE and USFWS came to a general understanding on how the comments and data provided by USFWS would be incorporated in to the final EA.

1. Characterizing bird and bat use of the Proposed Project Area

a. <u>USFWS Comments/Concerns</u>:

- The assumption that conditions and migrant behavior are the same over land and over water may not be accurate. USFWS recommends a radar study in the Proposed Project Area, but this study has not been conducted to date. With the available data presented in the Draft EA, the USFWS is unable to estimate the number of passerines (majority of mortalities at wind projects) that might be passing over the Proposed Project Area within the rotor-swept zone and thus at risk for collision.
- The 2017/2018 aerial flight surveys will help inform how distance from shore affects distribution of waterbirds and provide project-specific data on seasonal passage rates.
- Acoustic monitoring to assess use of the project airspace by bats to date has been inadequate. LEEDCo made inappropriate assumptions that bat levels at the project location 8 miles from shore would be less than levels surveyed at the crib location 3 miles from shore. More detectors are needed, including detectors in the rotor-swept zone. 2017 bat acoustic survey data should be incorporated.
- Ongoing bat acoustic studies may help inform bat use of the Proposed Project Area and inform risk.
- There are misleading statements in Section 3.4.1.3 of the Draft EA regarding migrants tending to concentrate along shorelines and avoiding flying over large water bodies.

<u>DOE Response</u>: The EA for the Proposed Project, a demonstration scale offshore wind project, provides a meaningful evaluation of the Proposed Project based on currently available environmental data used to draw conclusions about potential impacts to the environment. By supporting regionally diverse offshore wind advanced technology demonstration-scale projects, such as the Proposed Project, these projects could

generate performance, engineering, environmental monitoring, operations, and cost data to further the existing knowledge base.

The EA does not contradict the statements provided by the USFWS or the cited studies. The evidence in the cited studies, and the statements supported by references to those studies in the EA, are consistent both with the observation that large numbers of nocturnal migrants commonly make flights across the Great Lakes, and that they tend to concentrate along the shorelines to some degree. The latter point is the most likely explanation for the pattern of reduced migrant density observed in the central Lake Erie basin compared with over land documented in next-generation radar (NEXRAD) studies by Diehl et al. (2003) and Nations and Gordon (2017) and cited in the EA. Section 3.4.1.3, Birds and Bats, of the EA has been updated to make clear that nocturnal migrants are known to fly over water.

Section 3.4.1.3, Birds and Bats, of the EA has also been updated to incorporate 2017 survey data (aerial flight and bat acoustic data) presented in a 2018 draft Great Lakes radar technical report (Gosse et al., 2018). The 2017 survey data do not affect the risk assessment discussed in the EA, as the risk assessment conclusions are based primarily on the small size of the Proposed Project (as described in Section 3.4.2.3, Birds and Bats, and Appendix L-1).

b. USFWS Comments/Concerns:

- The NEXRAD data have limitations related to determining altitude of birds/bats flying and whether they are in the rotor-swept zone.

DOE Response: Within radar ornithology, the primary application of the analysis of NEXRAD data is to describe landscape-level patterns of spatial and temporal variation in the density of nocturnal migrant passage. This has been well established in five decades of peer-reviewed technical studies of nocturnal bird migration based on NEXRAD data analysis. Even though these data are coarser than surveillance radar data, and it is not possible to sample the entire elevational spectrum of migrants moving through the night sky because of the inherent limitations of NEXRAD radar, it is deemed by professional ornithologists to be useful for describing variations in migrant density across time and space at the landscape scale. The USFWS statement about which portion of the sky the NEXRAD data comes from is correct; however, the NEXRAD data are informative with respect to overall migrant density at the Proposed Project. Section 3.4.1.3, Birds and Bats, of the EA has been updated to recognize the limitations of NEXRAD data.

c. USFWS Comments/Concerns:

- USFWS' marine radar studies indicate large numbers of birds/bats migrating over Lake Erie often within the rotor-swept zone.

DOE Response: DOE appreciates the USFWS providing the marine radar studies data. The preliminary analysis of the marine radar studies contributes further to enhancing the baseline of information of bird migration over Lake Erie and can be used to refine pre- and post-construction monitoring procedures. Section 3.4.1.3, Birds and Bats, of the EA has been updated to include the USFWS data. Nonetheless, the additional data does not alter the risk assessment discussed in the EA, as the risk of adverse impact remains low because of the small size of the Proposed Project.

2. Evaluating collision mortality of birds and bats from the operating project

a. USFWS Comments/Concerns:

- Conclusions in Draft EA regarding potential bird/bat impacts are based on assumptions that may or may not be accurate.

DOE Response: The conclusion of minor impacts to migrant birds in the EA are based primarily on the Proposed Project consisting of six turbines and does not rest on the assumption that conditions and migrant behavior are the same over land and over water. Section 3.4.2.3, Birds and Bats – Operation and Maintenance – Collision Effects - Songbirds, of the EA has been revised to clarify the conservative prediction presented in the risk assessment, that the per megawatt (MW) fatality rate for the Proposed Project is likely to fall anywhere within the range of rates documented at land-based facilities. The anticipated impacts of the Proposed Project would be low because of the small size of the Proposed Project.

b. USFWS Comments/Concerns:

- Attraction to man-made structures may increase mortality. Mortality rates likely higher during spring/fall migrations**.**

DOE Response: Behavioral Avoidance/Attraction Effects and Collision Effects are presented in the EA in Section 3.4.2.3, Birds and Bats – Operation and Maintenance. As discussed in greater detail in the EA, it is estimated that millions of birds migrate through the Great Lakes region during spring and fall migration and the presence of the wind turbines may cause some behavioral avoidance or attraction and collision effects. However, the Proposed Project would only include six turbines. Based on the small size of the Proposed Project and the use of bird-safe designs, the overall risk of adverse impacts (including fatal collisions) is low and DOE does not anticipate population-level effects for any species.

c. USFWS Comments/Concerns:

- Wind energy facilities known to cause fatalities of bats. Mechanisms for bat mortality at wind projects is uncertain; unclear if bats are attracted to turbines. Feathering of turbine blades has reduced mortality.

DOE Response: The information and statements in the cited studies are consistent with the EA, including the possible attraction of bats to turbines in the offshore environment (refer to Section 3.4.2.3, Birds and Bats – Operation and Maintenance - Behavioral Avoidance/Attraction Effects and Collision Effects).

Regarding risks posed by the Proposed Project to bats, the EA assumes that per-turbine bat fatality rates would fall somewhere within the range of bat fatality rates reported at 55 publicly available studies that reported robust, bias-corrected bat fatality rates at land-based wind energy facilities within the Great Lakes region. This assumption is conservative, and the EA likely overestimates potential impacts, given that the Proposed Project bat acoustic studies to date have suggested that levels of bat acoustic activity are lower, and possibly substantially lower offshore in the central Lake Erie basin than they are on land, consistent with the observation that bats are primarily terrestrial animals. Even acknowledging uncertainty in per-turbine bat fatality rate, based on the small size of the Proposed Project, a low overall bat fatality rate (relative to land-based wind farms in the region) would be anticipated. The conclusions regarding risks to bats presented in the EA do not rest on any inferences regarding the levels of offshore bat acoustic activity, but on the fact that the Proposed Project would have six turbines. Section 3.4.2.3, Birds and Bats – Operation and Maintenance – Collision Effects - Bats, of the EA has been revised to emphasize the more conservative prediction presented in the risk assessment, that the per MW bat fatality rate for the Proposed Project would likely fall anywhere within the range of rates documented at land-based facilities, rather than highlighting the likelihood of the lower fatality rate scenario.

Avoidance, minimization, and adaptive management measures, such as the feathering of turbine blades, are discussed in the following response.

3. Monitoring to inform items 1 and 2

a) USFWS Comments/Concerns:

- Post-construction monitoring, should be tested on land first prior to funding construction, and preferably prior to finalizing EA. Recommend DOE condition the funding of project on plans, reviewed and commented on by USFWS, and specific funding targeted to that component.
- Because it is a demonstration project, pre-construction monitoring to inform risk and post-construction monitoring to assess actual impacts are important.
- It is noted that small size of the Proposed Project drives the effects analysis. While that may be true, one goal of this demonstration project should be to measure actual effects of turbines on birds/bats to inform potential future development in Lake Erie.
- If future studies or monitoring indicate larger numbers of birds or higher mortality rates, additional minimization measures and adaptive management should be used. Currently, the EA does not provide or require specific plans. Studies should be defined, reviewed by appropriate state/federal agencies, and required as part of the EA.
- If future studies or monitoring indicate larger numbers of bats or higher mortality rates, additional minimization measures (feathering at higher cut-in speeds, especially during fall) and adaptive management should be used.
- All pre- and post-construction monitoring data should be made public.
- Should findings in pre-construction monitoring contradict assumptions in Draft EA, findings in the Draft EA should be revisited.

DOE Response: Section 2.6.2, Applicant Committed Measures – Birds and Bats, describes avoidance and minimization measures LEEDCo would commit to for the Proposed Project. LEEDCo signed a Memorandum of Understanding (MOU) with the Ohio Department of Natural Resources (ODNR) to develop and agree upon sampling plans that lay out testing and analyses that would be conducted before, during and post-construction for birds and bats. Part of DOE's overall goal in supporting this demonstration-scale offshore wind project is to collect useful data and support innovation and learning. DOE has provided funding to LEEDCo in support of preliminary project planning activities, including pre-construction monitoring efforts. If DOE decides to provide funding to LEEDCo in support of final design, construction, and operation of the Proposed Project, the federal funding would also support any agreed upon post-construction monitoring activities.

LEEDCo is working on a Bird and Bat Conservation Strategy in coordination with the ODNR and USFWS that includes post-construction monitoring and adaptive management measures. Collecting and evaluating post-construction monitoring data would inform continued operations of the Project and implementation of adaptive management measures. Adaptive management measures could include modifying operational conditions, such as feathering wind turbine blades during certain seasons or weather events. LEEDCo's coordination with USFWS and ODNR, as well as compliance with agreed upon measures, would be required as a condition of the DOE financial assistance award. LEEDCo is committed to post-construction monitoring and adaptive management; however, the specific technology and protocol would be selected in the future based on ongoing evaluation of emerging technologies in this rapidly evolving field.

As a demonstration project, adaptable protocols may be beneficial and help to ensure sound scientific data collection. LEEDCo is required to fully comply with the Migratory Bird Treaty Act as well as the Bald and Golden Eagle Protection Act. The above identified processes and agreements may or may not be completed

prior to finalizing the EA; however, the Proposed Project would not move forward with construction until these agreements are reached, and all requirements are satisfied. While DOE supports pre- and post-construction monitoring efforts, these efforts would not affect the potential impacts of the Proposed Project. DOE's EA necessarily relies on an evaluation of the proposed demonstration-scale project and currently available environmental data to draw conclusions about potential impacts to the human environment.

4. Compliance with NEPA

USFWS comments and DOE's responses on compliance with NEPA are provided in the comment response matrix, specifically in responses 12, 18, and 19.

References

Diehl, R.H., R.P. Larkin, and J.E. Black. 2003. Radar Observations of Bird Migration Over the Great Lakes. Auk 120: 278-290.

Gosse, J.C., K.W. Heist, N.A. Rathbun, and M.T. Wells. 2018. Draft Great Lakes Radar Technical report Lake Erie, Fall 2017. U.S. Department of Interior, Fish and Wildlife Service.

Nations, Chris and Caleb Gordon. 2017. Assessment of Nocturnal Bird Migration Activity from Weather Radar Data for the Proposed Icebreaker Wind Energy Facility, Lake Erie, Ohio. (Appendix J of the EA)

Ohio ODNR Comments

Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR JAMES ZEHRINGER, DIRECTOR

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October 11, 2017

Roak Parker
U.S. Department of Energy
15013 Denver West Parkway
Golden, Colorado 80401

Re: 17-598; Draft Environmental Assessment (EA) - LEEDCo Project Icebreaker

Project: The Proposed Project would consist of six wind turbine generators erected on foundations constructed on the Lake Erie lakebed that would generate approximately 21 megawatts (MW) of electricity.

Location: The proposed project is located 8 miles offshore from Cleveland, Ohio, in Lake Erie.

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Natural Heritage Database: The Natural Heritage Database has the following record at or within a one-mile radius of the project area:

Lakefront Reservation – Cleveland Metroparks (formerly Cleveland Lakefront State Park which was managed by the ODNR Division of Parks & Recreation)

A review of the Ohio Natural Heritage Database indicates there are no records of state or federal listed plants or animals within the project area. We are unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests or national wildlife refuges, parks or forests within the project area. The review was performed on the project area specified in the request as well as an additional one mile radius. Records searched date from 1980. This information is provided to inform you of features present within your project area and vicinity.

Please note that Ohio has not been completely surveyed and we rely on receiving information from many sources. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although all types of plant communities have been surveyed, we only maintain records on the highest quality areas.

Fish and Wildlife: The Division of Wildlife (DOW) has the following comments.

The DOW recommends that continued coordination occur with our partnering agency, U.S. Fish and Wildlife Service (USFWS) Ohio Field Office, specifically concerning the Migratory Bird Treaty Act (16 U.S.C 703-712; MBTA), the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544, 87 Stat. 884; ESA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; BGEPA).

The DOW recommends no in-water work from April 15 through June 30 to reduce impacts to indigenous aquatic species and their habitat. However, an in-water work waiver of this period can be requested that may partially or fully waive this restriction.

Comments on aquatic resources for US DOE Draft Environmental Assessment, Project Icebreaker EA 17-598

Section 3.4.1.2

Page 3-28 Paragraph 2:

General implications that the hypoxic zone is seasonally and annually static and that hypoxic conditions would cause aquatic habitat to be considered poor are incorrect. Areas of hypoxia in Lake Erie are inter-annually and intra-annually dynamic, with multiple factors (e.g., nutrient load and climate change) influencing the extent and distribution of hypoxic zones (Kraus et al. 2015 and ODNR, unpublished data). Historic ODNR creel, trawl and limnological data demonstrate that quality fisheries can exist in offshore Cleveland locations. Conclusions drawn from one year of hypoxic conditions may be misleading. The 2016 hypoxic event was one of the most extreme that ODNR has measured since 1990, which is quantified by the volume (i.e. thickness of the low oxygen layer on the bottom) and duration that the hypoxic conditions persisted (i.e. into October). (Kraus, R. T., Knight, C. T., Farmer, T. M., Gorman, A. M., Collingsworth, P. D., Warren, G. J., P. M. Kocovsky, J. D. Conroy, and Y. Prairie. 2015. Dynamic hypoxic zones in Lake Erie compress fish habitat, altering vulnerability to fishing gears. Canadian Journal of Fisheries & Aquatic Sciences 72:797-806.)

Page 3-28 Paragraph 3-4:

ODNR-DOW cautions against drawing conclusions about the potential impact of turbines based on the first year of data collected prior to turbine installation. Conclusions about potential impacts of turbines on aquatic resources would require comparative analysis of both pre- and post-construction data.

Comments on avian and bat resources for US DOE Draft Environmental Assessment, Project Icebreaker EA 17-598

The applicant has committed to pre- and post-construction monitoring efforts via two Memoranda of Understanding with ODNR. As has been noted, this would be the first wind project installed in a freshwater lake in North America; therefore, ODNR recognizes both the need for adaptable protocols and collection of sound data. Recognizing these limitations, these monitoring studies and protocols will be designed to provide information that will help to guide future monitoring efforts and provide a sound scientific basis for future decision-making. Specific methodology has not yet been determined for some important elements at the project site including: bat activity in the proposed rotor-swept zone; nocturnal movement of bird and bats; and post-construction monitoring protocols for bird and bat mortality.

It is the position of ODNR to have data to support site-specific conditions in order to evaluate the risk of the project to bird and bat species. Very little information about birds and bats at the project site has been collected to-date and conclusions drawn from this data may be misleading. Additionally, ODNR has concerns that use of a single technology may not able to accurately monitor bird and bat behavior or collisions over water. Therefore, we encourage review and application of several methods (both experimental and verified) to provide sound data. Without this information, post-construction monitoring may not provide accurate or complete data on impacts of the project to birds and bats.

Finally, a determination of impact, or lack thereof, whether positive or negative from this project, should not be construed to represent an impact condition for projects with different turbine configurations, numbers, and offshore locations.

Parks and Watercraft: The Division of Parks and Watercraft has the following comment.

The Division of Parks and Watercraft appreciates the continued communication with the U.S. Coast Guard and welcomes any further discussion regarding recreational navigation if needed. Mr. Patrick Brown, the Division of Parks and Watercraft Law Enforcement Supervisor and Boating Law Administrator, will the primary point of contact. Mr. Brown can be reached at Patrick.Brown@dnr.state.oh.us or 614-265-6352.

Coastal Management: The Office of Coastal Management has the following comment.

The Submerged Lands Lease, SUB-2356-CU, between the State of Ohio and LeedCo was commenced on February 1, 2014 and ends on January 31, 2064. The Lease authorizes the occupation of the submerged lands of Lake Erie, as described in the Lease, by a wind-powered electrical generation facility and transmission and array cables for the purpose of researching and developing a project to convert the wind resources on the Lease property to electricity and for the subsequent collection and transmission of that electricity to market. A consent to assignment of the lease from Lake Erie Energy Development Corporation to Icebreaker Windpower, Inc. was granted by the State of Ohio on January 18, 2017.

The project as proposed in the application differs from the project as approved in the existing Submerged Lands Lease. A modification to the Lease is required to accurately reflect the proposed number and location of turbines, associated facilities, and transmission lines. Additionally, Exhibit C "Performance Contingencies" of the Lease will need to be modified to accurately reflect the Regulatory Metrics and associated timing, and the final Fisheries and Avian & Bat Monitoring Plans. It is the understanding of the Office of Coastal Management that Icebreaker Wind is preparing an application to request modification of the Lease.

Pursuant to the Coastal Zone Management Act of 1972, as amended, and its corresponding federal regulations, the U.S. Army Corps of Engineers permit may not be issued until a Federal Consistency concurrence is issued by ODNR. Based on ODNR's receipt of necessary information, the Federal Consistency review (#2017-054) began on September 12, 2017 and will last no longer than six months from that date. To ensure Consistency with the applicable enforceable policies of the Ohio Coastal Management Program, a State of Ohio *Submerged Lands Lease* modification and an Ohio Environmental Protection Agency *401 Water Quality Certification* must be obtained by the applicant.

Water Resources: The Division of Water Resources has the following comment.

The local floodplain administrator should be contacted concerning the possible need for any floodplain permits or approvals for this project. Your local floodplain administrator contact information can be found at the website below.

http://water.ohiodnr.gov/portals/soilwater/pdf/floodplain/Floodplain%20Manager%20Community%20Contact%20List_8_16.pdf

Geological Survey: The Division of Geological Survey has the following comments.

Page 3-1, Section 3, Affected Environment and Environmental Impacts

Wind power projects have been found to affect the local micro-climate in the vicinity of the project itself, with slightly lower daytime temperatures and slightly higher nighttime temperatures as seen in the results of one study, (Roy and Traiteur, 2010, Impacts of wind farms on surface air temperatures in the *Proceedings of the National Academy of Sciences*). Given the lake-based setting, there may be a potential impact to the local ice regime. For example, would the turbines tend to create an ice-freeze zone of lake water that would be attractive to birds? However, nothing in this section, or anywhere else in the EA addresses the potential impact of the project on the local micro-climate, or whether the project will include monitoring of the local micro-climate.

Page 3-15, 3.2.2.2 Lake-Based Geology and Sediments

The second paragraph under heading *Decommissioning*: "The export cable and inter-array cables would remain buried and therefore would have no impact on lake-based geology or sediments during decommissioning."

Following decommissioning, when the export cable is no longer in use and no longer being monitored, there will exist over the long term a risk of the cable, still buried in unconsolidated sediment, of becoming exhumed or disturbed by ship anchors or ice keels.

Page 3-66, Section 3.7.2.2 Effects of Climate Change on Project

The second paragraph under heading *Operation and Maintenance*, about halfway through paragraph: "Ice load data were investigated using multiple approaches and are discussed in more detail in Appendix Q. The results provided an extensive data set for sheet ice thickness, frequency of ridges and keels, the maximum possible thickness of consolidated ice, and estimated dynamic ice forces and their significance in the fatigue limit design of the turbine foundations. The final ice analysis reviewed all previous calculations and data to confirm that the proposed project foundation design would meet design requirements and be able to withstand Lake Erie ice loadings."

This statement is confusing because Appendix Q does not contain an analysis of the interaction of ice with the foundation design; it is only an analysis of the characteristics of the ice itself. Nothing in Appendix Q confirms that the proposed foundation design would be able to withstand ice loadings. In fact, the report in Appendix Q states (page 48) that "There is currently not sufficient information on the ice conditions in Lake Erie to define the likelihood of a collision." Also, the Conclusion section of the report in Appendix Q states that no ice thickness observations have been collected since the 1970s, that ice keels "can be 25 m deep or more" and that "further surveys of the Lake Erie bed could provide information on the distribution of scours throughout the lake and the rate of scour formation." These statements indicate that the understanding of ice characteristics in the lake is incomplete, so the statement that "the Proposed Project foundation

design would meet design requirements and be able to withstand Lake Erie ice loadings" would not appear to be supported by Appendix Q, or by anything provided in Appendix R.

ODNR appreciates the opportunity to provide these comments. Please contact John Kessler at (614) 265-6621 if you have questions about these comments or need additional information.

John Kessler
ODNR Office of Real Estate
2045 Morse Road, Building E-2
Columbus, Ohio 43229-6693
John.Kessler@dnr.state.oh.us

Ohio EPA Comments

Ohio Environmental Protection Agency

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

October 6, 2017

Re: Pre-App LEEDCo 2017
Permit - Intermediate
Correspondence
401 Wetlands
Cuyahoga
DSW401165154

CERTIFIED MAIL

Kristin Kerwin, NEPA Compliance Officer
U.S. Department of Energy Golden Field Office
15013 Denver West Parkway
Golden, CO 80401

Subject: Ohio EPA Comments on DOE EA Public Notice
Pre-App LEEDCo 2017
Corps Public Notice No. 2010-00223
Ohio EPA ID No. 165154
Department of Energy EA-2045

Dear Ms. Kerwin:

On August 22, 2017, the Ohio Environmental Protection Agency (Ohio EPA) received a "Notice of Availability of the Draft Environmental Assessment for Lake Erie Energy Development Corporation's Project Icebreaker, Offshore Cleveland, Ohio, in Lake Erie" from the Department of Energy (DOE). DOE is proposing to provide funding to Lake Erie Energy Development Corporation (LEEDCo) to support the development of Project Icebreaker, and the above-referenced document was soliciting comments for the project from Ohio EPA. Our comments are as follows:

1. There is a very low probability the project's lake bottom disturbance will impact water quality at a public water system's intake. However, it is recommended that the LEEDCO project manager maintain contact with the Cleveland Water Department throughout the duration of the project. The primary contact at Cleveland Water Department is Margaret (Maggie) Rogers, (216) 664-2444.

2. Based on the United States Army Corps of Engineers' Public Notice for this project (September 13, 2017), the Corps will require a 404 Permit for discharges associated with unavoidable impacts to Lake Erie. Ohio EPA will require a 401 Water Quality Certification (WQC) for the same impacts to Lake Erie. LEEDCo

has been working with Ohio EPA in a pre-application status on the 401 WQC application to assure a smooth application processing.

3. This project does include a Hydraulic Directional Drill (HDD) under the harbor and breakwall. To avoid impacts to water quality, Ohio EPA will require a contingency plan for the proposed HDD work to ensure any inadvertent releases of drilling mud are properly addressed promptly.

4. To protect water quality, the use of any additives, beyond bentonite and water, in the HDD operation should be prohibited unless authorized by Ohio EPA.

Thank you for allowing us the opportunity to provide comments.

If you have any questions, please me at (330) 963-1258 or via e-mail at joseph.loucek@epa.ohio.gov.

Sincerely,

Joe Loucek
Application Coordinator
401/Wetlands Section

JL/co

US EPA Comments

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

OCT 10 2017

REPLY TO THE ATTENTION OF:

J. Roak Parker, NEPA Document Manager
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Golden Field Office
15013 Denver West Parkway
Golden, Colorado 80401

RE: Draft Environmental Assessment -- LEEDCo Project Icebreaker Lake Erie, City of Cleveland, Cuyahoga County, Ohio (DOE/EA-2045)

Dear Mr. Parker:

The U.S. Environmental Protection Agency reviewed the aforementioned project document dated August 2017. Our comments are provided pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR 1500-1508), and Section 309 of the Clean Air Act.

The Department of Energy (DOE) is evaluating whether to authorize the expenditure of Federal funds by the Lake Erie Energy Development Corporation (LEEDCo) to support the development, design, construction, and commissioning of an offshore wind advanced technology demonstration project (the Proposed Project). U.S. Army Corps of Engineers, Buffalo District, and the U.S. Coast Guard are Cooperating Agencies for the NEPA analysis. Because operation, maintenance, and eventual decommissioning of the Proposed Project are connected actions, these aspects of the Proposed Project are also analyzed in the Draft Environmental Assessment (Draft EA).

The Proposed Project would consist of the construction, operation, maintenance, and eventual decommissioning of a 21 megawatt (MW) offshore wind technology demonstration project, consisting of six wind turbine generators, submerged electric collection cables, and a substation. The turbines would be erected on foundations constructed on the Lake Erie lakebed, on leased submerged state lands approximately 8 miles off the shoreline of the City of Cleveland. Each turbine would have a name plate capacity of approximately 3.5 MW, and the blade rotor diameter would be approximately 413 feet. The turbine array would be arranged in a single row generally oriented southeast to northwest. The Proposed Project would expect to operate for approximately 8,200 hours annually, generating approximately 75,000 megawatt-hours (MWh) of electricity each year.

The total lake area considered as the Proposed Project Area includes the proposed turbine sites and the cable route. The area of the proposed turbine sites is approximately 4.2 acres. The area of the proposed cable route is approximately 135 acres, which consists of a 100-foot-wide band along the approximately 12.1-mile cable route. The turbines and inter-array cables would be in

water depths of approximately 57 to 61 feet. The export cable would be in water depths of approximately 60 to no shallower than 30 feet and buried at least 12 feet below both the breakwater and the authorized dredge depth of the Outer Harbor Navigation Channel.

Onshore components, including an overhead cable, underground concrete duct bank, underground cable, and new substation (collectively, Proposed Substation) would be located in Cleveland. Construction would be supported by the temporary use of the Port of Cleveland to stage, pre-assemble, and test the turbine components and potentially to stage and assemble the foundation components, completed foundations, and submerged electric collection cables. Energy generated by the Proposed Project would deliver power to a single point of interconnection on the existing Cleveland Public Power (CPP) electric grid.

EPA's comments on the Draft EA cover the following issues: alternatives analysis and selection, air quality, scheduled maintenance, materials management, and species impacts.

ALTERNATIVES ANALYSIS / SELECTION

The Draft EA indicates that only one 'action' alternative is being considered at this time; LEEDCo's Icebreaker Project was one of three projects DOE identified from its offshore wind portfolio as having demonstrated significant progress toward being successfully completed. The LEEDCo Icebreaker Project was competitively selected for a DOE financial assistance award under the DOE Energy Efficiency and Renewable Energy Golden Field Office fiscal year 2012 funding opportunity announcement: U.S. Offshore Wind: Advanced Technology Demonstration Projects. The stated primary goals of the Advanced Technology Demonstration Projects are to:

- ✓ install innovative offshore wind systems in U.S. waters in the most rapid and responsible manner possible; and
- ✓ expedite the development and deployment of innovative offshore wind energy systems with a credible potential for lowering the levelized cost of energy.

Recommendations: The NEPA document should describe the process of selecting alternatives for analysis in order to produce a defensible NEPA record, particularly since the Proposed Project is a demonstration project. If the other two candidate projects DOE identified from its offshore wind portfolio were described in the Final EA, along with the criteria which led to the selection of the LEEDCo project, the EA would then provide a relevant record of alternatives analysis and selection. Therefore, EPA recommends the Final EA include a succinct discussion of how LEEDCo was selected to apply for construction funding.

AIR QUALITY

Construction activities will result in temporary impacts to air quality.

Recommendations: EPA recommends the Final EA and Finding of No Significant Impact (FONSI) include a commitment to implement relevant construction-related emission reduction measures listed on the enclosed document, *EPA's Construction Emission Control Checklist.*

SCHEDULED MAINTENANCE

The Draft EA indicates that inspections of the underwater structures and lakebed would be performed *periodically* throughout the life of the Proposed Project.

Recommendations: EPA recommends the project define more specifically the planned frequency for the project to be "periodically inspected." For example, do industry standards

exist concerning frequency of underwater structure inspection for the types of structures proposed?

MATERIALS MANAGEMENT

The area surrounding the Lake Road Substation is developed, consisting almost entirely of unpaved, but previously disturbed, outdoor storage space, with no significant ecological resources. The Draft EA indicates the proposed substation would be constructed on the Cleveland Public Power site adjacent to the existing Lake Road Substation. The entire proposed substation area would be excavated to a depth of approximately 3 feet to install the grounding grid. All unused excavated backfill would be removed from the site for appropriate disposal upon completion.

Recommendations: EPA recommends DOE and LEEDCo commit to recycling construction and demolition debris (see Section 3.5.2.1) in any decision documents if the Proposed Project proceeds. For example, advertising within the community that clean backfill is available prior to disposing of any unused materials will reduce quantities that would otherwise be disposed of in landfills and reduce overall project cost.[1]

AVIAN AND BAT SPECIES

The determinations found in the Draft EA concerning impacts to bird, bat, and threatened or endangered species point to total fatality levels that are expected to be lower for the Proposed Project than for typical land-based wind energy facilities in the region. The Draft EA then concludes that potential impacts to these resources would be considered minor.

Recommendations: Acknowledging that LEEDCo has coordinated with the U.S. Fish and Wildlife Service (USFWS) and the Ohio Department of Natural Resources (ODNR) concerning species and that USFWS and ODNR will provide comments on the Draft EA during the public comment period, EPA anticipates that subsequent NEPA documents will include conclusions from USFWS and ODNR regarding the following:

- ✓ Is baseline information sufficient for bird, bat, and threatened or endangered species to make a determination of minor impact (e.g., radar and acoustic monitoring protocols)?
- ✓ Has potential impact been sufficiently analyzed to make a determination of minor impact for bird, bat and threatened or endangered species?
- ✓ Are there any additional mitigation/adaptation measures suggested by USFWS and/or ODNR that could further reduce impact (e.g., cut-in speed period during spring bat migration)?
- ✓ LEEDCo indicates that a Bird Bat Conservation Strategy (BBCS) will be developed to conduct thorough post-construction monitoring? What are the specifics of post-construction monitoring (e.g., frequency and length of monitoring)? Have monitoring protocols been successfully tested on land before attempting to use the same protocols in the aquatic environment?
- ✓ LEEDCo also indicates that adaptive management measures will be included in the BBCS. What specific adaptive management measures are considered (e.g., adjusting the pitch of the turbine blades (i.e., blade feathering) during specific seasons, hours of the day, and weather conditions, increasing cut-in speeds)? What are the thresholds which would trigger proposed adaptive management measures to be instituted?
- ✓ Will the BBCS be developed in coordination with USFWS and ODNR?

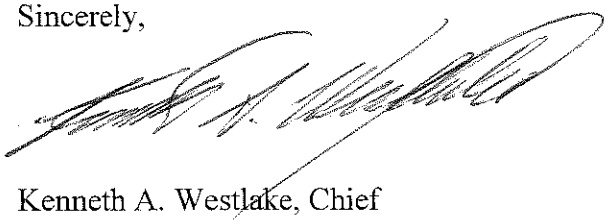
MEASURES TO REDUCE IMPACTS / MITIGATION / PERMITTING

[1] https://www.epa.gov/smm/sustainable-management-construction-and-demolition-materials

EPA strongly encourages DOE and LEEDCo to incorporate all recommendations from relevant Federal and state agencies (e.g., National Oceanic and Atmospheric Administration, USFWS, ODNR, etc.) into the Final EA, as well as, decision and contract documents; doing so would incorporate the expertise of these agencies and should reduce impacts.

Please send a copy of subsequent NEPA documentation concerning this project as it becomes available. We are available to discuss our comments with you; please contact Kathy Kowal of my staff at 312-353-5206 or via email at kowal.kathleen@epa.gov.

Sincerely,



Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

Enclosure: *EPA's Construction Emission Control Checklist*

cc: Dan Everson, USFWS, Ohio Ecological Services Field Office
Megan Seymour, USFWS, Ohio Ecological Services Field Office
John Kessler, Ohio Department of Natural Resources
Diane Kozlowski, U.S. Army Corps of Engineers, Buffalo District
Lt. Michael Collet, U. S. Coast Guard, Sector Buffalo

U.S. Environmental Protection Agency
Construction Emission Control Checklist

Diesel emissions and fugitive dust from project construction may pose environmental and human health risks and should be minimized. In 2002, EPA classified diesel emissions as a likely human carcinogen, and in 2012 the International Agency for Research on Cancer concluded that diesel exhaust is carcinogenic to humans. Acute exposures can lead to other health problems, such as eye and nose irritation, headaches, nausea, asthma, and other respiratory system issues. Longer term exposure may worsen heart and lung disease.[1] We recommend the Department of Energy and Lake Erie Energy Development Corporation consider the following protective measures and commit to applicable measures in a revised Environmental Assessment and any decision documents if the proposed project will be constructed.

Mobile and Stationary Source Diesel Controls

Purchase or solicit bids that require the use of vehicles equipped with zero-emission technologies or the most advanced emission control systems available. Commit to the best available emissions control technologies for project equipment in order to meet the following standards.

- On-Highway Vehicles: On-highway vehicles should meet, or exceed, the EPA exhaust emissions standards for model year 2010 and newer heavy-duty, on-highway compression-ignition engines (e.g., long-haul trucks, refuse haulers, shuttle buses, etc.).[2]
- Non-road Vehicles and Equipment: Non-road vehicles and equipment should meet, or exceed, the EPA Tier 4 exhaust emissions standards for heavy-duty, non-road compression-ignition engines (e.g., construction equipment, non-road trucks, etc.).[3]
- Marine Vessels: Marine vessels hauling materials for infrastructure projects should meet, or exceed, the latest U.S. EPA exhaust emissions standards for marine compression-ignition engines (e.g., Tier 4 for Category 1 & 2 vessels, and Tier 3 for Category 3 vessels).[4]
- Low Emission Equipment Exemptions: The equipment specifications outlined above should be met unless: 1) a piece of specialized equipment is not available for purchase or lease within the United States; or 2) the relevant project contractor has been awarded funds to retrofit existing equipment, or purchase/lease new equipment, but the funds are not yet available.

Consider requiring the following best practices through the construction contracting or oversight process:

- Establish and enforce a clear anti-idling policy for the construction site.
- Use onsite renewable electricity generation and/or grid-based electricity rather than diesel-powered generators or other equipment.
- Use electric starting aids such as block heaters with older vehicles to warm the engine.
- Regularly maintain diesel engines to keep exhaust emissions low. Follow the manufacturer's recommended maintenance schedule and procedures. Smoke color can signal the need for maintenance (e.g., blue/black smoke indicates that an engine requires servicing or tuning).
- Retrofit engines with an exhaust filtration device to capture diesel particulate matter before it enters the construction site.
- Repower older vehicles and/or equipment with diesel- or alternatively-fueled engines certified to meet newer, more stringent emissions standards (e.g., plug-in hybrid-electric vehicles, battery-electric vehicles, fuel cell electric vehicles, advanced technology locomotives, etc.).

[1] https://www3.epa.gov/region1/eco/diesel/health_effects.html
[2] http://www.epa.gov/otaq/standards/heavy-duty/hdci-exhaust.htm
[3] http://www.epa.gov/otaq/standards/nonroad/nonroadci.htm
[4] http://www.epa.gov/otaq/standards/nonroad/marineci.htm

- Retire older vehicles, given the significant contribution of vehicle emissions to the poor air quality conditions. Implement programs to encourage the voluntary removal from use and the marketplace of pre-2010 model year on-highway vehicles (e.g., scrappage rebates) and replace them with newer vehicles that meet or exceed the latest EPA exhaust emissions standards.

Fugitive Dust Source Controls

- Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative, where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
- Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.

Occupational Health

- Reduce exposure through work practices and training, such as maintaining filtration devices and training diesel-equipment operators to perform routine inspections.
- Position the exhaust pipe so that diesel fumes are directed away from the operator and nearby workers, reducing the fume concentration to which personnel are exposed.
- Use enclosed, climate-controlled cabs pressurized and equipped with high-efficiency particulate air (HEPA) filters to reduce the operators' exposure to diesel fumes. Pressurization ensures that air moves from inside to outside. HEPA filters ensure that any incoming air is filtered first.
- Use respirators, which are only an interim measure to control exposure to diesel emissions. In most cases, an N95 respirator is adequate. Workers must be trained and fit-tested before they wear respirators. Depending on the type of work being conducted, and if oil is present, concentrations of particulates present will determine the efficiency and type of mask and respirator. Personnel familiar with the selection, care, and use of respirators must perform the fit testing. Respirators must bear a NIOSH approval number.

USFWS Comments

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

October 4, 2017

U.S. Department of Energy
Golden Field Office
Attn: Kristin Kerwin
15013 Denver West Parkway
Golden, CO 80401

TAILS# 03E15000-2017-I-1867

Re: Draft Environmental Assessment for Lake Erie Energy Development Corporation's Project Icebreaker, Offshore Cleveland, OH (DOE/EA-2045)

Dear Ms. Kerwin:

This is in response to your August 22, 2017 Draft Environmental Assessment (EA) for the Lake Erie Energy Development Corporation's (LEEDCo's) proposed Project Icebreaker, which involves the construction and operation of six 3.5 megawatt (MW) wind turbines, 12 miles (mi) (19.3 kilometers (km)) of transmission cable, and a substation. The turbines would be installed in Lake Erie, 8-10 mi (12.9-16.1 km) offshore of Cleveland, Cuyahoga County, Ohio. The transmission cable would run from the turbines, across the lake bottom, to the shore, where it would connect to a new substation to be located at the Cleveland Public Power substation. Additionally, 150 feet (ft) (45.7 m) of overhead transmission lines would be constructed to link the new and existing substations. The turbines are expected to operate for 25 years. Each turbine has a rotor diameter of 413 ft (126 m), yielding a rotor-swept area of 3.08 acres (0.012 km^2) per turbine, and 18.48 acres (0.075 km^2) for the total project. At its closest point, each blade will be approximately 65 ft (20 m) above water level. The EA states that LEEDCo (applicant) plans to conduct post-construction monitoring to assess all-bird and all-bat mortality and to monitor avoidance/attraction/displacement that may occur. The EA also states that the applicant plans to develop a Bird and Bat Conservation Strategy that would outline conditions for adaptive management implementation based on the results of post-construction monitoring.

Funding for the project may be provided by the U.S. Department of Energy (DOE) as a U.S. Offshore Wind: Advanced Technology Demonstration Project. According to the Draft EA, "By providing funding, technical assistance, and government coordination to accelerate deployment of these demonstration projects, DOE can help eliminate uncertainties, mitigate risks, and support the private sector in creating a robust U.S. Offshore Wind Energy Industry." Additionally, the U.S. Army Corps of Engineers (Corps) may permit the project under sections 404 and 408 of the Clean Water Act and section 10 of the Rivers and Harbors Act. The Corps published a Public Notice on September 13, 2017 soliciting review and comment on the project

under their authorities (Application No. 2010-00223). The U.S. Coast Guard will assess the impact of the project on navigation. The Draft EA has been developed to analyze the potential impacts to the human environment that may occur if DOE authorizes the expenditure of federal funding on this project and the Corps issues permits to allow for construction.

This letter transmits the U.S. Fish and Wildlife Service's (Service) comments on the Draft EA. The Service and DOE have concluded section 7 informal consultation under the Endangered Species Act of 1973, as amended (ESA), thus this letter does not address any ESA issues.

General Comments

In general, the Service agrees with the characterization of impacts to fisheries and benthos included in the Draft EA. Our comments in this letter address our three outstanding concerns: 1) characterizing bird and bat use of the project area; 2) evaluating collision mortality of birds and bats from the operating project; and 3) monitoring to inform items 1 and 2.

Section 2.7.2 of the Draft EA references the Memorandum of Understanding (MOU) between LEEDCo and the Ohio Department of Natural Resources (ODNR) committing to pre- and post-construction wildlife monitoring and states that LEEDCo has had discussions with ODNR and the Service to develop a sampling plan that lays out testing and analyses that will be conducted before, during, and post-construction for birds and bats. While the Service has been engaged in discussions with LEEDCo, please note that the Service is not a party to the MOU, and that only some of the Service recommendations on pre- and post-construction monitoring have been included in the MOU or sampling plan (See Service comments dated Feb. 28, 2017, attached). Also note that the MOU and sampling protocol do not provide detailed methods for several critical components of the pre-and most components of the post-construction monitoring. We recommend that DOE condition the funding of the project on inclusion of a robust pre- and post-construction monitoring protocol reviewed and commented on by the Service, and that specific funding be targeted for this project component.

The conclusions reached in the Draft EA regarding potential impacts to birds and bats are based on available data collected primarily outside of the project area. For example, some of the data are from the Cleveland water intake crib (located approximately 3 miles offshore of Cleveland, approximately 5 miles from the project area) or nearshore areas of the lake near Cleveland. Additional data on bird use of the airspace were generated using NEXRAD weather radar data from the Cleveland area which provides limited data about bird and bat use within the airspace that will be occupied by the turbines (the "rotor-swept zone"). Waterfowl surveys conducted by ODNR over Lake Erie several years ago that occurred in the project vicinity are used to inform waterfowl distribution within the project area. Collision mortality estimates were generated using land-based wind projects in the U.S. and Canada. The available bird and bat data is summarized in several appendices to the Draft EA (Appendices J, K, and L). Studies of bird and bat use of the specific project area have been recommended by the Service for several years (Attachment 1, Service correspondence dated April 24, 2009, November 15, 2013, March 24, 2014, October 21, 2016, February 28, 2017, March 3, 2017) but are just starting to be implemented. A bat acoustic study within the project area was started in spring 2017 and aerial waterfowl surveys will begin in fall 2017. Data from these site-specific studies are not available

for inclusion in the Draft EA, though the first quarterly report for the bat acoustic survey was recently provided to the Service.

Thus, the conclusions in the Draft EA are based on assumptions that observations from other parts of Lake Erie are relevant to the project area, and that impacts at onshore wind facilities in the U.S. and Canada are relevant predictors of impacts to birds and bats at offshore wind developments in Lake Erie. These assumptions may or may not be accurate. Because of the potential risk of bird and bat mortality, and because this project is designed to be a demonstration project to evaluate offshore wind installation in the Great Lakes, pre-construction monitoring to inform risk and post-construction monitoring to assess actual impacts are necessary components of the project that must be implemented. Should the findings of site-specific pre-construction monitoring yield results that contradict the assumptions in the Draft EA, the findings in the Draft EA should be revisited to ensure accurate information on risk to birds and bats is publicly available. All pre- and post-construction data should be made publicly available such that this project can inform future project planning.

We note that the small size of the project (6 turbines) is driving the effects analysis relative to potential impacts to birds and bats. That is to say, because there are only 6 turbines, even if the per-turbine mortality rates for bird or bats at the project area were to be much higher than at land-based wind projects, the total impact of this project will be minor. While that may be true, one goal of this demonstration project should be to measure what the actual effect of offshore turbines is on birds and bats, to inform potential future wind development in the Great Lakes. If per-turbine impacts are not accurately measured for this precedent-setting project, risk levels of larger future projects may be substantially underestimated.

Section 3.4.1.3

Section 3.4.1.3 of the Draft EA describes the Affected Environment relative to birds and bats. Pages 3-29 and 3-32 describe a NEXRAD weather radar analysis of bird and bat use of the project area (Draft EA Appendix J, Nations and Gordon 2017). Page 3-32 states, "Several recent studies employing marine radar in shoreline environments have demonstrated relatively high densities of nocturnal migrant birds along the shorelines of Lake Erie and Lake Ontario, reinforcing the understanding that such migrants tend to concentrate along coastlines and avoid flying over large water bodies, such as Lake Erie, if possible (Rathbun *et al*. 2016; Horton *et al.* 2016)." Page 3-51 includes a similar statement. These statements are misleading; Rathbun *et al.* (2016) and Horton *et al.* (2016) both document that large numbers of migrants do fly over water bodies. For example, Horton *et al.* (2016) showed that nocturnal migrants flew predominantly to the north and northeast from the coast of Erie County, Ohio during spring. Overwater flight has been observed at all Great Lakes sites reported in these publications. These publications instead state that migrants concentrate on the shoreline during dawn and daytime when they land to rest and refuel. During the actual nocturnal migration, however, migrants commonly cross Lake Erie and all of the other Great Lakes. Additional evidence for migrants crossing over Lake Erie is included in the NEXRAD weather radar analysis appendix (Nations and Gordon 2017). In the spring, the predominant migration movement direction (Figure 4, Appendix J) was to the NNE from Cleveland, indicating that migrants are heading out to cross over the lake.

The NEXRAD weather radar analysis primarily provides data on migrating birds and bats located above the rotor-swept zone, thus most of these migrants would not be at risk from turbine operation. There was, however, some overlap between the rotor-swept zone of the turbine and the area included in the NEXRAD radar analysis (Nations and Gordon 2017):

> "…at the 0.5 degree elevation the height of the lower −3 dB point ranged from 105 to 135 m above the Project Area. Thus, there was some overlap of the radar beam and the rotor-swept zone for the proposed turbines, which have a maximum blade tip height of 146 m."

And

> "Differences in migration intensity with radar elevation indicate that, at the Project Area, there are more than twice as many birds at the lower 0.5 degree elevation (Figure 6c and Table 5). While the airspace sampled at this elevation does overlap with the rotor-swept zone, the extent of overlap is small (Figure 3), thus the migrant bird activity detected by this lower beam primarily comes from altitudes immediately above the rotor swept zone of the turbines. Given the limitations of NEXRAD resolution, it is not possible to determine the precise flight altitudes of birds within the radar beam."

Thus, due to the coarse resolution of NEXRAD data, it is impossible to use this data to determine if birds and bats are flying within the rotor-swept zone or above it. Bird and bat densities at higher altitudes do not always correlate with densities at lower altitudes, and this may especially be the case in a different environment such as offshore. The general pattern of increasing densities of birds and bats at lower altitudes does fit with what the Service's Avian Radar Team has found at many sites across the Great Lakes (Rathbun *et al*. 2016; Horton *et al.* 2016). However, unlike NEXRAD, the radar units used by the Service are able to track individual targets and distinguish target flight altitude exactly. The densities shown in the Service results indicate that densities often increase as altitude decreases, especially and often significantly at lower altitudes (50-150m) that include the rotor-swept zone. This area is a key gap in the NEXRAD analysis, and a main reason that the Service recommended on-site avian radar studies to be conducted for pre- and post-construction. Unpublished data collected on Lake Erie in Cleveland this fall by the Service (Attachment 2) using avian marine radar indicates large numbers of bats and birds migrating across the lake during fall, often within or near the rotor-swept zone.

The ongoing bat acoustic surveys will help to elucidate how distance from shore affects the number of bat calls detected and will provide project-area specific information on bat call detections as well as information on seasonal passage rates that may inform risk, but more detectors, and detectors within the rotor-swept zone, as requested in the Service's February 28, 2017 letter, would provide a better understanding of these patterns. Other authors (Kunz et al. 2007) have recommended even more acoustic detectors on a per-turbine basis to effectively assess potential flight activity through the rotor-swept zone.

The first quarterly report on the bat acoustic survey was provided to the Service in September, 2017 (Gordon *et al*. 2017). This report indicates that hundreds of bat calls are being detected at both the 7-mile buoy (within the project area) and 3-mile buoy (near the crib) location, and that

bats are being detected in spring, summer, and fall at 3 and 7 miles from shore, implying that bats migrate across the lake. A large proportion of bat calls recorded at both buoys have been migratory tree bats (the three species most frequently involved with wind turbine collisions (Arnett *et al*, 2008; Kunz *et al*, 2007; Cryan *et al*., 2014), and specifically hoary bats, a species of concern for the Service due to their high mortality rates at wind energy facilities (Arnett and Baerwald, 2013).

Page 3-33 of the Draft EA states, "Because there were substantially lower levels of bat activity 3 miles from shore when compared to the onshore activity, and the proposed turbines would be 8 to 10 miles offshore, even lower levels of bat activity are expected where the turbines would be located." This is not an appropriate assumption, as bats that are migrating across Lake Erie could encounter both the crib at 3 miles from the shoreline, and the project area at 10 miles from the shoreline. Acoustic monitoring efforts to date have been inadequate for assessing bat use of the project airspace and risks to bats.

Section 3.4.2.3.

Section 3.4.2.3 of the Draft EA assesses environmental impacts to birds and bats. Birds are known to collide with tall stationary structures such as buildings, power lines, and communication towers. It is estimated that between 100 million and 1 billion birds are killed annually in the U.S. from striking man-made structures (Klem 1990; Manville 2000). Wind turbines pose an added threat to birds which may collide with the stationary base, or may be struck by the spinning blades. Erickson *et al.* (2014) evaluated 116 post-construction mortality studies from wind power projects and based on these estimated that 368,000 birds are struck by turbines each year. Of the observed bird mortality, wood warblers comprise 10.8% of all bird mortalities, second only to larks which comprise 13.7% and are dominated by horned lark mortalities. Horned larks have aerial breeding displays which may make them particularly susceptible to wind turbine collisions (Erickson *et al.* 2014). Shorebirds comprise 1% and waterbirds comprise 0.2% (Erickson *et al.* 2014). Rates of avian collision mortality at existing wind facilities in the east and upper Midwest of the United States have been documented to range from zero to approximately 11 bird fatalities per MW per year (Erickson *et al.* 2014), and post-construction studies at land-based wind projects in Ohio from April-November fall within this range (USFWS unpublished data).

Canada recently analyzed post-construction collision data for 37 wind power projects in Ontario over multiple years ranging from 2006-2014. Data collection was standardized to occur within 50 m of the turbine from April 1-October 31. Based on this data, the estimated mortality for non-raptors was 6.14 +/- 0.31 birds/turbine, with a range of 0-44.31 birds/turbine (Bird Studies Canada *et al.* 2016). Passerines accounted for the most mortality (69%) across wind projects in all of Canada, while waterbirds (which would include shorebirds) accounted for 3.2% of mortality (Bird Studies Canada *et al.* 2016). For projects located along the north shore of Lake Erie in Ontario opposite Cleveland (Port Alma, South Kent, and Erieau), bird mortality rates ranged from 1.15-2.5 birds/MW/year (see: https://drive.google.com/drive/folders/0B24A4SH_cewXV0VhTENxTGp3LVk). Results from the NEXRAD study (Nations and Gordon 2017) suggest that bird/turbine collision risk for the proposed offshore project is lower than it would be for a similar project located near shore or onshore in the Cleveland area because migration intensity was 2.5 times lower at the project area than over land. However, this fails to account for the observations that birds will sometimes seek

man-made structures to land on while migrating over large bodies of open water such as oil platforms or even freighters (Perkins 1964). This probably results from the migrants encountering adverse weather conditions during the crossing. In such cases, attraction to the turbines could increase mortality rates.

Although avian collision mortality can occur at any time of year, patterns in avian collision mortality at tall towers, buildings, wind turbines, and other structures suggest that the majority of fatalities occur during the spring and fall migration period (NRC 2007). Data from Ontario indicated slightly higher bird mortality during fall (mid-July-Oct. 31) (Bird Studies Canada *et al.* 2016). Erickson *et al.* (2014) also found a peak in mortality in fall, and a smaller peak in spring but cautioned that peaks may be influenced by species-specific behaviors (e.g., horned larks are often found as mortalities in spring, when aerial mating displays may result in more flights into the rotor-swept zone of the turbine). Limited data from existing wind facilities suggest that migrant species represent roughly half the fatalities, while resident species represent the other half (NRC 2007).

The Draft EA indicates that waterfowl and waterbirds have overall low collision susceptibility and are not found in large numbers in the project area. Further, it finds that gulls have high maneuverability and are likely to avoid turbine collisions. The proposed aerial flight surveys in 2017 and 2018 will help to elucidate how distance from shore affects the distribution of waterfowl and waterbirds, and will provide project-area specific information on seasonal passage rates that may inform risk.

While the density of migrating passerines over Lake Erie may be "less than half" than the density over land based on the NEXRAD analysis (Nations and Gordon 2017), there are still likely to be millions of individual birds crossing Lake Erie during spring and fall migration each year, and a proportion of these are flying at altitudes within the rotor-swept zone (Horton *et al.* 2016, also see Attachment 2). Weather patterns likely influence large migration events to some degree, although these patterns are probably complex (Newton, 2008). Among birds, passerines comprise the majority of mortality at wind power projects. With the available data we are unable to estimate how many passerines might be crossing through the project area while flying at altitudes within the rotor-swept zone, and thus that might be at risk of collision with the turbines. The Service recommended conducting a radar study to evaluate this risk, but implementation of the study within the project area has not occurred to date. According to the Draft EA, based on land-based mortality, "studies show fatality rates would most likely be between 2.10-3.35 birds/MW/year for small passerines, most of which are nocturnal migrants, which would lead to roughly 21-42 total bird fatalities per year for the proposed project. However, this is making the assumption that conditions and migrant behavior are the same over land and over water, which as described above may not be accurate.

To minimize the risk of mortality for all birds, LEEDCo has proposed to utilize only flashing red and yellow lights on the turbines and work platforms, respectively. Gehring *et al.* (2009) found that communication towers lit at night with only flashing lights, as opposed to steady-burning lights resulted in 50–71% fewer avian fatalities. If future bird studies in the project area indicate the potential for large numbers of birds to be exposed to the turbines, additional minimization measures (such as turning turbines off during high risk weather events during night migration periods) should be proactively implemented, particularly at night during spring and fall

migration when mortality is expected to peak. Further, if post-construction monitoring indicates that bird mortality rates are higher than predicted in the Draft EA, then additional minimization measures should be used in an adaptive management context. The EA currently does not provide or require specific plans to obtain this data. As currently written, future studies remain undefined, are not required, and may not reliably indicate the number of fatalities for both birds and bats that occurs once operations begin. Studies need to be fully defined, should be reviewed by both appropriate state and federal agencies, and be required as part of the EA to be of value in determining impacts on biological systems.

Wind energy facilities in various habitats across the U.S. and Canada have been documented to cause "widespread and often extensive fatalities of bats" (Arnett *et al.* 2008). Within the midwestern U.S. states, bat mortality rates (adjusted for bias such as searcher efficiency, carcass removal, and unsearched areas) range from a low of 1.43 bats/MW/study period at the Big Blue facility in Minnesota (Fagen Engineering, LLC 2014), to 30.61 bats/MW/study period at the Cedar Ridge facility in Wisconsin (BHE Environmental, Inc. 2010). For wind projects located along the north shore of Lake Erie in Ontario opposite Cleveland (Port Alma, South Kent, and Erieau), bat mortality rates ranged from 3.37-6.8 bats/MW/year within 50 m of the turbine from April 1-October 31
(see: https://drive.google.com/drive/folders/0B24A4SH_cewXV0VhTENxTGp3LVk).

At this time, research into the mechanisms that cause mortality of bats at wind power sites is ongoing but collisions associated with moving turbine blades are clear proximate causes of death. It is unclear if bats are attracted to turbines, but the potential for attraction is of concern, particularly in an offshore setting where attraction may be intensified if turbines are perceived by bats as the only available roost (Cryan and Barclay, 2009). Research on how to avoid fatalities is continuing. Currently, only a few operational tools have shown success at avoiding or minimizing take. Feathering of turbines (changing the orientation of the blades out of the direction of the wind in order to stop the blades from turning during low wind speeds) during times when bats are most at risk has been shown to reduce mortality (Arnett *et al*. 2011, Good *et al*. 2012).

The draft EA concludes that the project is most likely to cause mortality of 1-4 bats/MW/year, but because bat and turbine interactions are not well understood, it could cause mortality of as many as 20-30 bats/MW/year. The ongoing bat acoustic studies may help to characterize patterns of bat use of the offshore airspace during various seasons and provide relative information on bat use of the project area (10 mi offshore) compared to areas closer inland. This data may help to inform collision risk to some degree.

To minimize the risk of mortality for all bats LEEDCo has proposed to feather turbine blades until the manufacturer's cut-in speed of 3.0 m/s has been reached at night during fall migration. At a study at Fowler Ridge, IN, feathering below the manufacturer's cut-in speed (3.5 m/s) reduced all-bat mortality by 36% and feathering at higher cut-in speeds showed greater reductions in bat mortality rates (Good *et al.* 2012). If the acoustic studies currently ongoing indicate the potential for large numbers of bats to be exposed to the turbines then DOE should require that the applicant implement higher cut-in speeds, particularly in the fall (August 1-October 31) when most bat mortality occurs, as a minimization measure. For all species of bats, nearly all migration occurs when temperatures are above 50 degrees Fahrenheit, and wind speeds are less than 6.9 m/s at night. Feathering during these conditions could avoid a large proportion

of bat mortality (Bowden *et al*. 2014).

Further, if post-construction monitoring indicates that bat mortality rates are higher than 1-4 bats/MW/year, the EA should state whether higher cut-in speeds will be used in an adaptive management context.

Post-construction monitoring

Because of the potential risk of bird and bat mortality, and because this project is designed to be a demonstration project to evaluate offshore wind installation in the Great Lakes, post-construction mortality monitoring is a necessary component of the project that this EA is evaluating. It will be difficult to detect carcasses struck by turbines in the open water environment. Developing and validating methods for generating robust mortality estimates for bats and birds, and testing methods to collect and identify carcasses at offshore wind projects is critically important if this demonstration project is to inform future offshore wind development in the Great Lakes and elsewhere. LEEDCo has proposed several methods of post-construction monitoring and the Service has recommended pursuing certain options, including emerging technological tools (see Service's Feb. 28, 2017 letter, also Flowers 2015, Suryan et al., 2016). However, in order to first test if these technologies would be effective, preferably in conjunction with each other, they need to be tested on land where traditional fatality monitoring could also be done for validation purposes. To date these tests have not occurred. The Service recommends that the draft EA be revised to include a plan for effective fatality monitoring and that the techniques be validated using land-based facilities prior to funding construction and preferably prior to finalizing the EA. We strongly recommend that DOE condition the funding of the project on inclusion of a robust post-construction mortality monitoring protocol which has been reviewed and commented on by the Service, and that specific funding be targeted for this project component.

National Environmental Policy Act (NEPA)

In our October 21, 2016 letter (attached), we advised DOE that we believed an EA was not the proper document for the proposed project. We stated, starting on page 7, that this project had three attributes that typically require an Environmental Impact Statement (EIS) according to CEQ regulations. This included (1) that possible effects on the human environment are uncertain and (2) that the project is precedent setting since it is the first proposed off-shore wind facility in freshwater and that it is intended as a demonstration project. Finally, (3) there is uncertainty regarding the potential impacts of this project, which may be understandable and acceptable for a demonstration project; however, given the lack of defined robust pre- and post-construction studies, there is likely to be little more certainty of biological impacts after the project is constructed and operating than is currently available.

The draft EA is also missing two additional components that should be found in a NEPA document. Except for the Proposed Alternative, this document does not fully analyze any additional alternatives as called for in 40 C.F.R. § 1502.14. The Service recommends an alternative where a complete set of detailed pre- and post-construction studies for impacts to birds and bats are presented and required, along with a robust adaptive management plan to address impacts, should they be greater than anticipated.

A second missing component is a discussion in the Cumulative Impacts section that addresses the cumulative impacts of commercial wind development in Lake Erie under both the existing alternative and the one proposed above. The draft EA states that "by providing funding, technical assistance, and government coordination to accelerate deployment of these demonstration projects, DOE can help eliminate uncertainties, mitigate risks, and support the private sector in creating a robust U.S. Offshore Wind Energy Industry." Thus, one of the cumulative effects of funding the project could be the accelerated development of utility-scale wind power in the offshore waters of Lake Erie. The Cumulative Impacts section does not anticipate or analyze this reasonable outcome. The importance of including detailed studies and adaptive management in one of the alternatives and comparing that to the current Proposed Alternative is that the Cumulative Impacts analysis would showcase the difference in impacts to birds and bats from utility-scale wind developing in Lake Erie between an alternative that provides robust biological studies and assessments of impacts and one with less rigorous pre-construction monitoring and an uncertain post-construction impact analysis method. An alternative with robust pre-and post-construction monitoring and adaptive management would clearly help eliminate uncertainties and mitigate risk, as per the goals of funding the demonstration project, better than an alternative with a to-be-determined method of monitoring, as currently proposed.

Summary

In summary, there is great uncertainty as to how birds and bats are using the airspace in and around the project area, and how many individuals may be exposed to and strike the proposed turbines over the life of the project. Birds and bats in the offshore environment may behave similarly to those on land, or they may not. Pre-construction monitoring data that is in the process of being collected and may be collected in the near future may help to inform some of these gaps. But there are not any detailed plans the Service is aware of to accurately determine numbers and altitudes of nocturnal migrants passing over the construction site which would both help inform the potential for interactions and fatalities and could also determine whether birds and bats are displaced by turbines. Methods for post-construction fatality studies are only conceptual at this point, and will require substantial time and effort to develop and validate. These studies are imperative in order for this project to serve as a valid demonstration project for commercial construction. Bird and bat interactions with wind turbines are not well understood and this is especially true for off-shore facilities.

Existing off-shore wind projects in Europe have collected post-construction data relating to avoidance and displacement of waterfowl, but mortality data has proven to be much more difficult to collect. Pre-construction studies are needed to determine the numbers, altitudes, and behavior of nocturnal migrants and robust post-construction mortality monitoring will be essential to address whether risks are translated to fatalities. Innovative technological methods will be necessary in the offshore environment where traditional monitoring methods are not feasible, but in order to rely on these innovations, they need to be validated at on-shore locations.

We believe that an EA is the incorrect NEPA document for this project. Additionally, in order for an EA to be reasonably sufficient, we believe that DOE should include an alternative that presents defined and adequate pre- and post-construction studies and an adaptive management

strategy. Finally, the NEPA analysis should include an analysis of the potential cumulative impacts of facilitating accelerated development of utility-scale wind power in Lake Erie. Thank you for the opportunity to provide comments on this proposed project. Please contact Megan Seymour at extension 16 in this office for further information.

Sincerely,

Dan Everson
Field Supervisor

cc: Erin Hazelton, ODNR Division of Wildlife, Columbus, Ohio, Erin.Hazelton@dnr.state.oh.us
Kenneth Westlake, EPA Region 5, ORA Division, westlake.kenneth@epa.gov
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Attachments:

Attachment 1: Service correspondence on the LEEDCo project: March 3, 2017; February 28, 2017; October 21, 2016; March 24, 2014; November 15, 2013; and April 24, 2009.

Attachment 2: U.S. Fish and Wildlife Service avian radar, preliminary data from Cleveland, Ohio, early fall 2017

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ATTACHMENT 1

Service Correspondence on the LEEDCo Project

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

March 3, 2017

Mr. Patrick Donlon
Ohio Power Siting Board
180 East Broad St.
Columbus, OH 43215-3793

TAILS: 03E15000-2016-TA-1571

Re: Icebreaker Wind Farm Project 16-1871-EL-BGN

Dear Mr. Donlon:

This is in reference to the Ohio Power Siting Board's (OPSB) February 2, 2017 letter regarding the proposed Icebreaker Wind Farm Project Application (Application), to be located in Lake Erie offshore of Cleveland, Cuyahoga County, Ohio. The proposed Icebreaker Wind Farm involves the installation of up to six wind turbine generators, submerged electric collection cables, and a facility substation. The total generating capacity of the facility will not exceed 20.7 megawatts (MW). The project is located approximately eight to ten miles off the coast of Cleveland. Only the substation interconnection is occurring on land; no impacts to wetlands or forested areas are anticipated. The project is being proposed by Icebreaker Wind Project Incorporated (Applicant).

The following comments are being provided pursuant to the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; BGEPA), the Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA), the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544, 87 Stat. 884; ESA), and the Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j, not including 742 d-l; 70 Stat. 1119), as amended.

GENERAL COMMENTS:

The U.S. Fish and Wildlife Service (Service), Applicant, their representatives, and the Ohio Department of Natural Resources (ODNR) have been involved in discussions regarding this proposed project since 2008. We have participated in numerous meetings and conference calls, and provided recommendations relative to addressing fish and wildlife impact assessment throughout the development of this project. The project has evolved over the years, including changes to the number of turbines and the location of the project relative to the shoreline.

Construction and operation of offshore wind turbines presents a very different set of challenges than land-based turbines in terms of wildlife impact mitigation. Not only are common techniques for quantifying mortality impossible to implement (e.g. carcass surveys), large inland water bodies such as the Great Lakes have unique hydrological, biotic, and ecological properties compared to sea and land installations, for which there is no data and no precedent. This will be

the first installation of wind turbines in a freshwater ecosystem anywhere in the world. It will be the first installation of offshore wind anywhere in the Great Lakes, and likely only the second offshore wind facility in the western hemisphere. The manner in which this project is evaluated and permitted will be a model for future similar projects. According to the Application, this project is proposed as a "demonstration-scale project to help assess the potential success for future larger-scale offshore wind farms in Lake Erie and other Great Lakes." Information gathered from this project will be used to assess the feasibility of developing commercial-scale wind facilities in Lake Erie, or the Great Lakes as a whole.

Because of the unknown consequences of developing offshore wind energy in the Great Lakes and the precedent-setting nature of this project, the pre- and post-construction evaluations of potential impacts on fish and wildlife are crucial. As such, it is essential to have rigorous and scalable pre- and post-construction studies within the project area to evaluate potential impacts.

Some pre-construction wildlife studies were initiated by the Applicant in 2010 based on recommendations from the Service and ODNR. These included bat acoustic monitoring April 1 – November 10, 2010 and radar monitoring March 31-October 12, 2010 (Svedlow et al. 2012) from the Cleveland Crib. Two additional surveys were conducted that were not part of the studies recommended by ODNR or the Service (avian acoustic surveys, and boat based nocturnal surveys). Substantial complications occurred during the 2010 radar studies that rendered the study results uninformative to the proposed project area. Further, the radar and acoustic studies did not include the currently proposed project area. The Applicant provided analysis of bird and bat risk using NEXRAD radar data (Livingston, 2008; Nations and Gordon 2017). While these reports characterize bird and bat migration in spring and fall over the project area compared to other areas in the region, NEXRAD data by nature do not provide information on numbers and altitudes of birds and bats flying within the rotor-swept zone of the turbines, which is the data we need to inform risk to these species. Thus, the Service, ODNR, and the Applicant are working on developing a new bird and bat study protocol to be implemented in 2017-2018 that should help inform risk to birds and bats within the currently proposed project location.

Implementation of a pre-construction bird and bat study protocol is challenged by the remoteness of the project area, the depth of water, and limited accessibility during certain seasons (e.g., winter). All of these accessibility limitations drive up the cost of studies and present unique technological hurdles. The Service and ODNR are working with the developer to design a pre-construction bird and bat study protocol that is technologically and economically feasible, scaled to the project size (6 turbines), gathers site specific data where possible, and uses comparable data collected from a more accessible location (for example, the Cleveland Crib) when necessary. While this is not ideal and would not be appropriate for a utility-scale offshore wind project, we believe it will be sufficient for a demonstration scale project. We are also working with the Applicant to design an innovative post-construction monitoring protocol that will use emerging technology to assess a suite of impacts to birds and bats.

ODNR and the Service also requested a suite of aquatic and benthic studies to assess the importance of the project area to fish and to establish baseline conditions pre-construction. The Applicant began implementing these surveys in 2016, and work continues.

Any certificate issued by the OPSB should be contingent upon full implementation of the pre- and post-construction studies agreed upon by the Service, ODNR, and the Applicant.

MIGRATORY BIRD COMMENTS:

The Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA) implements four treaties that provide for international protection of migratory birds. The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the MBTA has no provision for allowing unauthorized take, the Service recognizes that some birds may be taken during activities such as wind turbine operation even if all reasonable measures to avoid take are implemented. The Service's Office of Law Enforcement carries out its mission to protect migratory birds not only through investigation and enforcement, but also through fostering relationships with individuals and industries that proactively seeks to eliminate their impacts on migratory birds. Although it is not possible under the MBTA to absolve individuals, companies, or agencies from liability (even if they implement avian mortality avoidance or similar conservation measures), the Office of Law Enforcement focuses on those individuals, companies, or agencies that take migratory birds with disregard for their actions and the law, especially when conservation measures have been developed but are not properly implemented.

The Service strongly encourages developers to coordinate with Service biologists regarding their projects. Proper coordination will help developers make informed decisions in siting, constructing, and operating their facilities. Additionally, the Service hopes to work cooperatively with wind developers to advance the state of the art of wind power siting, construction, and operation. Advancements in these areas will represent great strides toward the environmentally safe development of this otherwise renewable and clean source of energy. The Service recommends that the Applicant develop a Bird and Bat Conservation Strategy (BBCS) to address pre- and post-construction monitoring to assess risk to migratory birds and bats, to identify minimization measures that will be implemented to minimize risk, and to identify potential mitigation actions to implement if such risk reaches high levels. We note and appreciate that page 122 of the Application includes a commitment to complete a BBCS.

The proposed project location is between 8-10 miles off the coast of Cleveland, thus does not provide habitat for many species of birds that breed in Ohio. However, millions of migrating birds move through the Great Lakes region during spring and fall migration each year (Rich et al. 2004, France et al. 2012, Horton et al. 2016) and could cross through the project area and potentially be exposed to risk.

Gordon and Erickson (2016) completed a bird and bat risk assessment for the project using data collected from other land-based wind projects, offshore projects in Europe, and NEXRAD. This assessment concludes low risk of adverse impacts to birds primarily because of the small scale of the project (6 turbines) and because "the level of use of this area by birds and bats is low compared to bird and bat use of terrestrial or nearshore environments" (Gordon and Erickson 2016). We agree that the small number of turbines generally will result in a limited amount of impacts from both mortality and displacement, but we do not believe that the data currently available provides conclusive evidence of low risk based on the level of bird use.

Further, because this project is meant to be a demonstration project with wider applicability to future offshore wind projects, we believe it is important to gather site specific data to understand the baseline use of the project area by birds and compare that with post-construction data to elucidate what the actual impacts are, and to be able to extrapolate those conclusions to a larger project. Thus the question is not just, "is this project 'low' risk to birds?" rather we want to understand larger issues such as, how much risk to birds do offshore turbines present relative to land-based turbines (e.g., how much mortality occurs on a per-MW basis), and how do birds respond to offshore turbines in the Great Lakes?

The waters around Cleveland provide important overwintering habitat for gulls (herring, ring-billed, Bonaparte's, great black-backed, etc.), ducks (greater and lesser scaup, red-breasted and common mergansers, goldeneye, bufflehead, redhead, canvasback), common loons and horned grebes. During winter, flocks of over 10,000 birds are not uncommon near Cleveland. Additionally, several locations (Wendy Park, Edgewater Park, Cleveland Lakefront Preserve, etc.) along the lakeshore are known for their large concentrations of passerines during migration. The site is approximately 4.5 miles from an area designated by The Audubon Society as the Cleveland Lakefront Important Bird Area (IBA). This area was selected as an IBA due to the large concentrations of birds that congregate there during spring and fall migration (also wintering waterfowl, gulls, and eagles). ODNR completed two years of spring and fall pelagic bird distribution surveys in the offshore waters of Lake Erie (Norris and Lott 2011). These surveys indicate that during spring and/or fall common loon, horned grebe, Bonaparte's gull, common merganser, red-breasted merganser, ring-billed gull, herring gull, double-crested cormorants, and goldeneye are likely to occur in the vicinity of the project area in numbers ranging from single individuals to flocks of several hundred (Norris and Lott 2011).

The Application indicates that risk to waterfowl is low due to the low abundance of birds near the turbine sites and the tendency for waterfowl to avoid turbine locations, but project-specific data on waterfowl use and abundance is lacking. We are currently working with the Applicant and ODNR to recommend site-specific pre- and post-construction waterfowl surveys fall through spring to quantify waterfowl use in the project area before and after construction, to better document displacement effects, should they occur.

Large concentrations of waterfowl in the offshore environment may attract raptors. Peregrine falcons have been observed hunting from the Cleveland Crib (~3 miles from shore); therefore turbines may provide similar foraging opportunity for species like peregrines, though most species of raptor avoid flying over large open bodies of water due to the absence of thermals. We generally agree that because the project is so far from the shoreline, overall raptor use of the project area is likely to be low, and thus collision risk to raptors is also likely low.

The bird and bat risk analysis (Gordon and Erickson 2016) categorizes the risk to nocturnally migrating songbirds as "low," based on our understanding of bird migration along the shorelines of the Great Lakes and NEXRAD analysis of the open water. NEXRAD data generally provides coarse information on densities of birds migrating well above the height of the rotor-swept zone and thus does not accurately characterize risk to songbirds flying within the rotor-swept zone. While the intent of the 2010 radar study was to help quantify the risk to migratory songbirds

from the Applicant's project, and was at a scale appropriate to address the question, due to radar malfunctions, the site where the radar was located, the time when the radar was operational, and other factors, the data obtained was not sufficient to inform risk. The Service is now working with the Applicant to design a radar project (both pre- and post-construction) to provide important site-specific information for assessing the potential impacts of offshore wind facilities on nocturnally migratory songbirds.

BALD EAGLE COMMENTS:

The project lies within the range of the bald eagle (*Haliaeetus leucocephalus*). Bald eagles are protected under the Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA), and are afforded additional legal protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, BGEPA). The BGEPA prohibits, among other things, the killing and disturbance of eagles.

Bald eagles nest in super canopy trees and typically forage on fish, mammals, and carrion. The project area does not support suitable nesting habitat, and it is unlikely that eagles would forage eight to ten miles offshore during the summer, when plentiful food resources are present much closer to their nesting habitats. The Service anticipates that take of eagles is unlikely during the summer due to the distance this facility is from the shoreline. Conversely, in winter when ice forms along the shoreline it may force wintering birds closer to the proposed facility. Within the last several years Lake Erie has almost completely frozen over. As the ice builds along the shoreline it forces ducks, gulls, etc. further into the lake. Eagles, which will feed on fish and waterfowl, will congregate long the leading edge of the ice, or near open leads in the ice. Should the ice extend far enough, it may put waterfowl and eagles in close proximity to the turbines. The Service is currently working with the Applicant to develop a study protocol and analysis of Lake Erie ice formation that will inform bald eagle risk during the winter based on ice conditions. If take of eagles cannot be avoided, the Applicant should work with the Service's Division of Migratory Birds to obtain an eagle take permit.

ENDANGERED SPECIES COMMENTS:

The proposed project is located in Cuyahoga County, in Ohio. There are five species of birds or bats that are federally endangered, threatened, proposed, or candidate species that may occur in Cuyahoga County during some portion of the year: Indiana bat (*Myotis sodalis,* endangered), northern long-eared bat (*Myotis septentrionalis*, threatened) Kirtland's warbler (*Setophaga kirtlandii,* endangered), piping plover (*Charadrius melodus,* endangered), and red knot (*Calidris canutus rufa,* threatened).

Cuyahoga County has confirmed records for Indiana and northern long-eared bats. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags $\geq$3 inches diameter at breast height (dbh) that have any exfoliating bark, cracks, crevices, hollows and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or

loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat. Both of these species may travel several hundred miles between their summering habitat and winter hibernacula (Griffin 1945, Winhold and Kurta 2006). In the winter, Indiana bats and northern long-eared bats hibernate in caves and abandoned mines.

The project area does not provide suitable summer or hibernation habitat for Indiana bats or northern long-eared bats. Thus, no impact to these species is anticipated during the summer or winter. The only potential risk periods for either of these species are during spring and fall migration.

The Indiana bat range does not extend into Canada. Thus, there is no reason to expect that Indiana bats would be flying across Lake Erie during spring or fall migration. Therefore we do not anticipate that this species will be impacted by the proposed project.

The range of the northern long-eared bat does include Canada north of the project area. However, northern long-eared bats are thought to be short-distance migrants. Short migratory movements between summer roost and winter hibernacula between 56 km (35 mi) and 89 km (55 mi) have been documented most often (Nagorsen and Brigham 1993 p. 88; Griffin 1945, p. 53). However, movements from hibernacula to summer colonies may range from 8 to 270 km (5 to 168 mi) (Griffin 1945, p. 22). Thus it is unlikely that northern long-eared bats would be migrating long distances across the open waters of Lake Erie (~50 miles of open water from the Cleveland shore to the Canada shore). Additional acoustic surveys proposed to occur offshore will help to evaluate potential risk to this species from offshore wind development.

Piping plovers, red knots, and Kirtland's warblers all migrate through Ohio but none are known to nest or overwinter within the state.

The Great Lakes population of piping plover nests primarily in Michigan and consists of approximately 63 pairs of birds. These birds overwinter primarily along the Atlantic coast, with some along the Gulf coast (USFWS 2009). While their migration paths are unknown, they have been documented to stop over on sand beaches along the shore of Lake Erie in Ohio. It is unknown if they migrate across the open waters of Lake Erie, or if their migration path would take them through the proposed project area.

Kirtland's warblers nest in young stands of Jack pines primarily in Central Michigan. Their current population is over 3,000 individuals (USFWS 2012a). They overwinter in the Bahamas. Individual birds have been banded during spring and fall migration, and geo-locators have indicated at least some of these birds are likely to have migrated across open waters of Lake Erie. Further, Kirtland's warblers have been documented to stop over all along the Lake Erie shoreline in Ohio (USFWS 2012a).

Red knots nest in the high arctic, and winter along both coasts of North America and south into Central and South America. While the vast majority of the red knot population migrates along the Atlantic and Pacific coastlines, occasionally small numbers of birds have been found in Ohio, typically along marshes in the western basin of Lake Erie. The proposed location for the facility does not have suitable habitat for these species. Most observations of these species in Ohio occur along the shoreline of the western basin of Lake Erie where there is more stopover habitat.

FISHERIES COMMENTS:

One of the responsibilities of the Service is to manage interjurisdictional fisheries, i.e., fisheries that are managed by more than one state or nation. The waters of Lake Erie are managed by four states (Michigan, Ohio, Pennsylvania, and New York), and Canada. A component of the pre-construction survey project developed jointly between ODNR and the Service are studies to assess the fisheries in the proposed project area and to evaluate potential risk to fish during construction and operation of the project, including the electrical lines. Pre-construction studies began in 2016 and are still ongoing to establish baseline conditions. Post-construction studies are being developed by ODNR and the Applicant, with Service input to evaluate actual impacts to fish and the aquatic environment.

NON-LISTED BAT COMMENTS:

Less than a decade ago the biggest threats to bat populations were loss of hibernacula and destruction of summer habitat. Since then the spread of white-nose syndrome (WNS), a novel fungal disease rapidly spreading across the Midwest, has caused the death of millions of cave hibernating bats (USFWS 2012b). Populations of cave bats have declined so significantly, mostly attributed to WNS, that the Service has recently listed the northern long-eared bat as a threatened species. The Service is currently conducting status reviews for two additional species, the little brown bat (*Myotis lucifugus*) and tri-colored bat (*Perimyotis subflavus*) due to declines associated with WNS. Both of these species were documented in acoustic surveys conducted in 2010 (Svedlow et al. 2012).

As of September 2011, the 13,361 installed MW of wind energy in the Midwestern U.S. is anticipated to cause mortality of, on average, 106,000 bats per year (Arnett and Baerwald 2013). The majority of these are long-distance migrating tree bats, but cave hibernating bats also make up a small proportion of mortality. A recent publication indicated that the hoary bat population could experience "rapid and severe declines…within 50 years and increased risk of extinction in 100 years" solely based on mortality occurring at existing wind projects (Frick et al. 2017).

The results of the bat acoustic study at the Cleveland Crib (Svedlow et al. 2012) state that 4 bat passes/detector-night were recorded in 2009. Ninety five percent of the calls recorded were of the three bat species most susceptible to collisions with wind turbines (Svedlow et al. 2012, Arnett and Baerwald 2013). The bird and bat risk assessment (Gordon and Erickson 2016) indicates that the number of bat calls detected during acoustic monitoring at the Cleveland Crib in 2010 was on the low end of detections compared to other land-based wind projects, but fails to note that other comparable land-based wind projects with similar rates of bat acoustic calls are

among the sites with the highest post-construction bat fatality rates (e.g., Fowler Ridge, Forward Energy, Blue Sky Green Field, etc.).

There are several factors that confound the results of the bat acoustic survey conducted on the Cleveland Crib in 2009. Since all monitoring had to be conducted from the Cleveland Crib, acoustic monitoring sites were co-located with radar monitoring locations. Radar has been shown to reduce bat activity, potentially due to electromagnetic fields causing discomfort (Nicholls and Racey 2007). Large concentrations of insects were also observed swarming above the Cleveland Crib. Bats have been observed pausing during migration to take advantage of congregations of insects around offshore wind turbines (Ahlén et al. 2007, 2009). Thus the acoustic monitoring included a factor that may reduce bat activity, and one that may increase bat activity. It is unknown if either factor influenced the number of detections recorded at this site.

The Applicant's bird and bat risk assessment acknowledges the difficulty in predicting bat mortality rates for the project due to our limited understanding of bat and wind turbine interactions, but concludes that the overall bat collision risk is low due to the small number of turbines (Gordon and Erickson 2016), regardless of whether or not the mortality rates per megawatt are at the low or high end of the spectrum of mortalities seen at land-based wind facilities.

We believe that the available information is insufficient to determine bat mortality risk on a per-MW basis, given the lack of site-specific data and the inconsistencies in pre- and post-construction data collected at land-based wind projects. We believe it is important to gather site specific data to understand the baseline use of the project area by bats and compare that with post-construction data to elucidate what the actual impacts are, and to be able to extrapolate those conclusions to a larger project. Thus the question is not just, "is this project 'low' risk to bats?" rather we want to understand larger issues such as, how much risk to bats do offshore turbines present relative to land-based turbines (e.g., how much mortality occurs on a per-MW basis), and how do bats respond to offshore turbines in the Great Lakes?

The Service is working with the Applicant to develop a new radar and acoustic monitoring protocol that will evaluate bat activity within the proposed project area pre- and post-construction. These studies are anticipated to be completed in 2017-2018. These studies will provide a baseline index of bat activity within the project with which to compare post-construction data on behavior and mortality. Innovative methods will be used to estimate bat mortality post-construction with the aim of generating bat/megawatt mortality rates that can be extrapolated to larger offshore projects, compared with onshore projects, and to determine if minimization measures to limit mortality are necessary.

To date the only mechanism known to reduce bat mortality at wind turbines is to curtail turbines during nights of low wind speed, which is the period when bats are most susceptible to being struck. Should this facility be constructed, the Service requests that at a minimum, turbines should be curtailed (the blades should be oriented such that they do not catch the wind) until the manufacturer's cut-in speed (3.0 m/s for the turbine model proposed in the Application) is reached at night during bats' active periods (generally April-October). If, based on the results of

post-construction monitoring, bat mortality is anticipated to be high, a higher cut-in speed may be warranted during periods of time when bats are most at risk.

POST-CONSTRUCTION MONITORING:

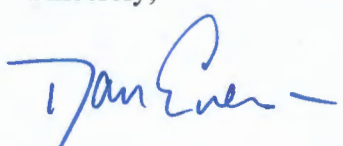
In order to assess the actual impact of the project in migratory birds, bats, fish, and the aquatic environment, post-construction monitoring is critical. Further, one of the purposes of a small-scale demonstration project is to assess the impacts of the project and be able to extrapolate those impacts to a larger scale. Thus, this project should have a valid post-construction monitoring plan that is approved by both the ODNR and Service that quantitatively and qualitatively describes impacts to birds, bats, and aquatic resources.

This project presents unique risks to migratory bats and migratory birds due to the proximity of the project area to the offshore waters of Lake Erie. Because the turbines will be sited in an open water environment, conventional post-construction mortality monitoring to determine impact of the project and birds and bats will be impossible to implement. Thus, innovative new methods for monitoring bird and bat mortality in the offshore environment will have to be developed and implemented, and their reliability is unknown. The Applicant, Service, and ODNR are currently evaluating multiple innovative methods for assessing impacts to birds and bats. A post-construction monitoring plan for fisheries has been developed and is being finalized. Implementation of a post-construction monitoring plan for birds, bats, fish, and the aquatic environment, agreed upon by the Service, ODNR, and Applicant should be made a condition of any issued permit.

This letter provides technical assistance only and does not serve as a completed section 7 consultation document. If project plans change, if portions of the proposed project were not evaluated, or if additional information on listed or proposed species or their critical habitat becomes available, it is our recommendation that you reinitiate coordination with this office.

If you have questions, or if we can be of further assistance in this matter, please contact our office at (614) 416-8993 or ohio@fws.gov.

Sincerely,



Dan Everson
Field Supervisor

cc: Scudder Mackey, ODNR (via e-mail)
Kate Parsons, ODNR (via e-mail)
Jeff Gosse, USFWS Region 3 (via e-mail)

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LeedCo Icebreaker Pre-construction and Post-construction Monitoring Survey Protocol

U.S. Fish and Wildlife Service and Ohio Department of Natural Resources Division of Wildlife

Comments

Feb. 28, 2017

The below comments represent U.S. Fish and Wildlife Service and Ohio Department of Natural Resources Division of Wildlife recommendations relative to the matrix of pre- and post-construction monitoring options provided by LeedCo via e-mail on January 5, 2017.

1. Bat acoustic monitoring
    a. Pre-construction
        i. On 10 mile large buoy—high (~50 m or as high as possible) and low (~water level) detectors. If the "high" and "low" detectors are separated by at least 40 m, add a "middle" (~30 m) detector too.
        ii. On 3 and 7 mile buoys—low detector
        iii. On Cleveland crib—high (~50 m) and low (close to water surface) detectors
        iv. Per ODNR protocol, use AnaBat detectors (either SD1 or those equipped with CF ZCAIMS), with sensitivity adjusted to detect a calibration tone3 at 20 meters.
        v. March 15-November 15, half hour before sunset until half hour after sunrise; all monitors running concurrently for the entire season.
    b. Post-construction
        i. On 3 turbines (at least one on an end)—high (nacelle), medium (~ 30 m), and low (~10 m)detectors
        ii. On crib—high, low detectors
        iii. On 10 mile buoy –high and low detectors
    c. Rationale
        i. Provides bat species composition at various altitudes, index of bat activity overall and at various heights, seasonal patterns of movements. Allows comparison between site-specific data and crib data, assuming that site-specific data may not be as high as can be obtained from crib.
    d. Successful performance criteria
        i. 80% of nights per detector recorded during active period (March 15-Nov 15)
2. Waterfowl aerial surveys—with observer
    a. Pre-construction, *see attached protocol*
        i. Focus on waterfowl (esp. red-breasted mergansers that are easily spooked), bald eagles, ice relative to location of birds
        ii. Survey transects should run parallel to the turbine string.
        iii. Dates: mid-October - end of May
        iv. Frequency: Every 2 weeks

v. Transect spacing: Transects should be close enough to the turbines to observe birds between the turbines, but need to be a safe distance from the blades.
vi. Flight heights: 76-100 m in order to detect small waterbirds.
vii. Flight speeds: 150-200 km/h (unless constrained by local flying restrictions)
viii. Weather conditions: 4 or below on the Beaufort scale, winds approximately 37 km/h or less. Minimum of 3.2 km of visibility (or pilot's discretion).
ix. GPS location for each bird or flock should be recorded.

b. Post-construction
    i. Similar transect protocol as pre-construction
    ii. Year 1 after construction, year 4 after construction

c. Rationale
    i. Species numbers, distribution, use of project area seasonal patterns; eagles; ice; avoidance/attraction/displacement

d. Successful performance criteria
    i. Bi-weekly surveys during designated timeframe in appropriate weather conditions.

3. Radar
    a. Boat based radar is not technologically there yet, nor cost advantageous, and it focuses on waterfowl, but we have other methods outlined to address waterfowl. NEXRAD data is not useful for assessing bird/bat behavior within rotor swept zone, which is the data we need. Thus we suggest these approaches should not be considered further.
    b. Pre-construction
        i. We strongly recommend S-band radar, *see attached protocol.*
        ii. Preferred is radar data from project area—FWS and ODNR have been requesting this information since 2008. We still advocate for a single radar, on its own platform, within project area for spring and fall season of pre-construction monitoring as the preferred option.
        iii. Our second choice is to install one or all turbine bases prior to fall (2017), put a radar on one of the turbine bases for fall 2017-spring 2018, then install turbines after spring 2018.
        iv. Our third choice is to install one or all turbine bases prior to fall. Once the first turbine base is installed at the furthest point from shore, place radar unit on it and begin collecting data on fall migration as other bases are being installed. Install towers, with radar on platform collecting data until last tower is erected. (Assumes data collected for 6-8 weeks over fall migration period, which is key focus). Additionally, install radar on Cleveland crib with elevated antenna for spring and fall.
            1. Limitations of this approach: We are only getting fall data (we believe that fall is the most important season due to high bat mortality in fall migration), no information on spring risk. We would use the comparison between crib data and onsite data in fall to extrapolate what may be occurring onsite in spring. This is not ideal, but we think it is workable.

Construction activities may cause "clutter" on the radar map and may alter bird activity within the project area.

v. Site specific radar data is critical to our analysis. If none of the above options can be implemented, we will work with the applicant to evaluate other methods of obtaining site specific radar data.

c. Post-construction
   i. Preferred is single radar, on its own platform, within project area, in years 1, 3, and 5, from spring-fall.
   ii. Our second choice is 2 radars mounted on turbine platforms, in years 1, 3, and 5, from spring-fall.

d. Rationale
   i. Site specific data on night migration of birds and bats. Altitude data of bird and bat targets within rotor swept zone, counts of targets, peak dates of migration, seasonal patterns. Avoidance/attraction/displacement.
   ii. Because this is a pilot project the intent is to study and understand the impact of the project on various resources. Without project-specific radar information we cannot get key information needed to understand that impact.

e. Successful performance criteria
   i. Site-specific data; radars operating and collecting data over at least 80% of nights during spring/fall migration period.

4. Carcass monitoring
   a. Pre-construction—proof of concept development
      i. Bat nets—We believe this concept could have merit, but we would like to see a more fleshed-out conceptual proposal first. Please draft a detailed proposal and plans, and a land-based test concept and submit to FWS and ODNR for review. Be sure to consider carcass distribution of bats relative to distance from turbine. Net should be designed to collect at least 30% of bat carcasses and carcasses should be recoverable from the nets.
      ii. "Thunk" detection—We believe this concept could have merit. We request follow-up with the technology developer to ensure the technology could be ready to deploy within the project timeframe (testing in year 1, deployment in 2018-2019, etc.). Please draft a detailed proposal and plans, and a land-based test concept and submit to FWS and ODNR for review.
      iii. Identiflight—The original application for this technology (detecting golden eagles during daylight and shutting down turbines) is very different that the application needed for this project (detecting small nocturnal animals striking turbines). We think that the other options are more applicable and closer to being ready than this option. We suggest not using this option at this time.
   b. Post-construction
      i. Bat nets— If proof-of-concept test works, then install on 3 turbines during years 1, 3, and 5, and through the lifespan of the technology.

ii. “Thunk detection”—If proof-of-concept test works, then install on 3 turbines during years 1, 3, and 5, and beyond, through the lifespan of the technology.
iii. Live observers—do not recommend this for carcass monitoring, as most mortality is expected to occur at night and could not be observed. Do not recommend this for waterfowl displacement study because aerial flights and radar would be better to address displacement.

c. Rationale—to detect collisions of birds/bats, identify carcasses at least to guild
d. Successful performance criteria—ability to detect bird/bat collisions. Generate a reasonable estimate of collisions/MW/year. Set up an adaptive management program to address potential performance issues with new technology.

UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. Fish and Wildlife Service
Ecological Services Office
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / Fax (614) 416-8994

October 21, 2016

Mr. Roak Parker
U.S. Department of Energy
15013 Denver West Parkway,
Golden, CO 80401

TAILS: 03E15000-2016-TA-1571

Re: Development of an Environmental Assessment for the Icebreaker Wind Facility, DOE/EA-2045

Dear Mr. Parker:

This is in reference to the development of an Environmental Assessment for Lake Erie Energy Development Corporation's ("LEEDCo") proposed Icebreaker Wind Facility. The proposed project involves the installation of up to six wind turbine generators, underground collection cables, and connection to an existing substation. The total generating capacity of the facility will not exceed 20.7 MW.

The project is located in Lake Erie, approximately eight to ten miles off the coast of Cleveland, OH in Cuyahoga County. This project plans to connect to an existing substation in Cleveland, thus transmission lines will be trenched into the substrate of Lake Erie from the shoreline to the project (~12 miles). The majority of this project will occur within Lake Erie with only the substation interconnection occurring on land; no impacts to wetlands or forested area are anticipated.

The following comments are being provided pursuant to the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; BGEPA), the Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA), the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544, 87 Stat. 884; ESA), the Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j, not including 742 d-l; 70 Stat. 1119), as amended.

The U.S. Fish and Wildlife Service (Service), LEEDCo, their representatives, and the Ohio Department of Natural Resources (ODNR) have been involved in discussions regarding this proposed project since 2008. We have participated in numerous meetings, conference calls, and correspondence regarding this project. LEEDCo initiated some pre-construction wildlife studies in 2010 based on recommendations from the Service and ODNR. These included bat acoustic monitoring April 1 – November 10, 2010 and radar monitoring March 31-October 12, 2010 (Svedlow et al. 2012). Two additional surveys were conducted that were not part of the studies recommended by ODNR and the Service (avian acoustic surveys, and boat based nocturnal surveys). Due to the potential impacts to fisheries ODNR and the Service requested several surveys to assess the importance of the area as a fishery. LEEDCo is currently working with

ODNR and the Service to undertake the fisheries studies. Substantial complications occurred during the 2010 radar studies that rendered the study results uninformative to the proposed project area. Further, the radar and acoustic studies did not include the currently proposed project area. Thus, the Service and LEEDCo are working on developing a new radar and acoustic study protocol (among other studies) to be implemented in 2017 that should help inform risk to wildlife from the proposed project at the proposed location.

GENERAL COMMENTS:

Construction of offshore wind turbines presents a very different set of challenges than land-based turbines in terms of wildlife impact mitigation. Not only are common techniques for quantifying mortality impossible to implement (e.g. carcass surveys), large inland water bodies such as the Great Lakes have unique hydrological, biotic, and ecological properties compared to sea and land installations, for which there is no data and no precedent. Because of the unknown consequences of developing offshore wind energy in the Great Lakes and the precedent-setting nature of this project, the pre- and post-construction evaluations of potential impacts on wildlife necessarily must meet a standard of rigor greater than wind projects on land. Further, this project has always been, and continues to be, proposed as a "demonstration project" or "pilot-project." Information gathered from this project will be used to assess the feasibility of developing commercial-scale wind facilities in Lake Erie, or the Great Lakes as a whole. As such, it is essential to have scalable pre- and post-construction studies to evaluate potential impacts.

MIGRATORY BIRD COMMENTS:

The Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA) implements four treaties that provide for international protection of migratory birds. The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the MBTA has no provision for allowing unauthorized take, the Service recognizes that some birds may be taken during activities such as wind turbine operation even if all reasonable measures to avoid take are implemented. The Service's Office of Law Enforcement carries out its mission to protect migratory birds not only through investigation and enforcement, but also through fostering relationships with individuals and industries that proactively seeks to eliminate their impacts on migratory birds. Although it is not possible under the MBTA to absolve individuals, companies, or agencies from liability (even if they implement avian mortality avoidance or similar conservation measures), the Office of Law Enforcement focuses on those individuals, companies, or agencies that take migratory birds with disregard for their actions and the law, especially when conservation measures have been developed but are not properly implemented.

The Service strongly encourages developers to coordinate with Service biologists regarding their projects. Proper coordination will help developers make informed decisions in siting, constructing, and operating their facilities. Additionally, the Service hopes to work cooperatively with wind developers to advance the state of the art of wind power siting, construction, and operation. Advancements in these areas will represent great strides towards the environmentally safe development of this otherwise renewable and clean source of energy. The Service recommends that LEEDCo develop a Bird and Bat Conservation Strategy (BBCS) to address

pre- and post-construction monitoring to assess risk to migratory birds and bats, to identify minimization measures that will be implemented to minimize risk, and to identify potential mitigation actions to implement if such risk reaches high levels.

The proposed project location is between 8-10 miles off the coast of Cleveland, thus does not provide habitat for many species of birds that breed in Ohio. But, millions of migrating birds move through the Great Lakes region during spring and fall migration each year (Rich et al. 2004, France et al. 2012, Horton et al. 2016).

The waters around Cleveland provide important overwintering habitat for gulls (herring, ring-billed, Bonaparte's, great black-backed, etc.), ducks (greater and lesser scaup, red-breasted and common mergansers, goldeneye, bufflehead, redhead, canvasback), common loons and horned grebes. During winter, flocks of over 10,000 birds are not uncommon near Cleveland. Additionally, several locations (Wendy Park, Edgewater Park, Cleveland Lakefront Preserve, etc.) along the lakeshore are known for their large concentrations of passerines during migration. The site is approximately 4.5 miles from an area designated by The Audubon Society as the Cleveland Lakefront Important Bird Area (IBA). This area was selected as an IBA due to the large concentrations of birds that congregate there during spring and fall migration (also wintering waterfowl, gulls, and eagles). Within the 2013 Avian Risk assessment it contends that "the Icebreaker site does not appear to be on a heavily used migration path for waterfowl or seabirds." While large numbers of birds may not feed within the area, they likely cross through the area to reach their overwintering areas near shore. These large concentrations of birds may attract raptors. Peregrine falcons have been observed hunting from the Cleveland crib (~3 miles from shore); therefore turbines may provide similar foraging opportunity for species like peregrines.

While the intent of the 2010 radar study was to help quantify the risk to migratory birds from construction and operation of the LEEDCo project, due to radar malfunctions, the site where the radar was located, the time when the radar was operational, and other factors, the data obtained was not sufficient to inform risk. The Service is now working with LEEDCo to design a radar project (both pre- and post-construction) to address our concerns and provide critical information for assessing the potential impacts of offshore wind facilities in the Great Lakes. We anticipate that this new radar study will occur in 2017. Until we have the results of this study we cannot assess the potential impact of the project on migratory birds.

BALD EAGLE COMMENTS:

The project lies within the range of the bald eagle (*Haliaeetus leucocephalus*). Bald eagles are protected under the Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA), and are afforded additional legal protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, BGEPA). The BGEPA prohibits, among other things, the killing and disturbance of eagles.

Bald eagles nest in super canopy trees and typically forage on fish, mammals, and carrion. The project area does not support suitable nesting habitat, and it is unlikely that eagles would forage eight to ten miles offshore during the summer, when plentiful food resources are present much closer to their nesting habitats. The Service anticipates that take of eagles is unlikely during the

summer due to the distance this facility is from the shoreline. Conversely, in winter when ice forms along the shoreline it may force wintering birds closer to the proposed facility. Within the last several years Lake Erie has almost completely frozen over. As the ice builds along the shoreline it forces ducks, gulls, etc. further into the lake. Eagles, which will feed on fish and waterfowl, will congregate long the leading edge of the ice, or near open leads in the ice. Should the ice extend far enough, as it did this past winter, it may put waterfowl and eagles in close proximity to the turbines. The Service is currently working with LEEDCo to develop a study protocol that will inform bald eagle risk during the winter. Until this study is completed, we cannot assess the potential impact of the project on bald eagles. If take of eagles cannot be avoided, LEEDCo should work with the Service's Division of Migratory Birds to obtain an eagle take permit.

ENDANGERED SPECIES COMMENTS:

The proposed project is located in Cuyahoga County, in Ohio. There are five species of birds or bats that are federally endangered, threatened, proposed, or candidate species that may occur in Cuyahoga County. Indiana bat (*Myotis sodalis,* endangered), northern long-eared bat (*Myotis septentrionalis*, threatened) Kirtland's warbler (*Setophaga kirtlandii,* endangered), piping plover (*Charadrius melodus,* endangered), and red knot (*Calidris canutus rufa,* threatened).

Cuyahoga County has confirmed records for Indiana and northern long-eared bats. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches diameter at breast height (dbh) that have any exfoliating bark, cracks, crevices, hollows and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat. Both of these species may travel several hundred miles between their summering habitat and winter hibernacula (Griffin 1945, Winhold and Kurta 2006). In the winter, Indiana bats and northern long-eared bats hibernate in caves and abandoned mines.

The LEEDCo project area does not provide suitable summer or hibernation habitat for Indiana bats or northern long-eared bats. Thus, no impact to these species is anticipated during the summer or winter. The only potential risk periods for either of these species are during spring and fall migration.

The Indiana bat range does not extend into Canada north of the project area. Thus, there is no reason to expect that Indiana bats would be flying across Lake Erie during spring or fall migration. Therefore we do not anticipate that this species will be impacted by the proposed project.

The range of the northern long-eared bat does include Canada north of the project area. However, northern long-eared bats are thought to be short-distance migrants. Short migratory movements between summer roost and winter hibernacula between 56 km (35 mi) and 89 km (55 mi) have been documented most often (Nagorsen and Brigham 1993 p. 88; Griffin 1945, p. 53). However, movements from hibernacula to summer colonies may range from 8 to 270 km (5 to 168 mi) (Griffin 1945, p. 22). Thus it is unlikely that northern long-eared bats would be migrating long distances across the open waters of Lake Erie (~50 miles of open water from the Cleveland shore to the Canada shore). Additional acoustic surveys proposed to occur offshore are currently being developed by the Service and LEEDCo and will help to evaluate potential risk to this species from offshore wind development.

Piping plovers, red knots, and Kirtland's warblers all migrate through Ohio but none are known to nest or overwinter here.

The Great Lakes population of piping plover nests primarily in Michigan and consists of approximately 63 pairs of birds. These birds overwinter primarily along the Atlantic coast, with some along the Gulf coast (USFWS 2009). While their migration paths are unknown, they have been documented to stop over on sand beaches along the shore of Lake Erie in Ohio. It is unknown if they migrate across the open waters of Lake Erie, or if their migration path would take them through the proposed project area.

Kirtland's warblers nest in young stands of Jack pines primarily in Central Michigan. Their current population is over 3,000 individuals (USFWS 2012a). They overwinter in the Bahamas. Individual birds have been banded during spring and fall migration, and geo-locators have indicated at least some of these birds are likely to have migrated across open waters of Lake Erie. Further, Kirtland's warblers have been documented to stop over all along the Lake Erie shoreline in Ohio (USFWS 2012a).

Red knots nest in the high arctic, and winter along both coasts of North America. While the vast majority of the red knot population migrates along the Atlantic and Pacific coastlines, occasionally small numbers of birds have been found in Ohio, typically along marshes in the western basin of Lake Erie. The proposed location for the facility does not have suitable habitat for these species. Most observations of these species in Ohio occur along the shoreline of the western basin of Lake Erie where there is more stopover habitat.

FISHERIES COMMENTS:

One of the responsibilities of the Service is to manage interjurisdictional fisheries, i.e., fisheries that are managed by more than one state or nation. The waters of Lake Erie are managed by four states (Michigan, Ohio, Pennsylvania, and New York), and Canada. A component of the pre-construction survey project developed jointly between ODNR and the Service were studies to assess the fisheries in the proposed project area and to evaluate potential risk to fish during construction and operation of the project, including the electrical lines. These studies are underway, but have yet to be completed. Until these studies are complete we are unable to evaluate the potential impacts of the project on interjurisdictional fisheries.

BAT COMMENTS:

Less than a decade ago the biggest threats to bat populations were loss of hibernacula and destruction of summer habitat. Since then the spread of white-nose syndrome (WNS), a novel fungal disease rapidly spreading across the Midwest, has caused the death of millions of cave hibernating bats (USFWS 2012b). As of September 2011, the 13,361 installed MW of wind energy in the Midwestern U.S. is anticipated to cause mortality of, on average, 106,000 bats per year (Arnett and Baerwald 2013). The majority of these are long-distance migrating tree bats. Populations of cave bats have declined so significantly, mostly attributed to WNS, that the Service has recently listed the northern long-eared bat as a threatened species. The Service is currently conducting status reviews for two additional species, the little brown bat (*Myotis lucifugus*) and tri-colored bat (*Perimyotis subflavus*) due to declines associated with WNS. Both of these species were documented in acoustic surveys conducted in 2010 (Svedlow et al. 2012).

LEEDCo's Bat Risk Assessment states that "relatively small numbers of migratory bats are likely to encounter the project." Long distance migrants including the eastern red (*Lasiurus borealis*), hoary (*Lasiurus cinereus*), and silver-haired (*Lasionycteris noctivagans*) bats are the species most susceptible to mortality at wind turbines (Arnett and Baerwald 2013). These species are known to cross large bodies of water and can be found far from shore (Pelletier et al. 2013). The results of the acoustic study (Svedlow et al. 2012) state that 4 bat passes/detector-night were recorded offshore at the Cleveland crib during acoustic surveys in 2009. Ninety five percent of the calls recorded were of the three bat species most susceptible to collisions with wind turbines (Svedlow et al. 2012, Arnett and Baerwald 2013). There are several factors that confound the results of acoustic surveys. Since all monitoring had to be conducted from the Cleveland Crib, acoustic monitoring sites were co-located with radar monitoring locations. Radar has been shown to reduce bat activity, potentially due to electromagnetic fields causing discomfort (Nicholls and Racey 2007). Large concentrations of insects were also observed swarming above the Cleveland Crib. Bats have been observed pausing during migration to take advantage of congregations of insects around offshore wind turbines (Ahlén et al. 2007, 2009). Thus the acoustic monitoring included a factor that may reduce bat activity, and one that may increase bat activity. It is unknown if either factor influenced the number of detections recorded at this site.

The results of the offshore acoustic monitoring conducted as part of LEEDCo's application showed higher numbers of bat calls than similar monitoring that has occurred at two existing wind facilities in Ohio. These two onshore wind projects, Timber Road and Blue Creek, recorded 2.78 and 1.31 passes/detector-night respectively. Both projects have resulted in higher than anticipated bat fatalities, based on post-construction monitoring conducted over three years of operation. Based upon this information it is unclear if the LEEDCo project will pose greater or lesser bat fatalities than onshore facilities.

The Service is working with LEEDCo to develop a new radar and acoustic monitoring protocol that will evaluate bat activity within the proposed project area. These studies are anticipated to be completed in 2017. Until these studies are complete, we are unable to evaluate the potential risk to bats from the proposed project.

To date the only mechanism known to reduce bat mortality at wind turbines is to curtail turbines during nights of low wind speed, which is the period when bats are most susceptible to being struck. Should this facility be constructed, the Service requests that at a minimum, turbines should be curtailed (the blades should be oriented such that they do not catch the wind) until the manufacturer's cut-in speed is reached. If, based on the results of the acoustic or radar study, bat mortality is anticipated to be high a higher cut-in speed may be warranted during periods of time when bats are most at risk.

POST-CONSTRUCTION MONITORING:

In order to assess the actual impact of the project in migratory birds, bats, fish, and the aquatic environment, post-construction monitoring is critical. Further, one of the purposes of a small-scale demonstration project is to assess the viability and potential impacts of the project. This project should have a valid post-construction monitoring plan that is approved by both the ODNR and Service. LEEDCo recently provided the Service with several potential methods for assessing impacts. These are currently being reviewed by the Service and ODNR.

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) COMMENTS:

The National Environmental Policy Act (NEPA) requires federal agencies to incorporate environmental considerations in their planning and decision-making through a systematic interdisciplinary approach. An Environmental Impact Statement (EIS) is required for any project subject to Federal control and responsibility that significantly affects the quality of the human environment (42 U.S.C. § 4332(C); 43 C.F.R. § 46.100(a)). Conversely, if impacts are not anticipated to be significant, an Environmental Assessment (EA) may be completed. Currently the DOE proposes to complete an EA. According to the CEQ NEPA regulations, the following are some of the issues that should be considered when evaluating whether a project's effect on the environment is significant:

a) *The degree to which the effects on the quality of the human environment are likely to be highly controversial (40 C.F.R. § 1508.27(b)(4)).* There is significant public interest in wind power and potential impacts from wind power on wildlife (particularly birds and bats). The Service has been contacted by multiple non-government entities regarding wildlife concerns over small wind projects near Lake Erie recently; we were subject to a lawsuit over a wind project's impact on bats in central Ohio several years ago; and one conservation group sent a notice of intent to sue over the NEPA analysis for a single turbine project on federal land in northwest Ohio in 2014. Overall, we anticipate a high degree of interest in this project, and substantial concerns from groups associated with conservation of wildlife resources. Further, because the extent of impacts to wildlife is uncertain (see additional discussion below), we anticipate more controversy than for a project on land.

b) *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks (40 C.F.R. § 1508.27(b)(5)).* This project presents unique risks to migratory bats and migratory birds including the bald eagle due to the proximity of the project area to significant migratory bird and bat habitat and concentration areas, specifically the offshore waters of Lake Erie. Because the turbines will be sited in an open water environment, conventional post-construction mortality monitoring to determine impact of the project and birds and bats will be impossible to implement. Thus, innovative new methods for monitoring bird and bat mortality in the offshore environment will have to be developed and implemented, and their effectiveness is unknown. Regardless, it will be difficult to monitor and quantify the impact of the project on birds and bats.

c) *The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration (40 C.F.R. § 1508.27(b)(6)).* This will be the first installation of wind turbines in a freshwater ecosystem anywhere in the world. It will be the first installation of offshore wind anywhere in the Great Lakes, and likely only the second offshore wind facility in the western hemisphere. The manner in which this project is evaluated and permitted will be a model for future similar projects. LEEDCo calls this a "demonstration" project and has indicated to audiences in prior years that the intent of the demonstration project is to show that freshwater offshore wind power in the Great Lakes is possible and to provide a roadmap for future development. Although the current project is described as a pilot project, LEEDCo indicated in a December 12, 2012, "Media Advisory Notice" that the ultimate intent is to expand from an initial 20-30 megawatt demonstration project to a 1,000 MW build-out by 2020. Thus, it is not unreasonable to expect that, if the demonstration project is found to be economically viable, it may likely be expanded to a much larger project, itself, as well as serve as a model for other full-scale projects elsewhere in the Great Lakes and other areas in the U.S. Given the precedent-setting nature of this demonstration project and potential influence on potential future off-shore wind project development, we believe an EA is inadequate to fully address the potentially significant, precedent setting aspects of this project.

We believe that the three factors above indicate that the project warrants an EIS-level analysis. We recommend that the DOE conduct an EIS to document the significance of the proposed project on fish and wildlife resources.

This letter provides technical assistance only and does not serve as a completed section 7 consultation document. If project plans change, if portions of the proposed project were not evaluated, or if additional information on listed or proposed species or their critical habitat becomes available, it is our recommendation that you reinitiate coordination with this office. We recommend that the project be coordinated with the Ohio Department of Natural Resources due to the potential for the project to affect state listed species and/or state lands. Contact John

Kessler, Environmental Services Administrator, at (614) 265-6621 or at john.kessler@dnr.state.oh.us.

If you have questions, or if we can be of further assistance in this matter, please contact our office at (614) 416-8993 or ohio@fws.gov.

Sincerely,

Dan Everson
Field Supervisor

cc: Scudder Mackey, ODNR (via e-mail)
Kate Parsons, ODNR (via e-mail)
Jeff Gosse, USFWS Region 3 (via e-mail)

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

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March 24, 2014

Mr. Klaus Lambeck
Ohio Power Siting Board
180 East Broad Street
Columbus, OH 43215-3793

TAILS: 31420-2009-TA-0721

Re: Icebreaker Wind Facility, 13-2033-EL-BGN

Dear Mr. Lambeck:

This is in reference to the Lake Erie Energy Development Corporation's ("LEEDCo") application to the Ohio Power Siting Board for a Certificate of Environmental Compatibility and Public Need (Certificate) for the proposed Icebreaker Wind Facility. The proposed project involves the installation of up to six 3.0 MW wind turbine generators, underground collection cables, and connection to an existing substation. The total generating capacity of the facility will not exceed 18 MW.

The project is located approximately seven to nine miles off the coast of Cleveland in Lake Erie. Approximately 60.6 acres (10.5 ac of permanent disturbance) of lakebed will be disturbed and 11 miles of interconnection cable will be needed. This project plans to connect to an existing substation in Cleveland. The majority of this project will occur within Lake Erie with only the substation interconnection occurring on land; no impacts to wetlands or forested area are anticipated.

The U.S. Fish and Wildlife Service (Service) received your letter requesting our review of the application for the informational completeness on February 10, 2014, and we submit this letter in response. The following comments are being provided pursuant to the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; BGEPA), the Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA), the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544, 87 Stat. 884; ESA), the Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j, not including 742 d-l; 70 Stat. 1119), as amended.

The Service, LEEDCo, their representatives, and the Ohio Department of Natural Resources (ODNR) have been involved in discussions regarding this proposed project since 2008. We have participated in meetings, and engaged in numerous conference calls and emails regarding this project.

Unlike onshore facilities, the Service currently does not have standardized pre-construction monitoring protocols to assess impacts of offshore wind facilities. The Service worked closely with the ODNR in developing a pre-construction monitoring protocol for this offshore wind energy facility which was the first of its kind for the region. LEEDCo conducted the following pre-construction wildlife surveys requested by ODNR and the Service: bat acoustic monitoring April 1 – November 10, 2010; and radar monitoring April 1-May 31 and August 15-October 13, 2010. Two additional surveys were conducted; these were not part of the studies recommended by ODNR and the Service (avian acoustic surveys, and boat based nocturnal surveys). Due to the potential impacts to fisheries ODNR and the Service requested several surveys to assess the importance of the area as a fishery. LEEDCo has yet to complete these studies.

GENERAL COMMENTS:

Currently there are no offshore wind facilities in North America, additionally there are very few (potentially only 1) wind facilities sited in a freshwater environment world-wide. The LEEDCo project has always been, and continues to be, proposed as a "demonstration project" or "pilot-project." Information gathered from this project will be used to assess the feasibility of developing commercial-scale wind facilities in Lake Erie, or the Great Lakes as a whole. As such, it is essential to have scalable pre- and post-construction studies to evaluate potential impacts to fish and wildlife Trust resources. Within the documents provided as part of the OPSB application LEEDCo provided results from portions of the recommended pre-construction monitoring (e.g., bird and bat monitoring), but portions of the recommended pre-construction monitoring were not conducted at all (fisheries monitoring), and no post-construction studies were proposed to assess potential impacts to birds, bats, and fisheries. Therefore, the Service finds that this application is incomplete. More specific comments on various issues of concern to the Service are presented below.

MIGRATORY BIRDS

Migratory birds are a Federal Trust resource entrusted to the Service by the MBTA. The proposed project location is between 7-9 miles off the coast of Cleveland, thus lacks habitat for many species of birds that breed in Ohio. The site is approximately 3.5 miles from an area designated by The Audubon Society as the Cleveland Lakefront Important Bird Area (IBA). This area was selected as an IBA due to the large concentrations of waterfowl and gulls that congregate there during spring and fall migration (also wintering waterfowl, gulls, and eagles) (Ritzenthaler 2008). The waters around Cleveland provide important overwintering habitat for gulls (herring, ring-billed, Bonaparte's, great black-backed, etc.), ducks (greater and lesser scaup, red-breasted and common mergansers, goldeneye, bufflehead, redhead, canvasback), common loons and horned grebes. During winter flocks of over 10,000 birds are not uncommon near Cleveland and the maximum daily counts for red-breasted merganser in some years has reached 250,000 (Ritzenthaler 2008). Additionally, several locations (Wendy Park, Edgewater Park, Cleveland Lakefront Preserve, etc.) along the lakeshore are known for their large concentrations

of passerines during migration. Within the Avian Risk assessment it contends that "the Icebreaker site does not appear to be on a heavily used migration path for waterfowl or seabirds." While large numbers of birds may not feed within the area, they are likely to cross through the area to reach their overwintering areas near shore and they do congregate in large numbers within just a few miles of the project. Due to the lack of offshore wind facilities in North America several LEEDCo documents cite the experiences of Europe to draw information. Yet several European countries have banned offshore facilities from within 12 miles of the shoreline (Rein et al. 2013), this may be in part due to the congregations of waterfowl found near shore.

Thus, the Service believes that waterfowl are at risk of mortality and possibly displacement from the Icebreaker project. LEEDCo should develop a Bird and Bat Conservation Strategy (BBCS) that outlines minimization measures, monitoring methods, and adaptive management that will be implemented to protect these species.

The boat landing that will be at the base of each turbine may attract species such as double-crested cormorants, herring and ring-billed gulls. Herring gull, lesser black-backed gull, great black-backed gull fly within the rotor swept zone between 30-35% of the time (Furness 2013). Also, during the pelagic bird surveys that were conducted by ODNR large numbers of ring-billed and herring gulls were observed feeding on the bi-catch of commercial fishing vessels. It is unclear whether commercial fishing vessels will be using this area, which could increase incidences of bird collisions by increasing the number of birds in the area. Thus, waterbirds are at risk from the project and LEEDCo should address these species in the BBCS.

LEEDCo's Environmental Assessment states that between 4-13% migrants fly within the height of modern wind turbine rotors, and that tens- to hundreds of millions of birds migrate over Lake Erie. Based upon these numbers it would mean that between 400,000-13,000,000 songbirds fly at rotorswept height when flying over Lake Erie. Within the "Final Avian Risk Assessment 2013" it states that "Fatality numbers and species impacted at the offshore site are likely to be similar, on a per turbine basis, to those found at projects that have been studied in eastern North America." Post-construction studies at onshore Canadian wind facilities average 8.2±1.4 birds per turbine (Zimmerling et al. 2013) and 6.86 birds per turbine for the United States (Loss et al. 2013). If waterfowl and waterbird mortality rates will be similar to those of European facilities, as suggested in the Avian Risk Assessment (see below), and if baseline songbird mortality rates will be similar to onshore facilities, it's likely that total bird mortality on a per turbine basis may be greater than at onshore facilities due to the increased abundance of waterfowl and waterbirds near the turbines.

<u>Mortality estimates from European offshore wind facilities.</u>

- 0.01-1.2 birds/turbine (Winkelman 1989, 1992a, 1992b, 1992c, 1995)*
- 6 birds/turbine (Painter et al. 1999)*
- 4-23 birds/turbine (Everaert et al. 2001)

* These numbers may not be corrected for searcher efficiency and carcass removal (Langston and Pullan 2003).

As part of the review of this project the Ohio Ecological Services Field Office sent the Spring – Fall 2010 Avian and Bat Studies Report Lake Erie Wind Power Study (TetraTech 2012) to a team of individuals in our Regional Office that conducts radar monitoring of birds and bats. This group provided 11 pages of comments and questions related to the radar report to LEEDCo on November 15, 2013 (attached). The Service has yet to receive a response to these questions. Without clarification on these questions the Service is unable to assess the results of the radar monitoring report and thus we believe that this application is incomplete.

BATS

Less than a decade ago the biggest threats to bat populations were loss of hiberacula and destruction of summering habitat. Since then, the expansion of the wind industry and the spread of white-nose syndrome (WNS), a novel fungal disease rapidly spreading across the Midwest, have caused the death of millions of bats (USFWS 2012; Arnett and Baerwald 2013). Populations of cave bats have declined so significantly, mostly attributed to WNS, that the Service has proposed listing the northern long-eared bat (*Myotis septentrionalis*) as a federally endangered species[1]. The Service is also currently conducting status reviews for two additional species, the little brown bat (*Myotis lucifugus*) and tri-colored bat (*Perimyotis subflavus*). Both of which were documented acoustically offshore at during the LEEDCo study.

While the offshore environment does not appear to provide habitat for tree-roosting bats, presence of habitat does not seem to be a good predictor of bat mortality at wind turbines during fall migration. Bat mortality at some wind facilities in agricultural landscapes in the Midwest has been occurring at rates as high as 49 bats per megawatt per year (Good et al. 2011), and when this mortality rate is applied across all operating wind facilities in the Midwest, it results in substantial total bat mortality. Research has indicated that bat mortality at operating turbines can be significantly reduced by feathering the turbine blades at low wind speeds.

LEEDCo's Bat Risk Assessment states that "relatively small numbers of migratory bats are likely to encounter the project." Long distance migrants such as eastern red (*Lasiurus borealis*), hoary (*Lasiurus cinereus*), and silver-haired (*Lasionycteris noctivagans*) bats are known to cross large bodies of water and can be found far from shore (Pelletier et al. 2013). The report states that 3.7 passes/detector-night were recorded at the offshore location and compares that to what was recorded onshore in Cleveland (38.0 passes/detector-night) to conclude that impacts to bats from the Icebreaker project would be less than a comparable on-shore project.

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[1] The proposed listing of northern long-eared bat, which was proposed in October of 2013, was not included in either the Bat Risk Assessment or the Summary of Sensitive Species. See "Endangered Species Comments" below.

The offshore acoustic monitoring conducted as part of LEEDCo's application detected bat activity at higher rates than during pre-construction monitoring that has occurred at 2 land-based operating wind facilities in Ohio. Timber Road and Blue Creek wind facilities in Paulding County, recorded 2.78 and 1.31 passes/detector-night respectively. Based upon this information it is unclear as to whether this offshore wind facilities will pose less of a threat to bats than onshore facilities. Additionally, there are several factors that confound the results of acoustic surveys. Since all offshore acoustic monitoring had to be conducted from the Cleveland Crib, acoustic monitoring sites were co-located with radar monitoring locations. Radar has been shown to reduce bat activity, potentially due to electromagnetic fields causing discomfort (Nicholls and Racey 2007). Large concentrations of insects were also observed swarming above the Cleveland Crib. Bats have been observed pausing during migration to take advantage of congregations of insects around offshore wind turbines (Ahlén et al. 2007, 2009). Thus there is a factor that may reduce bat activity, and one that may increase bat activity, therefore it is unknown if either influenced the number of detections recorded at this site. Regardless, 95% of the calls recorded were of the three species most susceptible to collisions with wind turbines. To date the only mechanism known to reduce bat mortality at wind turbines is to curtail turbines during nights of low wind speed, which is the period when bats are most susceptible to being struck.

Thus, the Service believes that bats are at risk from the project and LEEDCo should address these species in the BBCS. Should this facility be constructed, the Service requests that a condition be included within the Certificate requiring the curtailment of turbines at least up until the manufacturer's cut-in speed is reached at night during the fall migratory period. This measure should not affect energy generation, but may measurably reduce bat mortality.

ENDANGERED SPECIES COMMENTS:

The proposed project is located in Cuyahoga County, in Ohio. There are five species of birds or bats that are federally endangered, threatened, proposed, or candidate species that may occur in Cuyahoga County: Indiana bat (*Myotis sodalis*) Endangered, northern long-eared bat Proposed Endangered, Kirtland's warbler (*Setophaga kirtlandii*) Endangered, piping plover (*Charadrius melodus*) Endangered, and red knot (*Calidris canutus rufa*) Proposed Threatened.

Cuyahoga County has confirmed records for Indiana and northern long-eared bats. While northern long-eared bats may be relatively scarce in Ontario, as mentioned in the Bat Risk Assessment, they are captured at ~47% of mist-net sites in Ohio and comprise ~12% of the bats captured. Both of these species may travel several hundred miles between their summering habitat and winter hibernacula (Griffin 1945, Winhold and Kurta 2006).

While Indiana bats have been documented to fly over Lake Erie (Niver 2013, personal communication), given that no maternity colonies are known to occur in Canada, and that the majority of their hibernacula are to the south of the project area, it is unlikely that Indiana bats will encounter the LEEDCo project. Northern long-eared bats are a forest dwelling species,

feeding on insects gleaned from vegetation or in mid-air (Lee and McCracken 2004). Though historically abundant, the northern long-eared bat has rarely been found during mortality surveys at onshore wind facilities. Since this facility is not located near any forested area and because northern long-eared bats seem to be less susceptible to collision mortality from wind turbines it is unlikely that northern long-eared bats will encounter the LEEDCo project.

Piping plovers, red knots, and Kirtland's warblers all migrate through Ohio. Only the piping plover has historically nested within the state. The Great Lakes population of piping plover nests primarily in Michigan and consists of approximately 63 pairs of birds. Kirtland's warblers nest in young stands of Jack pines primarily in Central Michigan. Their current population is over 3,000 individuals (USFWS 2012). Red knots nest in the high arctic, and winter along both coasts of North America. While the vast majority of the red knot population migrates along the coastline, occasionally small numbers of birds have been found in Ohio, typically along marshes in the western basin of Lake Erie. The proposed location for the facility does not have suitable habitat for these species. Most observations of these species occur in the western basin of Lake Erie, where there is more stopover habitat. Finally, given the scale of the project it is the Service's believe at this time that it is unlikely these species will encounter the LEEDCo project.

BALD EAGLE COMMENTS:

Bald eagles are protected under the MBTA and are afforded additional legal protection under the BGEPA. BGEPA prohibits, among other things, the killing and disturbance of eagles. Due to the proposed project location and the distance this facility is from the shoreline, the Service believes that take of eagles is unlikely during the breeding, egg laying and incubation, chick rearing, and fledging periods. However, bald eagles winter along the shoreline of Lake Erie and are regularly observed along the lakeshore in Cuyahoga County (avianknowledge.net). In winter when ice forms along the shoreline it may force wintering birds closer to the proposed facility. Within the last several years Lake Erie has almost completely frozen over. As the ice builds along the shoreline it forces ducks, gulls, etc. further into the lake. Eagles, which will feed on fish and waterfowl, will congregate along the leading edge of the ice, or near open leads in the ice. Should the ice extend far enough, as it did this past winter, it may put waterfowl and eagles in close proximity to the turbines. Thus, bald eagles may be at risk from the Icebreaker project. The Service recommends that LEEDCo develop a BBCS to address this issue. If take of eagles cannot be avoided LEEDCo should work with the Service's Division of Migratory Birds to obtain an eagle take permit.

Within in the "Summary of Sensitive Species" the Applicant states that "the nearest [bald eagle] nest is located is located near Sandusky (Peterjohn and Rice 1991)", this information is outdated. In the 23 years since the original Breeding Bird Atlas was conducted the bald eagle population has expanding significantly. Ohio now has over 200 nesting pairs of bald eagles; the nearest known nest to the proposed project area is located in Cuyahoga County, approximately 11 miles away.

FISHERIES:

One of the responsibilities of the Service is to manage interjurisdictional fisheries, i.e., fisheries that are managed by more than one state or nation. The waters of Lake Erie are managed by four states (Michigan, Ohio, Pennsylvania, and New York), and Canada. A component of the pre-construction survey project developed jointly between ODNR and the Service were studies to assess the fisheries in the proposed project area. These studies have yet to be completed, thus this application should be deemed incomplete.

COORDINATION WITH THE U.S. ARMY CORPS OF ENGINEERS:

This project will require a section 10 permit of the River and Harbors Act and authorization under section 401 of the Clean Water Act. Both are administered by the U.S. Army Corps (Corps) of Engineers (Buffalo District). The Service reviews permit applications under these laws and works with the Corps to address fish and wildlife impacts. The Service will consult with the Corps under Section 7 of the ESA, if necessary, and will provide additional comments to the Corps under the National Environmental Policy Act.

POST-CONSTRUCTION MONITORING:

One of the purposes of a small-scale demonstration project is to assess the viability and potential impacts of the project. As such, if constructed this project should have a valid post-construction monitoring plan that is approved by both the ODNR and Service. Any and all results of post-construction mortality studies must be provided to both ODNR and the USFWS. This should be included as a condition of their Certificate.

The Service appreciates the opportunity to comment on this application, and looks forward to continued collaboration on this project. If you have questions, or if we may be of further assistance in this matter, please contact Keith Lott at extension 31 in this office.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

Cc: Ms. Jennifer Norris, ODNR, DOW, Columbus, OH
Mr. Nathan Reardon, ODNR, REALM, Columbus, OH
Mr. Joe Loucek, OEPA
Mr. Joe Krawczyk, USACE, Buffalo, NY

Attachment: "Review of: Spring-Fall 2010 Avian and Bat Studies Report lake Erie Wind Power Study (Prepared by TetraTech, A. Svedlow et al.) by USFWS Region 3 Radar Team."

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Review of:

Spring – Fall 2010
Avian and Bat Studies Report
Lake Erie Wind Power Study

(Prepared by TetraTech, A. Svedlow et al.)

by USFWS Region 3 Radar Team*

Thank you for the opportunity to review this report. We are aware of the challenges that the authors have faced related to the logistics of this type of study. We have experienced many of these types of challenges ourselves. We continue to gain experience with the Merlin Avian Radar systems. To date we have collected data over 3 spring and 3 fall migration seasons. Data has been collected on the shorelines of Lakes Michigan, Huron, Erie and Ontario. Therefore we have experience with migration patterns on both north-south and east-west shorelines. During this time we have, through trial and error, become quite experienced in the capabilities and limitations of these types of systems. Although we are currently using radar that has S-band capability for both the VSR and HSR antennas, we also have experience (spring 2011) with the unit that TetraTech was employing during this study.

Our primary concern is that this study is likely to be considered a precedent for studies for larger offshore wind farms. Because there is no currently effective methodology for post-construction mortality surveys of offshore wind turbines, pre-construction surveys/reports must be robust in their methods, analysis, and conclusions. Because of our experience with this type of radar system, we feel we can adequately justify our comments, concerns, and recommendations for this study. These are reported below.

***Contact: Jeff Gosse, jeff_gosse@fws.gov, telephone: 612-713-5138**

Methods

- We would like to see the clutter maps from each site for both the VSR and HSR antennas and a series of TrackPlots (hourly summaries of targets) for each site and antenna in order to ascertain the degree of interference related to weather, sidelobes, building interference on the crib, waves, insects, etc., that may influence target counts.
- How were times with "clear air" determined? (Pg 12 and 17). Review of visual radar data (Trackplots) for HSR and VSR separately (with lines connecting each plot) over 15 minute increments is how we filter out rain, and would also be appropriate for invertebrates.
- Page 7: VSR orientation directly E/W may have reduced the radar's ability to track targets moving directly north due to the number of consecutive hits needed on a target to record it in the database. Slightly offsetting the E/W azimuth could have increased target time in the radar beam and possibly reduce the number of missed targets.
- Pages 8-10: The report assumes little or no insect clutter, although it contradicts this assumption at other times, but results from the spring offshore data seem to suggest that insects were tracked with very high target counts and low mean flight heights. Please explain methods used for reducing insect clutter that were used.
- What was the VSR offset? It is reported as 750-1750m on Pg ii and 250-1250 on Pg 11.
- What were the true dates of the onshore portion of the study, March 31-April 20, or March 31-April 30? Pg 6 vs Pg 12.
- Page 7: What was the true number of days with useable data when offshore, 11 or 13?
- How were initial settings established and did the settings remained unchanged through the season? Were any settings changed between Spring 2010 onshore, offshore, and Fall 2010 offshore?
- Please separate the VSR and HSR radars when referring to hours the radar was collecting data (Pg 12 and 17). Were data from both radars removed if one had issues with "clear air", insects, or wave clutter?

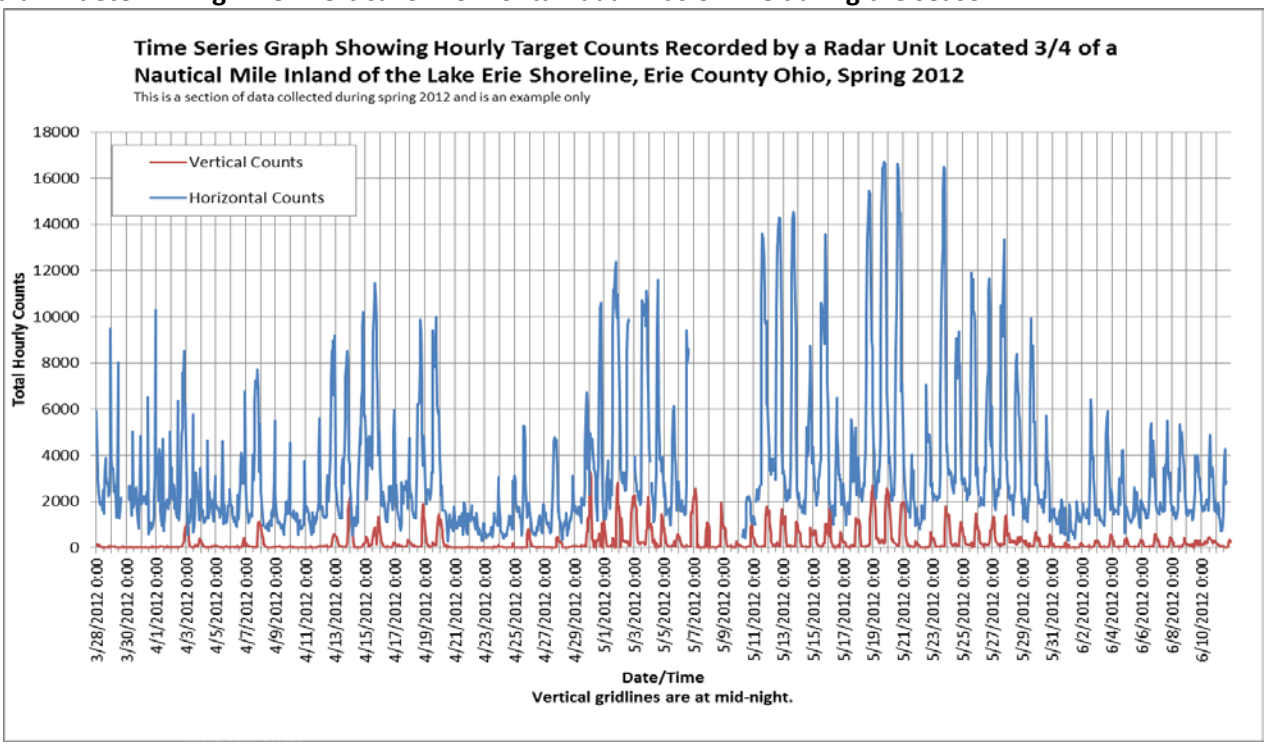
Analysis

- Survey effort (volume sampled) differed between areas below the RSZ, within the RSZ and above the RSZ. So reporting percentages below, within, and above are biased towards the area with higher effort (above the RSZ). Given the small amount of volume that occurs within and below the RSZ, a disproportionately large percentage of targets occurred within these high risk zones.

- Activity differs throughout the day and night and over the season, so reporting daily (24hr) or seasonal mean TPRs/heights/RSZ counts/percentages may mask times of higher risk (Pg 12-25).

- Timelines of radar data with VSR and HSR plotted hourly throughout the entire field season should be included in this report. This type of graph can help to distinguish between periods of migration and normal localized traffic. See example below.

Increases in vertical radar targets coincident with horizontal radar increases indicate migration, especially when the peak of activity is near midnight as illustrated below. Timelines can also be helpful in determining when vertical or horizontal radar was offline during the season.



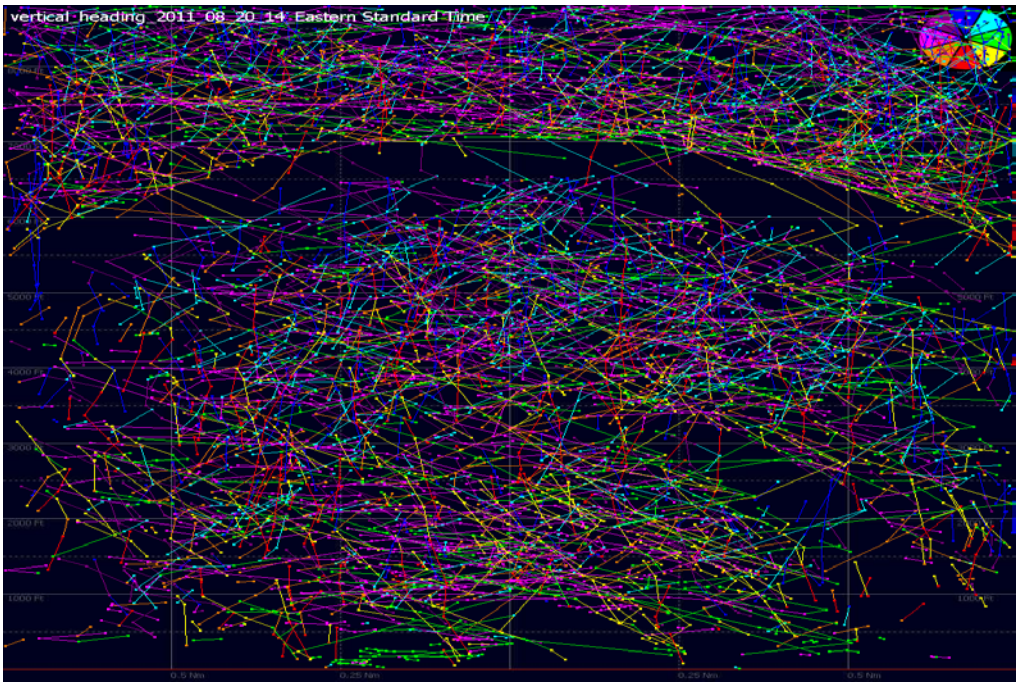
- Pp. 26 and 27, Figures 2.15, 2.16, and 2.17. Had the directional graphs been separated into four time periods (dawn, day, dusk, and night) we believe you would have seen more clearly what was occurring. Our data tends to show little directional movement during daylight (local movement), general north (spring) and south (fall) movement during night, and often a strong movement toward shore at dawn. By combining dawn and dusk with night, some of the nuances are lost and it is more difficult to understand what is occurring. The intermittent sampling may have also missed many of the strong migration pulses, also making the data more difficult to interpret.

- Caution should be used if using means as a metric for heights due to the potential for skewed distribution of targets. Medians, or preferably, 50m band graphs are much better at representing the data.
- Onshore data from the spring appears to only have captured 2 pulses of nocturnal migration in 11 nights of data collection (Pg 14). Mean TPR during this time would not reflect the migration pulses but be more reflective of the lulls in migration.
- Insect clutter can be reduced by manually editing it out. Cleaning the data this way may increase the number of hours of useable data and reveal times when vertebrates are feeding on insects and may be at risk.
- Below/in/above the RSZ are too broad of categories, as targets could be present just outside of the RSZ and be classified with targets much further away.
- Page 17: Times with high winds were excluded from the data analysis due to the resulting high amounts of wave clutter. Our data has shown that high winds can promote migration (depending on wind direction) and so migration pulses may have been thrown out.
- Your activity patterns were very unusual during the spring (Pg 13) when compared to the patterns we have seen with our radar data across the Great Lakes. The fall data matches more with what we would expect (Pg 21). Did the spring insect blooms and/or their potential to attract gulls and other birds have a large effect on the spring data?
- Page 9: Are rain tracks from virga events still included in the data? It is stated that these times are not thrown out. If the virga rain tracks are included that will bias the counts and height estimates; if they are removed then please state how they were identified and removed.
- Page 11: Why was 5.4m subtracted from the altitude measurements? We assume this is the height of the crib. If so, wouldn't the authors want to add 5.4m to each offshore target height? For example, if an offshore target is tracked at 20m, wouldn't the height actually be 25.4m? Adding or subtracting this value may move many targets from within the RSZ in the spring to above or below the RSZ.

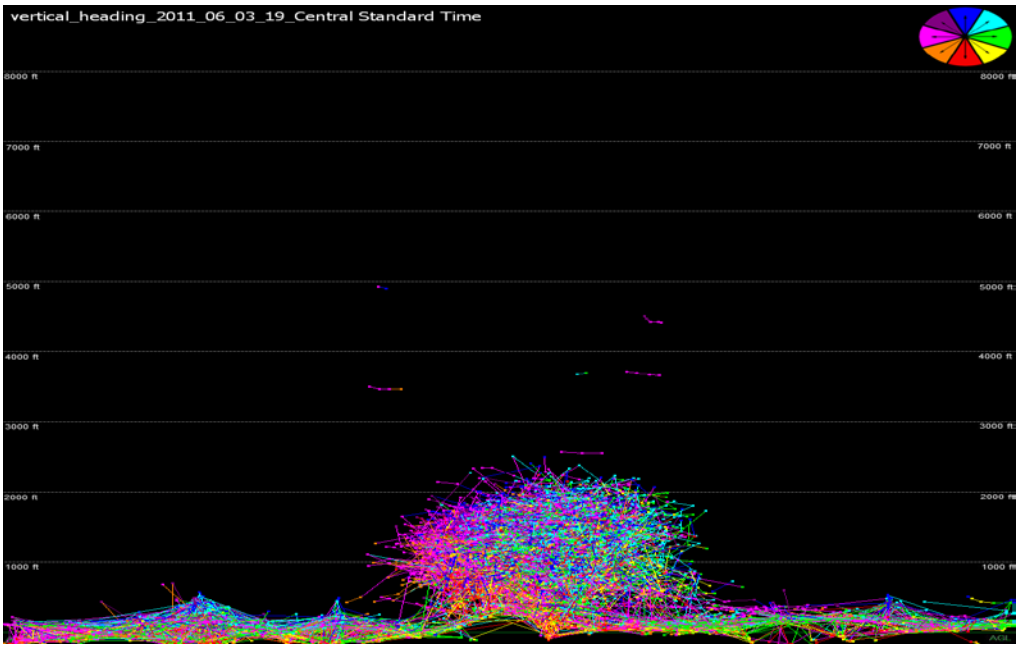
- Timelines of acoustic data, specifically bat passes, can also support driving factors of migration related to wind speed, precipitation, etc.

- Adequate pictorial examples of interference (waves, insects, rain) as well as high migration nights and observed phenomenon (e.g., reverse migration, directional patterns parallel to or going into shore) should be included in this report. Some examples are illustrated below:

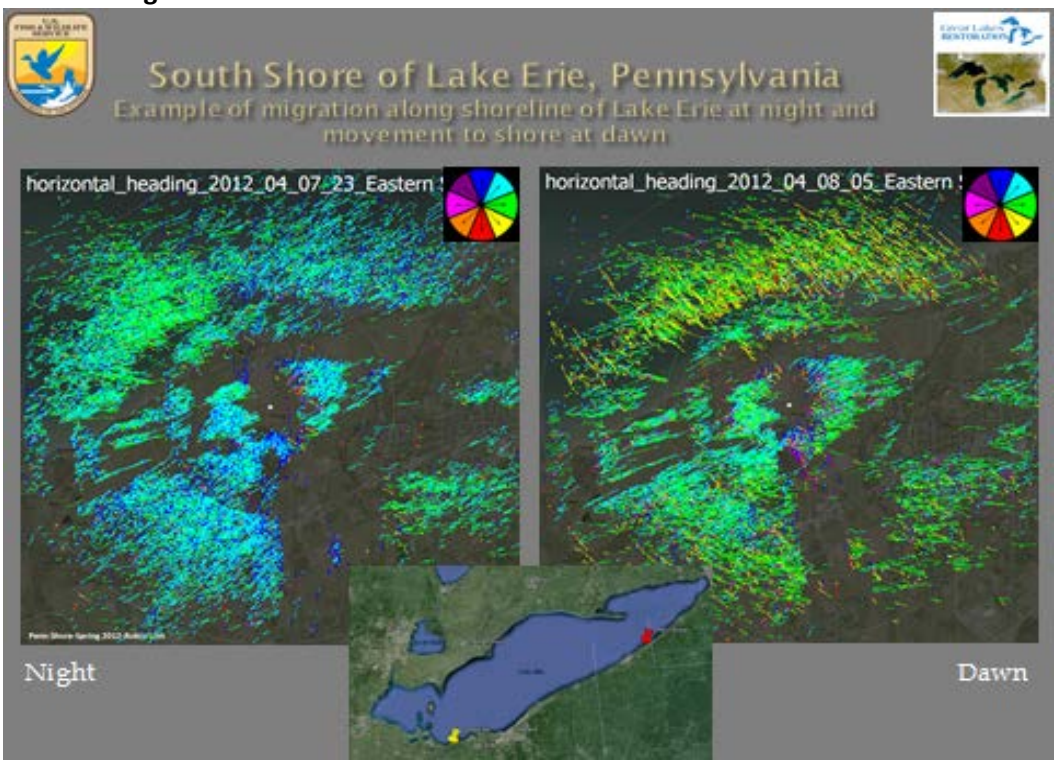
Rain Event on S-Band Vertical Radar. Note the random directionality of most plots. TrackPlots summarized at 15-minute intervals can easily be filtered out.



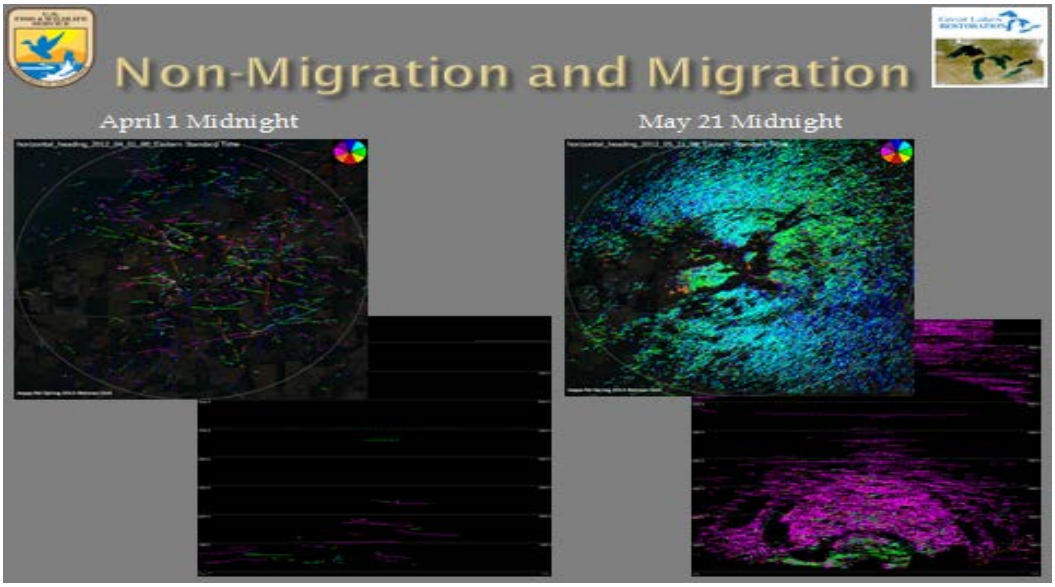
Insect Event on X-Band Vertical Radar. Episodes like this preclude any gathering of relevant data and must be filtered.



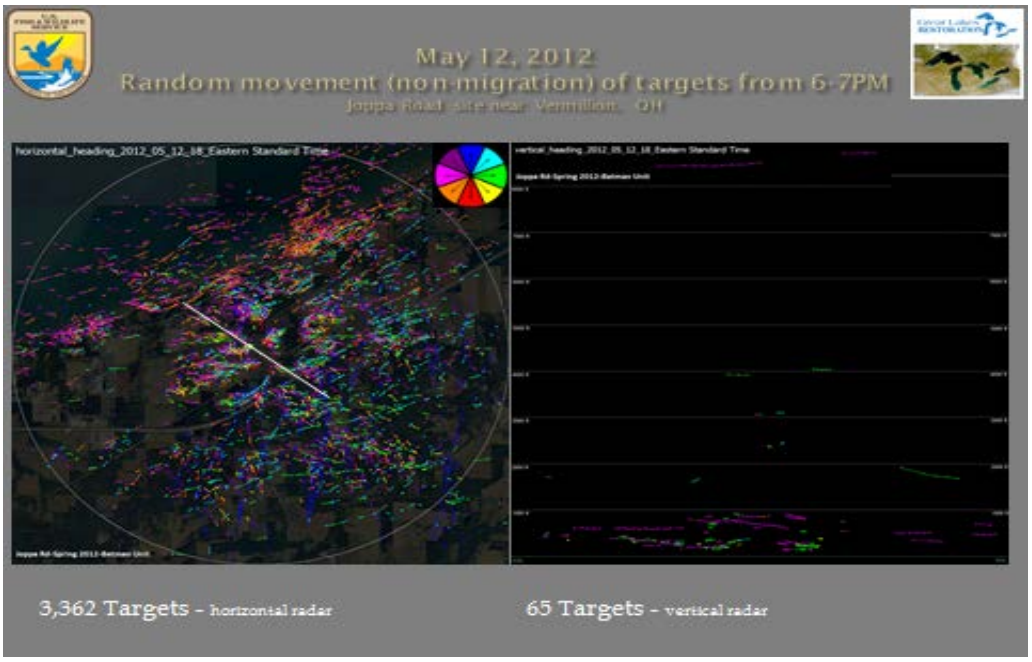
Migration along Lake Erie shoreline (left) and movement to shore at dawn (right). Compass rose color indicates direction of targets. Blue indicates north. In this example the green and light blue lines indicate northeast movement along the Lake Erie shoreline (left). The yellow/green lines indicate targets moving to the shoreline from open water (right) while onshore targets continue to move northeast at dawn.



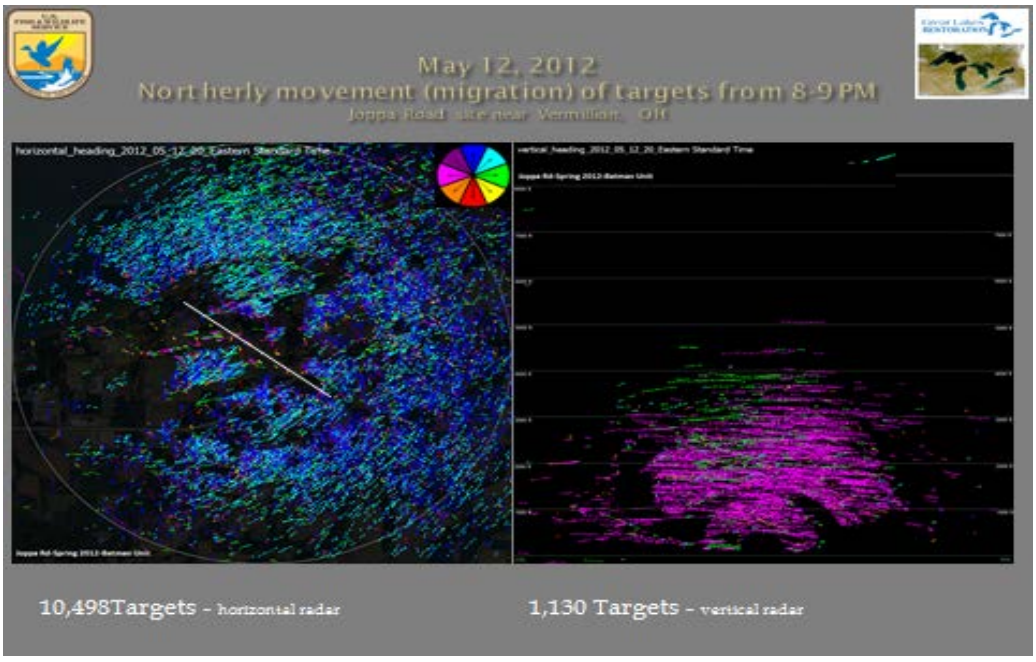
An example of target activity prior to and during spring migration. Horizontal scanning radar is at the top of the picture and vertical scanning radar is shown at the bottom of the picture. Although there is no indication of rain interference on April 1, strong winds in a direction not favorable to migration could also be responsible for low numbers of targets.



Random daytime (pre-sunset) movement of targets. Horizontal scanning radar on left shows random movements as portrayed by the various colored plots in relation to the compass rose. Blue indicates north direction. There is little high elevation target activity on the vertical scanning radar on the right.



Strong nighttime movement of targets. Horizontal scanning radar on left shows strong northern directionality of targets. The vertical scanning radar on left shows targets flying at higher elevations (up to 5,000') than the previous 6-7PM example.



Conclusions:

Given the complications the authors report for the radar portion of the study during the spring field season and the lack of timeline graphs, it is difficult to draw any conclusions regarding migration or potential risks to migrants from the proposed project. These complications include the loss of data at low elevation due to clutter during the onshore portion of the study, the mid-season shift to the offshore site, and the influence of insects and the Crib light source on TPR and height estimates. During both the spring and fall seasons there was substantial radar downtime that also complicates interpretation of the data. During the fall season, the data provided in the report seems to indicate that migration was occurring and, contrary to the author's conclusions, migrants were passing through the high risk zones (within and below the RSZ) at a high passage rate. Below are a few of the author's statements with our concerns bulleted:

Pg. 23: "*Pooled target counts from spring and fall within 50 m increments are presented in* ***Figure 2.12****. The vast majority of targets flew well below the RSZ, presumably near the surface of the lake*."

- There appears to be several problems with Figure 2.12. The figure is reported to depict the pooled targets for both spring and fall, yet a rough estimate of the total number of targets shown in the graphic is well below 2 million targets. According to appendix C.3 and C.5 there were nearly 7.5 million targets recorded during the spring and fall offshore portion of the study. The y-axis label indicates that the labels represent the "top of 50-meter increments" – so the 50-m band contains height values that range from 0.1 – 50 m. From our experience, this is consistent with how the DeTect SQL query bins height values. If true, then the most densely populated bin (the 50-m bin) includes heights that are within the RSZ and should be colored red. The y-axis extends up to 2800 m and then starts over at 1500 m. Reporting information in this manner is confusing and the spring and fall height profiles should be shown separately.

- Figure 2.7 and particularly Figure 2.12 indicates a very high number of targets occurring within or near the RSZ. This is without correcting for volume sampled and without knowing what the VSR clutter map looked like. These figures and the data they represent appear to disagree strongly with the text in the report.

Pg. 23: *"During periods of peak activity in spring most targets flew well below RSZ, . . ."*

Pg. 64-65: "*It is plausible that attraction to the rapidly flashing Crib lights could have attracted birds, bats, and insects, thereby causing higher than expected nighttime TPR recorded by the radar. Thus, higher than expected nighttime TPR could have been a result of lights attracting aerial vertebrates, as well as possibly insects, which can be seen with radar"*

- The light source was located at about 17 m above water level which coincides with the mean night flight height. Is seems that vertebrate and invertebrate targets that were

attracted to the light source also influenced the large number of targets recorded below the RSZ.

Pg. 28: "*However, it is evident from the fall TPRs that nocturnal migration was occurring, and at high rates, offshore, although most of these nocturnal migrants flew above the RSZ, as was evident from the mean altitudes that exceeded 300 m regularly during the night."*

- That mean altitudes exceeded 300 m regularly during the night does not indicate that most nocturnal targets flew above the RSZ (see comment above regarding Figures 2.7 and 2.12). Due to the distribution of migrant flight altitude the mean is a misleading indicator of central tendency. As a simple example, if the VSR counted 100 targets with 80 targets at 100m and 20 targets at 1000 m the mean height is at 280 m– so, while the mean might suggest that targets are at safe height, the reality is that 80% of the targets have passed through the RSZ.
- As well, reporting the TPR that is below, within, and above the RSZ is misleading in that the three categories do not represent the same sampling effort. Reporting the number of targets ***per altitude band*** that are below, within, and above the RSZ reduces the discrepancy in sampling effort among the three categories and is a more fair comparison. For example, Table 2.4 on pg 18 reports that at night during the fall season TPR below, within, and above the RSZ are 126.3, 638.5, and 929.3, respectively. The three categories contain 0.5, 3.5, and 52 altitude bands respectively (assuming they sampled to 2,800 m). Adjusting the TPR to account for this difference results in a TPR of 252.6, 182.4, and 17.9 respectively. (This method of stating TPRs would then be in closer agreement with what is observed in Figure 2.12.)

- Page 21: Are targets flying just below or above the RSZ really at little or no risk from turbines? Studies suggest that migrants adjust their flight height with different environmental conditions, so slight weather changes may cause high risk.
- Can valid conclusions be made from only ~250 hours of offshore radar data for each season when the migration season (Aug 1 – Nov 1) is 2208 hours long? This may cause pulses of high migrant activity to be missed and prevent analysis at the fine scale needed to observe patterns and asses times when migrants may be at risk. Did it really rain that much or was data removed for other reasons? The small proportion of useable data makes it difficult to adequately draw conclusions from this study. A breakdown of times due to equipment failure, weather, and other reasons for the reduced times of useable data would be helpful.
- Page 8: X band radar is much more affected by insects than S band and may not have led to accurate counts on the VSR and reduced the number of hours sampled with "clear air".
- An algorithm should be included to correct for the sample volume structure and density of targets (targets/1,000,000 m^3) per 50 m altitude band per hour of each biological period. Otherwise, RSZ numbers can be erroneously skewed and inaccurate.

- Our data suggests that there are correlations between weather and migrant activity for both acoustic monitors for bats and with the radar data. Sparse or intermittent data collection may be the reason that these correlations were not detected in the radar data for this project either due to pulses/favorable conditions being missed or sample size being too low.
- P19 and 20, Tables 2.9 and 2.10: Applying a straight regression line to TPR during the migration season seems meaningless. Migration builds and then decreases during the season and tends to look more like a bell curve than a straight regression.
- The report implies that most of the birds found offshore are gulls based upon visual observations. However such observations would not easily detect nocturnal passerines nor bats. Nocturnal directional movement would be indicative of migrants rather than gulls which are localized. A review of eBird data for Cuyahoga County indicates that many passerines such as warblers are observed during spring and fall migration periods indicating that they are passing through, either over the lake or along the shoreline.
- Currently in the literature, the use of cut-in speeds for the protection of bats seems to be the best proactive measure once turbines are in place. That, along with seasonal curtailment, could be used if it is determined that additional protection is needed once turbines are up and running. These will likely be included in a Section 7 consultation for the Indiana bat and northern long-eared bat if they occur in the development site.

Additional comments on other aspects of the study

<u>Bat Acoustics:</u>

- Page 63: The report mentions that the Crib lighting may attract bats/insects as a reason for high numbers of calls. Turbine lighting may play a similar role in attracting insects/bats. This relationship between offshore turbines and bats is discussed in the literature supporting the possibility of turbines attracting bats including suggestions that structures in large bodies of water generally attract emerging aquatic insects as well.
- Page 59: Even though activity offshore is less than activity onshore, the monitors still show there are bat species present offshore and they will be impacted by the turbines.
- Bat mortality caused by wind turbines is heaviest during fall migration. Since the acoustic monitoring portion failed to survey for bats in the fall season, this report falls short of adequately describing potential effects to bats by this project.
- Additional relevant information concerning bats and offshore behavior has been studied by Stantec Consulting Services Inc. The citation is: *Pelletier, S.K., K. Omland, K.S. Watrous, T.S. Peterson. 2013. Information Synthesis on the Potential for Bat Interactions with Offshore Wind Facilities – Final Report. U.S. Dept of the Interior, Bureau of Ocean Energy Management, Headquarters, Herndon, VA. OCS Study BOEM 2013-01163. 119 pp.*

Bird Acoustics:

- Without fall data, it is hard to make conclusions, especially since the radar data was so different between the seasons. (Pg 48)
- Boat surveys had few passerines (1) (Pg 33 and 36), but the acoustics said there were some detected (Pg 46).
- We use the same acoustic monitors and our maximum range is under 100m (not the 300m as reported on Pg 44).

Boat Based Surveys:

- This type of survey is biased due to human observers working from the surface of the water, timing of surveys (gulls/ducks/cormorants are more active at dawn/dusk to go between feeding grounds and passerines active at night when most difficult to detect), and infrequent schedule of surveys (once a week or so). This methodology also is biased due to the conditions surveys were performed in that may not have been optimal for migration.
- Data from the boat surveys for birds is used to claim that most/all activity seen on the radar in the area was gulls/cormorants/ducks. The methodology of the boat survey biased the counts towards large, low flying birds that are active around dawn and dusk as the detection at night of any birds is very difficult visually. The acoustic data shows that there were passerines flying over that the boat surveys missed, either due to the infrequent schedule that they were conducted on or due to the bias of the methods used. Fall acoustic data would have helped because the radar results were much more typical.

Comments from the November 12 Presentation

- Failed to address northern long-eared bat as a proposed species.
- Referred to 1 year of acoustic monitoring. It was actually one season.
- Would like to see the NEXRAD study, the distance between the radar site and the development site seems too close for optimum study.
- Focused primarily on avian fatalities. Most wind facilities have found higher bat than bird fatalities. This includes not only the Appalachian ridges but also multiple facilities in Wisconsin and at least one in northern Indiana.
- We question the appropriate use of the equation for predicting bird fatalities and also as referring to it as the Service's Model. The fact that it was utilized once by a Field Office does not make it the Service's.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

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April 24, 2009

Mr. David Nash
McMahon DeGulis LLP
812 Huron Rd., Suite 650
Cleveland, OH 44115

Dear Mr. Nash:

This is in response to your recent e-mail regarding an Avian Distribution and Use Study for the proposed Great Lakes Wind Energy Center, Cleveland, Cuyahoga County, Ohio. Though many details have not yet been decided, it is likely that the project will include 3 or more turbines of undetermined size approximately 3 miles offshore of Cleveland, in Lake Erie. A Feasibility Study describing the project in depth is anticipated to be released publicly on April 30, 2009.

As you know, the U.S. Fish and Wildlife Service (Service) and Ohio Department of Natural Resources (ODNR) have been actively involved in working with wind power developers throughout the State of Ohio and the Great Lakes Region through venues such as the Ohio Wind Working Group and Great Lakes Wind Collaborative. Specifically regarding this project, the Service and ODNR have provided informal recommendations and suggestions at numerous meetings (most recently on March 27, 2009) and conference calls (most recently on April 13, 2009) over the past few years regarding fish and wildlife issues, lake habitat, and the permitting aspects of siting an offshore wind project in Lake Erie, one of Ohio's most significant natural resources.

As you are aware, offshore wind power development within the waters of the Great Lakes has not yet been developed, though several companies are considering it in both the U.S. and Canada. This project could very well be the first of its kind in the region, and as such could be precedent-setting in terms of providing pre-construction, construction, and operational standards for Great Lakes offshore wind. Similarly, because offshore wind power has not been accomplished in the Great Lakes, or even in North America, there are many issues that have yet to be addressed, and a pilot project would be a good opportunity to take a first look at such issues. As a self-proclaimed "pilot project," we have all agreed since the first inception that this project can and should serve as a model for other offshore projects, to show how to "do it the right way," and to make sure it is a "green energy" project in every sense of the phrase and not simply renewable energy. As such, we believe that we have been clear in our desire to work closely with the project proponents to avoid and minimize impacts on fish and wildlife and their habitat, and to monitor and respond to any impacts that may occur.

As discussed at the March 27, 2009 meeting, both the Service and ODNR believe it is necessary to take a comprehensive look at all the details of the proposed project, and to provide

recommendations on necessary surveys based on the development plan. At this time, we understand that a decision as to the number of turbines, their location, and their size has not yet been made. It will be difficult for us to fully evaluate the need for various surveys and methods without this critical information. Further, while we do believe that pre-construction bird surveys are a critical component of the wildlife surveys needed, fisheries, benthic, and bat studies will likely also be necessary. As mentioned at the meeting, based on the general project location, the project lies within a region designated as having "extensive" or "moderate-high" limiting factors based on ODNR's Wind Turbine Placement Favorability Analysis Map for offshore projects in Lake Erie (http://www.ohiodnr.com/LakeErie/WindEnergyRules/tabid/21234/Default.aspx). This indicates that multiple fish, wildlife, habitat, cultural, and/or historical issues exist in this region that must be addressed. In lieu of reviewing and recommending individual surveys at various times, we would prefer to recommend and comment on the suite of surveys necessary to fully evaluate the project at one time. Additionally, many of these surveys could be completed concurrently, possibly reducing total time and money spent on surveys for the project. For these reasons, we suggest a comprehensive look at all fish, wildlife and habitat issues, and a pre- and post-construction survey protocol that defines how each will be addressed, similar to how the Service and ODNR have been reviewing land-based wind power projects.

ODNR is in the process of developing a draft Lake Erie Open Water Sampling Protocol for Offshore Wind Power Siting. This document will include a broad suite of studies to address most natural resource issues associated with offshore wind power siting. For birds, this draft document recommends boat or aerial transects to identify waterfowl and waterbird use of the project site as well as avian and bat radar monitoring. Likewise, recommendations from the Service's Division of Migratory Birds also include both a transect and a radar component. The proposed Avian Distribution and Use Study lacks the radar study component. While we agree that this is a demonstration project and does not warrant the same level of study as a full-scale development, we believe that a radar component is required for the following reasons:

1) The Avian Risk Assessment Report and accompanying Analysis of WSR-88D Data to Assess Nocturnal Bird Migration Offshore of Cleveland, Ohio provided to our office for review several weeks ago contained a significant amount of useful information; however, the key limiting factors of this information and the inherent problems with using NEXRAD data for assessing the potential for avian impacts at wind power facilities are that the NEXRAD radar does not encompass the rotor-swept area, and that it is difficult to discern the vertical distribution of targets. Therefore, in order to assess nocturnal bird use and flight height within the project area, site-specific radar monitoring is necessary. Because this is a demonstration project, we would be willing to consider a modified scope of study versus what would be recommended for a full-scale offshore wind project. For example, we may use the NEXRAD analysis to identify peak migration times, and focus radar studies during those times.
2) There are real concerns that it will be difficult, if not impossible to accurately assess post-construction mortality at any offshore wind farm. Several methods have been tried in Europe, but so far they have been of limited scope and utility. In order for the State and Federal wildlife agencies to have a level of certainty that nocturnal migrating song birds will not be at significant risk from this proposed facility, we need site-specific information on the flight height and density of birds using the rotor-swept airspace.

3) Depending on the project area, impacts to bats may also be a concern. Bat activity within the project area could be assessed by radar coupled with acoustic monitoring and thermal imagery for validation purposes.

Another significant concern relative to the proposed Avian Distribution and Use Study is that the spring migration season, particularly for waterfowl, is already well underway. By the time that the study team is mobilized and the study, as proposed in the Avian Distribution and Use Study, begins, peak waterfowl migration will have passed. Based on recommendations from the Service's Division of Migratory Birds, the key times to monitor waterbirds and waterfowl in Lake Erie during spring is from the time that lake ice begins to thaw through May 10. Because there are potentially significant congregations of some waterfowl species within the project area during the migration season (for example, Lake Erie including the project area, supports continentally important populations of red-breasted merganser as documented within the Avian Risk Assessment Report, and by the Service's Division of Migratory Birds), we strongly believe that it is not appropriate to complete an abbreviated waterfowl survey in the spring. Instead, we recommend commencing the waterfowl and waterbird monitoring this fall, and continuing it into the spring of 2010 to obtain a solid understanding of bird use within the project area for the entirety of the migration season. Additionally, there is an option to combine the waterfowl surveys with ODNR's proposed aerial waterfowl surveys during fall of 2009 and spring of 2010, which will be funded by a Service grant, providing monetary savings to the project proponents.

While we understand that there is a desire to move this project forward quickly, based on the number of State and Federal permits that will be required to complete the project, including a Section 404 permit from the U.S. Army Corps of Engineers and accompanying NEPA review, a Section 401 permit from the Ohio Environmental Protection Agency, a Submerged Lands Lease and other permits from the Ohio Department of Natural Resources Coastal Management Program, and a Certificate of Environmental Compatibility and Public Need from the Ohio Power Siting Board, we believe there is ample time to complete these studies prior to when project construction begins. Again, as a first of its kind, we anticipate that the permitting process for this project will be comprehensive and will likely require a significant amount of time to complete. Wildlife (avian and bat), fish and habitat studies could be conducted concurrently with preparing and submitting project applications to State and Federal agencies for review and public notice. Failure to conduct comprehensive studies for this project will prolong the lack of information regarding potential impacts to wildlife. This will make developing a full-scale project more difficult and defeat the purpose of developing a pilot project.

In summary, the Service believes this project is a unique opportunity to take a close look at how fish, wildlife, and Great Lakes habitat may be impacted by a pilot wind power development. The pre-and post-construction monitoring that is designed for this project will likely serve as a model for future offshore wind power projects in the Great Lakes. In lieu of taking a piecemeal or rushed approach to recommending surveys for various fish, wildlife and habitat impacts, we recommend looking comprehensively at all environmental aspects of the project, and recommending both pre- and post-construction survey protocols that will address all concerns in a timely, efficient, and cost-effective manner. This is how we typically review on-shore wind power developments. We believe that the current Avian Distribution and Use Study is too limited in scope to provide the necessary information to appropriately evaluate this project. Additionally, we do not have all the project information necessary to recommend the most

effective survey protocol for fish, wildlife, and habitat. Finally, due to the numerous State and Federal permits required for this project, we do not believe that conducting a full fall/winter/spring bird use study focusing on key migration times would delay implementation of the project. In fact, the information that the Service is requesting will be critical in completing any NEPA document required for the Section 404 permit. Until a full project scope is ready, we are not in a position to recommend a full suite of fish, wildlife, and habitat pre- and post-construction studies; however, we are committed to making these recommendations in a timely manner when complete project information is available.

Thank you for the opportunity to review this proposal. We look forward to working with you and your partners to develop a fish, wildlife, and habitat survey protocol that suits the informational needs of the permitting agencies and balances those needs with the nature of a demonstration-scale project. If you have questions or would like to discuss this further, please contact Megan Seymour at extension 16 in this office.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Supervisor

cc: Keith Lott, ODNR, 2514 Cleveland Road East, Huron, OH 44839
Stuart Siegfried, PUCO, 180 E. Broad St., Columbus, OH 43215
Dave Leput, Buffalo District Corps of Engineers, Buffalo, NY
John Watkins, ODNR, Office of Coastal Management, Sandusky, OH

Attachment 2

U.S. Fish and Wildlife Service Avian Radar
Preliminary Data from Cleveland, Ohio, Early Fall 2017
October 2, 2017

Attachment 2 contains preliminary data from the U.S. Fish and Wildlife Service's (Service) avian radar unit located on the shore of Lake Erie in Cleveland, Ohio during fall 2017. The radar unit is actively collecting bird and bat fall migration data that may inform the analysis in the LEEDCo Project Icebreaker Draft EA.

Summary of Migration Timing, Direction, and Altitude

Below are visual summaries of the data analyzed to date (August 3 – September 5), showing the pulsed nature of migration using an hourly time series, a set of graphs showing the main direction of migrants in the four major biological periods (dawn, day, dusk, night), and graphs showing the volume-corrected density of migrants by altitude. These graphs should be taken as preliminary, as a large portion of the migratory season has not yet occurred and full analysis has not been completed. In addition, these data are being collected on the coastline, out of range of the project area. However, these findings do show a substantial amount of migratory activity, occurring in part from lake crossing movements, with substantial migrant traffic within or near the rotor-swept zone.

While data collection is ongoing, the data presented in this attachment are only from the first part of the fall 2017 migration season, when migration activity was only underway for about 2 weeks (Figures 1 and 2). This is the only data that was available for analysis at this point in time, however as the season progresses additional information will be obtained and analyzed. From our other radar survey locations across the Great Lakes, we observe that fall migration generally peaks around mid to late September (Horton et al. 2016, Rathbun et al. 2016). However, from August 3 – September 5 on the Cleveland shore we recorded large numbers of migrants moving towards shore, presumably crossing Lake Erie. The conservative estimate from the vertical scanning radar (VSR) indicates that even during this early migration period, 2,000-2,500 targets per kilometer per hour were moving through the area during the night. Depending on the night, many of these targets were moving in from over the water (Figure 3 and Attachment 2a). While our site is on shore, these targets had high densities within or just above the proposed rotor-swept zone.

Our radar units can record data out to 2 nautical miles (nm) from the unit, which is located on the shoreline of Lake Erie. Thus, we are able to see approximately 2 miles out across the lake. Within this offshore area, we see targets arriving from further out in the lake (Attachment 2a) and often continuing straight in towards land. We see no reason to believe that these migrants would have changed their path just before our radar unit observed them, leading us to believe that the targets have crossed over Lake Erie.

At the Cleveland site the data collected to date also show high migrant use along the shoreline of Lake Erie. However, this does not mean that there is no or low activity over the open water. Our radar units often recorded targets flying in from over the open water, and potentially landing in the near-shore area at dawn. These targets that arrive from over the lake are part of the reason that we find a concentration of migrants in the shoreline area.

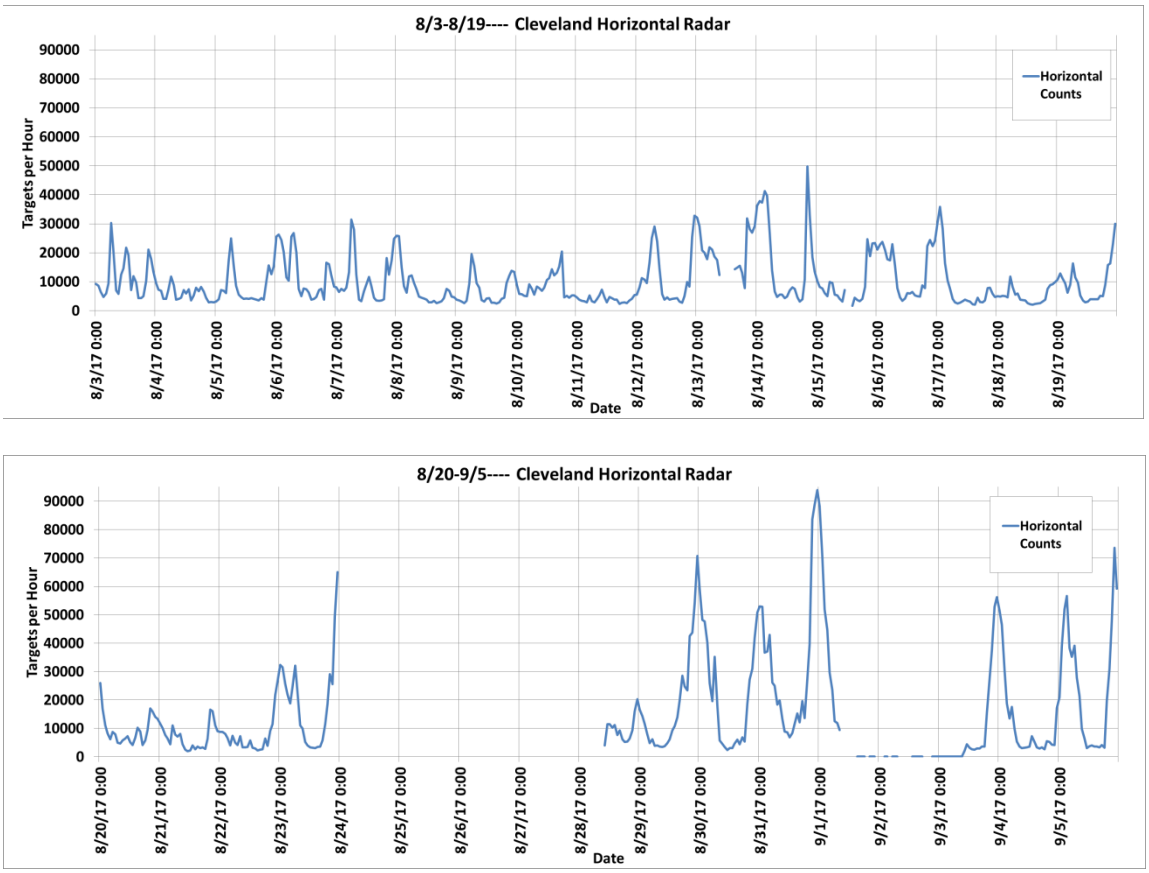


Figure 1. The above figure shows an hourly time series of radar targets on the Horizontal Scanning Radar (HSR) in Cleveland from August 3 to midnight September 6, 2017, with midnight centered on the vertical gray lines of the graph. Note the different scales between the Horizontal Scanning Radar (Figure 1) and Vertical Scanning Radar (VSR, Figure 2). The HSR covers a wider geographic area, but is sensitive to counting the same individual target multiple times or having area blocked by obstacles on the landscape. The VSR, while covering a smaller area, is less likely to have issues with multiple-counting or blockage, and provides a more conservative estimate. Spikes in targets per hour centered around midnight are indicative of migration events. Apparent migration events are indicated on August 13-17, 20, 23-24, August 30-September1 and September 4-6. The HSR was not operational from approximately 1:00 am August 25 until mid-day August 29 and again on mid-day September 2-4. The pulsed nature of these migration events necessitates continuous sampling. Gaps in the data represent time periods when the radar was down due to malfunction or time periods where large amounts of rain or other clutter occurred.

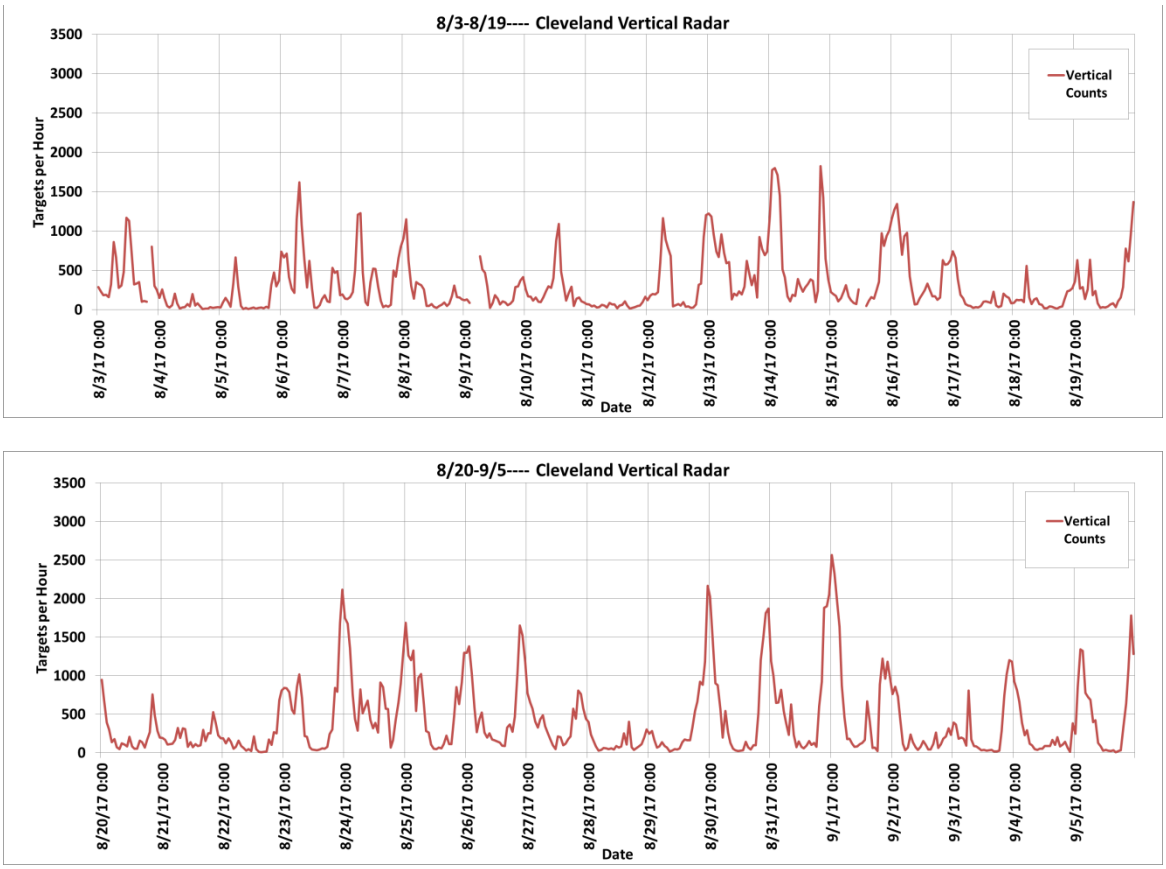


Figure 2. The above figure shows an hourly time series of radar targets on the Vertical Scanning Radar (VSR) in Cleveland from August 3 to midnight, September 6, 2017, with midnight centered on the vertical gray lines of the graph. Note the different scales between Horizontal Scanning Radar (HSR, Figure 1) and Vertical Scanning Radar (VSR). The HSR covers a wider geographic area, but is sensitive to counting the same individual target multiple times. The VSR, while covering a smaller area, is less likely to have issues with multiple-counting, and provides a more conservative estimate. Apparent migration events (indicated by increased targets centered around midnight) are indicated on August 8, August 13-17, August 23-27, August 30-September 2, and September4-6. High numbers of targets centered around midnight indicate nocturnal migration events. Gaps in the data represent time periods when the radar was down due to malfunction or time periods where large amounts of rain or other clutter occurred.

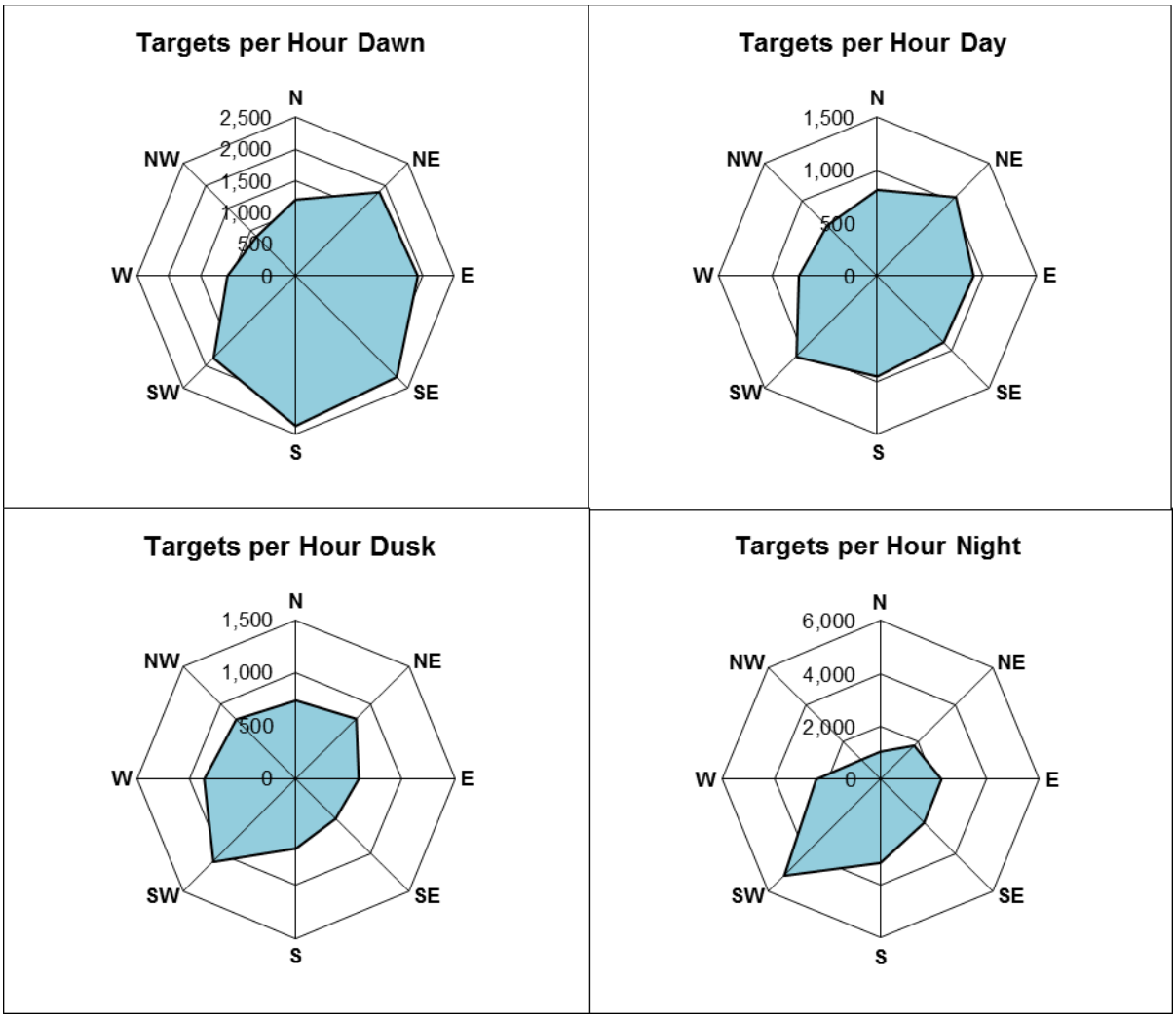


Figure 3. Rose graphs showing the flight direction of migrants during each biological period (dawn, day, dusk, and night) during early fall migration in Cleveland, Ohio. Note the different scales on the four graphs. Night movement shows a strong southwest direction, as well as a substantial southerly component. At dawn, directionality is consistent with migrants over water reorienting towards shore. As the data still constitutes early season movements, we expect there to be more migration nights added to the dataset and these directions may shift as the season goes on.

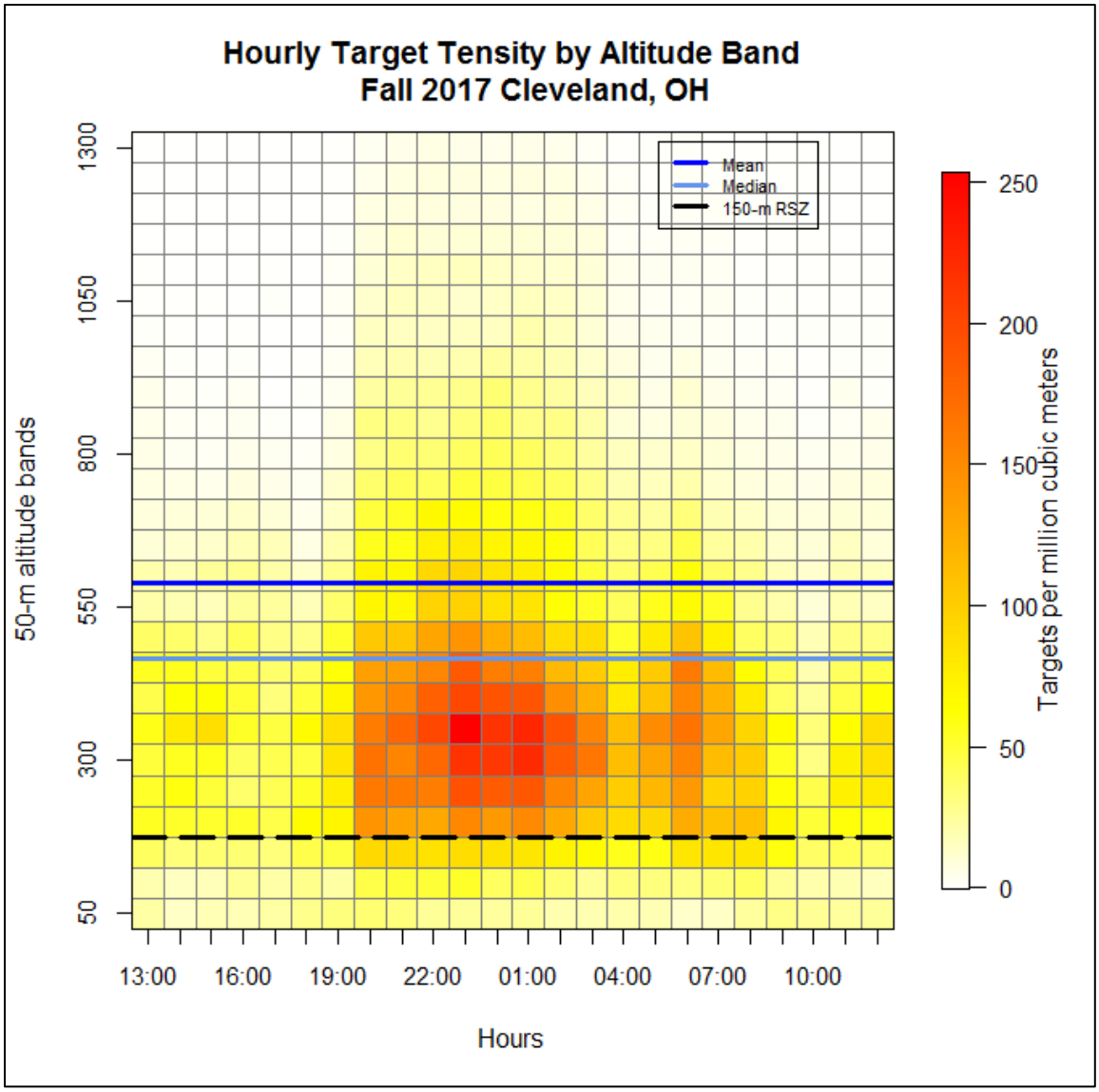


Figure 4: Heat map of target density by altitude and hour for early fall migration in Cleveland, Ohio. Hour is on the x-axis, centered on midnight (0:00), while altitude is on the y-axis, in 50-meter (m) bins. The label for each bin represents the top of that bin, so the 50 m bin is from 0-50 m. The radar data is truncated at 1300 m altitude for clarity, and target density is relatively low at altitudes of 1300-2800 m. Warmer colors indicate higher target density. Mean and median nocturnal flight altitudes are indicated by the dark and light blue lines, respectively. Note that these measures are affected by the upward-skewed distribution of targets, and both lie above the altitudes of maximum density. A rotor-swept zone of 150 meters is indicated by the dashed black line. These data provide a more precise view of migratory activity than the NEXRAD data presented in the EA, since 1) individual targets are tracked rather than reflection densities, and 2) 50 m bins are used rather than 300 m bins. Note also that the highest density is relatively close to the rotors-swept zone, and atmospheric conditions can raise or lower the center of density. In addition, due to clutter issues at our site and narrower beam width at low altitudes, we are likely underestimating the density of migrants at altitudes below 150m.

TrackPlots

Below are a series of 15 minute TrackPlots for the horizontal scanning radar (HSR) that is automatically generated by the radar software. These data have not undergone final editing and they may contain minor errors. Each line represents either a single flying bird, bat, or tight flock of these animals (target) detected by the radar unit over a 15 minute period. The images have been selected to demonstrate migrants engaged in overwater flight during moderate to high periods of migration.

The tracks overlay a satellite photo that accurately shows the location for this portion of Cleveland and Lake Erie with north corresponding to up in the image. The shoreline is shown as a white line overlaying the tracks and the radar location is depicted as a white dot near the center of the image. The color of the track identifies the direction of travel for each target as does the orientation of the line. The color wheel in the upper right of each image decodes the direction of travel with red being south; blue, north; green, east; and violet, west. Collectively, the images demonstrate large numbers of migrants approaching the shoreline from open water that most likely crossed the lake from the north shore. Date and time are embedded in the graphic in the top left corner starting with year, month, date, and beginning time of the recording in military time. The fourteen images below capture migration events with large or predominant lake-crossing components during 12 separate nights (August12-September 17), approximately 1/3 of nights in this timeframe. The image below was recorded on August 12, 2017 starting at 5:15 am (and extending through 5:30 am), Eastern Standard Time.

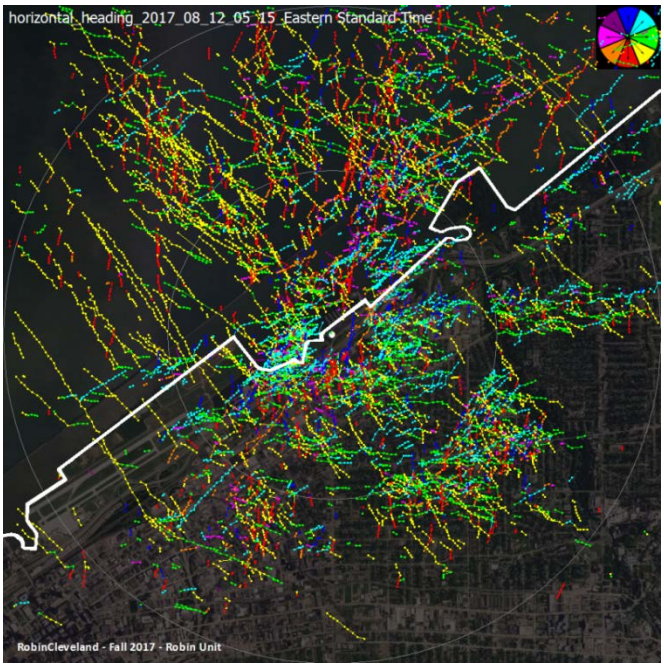


Figure 5. Moderate migration from offshore. Migration typically is decreasing at this time due to the approach of dawn.

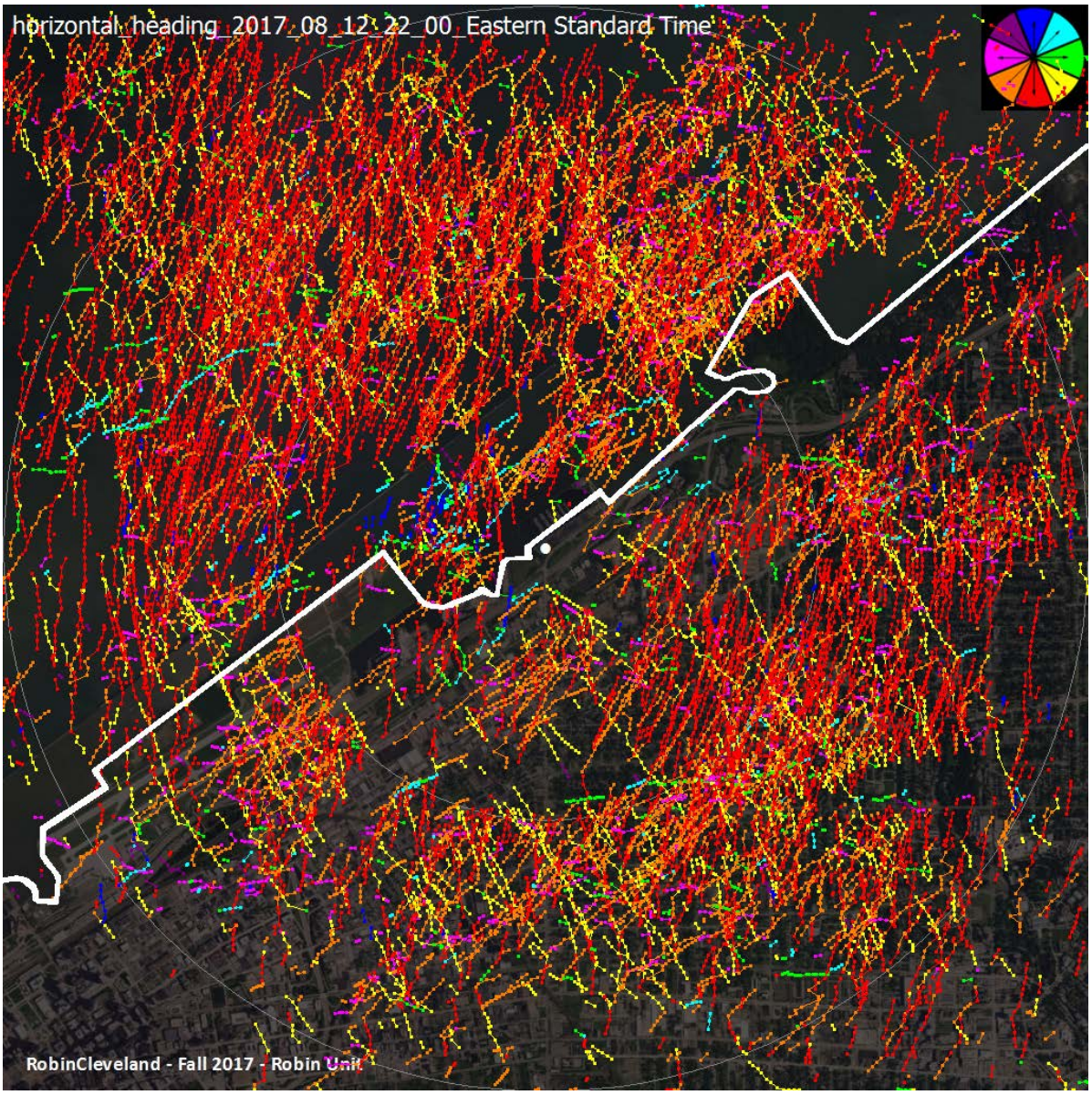


Figure 6. This graph depicts moderate migration coming from off-shore and moving to the south and south-southwest. Migration typically peaks within several hours of midnight, building from just after dusk and tapering off as dawn approaches.

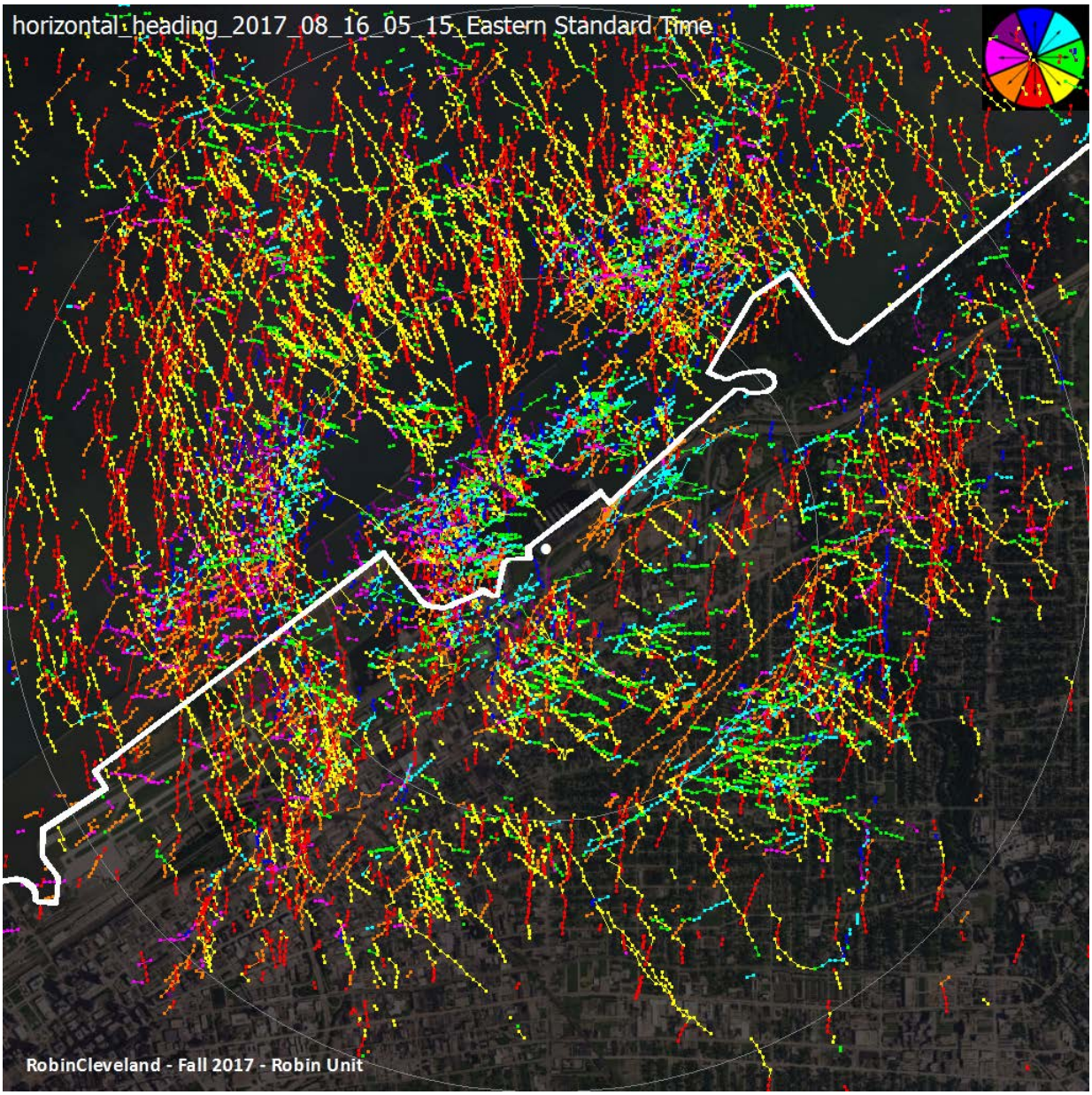


Figure 7. This graph depicts another example of moderate migration. Targets are flying towards shore before dawn.

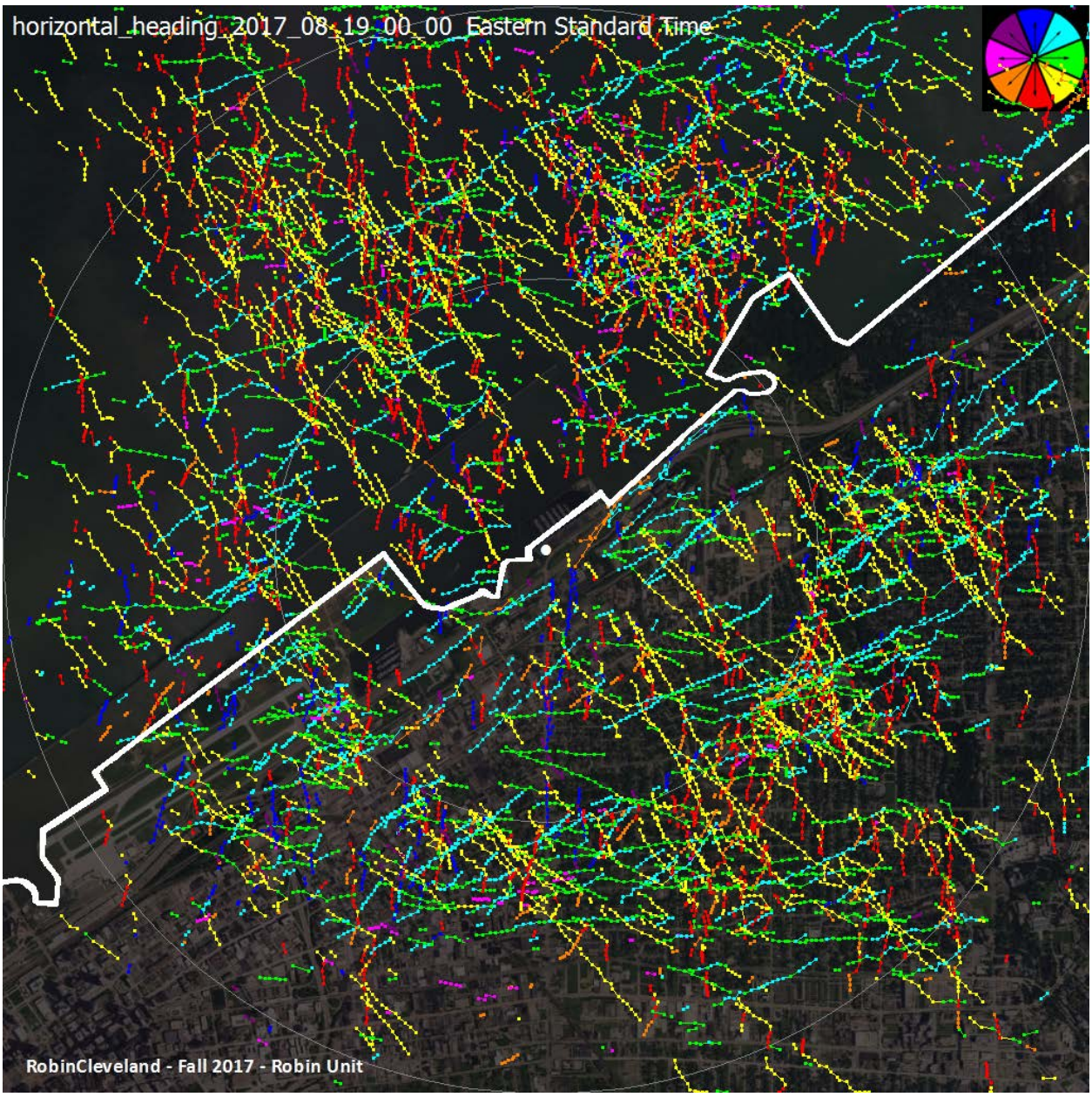


Figure 8. Light to moderate migration across Lake Erie, moving to the southeast and south, as well as parallel to shore to the northeast at midnight.

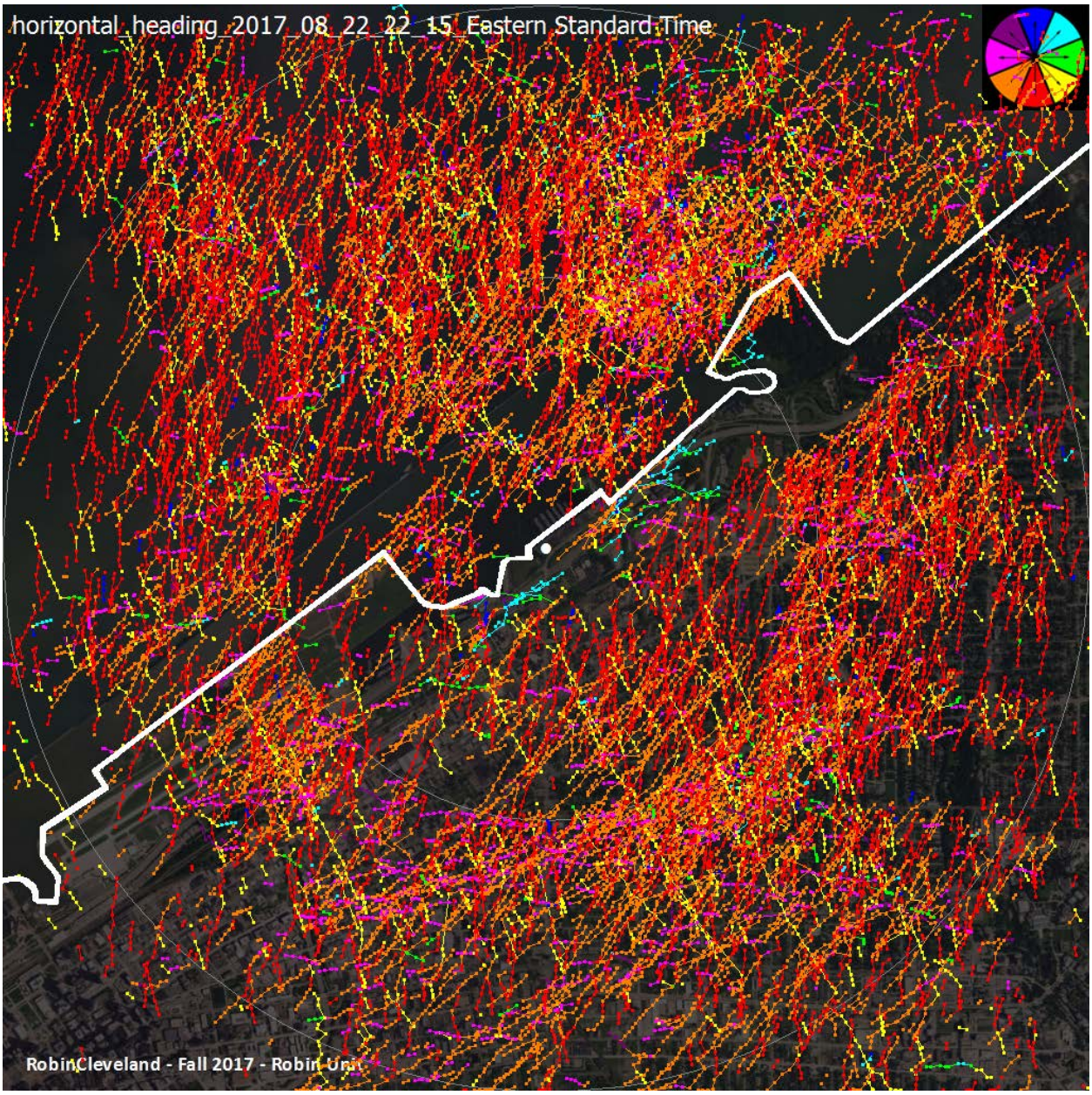


Figure 9. Heavy migration moving primarily in a south and southwest direction as midnight nears.

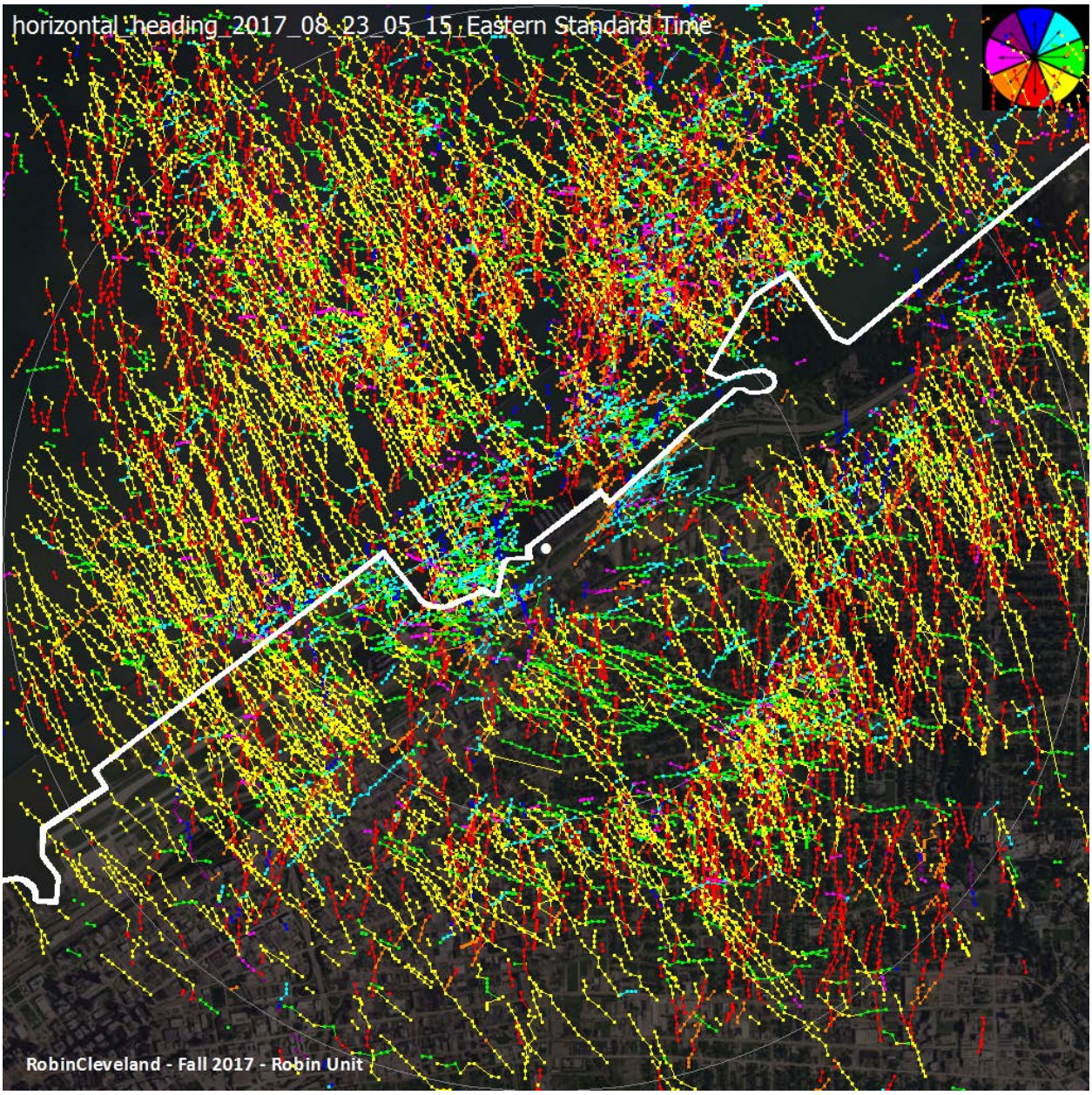


Figure 10. This graph depicts moderately heavy migration near dawn moving predominantly to the south and southeast.

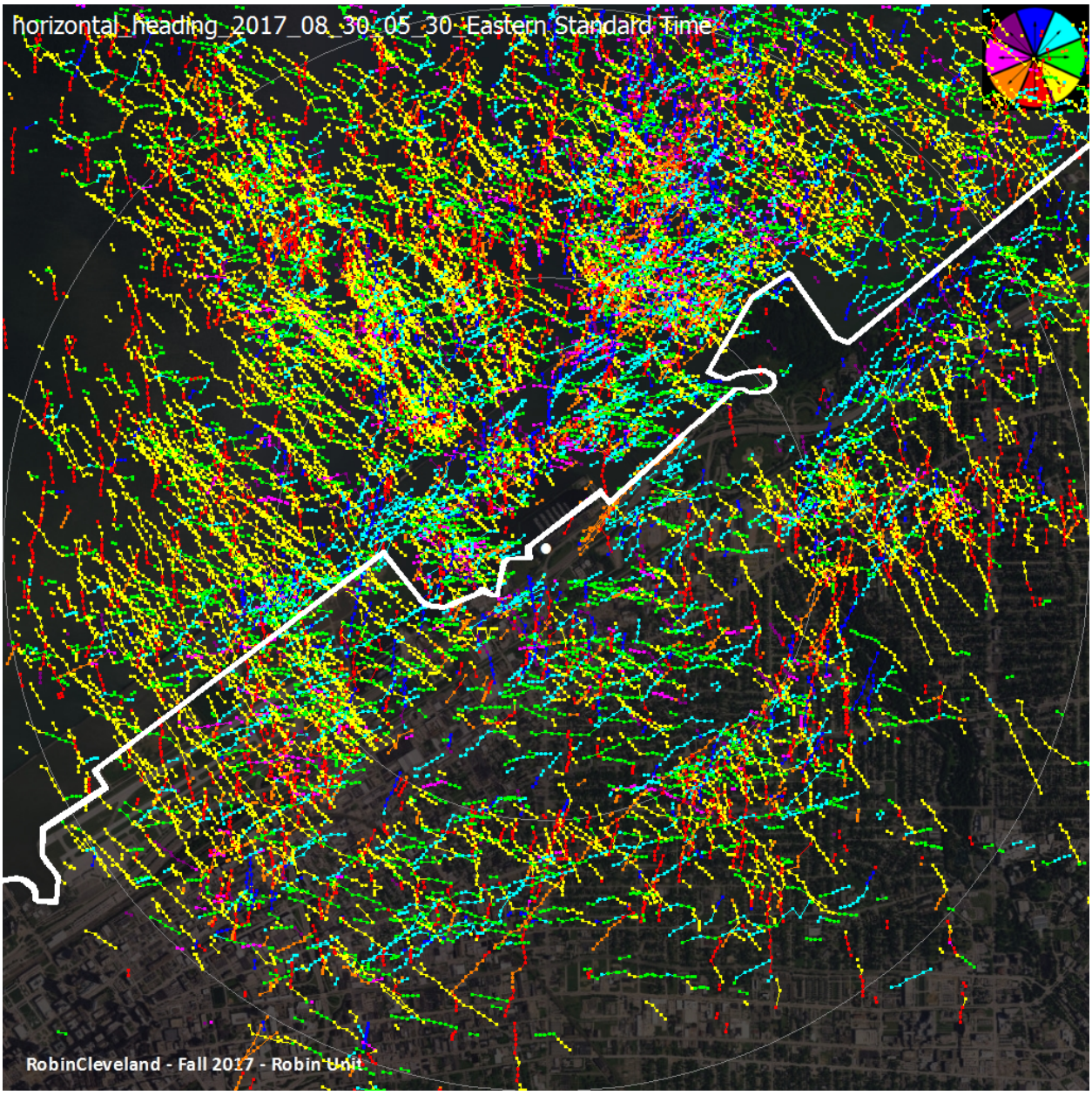


Figure 11. This graph depicts another example of moderate migration before dawn.

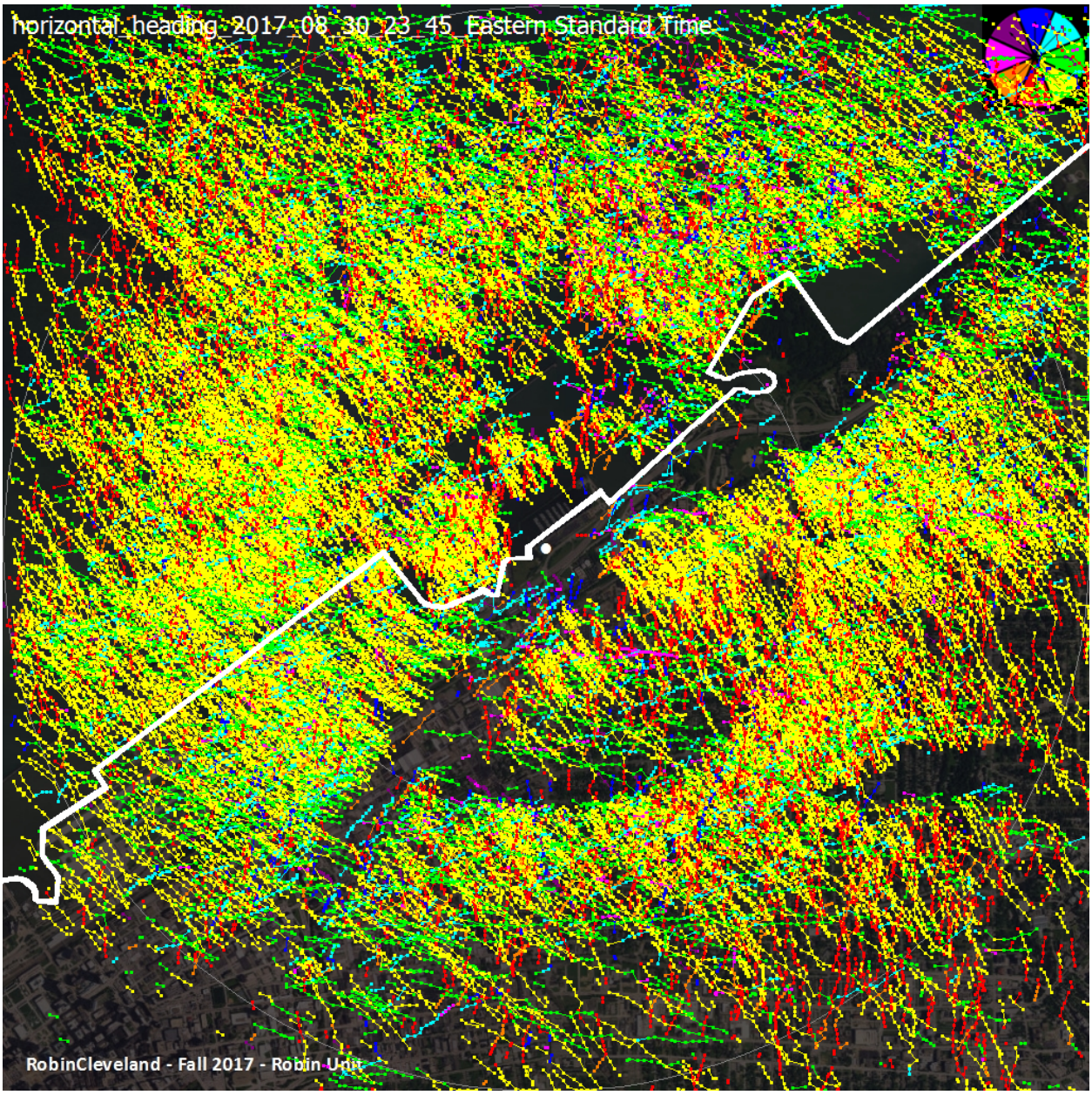


Figure 12. This graph depicts heavy migration just before midnight moving in a southeast direction.

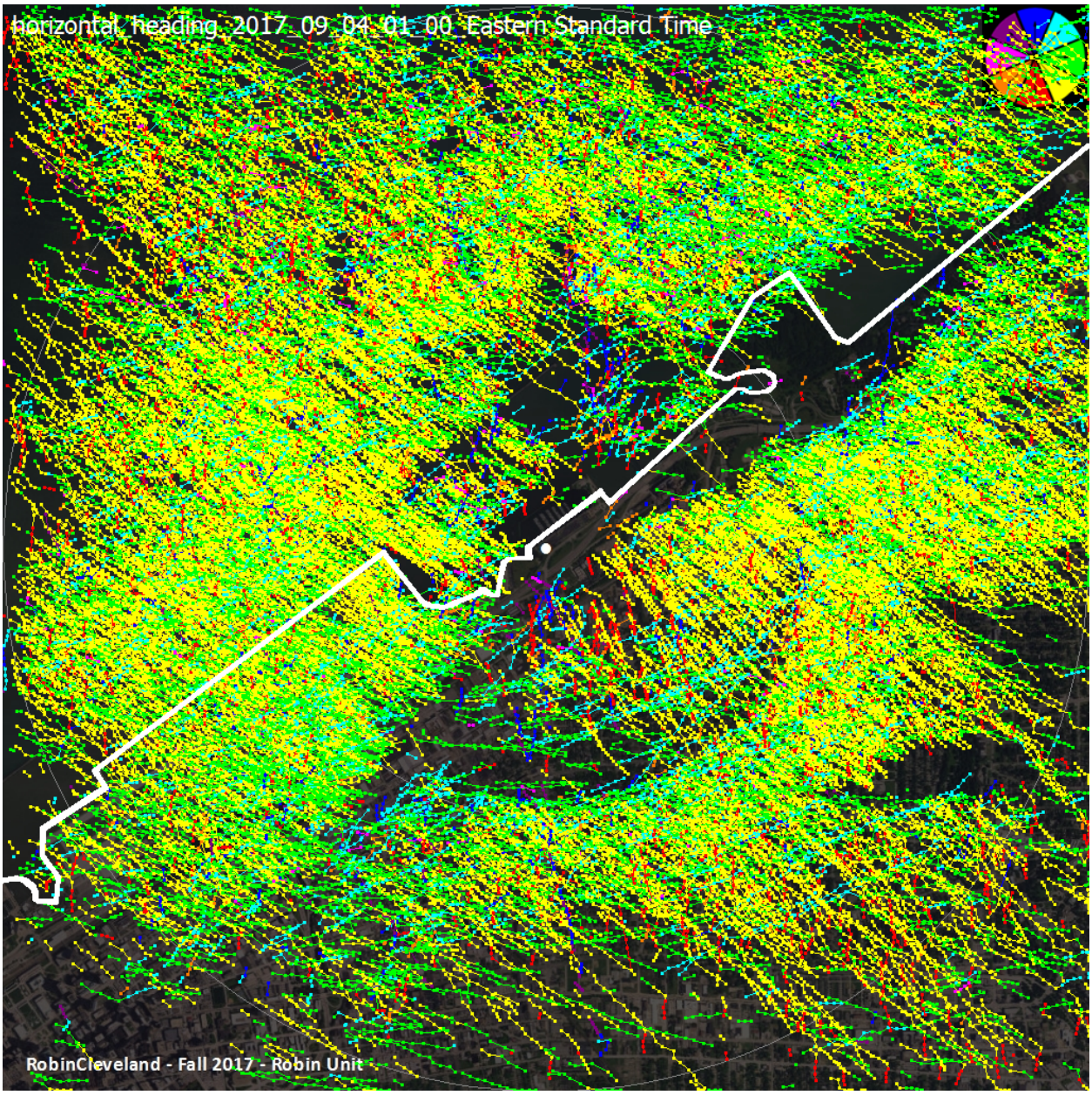


Figure 13. This graph depicts heavy migration an hour after midnight moving toward the southeast and east.

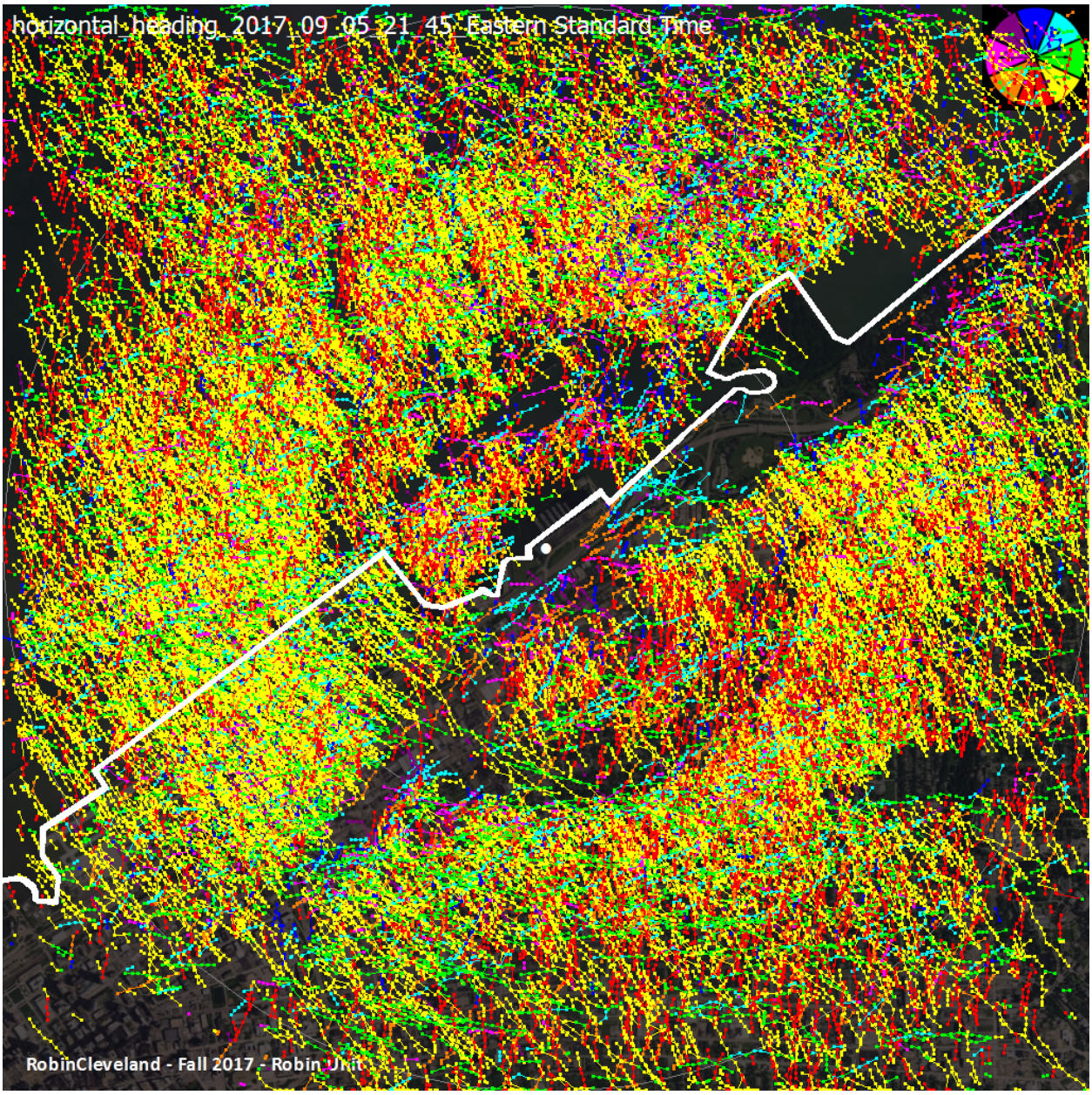


Figure 14. This graph depicts heavy migration in earlier part of the night moving generally southeast.

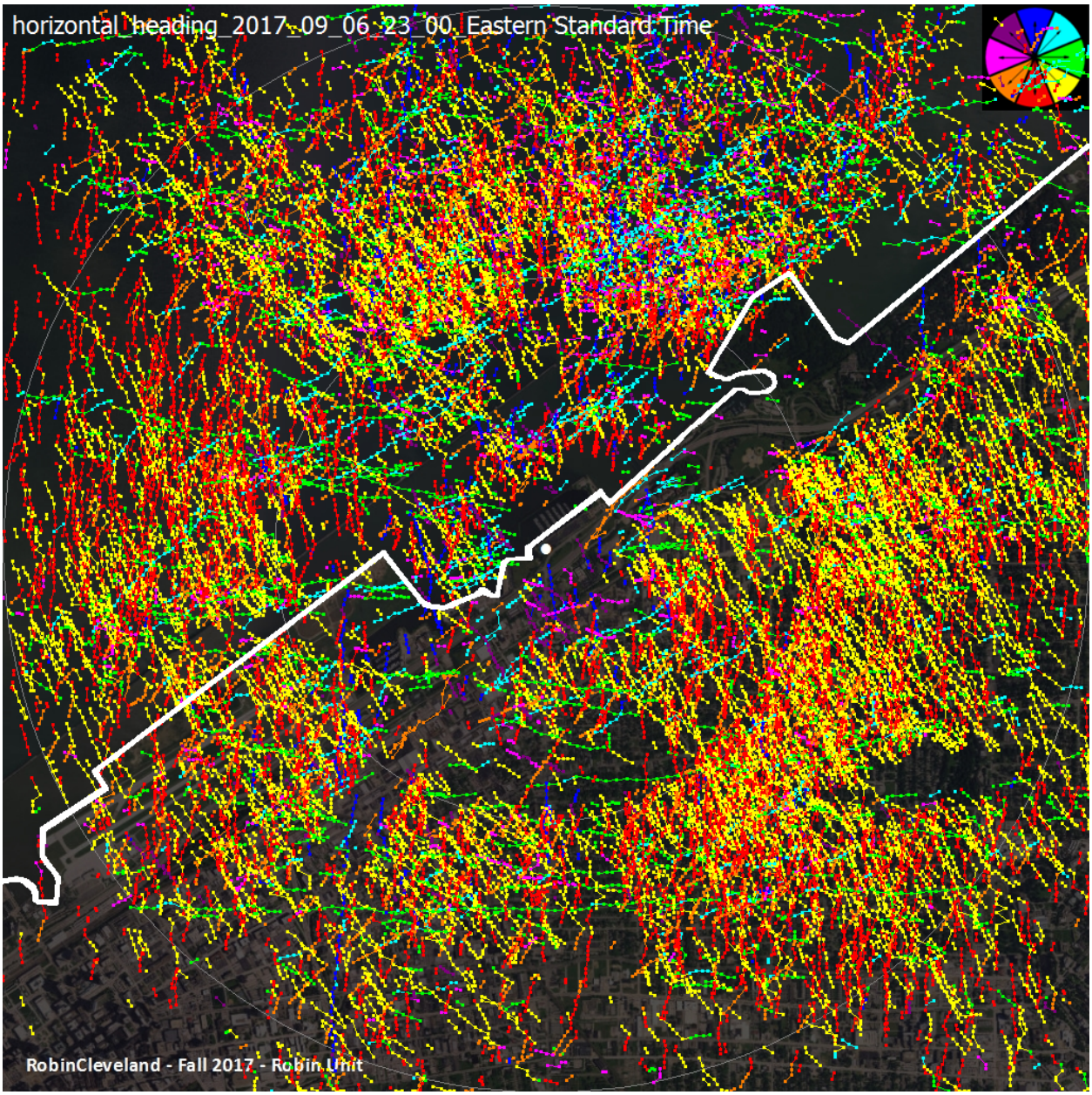


Figure 15. This graph depicts moderately heavy migration near the middle of the night with targets moving primarily south to southeast. Migration is pulsed and intensity varies from night to night.

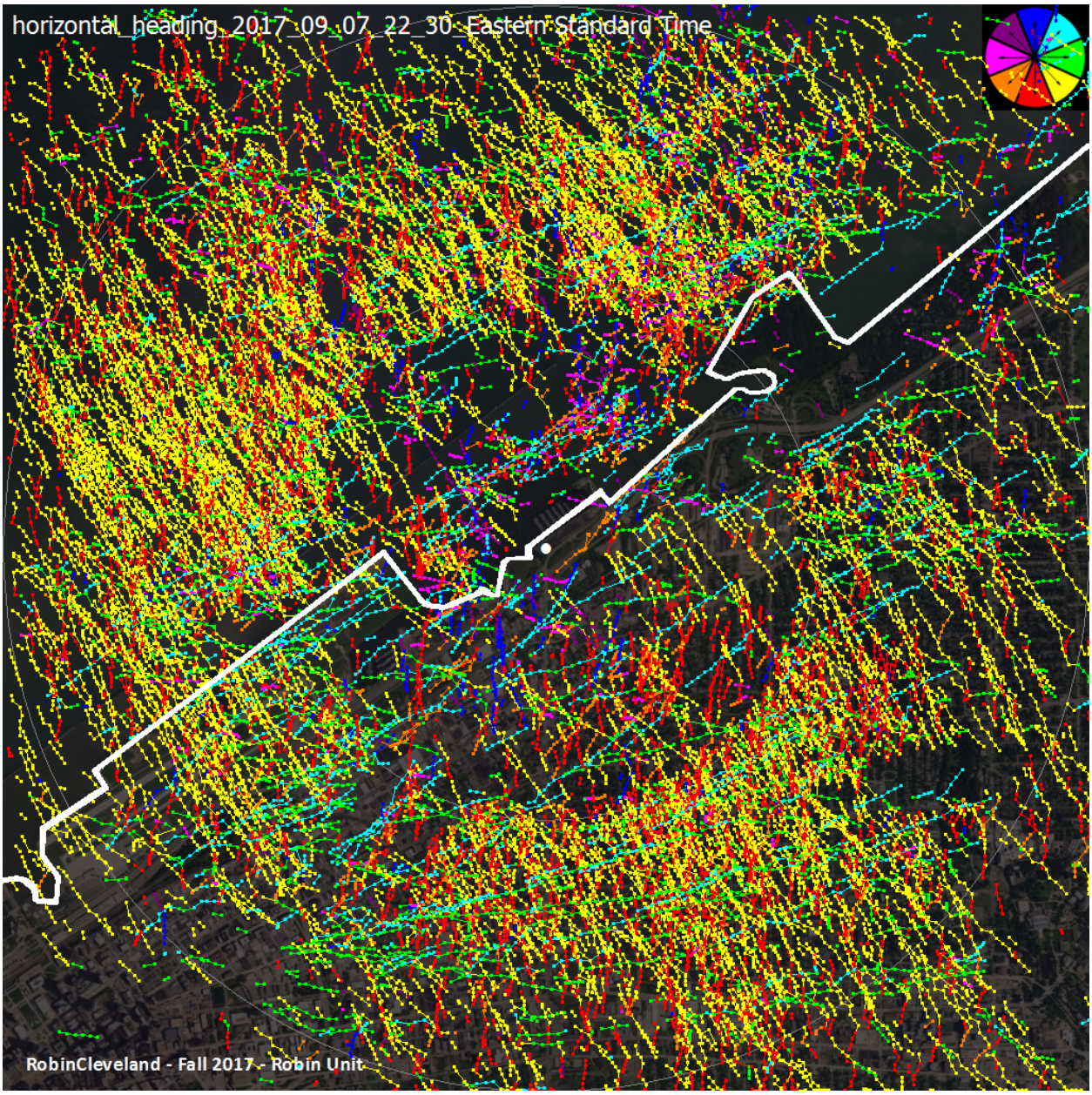


Figure 16. This graph depicts moderate to moderately heavy migration near the middle of the night.

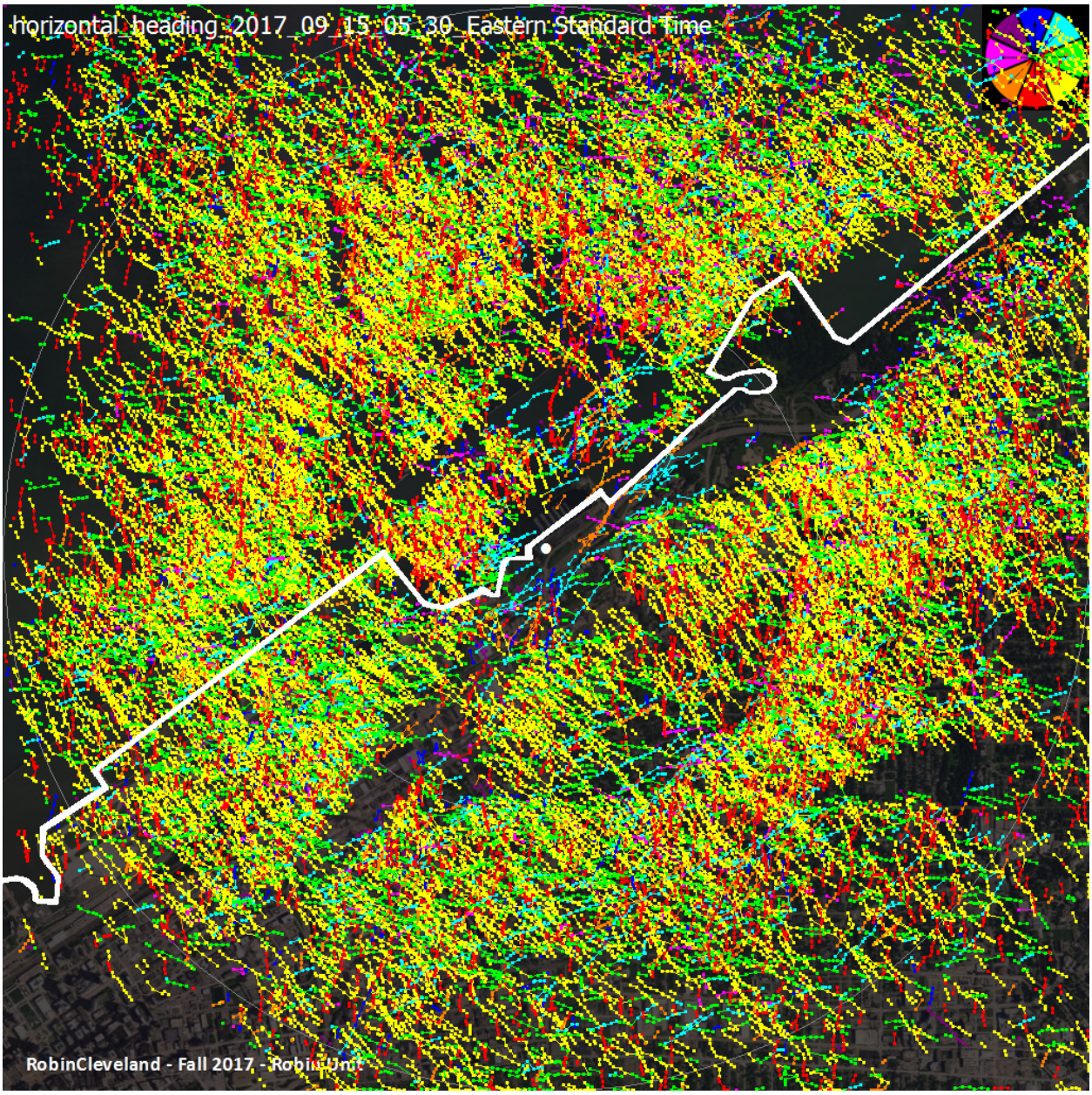


Figure 17. This graph depicts heavy migration to the southeast although getting closer to dawn. Migration varies by night, by time, and by time of season.

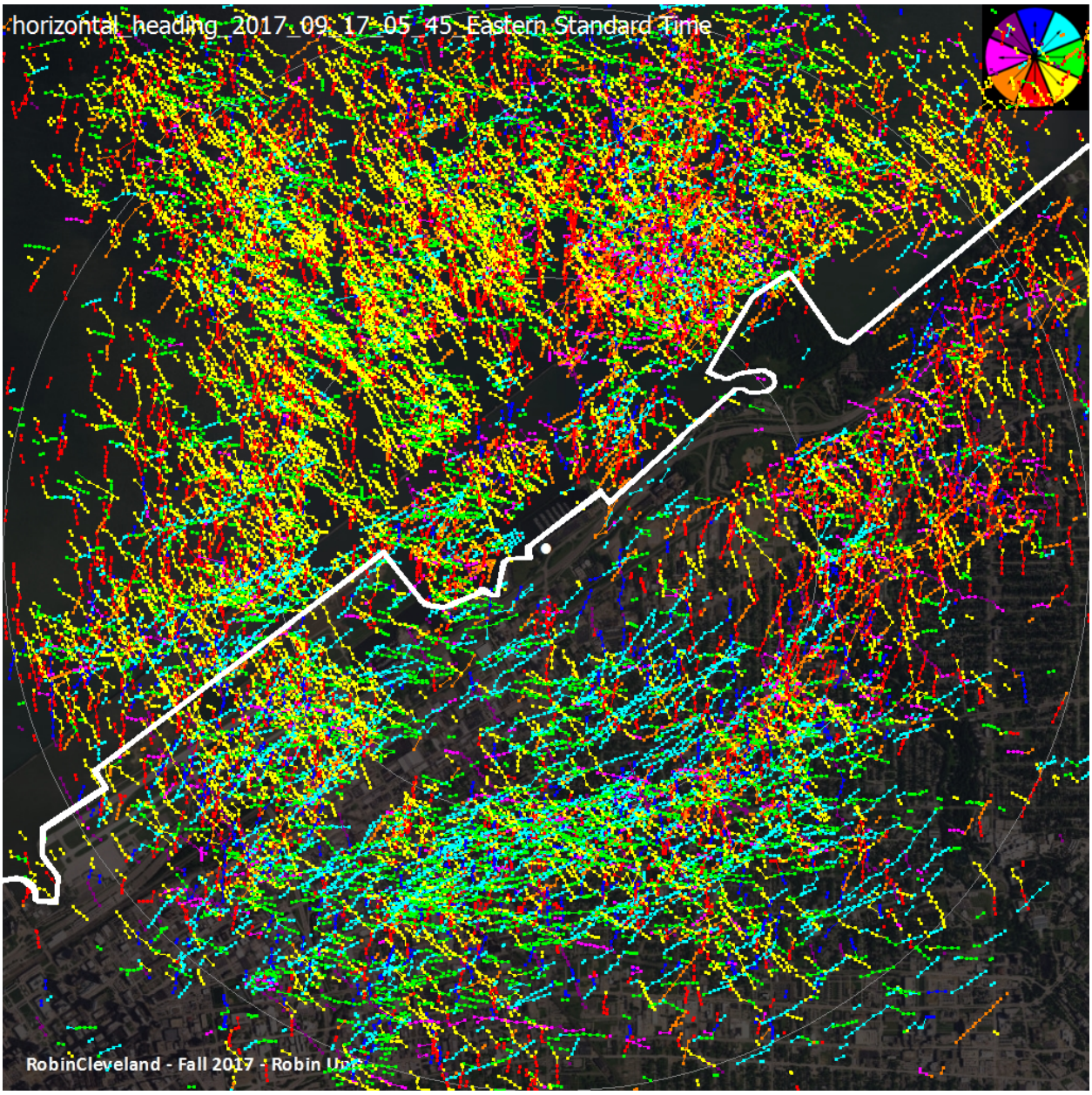
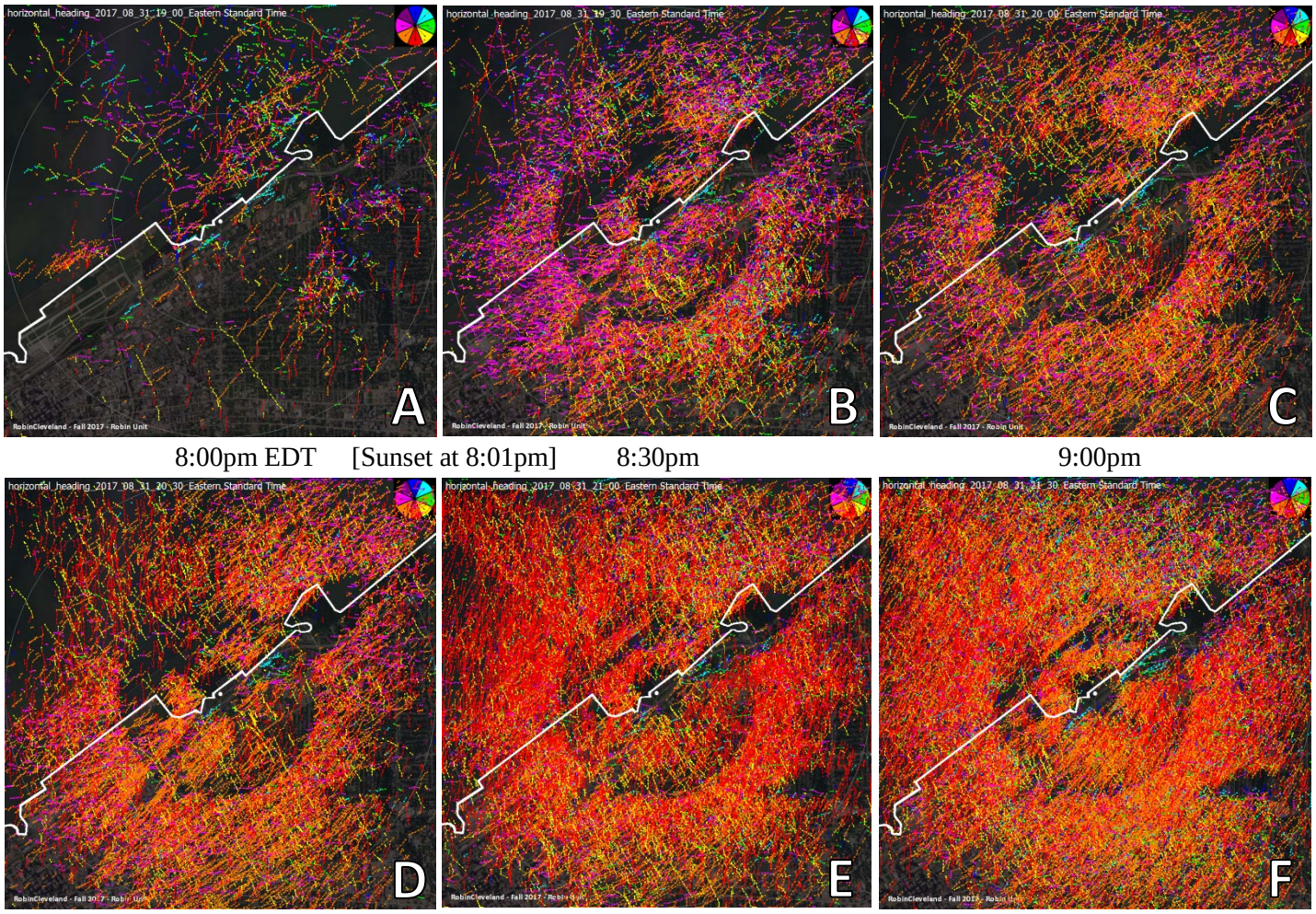


Figure 18. This graph depicts moderately high migration as dawn approaches. Note that while offshore migrants are moving mostly in a southeasterly direction, migrants on the left are tending to turn easterly after reaching shore and migrants on the right are tending to turn south or southwest after reaching shore.

South-bound Target Arrival at Cleveland



8:00pm EDT [Sunset at 8:01pm] 8:30pm 9:00pm

9:30pm 10:00pm 10:30pm

The plots above document the arrival of south-flying targets on the southern shore of Lake Erie (Cleveland radar site) approximately one and a half hours after sunset, and approximately one hour after the onset of migration on the night of August 31, 2017. Each plot represents 15 minutes of target tracking, beginning at the time listed. The white line represents the Cleveland shoreline and the radar location is a white dot at the center of each plot. Color indicates the direction of flight for each target, according to the color wheel at the top right of each plot: blue is north, green is east, red is south, and pink is west. Distance from our Cleveland site to the north shore of Lake Erie is approximately 80 km (50 miles). An average groundspeed of 61 kilometers per hour (17 m/s) has been recorded for migrants crossing large bodies of water (Bruderer and Liechti, 1998). Thus, migrants leaving at dusk should begin to arrive on shore approximately an hour and a half later, almost exactly the time elapsed observed (panels A and D).

A. Low activity at the time of sunset (8:01 pm EDT)
B. Migration begins in the half hour after sunset with flight to the west and southwest, and relatively low activity offshore (upper left of the plot)
C. Migration continues through the next half hour, mostly to the southwest, and heavier over land.
D. At 9:30, southern-moving (red) targets enter, particularly in the offshore portion of the plot.
E. In the next half-hour, south-bound target activity increases dramatically.
F. Heavy migration activity with predominant orientation to the south and southwest is evident throughout the plot.

Bruderer, B., & Liechti, F. (1998). Flight Behaviour of Nocturnally Migrating Birds in Coastal Areas: Crossing or Coasting. *Journal of Avian Biology*, *29*(4), 499-507

Black Swamp Bird Observatory Comments

BLACK SWAMP BIRD OBSERVATORY
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TEAMING RESEARCH WITH EDUCATION TO PROMOTE BIRD CONSERVATION

October 5, 2017

Buffalo District U.S. Army Corps of Engineers
Regulatory Branch
ATTN: Joseph W. Krawczyk
1776 Niagara Street
Buffalo, NY 14207-3199

U.S. Department of Energy
Golden Field office, NEPA Division
15013 Denver West Parkway
Golden, CO 80401

To Whom It May Concern:

Black Swamp Bird Observatory (BSBO) and the American Bird Conservancy (ABC) jointly reviewed the Department of Energy's (DOE) draft document *Environmental Assessment LEEDCo Project Icebreaker Lake Erie, City of Cleveland, Cuyahoga County, Ohio*, co-authored by the U.S. Coast Guard and the U.S. Army Corps of Engineers, and we submit the attached comments in critique of the draft.

In summary, it is our opinion that the draft Environmental Assessment (EA) is founded upon invalid, misleading, and erroneous studies presented by both Tetra Tech and Western EcoSystems Technology (WEST) on behalf of LEEDCo which are not supported by the data. Further, we find that because the Kirtland's Warbler, a federally designated Endangered Species, is known to be present in the project area during migration, and because the project area is within the confines of a Globally Important Bird Area, an EA is not sufficient to fulfill the requirements of the National Environmental Policy Act (NEPA), and that a more comprehensive Environmental Impact Statement (EIS) is required.

Please find attached our comments related specifically to four documents: (1) the draft EA, (2) Appendix J of the EA (WEST NEXRAD Analysis), (3) Appendix K of the EA (Tetra Tech Bird Survey Report), and (4) Appendix L of the EA (WEST-Icebreaker Wind: Summary of Risks to

Birds and Bats). We believe the details contained in these comments support our findings and our conclusions calling for an EIS to be completed instead of an EA.

Thank you for the opportunity to comment. We look forward to further discussions and are available for questions.

Respectfully submitted,

Mark Shieldcastle, Research Director
Black Swamp Bird Observatory

Michael Hutchins, Ph.D.
Director, Bird Smart Wind Energy Campaign
American Bird Conservancy

REVIEW

ENVIRONMENTAL ASSESSMENT

October 5, 2017

Black Swamp Bird Observatory (BSBO) and American Bird Conservancy (ABC) submit the following review of the Draft *Environmental Assessment LEEDCo Project Icebreaker Lake Erie, City of Cleveland, Cuyahoga County, Ohio* report prepared by U.S. Department of Energy (DOE); U.S. Coast Guard; U.S. Army Corps of Engineers (ACE).

Text in blue indicates passages taken directly from the above-named document, unless otherwise indicated. This review focuses exclusively on the areas of expertise of the author organizations. Therefore, comments are primarily associated with risk to birds and bats.

Page 1-1 Section 1.1 last paragraph – DOE states that this EA is to provide information to make an informed decision about the Proposed Action. It is our contention that this cursory Environmental Assessment (EA) does not accomplish this goal and therefore, must be replaced with a more detailed Environmental Impact Statement (EIS).

Page 1-4 Section 1.4.2 – The EA indicates the ACE has determined that this project is for "energy generation". However, the EA only considers two possible alternatives of building the project or not. This does not meet the definition as offered. We suggest that additional alternatives, including but not limited to distributed solar on our already-built environment (buildings, parking lots, roads), wave action, and experimental (bladeless) turbine design, that may provide less negative environmental impacts be included in the final draft of what should be an EIS.

Page 2-2 Section 2.2.1 Figure 2.1 – Text in 2.2.1 indicates six turbines make up the project, however the map in Figure 2.1 indicates seven turbines. Please confirm the actual number.

Sections 2.2.2.2 to 2.2.9 are outside our area of expertise and we offer no comments for consideration.

Page 2-22 Section 2.4.1 – A dated 2009 feasibility study does not take into account the designation of the Central Basin of Lake Erie as a Globally Important Bird Area (IBA). This designation is multiple levels above the Cleveland Lakefront Audubon IBA that was mentioned in importance of state and federally-protected native birds as a statutory natural resource. This designation is recognized by the National Audubon Society and Bird Life International and is accepted as a criterion by many governmental agencies to trigger additional environmental

review. This suggests ACE should consider additional alternatives, other than wind, that do not have well -documented environmental impacts on birds and bats.

Page 2-23 Section 2.4.1 – Bullet point 3 of paragraph 2 indicates LEEDCo used bird and bat risk assessments as late as 2016, after the Global IBA designation. This constitutes a failure of this EA to meet a primary criterion of providing information to make informed decisions as stated on page 1-1, Section 1.1 by utilizing the most recent information.

Page 2-29 Section 2.5.2 – Comments from the U.S. Fish and Wildlife Service (FWS) were extensive and blunt in the need for a detailed environmental assessment. Comments included but were not limited to:

1) This project should meet greater rigor than land based projects because of its added uncertainty.

2) The radar study of 2010 was completely inadequate and recommended additional work be completed in 2017. As of this writing this work has not been initiated.

3) LEEDCo studies were completely inadequate to assess risk to the Bald Eagle

4) That a valid approved post-construction monitoring plan must be developed. This has not been accomplished.

5) That the FWS provided citations from CEQ NEPA regulations and recommended that an EIS level analysis be completed and not an EA. The basis for this was well documented in FWS comments. This has not been accomplished.

Page 2-30 Section 2.6.1.a – The EA contends that no "conservation lands" are involved in this project. While we have not been able to ascertain the actual definition of "conservation lands" as designated here, we contend that the Global IBA designation meets that definition and therefore should be addressed in an EIS for this project. Public interest in this project is high and should not be ignored by DOE or ACE. The air column is now openly recognized as essential habitat for migrating birds and bats and should be afforded similar protection as land-based habitats (Davy et al. 2017).

Page 2-35 Section 2.7.2 – The EA mentions the MOU with the state ODNR, but does not include that LEEDCo's failure to fully comply may result in termination of the project. Language concerning compliance with appropriate laws protecting migratory birds and bats, such as the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act and the Endangered Species Act, should be mentioned as a prerequisite for approval and for DOE financing should be in the final document.

Sections 3.0 to 3.3 are outside our area of expertise and/or present no concerns and we offer no comments for consideration.

Page 3-29 Section 3.4.1.3 Migratory Birds – The EA states that "The Proposed Project would be located between 8 to 10 miles off the coast of Cleveland, a location that provides minimal or negligible habitat for anything other than migratory transit". This is an inaccurate statement and

must be changed. Considerable flyover, stopover, roosting, and feeding occurs for many species in the project area. Details will be supported later in the appropriate section.

A correction needs to be made to include "Global" to the statement "The Proposed Project would also be located within the Lake Erie Central Basin Global IBA".

Page 3-29 Section 3.4.1.3 Bald and Golden Eagles – The EA fails to mention trading flights that occur regularly between Ohio and Ontario. This needs to be mentioned here and addressed in the appropriate section. The EA has failed to address important parts of the Bald Eagle life cycle and how it utilizes the habitats of the area.

Page 3-29 Section 3.4.1.3 Project Area Studies – The EA indicates the Diehl et al. (2003) study supports that there are more than 2 times the number of birds over land than water along Lake Erie. This statement is inaccurate and needs to be struck from this EA. There was no statistical significance between land and water due to small sample size. Direct conversation with Dr. Diehl supported misinterpretation of his study. Dr. Diehl stated "This paper cannot support or refute the risk to migrating birds from turbines in Lake Erie". Simply put, NEXRAD, is not capable of estimating numbers or risk over Lake Erie. For one thing, it does not measure flight altitude, a key factor in risk, especially under varying weather conditions, such as high winds, fog, or low cloud cover. The same shortcomings are present in the WEST (2017) analysis. Appendix J contains a review of that supporting document.

In paragraph two of this section, the EA states the WEST NEXRAD study strengthened the data. While this study used more recent data and included three years instead of one, this improved sample design is negated by other flaws. For example, the study area was no more in the sample area than Diehl and was constrained by the inadequacies of NEXRAD for this particular question. A more in depth review of the WEST study is included in Appendix J. Despite statements to the contrary, this study does not support or refute any level of risk to birds and bats.

Paragraph three refers to the ODNR aerial survey. WEST took considerable and unsupported liberty with findings from this survey as well. A more detailed review of WEST's assumptions are covered in Appendix L. There was considerable variability in bird locations and abundance, and no data were collected during winter. Furthermore, the survey covered only diurnal movement, yet this area is known to be used by nocturnal migrants. The graphs reproduced by WEST from the study are therefore highly misleading and represent low estimates of bird abundance.

The Tetra Tech studies are examined in Appendix K. Simply put, these studies were poorly designed at best. Even WEST commented in the open house that these studies were poorly designed and conducted.

Page 3-30 Section 3.4.1.3 Project Area Studies – Raptors and Eagles - The EA utilizes Appendix L to support its conclusions that the project poses little or no risk to eagles or other raptors. Our comments on this section are covered in Appendix L. WEST relied on extensive unsubstantiated opinion. There is movement between Ohio and Ontario by resident eagles and Peregrine Falcons have been found on the Cleveland Crib; this species was mentioned in the

EA as an exception. Neither the boat survey, nor the ODNR aerial survey were designed to account for this group of species, so should not be cited in support of "no activity". In addition, soaring, migrating raptors are known to be attracted to offshore wind farms in Europe, especially during adverse weather (Skov et al. 2016).

Page 3-30 Section 3.4.1.3 Project Area Studies – Songbirds - As mentioned above, Diehl did not document twice the number of birds over the shore compared to water. There was no statistical difference between the two as confirmed by Dr. Diehl by phone. The data reported by WEST (Appendix L) was taken out of context, as this study represents only a single snapshot taken over a few days. It therefore does not and cannot represent the entire night migration, which may show extremely different results, especially during less than ideal weather conditions. Consequently, this data do not support low risk to migrating birds. This incorrect and unsupported conclusion of the EA is contrary to that of the recent FWS advanced radar studies around the Great Lakes. The FWS studies also mention the severe limitations of NEXRAD radar in assessing risks to birds and bats from wind energy development. There is a general understanding that birds do congregate along the coastline as a response to this formidable migration barrier. However, this in no way infers that large numbers of birds are not flying across the lake. Considerable data collected in the Western Basin of Lake Erie, between Long Point, Ontario and Presque Isle, Pennsylvania, and Rondeau Point, Ontario and Cleveland green spaces suggest there is massive lake crossing. Recent Motus tower studies have recently found that large numbers of migratory bats are also flying across the lakes (Mackenzie, pers. com.).

A review of Appendix J is included in this analysis. That document does not support the EA conclusions. In particular, there are huge limitations in the use of NEXRAD radar as previously mentioned as well as problematic comparisons presented by WEST based on Central and Eastern Lake Erie assumptions. None of these studies support low risk to birds, in fact, the FWS advanced marine radar studies refute WEST and have been used by the FWS to suggest that no turbines should be placed in the Great Lakes or within 5-10 miles of the shorelines.

Page 3-31 Section 3.4.1.3 Project Area Studies – Graphs - WEST has taken these graphs out of context for a visual misrepresentation favorable to the developer. The original ODNR study had different objectives. These graphs are thus inappropriate for the purpose expressed in this EA (i.e., to assess the risk to migrating or resident birds) in the following ways:

- The title says "Total bird observations". In fact these graphs represent only diurnal observations. Most migrant songbirds are moving at night.

- Timing of surveys are ignored which fails to include behavior and then timing of various species migratory movements.

-The surveys were conducted entirely during good weather, but bad weather is known to increase risk, as flight height is variable under conditions of heavy rain, high winds, fog and low cloud cover.

- The visual presentation uses scale to downplay large numbers of birds occurring farther from the shoreline. This EA should not be concerned with bird numbers away from the study area as this EA is not a "lesser of two evils" document.

- Large variability in the two years, which support more years of data to get at averages, if that is the parameter that is to be used to assess risk.

- Mean numbers should not be used to assess risk; high counts and/or median parameters with ranges would be more realistic for evaluation of risk.

- Graphs lump all species. This should be provided at species level for risk of various species to ensure that a few highly abundant species do not cloud the analysis for species of high conservation concern (e.g. the endangered Kirtland's Warbler). This is possible using marked animals and Motus towers and/or acoustic surveys.

- Results include all data including those from the Western Basin which is different in bird behavior attributes from the Central Basin.

- Study includes transects of various lengths, biasing the data towards areas closer to shorelines.

- Measures of density should use number of birds per mile of transect, not total birds by distance.

Page 3-32 Section 3.4.1.3 Project Area Studies – Waterfowl and Waterbirds - Based on the ODNR surveys, the EA states that only six bird species occur in the vicinity of the proposed project (see EA for list). This is a gross misrepresentation of ODNR scientific data. The ODNR study was not designed to look at species diversity at all times of the day and night and year. The best that can be stated would be "diurnal activity of large waterfowl and waterbirds indicated (those six) species were the only ones consistently reported during the study period." The results of that study cannot be generalized to include the nocturnal movements of any bird or bat species, including those six species, and was not designed to detect any other bird or bat groups. While, we commend the EA for acknowledging that they extrapolated the ODNR data to try to fit the project area, there was no attempt to conduct and analyze surveys in the area during the time period particular species are expected in Lake Erie. As a result, the EA grossly underestimates the potential risk to birds by:

- Condensing the entire survey results instead of considering occurrence of various species in the region.

- Making assumptions on species risk without any nocturnal data, or data collected during varied weather conditions.

- Not accounting for detectability or variability of detecting and counting individuals of various species using visual sampling methods with transects.

- Making assumptions about the presence or absence of species risk with limited spring and fall data and no winter data.

- Making no reference to the number of Common Loon, Horned Grebe, and Bonaparte's Gull per mile being actually higher in the project area. Common Loon in particular is a species of elevated concern.

- Making no mention of the potential of turbines attracting birds during the winter or the potential of the turbines creating ice leads that could attract birds, such as waterfowl and waterbirds.

Page 3-32 Section 3.4.1.3 Project Area Studies – Bats - The EA suggests that the project will be of low risk to bats. First, all conclusions are based on Tetra Tech surveys (Appendix K) that are of highly suspect sample design and field compliance. A more complete review of these deficiencies are included in Appendix K. Secondly, the EA does not account for call rate variation of bats in a simple environment compared to one that is more complex. It is believed bats call less frequently when few structures are present such as over water, than when in a variable environment with trees and buildings. The Tetra Tech study thus fails to meet scientific merit or rigor to make any assumptions on the risk to bat populations as required by the EA. Detector nights and bats per night are reported in error in the EA as all four offshore detectors are located in one location which means they essentially represented only one location versus four locations onshore. This brings into question the statement in the EA that bats of state concern were recorded more than twice as often onshore as offshore when, in fact, just the opposite might be true. Recent yet to be published studies using Motus towers and marked individuals by Bird Studies Canada indicate large numbers of migratory bats crossing the Great Lakes (Mackenzie, pers. comm.).

A variety of factors invalidate the EA's conclusion of low risk to bats including the following:

- Only one year of data from Tetra Tech was collected. This is inadequate in any study of scientific merit.

- Downplays the fact that the same species were recorded offshore as onshore.

- Ignores the dependency of the four detectors all being in the same location. This resulted in one quarter of the potential land mass being sampled.

-Concludes more migration onshore and little offshore, but the data do not support that conclusion.

-Concludes the study area is not an important migration corridor, even when more calls were recorded offshore for migratory bats when dependency is applied.

- Concludes 10 times more onshore activity, but includes migratory and resident periods. This is not a valid comparison for risk.

- Concludes that with the crib closer to shore that even fewer bats would occur in the study area. There are no data supplied by the EA to support this conclusion. Recent unpublished data from Motus towers conducted by Bird Studies Canada (Taylor et al. 2017, Mackenzie, pers. comm.) indicates considerable movement of migratory bats across Lake Erie.

Page 3-33 Section 3.4.1.4 Insects – Monarch - The EA does not make a conclusion on risk to migrating monarch butterflies. This needs to be addressed.

Page 3-34 Section 3.4.1.5 Aquatic and Terrestrial Protected Species - Federal listed or protected species - The EA states that there are no candidate or proposed listed species in the project area. This is an incorrect statement. For example, the Golden-winged Warbler is under review for listing at this time. In addition, recent studies have shown that the endangered Kirtland's Warbler is known to cross Lake Erie during its migration to the boreal forests of Michigan to breed, then again to return to the Bahamas (Cooper et al. 2017). Migrating Kirtland's Warblers have been seen along the shorelines of Lake Erie (Petrucha et al. 2013). This must be addressed in an EIS.

Page 3-35 Section 3.4.1.5 Aquatic and Terrestrial Protected Species - Indiana Bat – The EA has concluded that the Indiana Bat is unlikely to be in the project area. This is based off of Tetra Tech studies, the shortcomings of which have been discussed above and in the review of Appendix K. With the inability to distinguish calls from other *Myotis* species and the extremely inept Tetra tech studies relied on in this EA, it is irresponsible to conclude low risk as this EA does.

Page 3-37 Section 3.4.1.5 Aquatic and Terrestrial Protected Species - Kirtland's Warbler – The EA used extremely dated information on bird migratory movements. This has resulted in an inadequate picture of potential risk to this species. The EA totally ignores new information on Kirtland's Warbler in the project area and bases its support of low risk on a newspaper article (McCarty 2012). This is scientifically unacceptable. New information (Cooper et al. 2017), Indicates that a substantial portion of the population passes through the Central Basin during fall migration. Being a federally listed species, its likely presence should automatically trigger an EIS for this project.

Page 3-38 Section 3.4.1.5 Aquatic and Terrestrial Protected Species - Piping Plover – The EA has failed to demonstrate support of low risk for this species. The boat survey is not an appropriate sample design to indicate risk to any species, let alone an endangered species. Inadequacies of that study are covered in Appendix K. No support for the acoustic monitoring is given on call rates and detectability to indicate the survey method has any bearing on risk assessment. While sightings are rare, they are annual along Lake Erie from the Western Basin to Conneaut.

Page 3-38 Section 3.4.1.5 Aquatic and Terrestrial Protected Species - Rufa Red Knot – The EA provides as support for low risk the Tetra Tech studies that are of inadequate sample design. They cannot be used in any manner to assess species risk. As a result, the EA fails to address this federally protected species.

Page 3-39 Section 3.4.1.5 Aquatic and Terrestrial Protected Species - State Listed Species – The EA provides no data concerning this list of species. A vast number of migratory birds, many of conservation concern, can be expected to pass through the project area as well as several of the migratory bat species. To simply state that the database does not include any records in the project area only indicates that no data has been collected or study completed in the area.

Absence of data does not indicate absence of species. LEEDCo studies (Appendix K) have been shown to be inadequate to make any risk statements for any of these species.

Page 3-48 Section 3.4.2.3 Birds and Bats – The scientific failings of WEST (Appendix L) are covered in detail in our review. This review will document failings in evaluation of risk levels to both birds and bats, post-construction monitoring, and identification of ecological resources. The EA does not provide scientifically supported evidence of low risk to bird and bat resources A full EIS will, therefore, be required for this project. Since many of the same text is utilized in this EA for both Construction and Operation and Maintenance under this section, comments are consolidated below sub-headings.

Page 3-48 Section 3.4.2.3 Birds and Bats – Displacement Effects – The EA makes assumptions that are not supported by the science, ignores bird life cycles, and fails to address nocturnal movements and daily bird activities. Points of failure in this EA include:

- There is no discussion of daily feeding activities of identified species that could be substantially adversely affected by this project. This concern is supported by cautionary statements in Masden (2009) and discussed in our review of Appendix L.

- Makes assumptions of effects being negligible based on ODNR's seasonal aerial survey, which includes no data for the winter period.

- Fails to adequately review the ODNR study for actual risk by using all surveys instead of relevant surveys during migration.

- Makes assumptions off of LEEDCo baseline data that has been discarded as unscientific by state and federal wildlife agencies and by our review of Appendix K.

Page 3-49 Section 3.4.2.3 Birds and Bats – Behavioral Avoidance – The EA makes multiple unsubstantiated assumptions to support low risk to birds and bats. There were no supportive data from the project area included in the EA. The failings of Appendix L are covered in detail in attached documents. The EA makes unsupported assumptions of European studies, extrapolating beyond the scope of the original studies.

Specific failings include:

- The EA (from Appendix L) states avoidance behavior would be negligible. WEST extrapolated from Masden (2009), without any scientific support. The species are different between Denmark and Lake Erie. Masden calculated the entire migratory path whereas WEST made no attempt to complete the same analysis for Lake Erie species. Therefore, to assume negligible avoidance is not supported.

- Madsen made strong statements that if feeding flights were involved with the migratory species it would entirely change the conclusions of their manuscript. For Lake Erie species, foraging flights are strongly involved and must be incorporated in studies to ascertain their importance before making any risk assessment.

- Repeating the assumption that migration across the Lake is lower than on land. That assumption has already been addressed. It is not supported as presented by the EA.

- The EA does provide scientific support for the red-flashing light system proposed for the turbines in reducing attraction for nocturnal migrants. In addition, there is no discussion of attractants of the platform lights used on the turbine bases. Associated lighting has been documented to result in large mortality events at wind facilities and offshore oil drilling platforms. This needs to be addressed in the EA.

- There is no mention of ice leads forming around turbine bases during winter. The resulting open water could attract birds, increase collision risk for waterfowl, waterbirds, and Bald Eagles. This needs to be addressed in the environmental review process.

Page 3-50 Section 3.4.2.3 Birds and Bats – Collision Effects – The EA bases its conclusions of low risk minor impacts primarily off of Appendix L. The fallacies of that document have been discussed multiple times in this review and in more depth in our review of that document. Technically the EA provides no information of scientific merit to support its conclusions. The statement that the proposed project is not likely to generate population-level effects for any species ignores the key principle of the Migratory Bird Treaty Act (MBTA). The MBTA does not require population level effects to be enforced. The DOE has made it clear that LEEDCo must meet the legal requirements of the MBTA. The loss of even one listed bird under MBTA is illegal and could result in prosecution or fines. That negates even mentioning population-level effects in this document. The EA fails to provide scientific support for the conclusion of low impact and therefore an EIS, not a cursory EA, is necessary.

Page 3-50 Section 3.4.2.3 Birds and Bats – Collision Effects – Raptors and Eagles – Study design used in this EA are not appropriate to draw any conclusions on risk to eagles and other raptors. Short comings of Appendices K and L are attached in our review of these documents. The EA provides no documentation to support its conclusion that it would be unlikely the turbine sites would provide an ice free environment. The EA does not even discuss flights of Bald Eagle or Peregrine Falcon between Ohio and Ontario. Casual observations have documented eagle crossings and Peregrines have been located hunting in the area and on the crib in the interior of Lake Erie. It also failed to mention that soaring, migrating raptors have been attracted to offshore wind turbines in Europe, thus increasing risk (Skov et al. 2016). The EA fails to supply the scientific rigor or merit to conclude low risk for these species.

Page 3-51 Section 3.4.2.3 Birds and Bats – Collision Effects – Songbirds – paragraph 1 – Appendix L is discussed in more detail in our attached review of this document. We agree with the EA conclusion that most collisions with man-made structures take place at night and generally in inclement weather. However, this EA has not supplied any documentation of bird use of the study area in inclement weather. Radar studies of LEEDCo were confined to "clear air" conditions and are therefore irrelevant to any discussion of risk to migrating birds. Recent advanced radar studies by the FWS around the Great Lakes all conclude high risk to migrating nocturnal songbirds from turbine development in the region. The EA mentions lighting plans but does not discuss the platform lighting that could attract birds to the turbine site.

Page 3-51 Section 3.4.2.3 Birds and Bats – Collision Effects – Songbirds – paragraph 2 – The EA has misrepresented the findings of the Diehl manuscript. That paper does not indicate twice as many birds over land as over water, in fact it indicates no difference. In personal communication, Dr. Diehl indicated his study and NEXRAD in general cannot support or refute risk to migrating birds. It is simply the wrong radar type for this question scientifically. Both the Diehl study and the 2017 WEST analysis fail to provide project area-specific data to form any conclusions on bird or bat risk. The proposed project area is at the boundary or actually beyond the affective distance for the NEXRAD radars used in the EA. In fact both the Diehl study and those of the FWS indicate a dawn assent phenomenon that likely support the hypothesis that birds are crossing Lake Erie below the radar beam (especially NEXRAD) and are rising up into the beam sweep near shore. This means that actual bird risk is likely greater than that indicated by the EA. The NEXRAD radar studies do support vast bird numbers in the region, but do not support the EA statement that birds avoid flying across the lake. All studies support the concept that songbirds are reluctant to cross the Lake, especially if they are in poor condition. Regardless of condition, birds stop at the lakeshore to feed and get ready for the remainder of their flight. Birds that have the energy to cross the Lake are at an advantage, since they will be the first to the breeding grounds and have their pick of courtship and nesting sites.

Page 3-51 Section 3.4.2.3 Birds and Bats – Collision Effects – Songbirds – paragraph 3 – The EA makes several assumptions in Appendix L that are not supported by data or scientific rigor. A more in-depth review of Appendix L is included in our review of this document. However, the following weaknesses are clear:

- There are ongoing independent reviews of projected mortality rates that indicate consultants are greatly biasing their pre-construction estimates of actual mortality downward. The fact that there is a very weak correlation between pre-construction risk studies and post-construction mortality for both birds and bats provides evidence for this conclusion (Ferrer et al, 2011; Lintott, 2016). There are a series of data manipulations that have been identified that will result in a more realistic mortality estimates once correct and honest analyses are completed on the data sets (Johnson et al. 2016).

- Assumptions in Appendix L ignore that the volume of birds at risk in the project area is much greater than land sites that were used in their analyses.

- Use of the estimate of 2.1 to 3.35 birds per MW per year is under review and will most likely be raised substantially following analysis. Please consider that the vast majority of previous data on bird mortality at wind energy sites have been collected by paid consultants to the industry—a direct conflict of interest (Johnson et al. 2016).

- The EA comes up with an estimate of 21 to 42 total bird fatalities per year for the proposed project. Using the present figure of 2.1 to 3.35 birds per MW per year and multiplying that times 21 MW for the project it seems the numbers would be much greater (44 to 70).

Page 3-51 Section 3.4.2.3 Birds and Bats – Collision Effects – Songbirds – paragraph 4 – Data presented in this EA and the supporting document in Appendix L does not support the EA's conclusions.

- Data do not support a complete "preference" to migrate along the shoreline, but does ignore that large numbers of birds do cross the lake.

- While a lighting program for the turbines has been adopted to reduce attractiveness, the EA fails to address the potential of attracting nocturnal migrants by lighting the platforms. Major mortality events have been associated with this type of lighting, and even the supporting documents indicate a concern that lighting of the crib may attract birds and bats, hence "influencing the observed bird and bat records of pre-construction LEEDCo studies. It is difficult to support any position while trying to have it both ways.

- This is touted as a demonstration project for the feasibility of a major build out by LEEDCo. The DOE, and Fred Olsen must consider the cumulative impacts of any future development and by other developments proposed around the Great Lakes in both the U.S. and Canada. Consideration of the cumulative impacts is another reason for a full blown EIS.

- The EA does not address the issue that flight altitude of migratory birds and bats across open water may be lower than thought and place a greater risk of those species being within the rotor swept zone of large wind turbines. This is likely especially true during bad weather, such as heavy rain, strong winds, fog or low cloud cover and must be addressed in the EIS.

The above points support a failure of the EA to demonstrate low bird risk and that a more detailed EIS, rather than a cursory EA, must be conducted to address MBTA, BGEPA, and ESA concerns.

Page 3-51 Section 3.4.2.3 Birds and Bats – Collision Effects – Waterfowl and Water Birds – Short falls of Appendix L are covered in detail in our review of that document. The relationship of bird numbers by distance from shore is irrelevant. This EA should address only the risk to birds in the project area or any potential areas to be developed in the future.

- In actuality several important species (e.g. waterbirds) are more abundant in the proposed project area than near shore.

- The EA does not discuss the risk to foraging and flying flocks of waterfowl by the project. This must be completed as a primary species is the Red-breasted Merganser of which over half the world population occurs in the Central Basin of Lake Erie at one time. This was one factor leading to the designation of the area, including the project area, as a Globally Important Bird Area. This alone should trigger the need for an EIS.

- The EA does not discuss nocturnal movements of waterfowl while staging in Lake Erie. This must be discussed. Studies from Lake St. Clair and western Lake Erie indicate considerable movement for foraging, resulting in large concentrations of birds at night (Shirkey 2012).

- The EA does not discuss the altitude of waterfowl during foraging and movement flights either diurnally or nocturnally.

- The EA does not discuss waterfowl and waterbird activity during the winter time frame when large numbers of birds may be present.

- The EA does not provide scientific support for low risk during winter when ice leads may be created by the turbines, a potential attractant to some types of birds.

The Appendix L fails to provide the scientific rigor needed to support any risk assessment made by this EA. Therefore an EIS needs to be conducted.

Page 3-52 Section 3.4.2.3 Birds and Bats – Collision Effects – Bats – The EA has formed a number of conclusions based on false assumptions or made definitive statements where little or nothing is known. The failures of Appendix L are covered in the separate review attached, but the following weaknesses are evident:

- Assumptions made in Appendix L utilized extremely biased and inadequate studies done by LEEDCo's, paid consultants, a direct conflict of interest.

- Correction of those errors would alter WEST's analysis and push risk estimates upwards, possibly by magnitudes.

- As explained in our Appendix L review, WEST made invalid assumptions to assign mortality estimates per MW to attain the 21-83 total fatalities when accounting for studies that supplied both pre-construction acoustics and mortality data.

- Under WEST's "worse case" scenario of 20-30 bats taken per MW per year, this would translate into 400-630 bats a year with only 6 turbines. This would be greater than almost all other facilities made up of 50+ turbines.

- To make the assumption that this would only raise mortality to moderate risk is a biased and unsupported statement at best.

- From data presented in this EA, there is no support for the conclusion that impacts would be minor. An EIS must therefore be conducted.

Page 3-54-55 Section 3.4.2.5 Aquatic and Terrestrial Protected Species – Collision Effects – Kirtland's Warbler – The EA uses very dated information on presence of the Kirtland's Warbler in the project area. It does not refer to data after 2004, but does refer to a resource that was a newspaper article rather than scientific literature. Major changes in our scientific knowledge have occurred since then. The EA also does not include recent telemetry data for the species that supports the project area as a primary migration pathway.

- The FWS model needs to be updated with the new telemetry data. It is extremely dated and irrelevant until new scientific literature is incorporated into the model.

- The FWS advanced radar studies (Bowden et al. 2015; Horton et al., 2016; Rathbun et al. 2016; Rathbun et al. 2017) do not reinforce the assumption that birds avoid crossing large bodies of water. They support the observation that birds stop prior to crossing to feed and rest, not that they do not cross.

- The altitude songbirds fly across open water is not documented. Inclement weather is also thought to play a major role in flight altitude. Kerlinger and Guarnaccia (2013) do not incorporate

open water scenarios nor do they address biases in reported radar altitude estimates. The recent FWS advanced radar studies have invalidated Kerlinger's and Guaranaccia's statements and indicate that the radar estimates for altitude need to be adjusted for air column bias with height. This alone can make major changes in risk assessments.

- The EA purports no population level effects, which again, is irrelevant under the MBTA.

The EA fails to provide scientific valid arguments to support low risk for the Kirtland's Warbler. Neither the MBTA or ESA are based on population-level effect. With the new telemetry data now available and the observed migration route an EIS is required. . As a highly endangered species, the loss of even small numbers of these birds could have a population-level effect.

Page 4-2 Section 4.1.2 Offshore Projects – The EA indicates there are no known or reasonably foreseeable offshore wind projects in Lake Erie. This is a patently false statement with the purpose to mislead readers. Icebreaker has been touted as a demonstration project designed to determine the feasibility of additional wind projects in or around Lake Erie. Fred Olsen (the applicant) has publicly announced plans for several thousand turbines in Lake Erie. Ontario has suspended the building of several thousand turbines in Lake Erie depending on the outcome of Icebreaker. The long-term impacts of all these projects on Lake Erie and the Great Lakes in general could be devastating. Yet, the future of wind energy development in the Great Lakes is not addressed in the EA. This omission alone should alter the conclusion of no major impacts and must be corrected through the completion of an EIS. These known anticipated projects could have major impacts on our native migratory birds and bats, resources that are worth billions of dollars to the U.S. economy through their ecological services, including pest control, pollination and dispersal (Sekerciglu et al., 2016). North America's native birds are already in serious trouble and, with wind energy development, we are adding yet another anthropogenic cause of mortality. The 2016 State of the Birds report indicated that fully one-third of all our native birds will need concerted conservation action in order to ensure their future (North American Bird Conservation initiative, 2016). Our nation's ecologically and economically valuable birds and bats should not be collateral damage in our efforts to address climate change. When it comes to wind energy siting is everything, and it must be kept away from large concentrations of birds or bats in order for it to be considered truly "green." This project and others like it in or around the ecologically sensitive Great Lakes are drawing international criticism from conservationists (Minor 2016, Hutchins 2017).

Page 4-2 Section 4.2 Cumulative Impacts – Biological Resources – Birds and Bats – The EA failed to recognize the identified and anticipated offshore projects in Ohio and Ontario and throughout the Great Lakes and therefore, for the reasons explained in the above section, has violated the NEPA review process, which requires consideration of cumulative impacts. An EIS is therefore required before further consideration. Failure to do so could result in legal challenges to the project, thus resulting in cancellation, further delaying its development by many years.

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APPENDIX J REVIEW

Black Swamp Bird Observatory (BSBO) and American Bird Conservancy (ABC) submit the following review of the NEXRAD Analysis by WEST – Appendix J of the Draft *Environmental Assessment LEEDCo Project Icebreaker Lake Erie, City of Cleveland, Cuyahoga County, Ohio* report prepared by U.S. Department of Energy (DOE); U.S. Coast Guard; U.S. Army Corps of Engineers (ACE).

This review focuses exclusively on the areas of expertise of the author organizations. Therefore, comments are primarily associated with risk to birds and bats.

Page 4 - Methods – NEXRAD and Radar Sample Areas - There are many concerns that create considerable uncertainty as to what the NEXRAD results may actually imply. These include:

- The Project Area is at the very fringe or beyond the usefulness of NEXRAD radar for answering the question being posed.

- Dr. Diehl, whose paper is heavily referred to here, indicated in personal communication that this radar type is not useful for determining risk to birds at wind facilities. The FWS Advanced Radar Team had similar comments. The long distance between shore and the project area greatly reduces targeting capabilities. Furthermore, there are physical structures in the way that compromised the radar beam between its source and the project area.

- There is virtually no overlap between NEXRAD radar beam height and the rotor swept risk zone of the proposed turbines. NEXRAD measurements are simply too high to draw meaningful conclusions about risk from this study.

- The differences of the relative altitude from land polygons and lake polygons are of more consequence than related here as the Cleveland NEXRAD radar is well above lake level in relation to surrounding land masses.

- NEXRAD cannot determine target heights with accuracy needed to assess risk, especially since there is almost no overlap between the rotor-swept area of the turbines (risk zone) and radar beam.

- There are more variables in bird activity and height than just distance from the radar. This includes behavior, atmospheric conditions, wind direction and timing just to mention a few. These need to be investigated and eliminated from consideration prior to drawing conclusions.

- WEST has included the Buffalo site to simulate a paired test with the Cleveland radar. However, the Buffalo radar polygons deviate considerably from the project area polygon, including orientation to migration and distance from shore.

Page 6 - Methods – Data Selection – WEST only collected and analyzed data during clear, mild weather ("Clear air"). The title of this study should therefore be changed to: "NEXRAD Clear Air Bird Migration Analysis." It is in no way a complete and realistic estimation of bird migration throughout the project area. While precipitation is a major drawback to radar monitoring of bird and bat migration, this decision essentially eliminated times of peak migration, thus greatly biasing the results. Not only are peak migration movements associated with low pressure systems, the height of such movements are governed by atmospheric and weather conditions. This study has ignored key periods in the project area, thus making it useless for determining annual risks to birds and bats from wind turbine operation.

The study also only used data from 30 minutes after sunset to 30 minutes before sunrise. Why was this decided? This could affect results on volume, orientation to, and distance from land.

Page 11-14 - Results – Migration Direction – Migration direction showed tremendous variability, so much so, that firm conclusions could not be drawn. It would have been helpful and possibly very enlightening if WEST had included wind direction as a co-variable and/or broke the data analysis down into time periods related to distance from lift off points.

Page 14 - Results – Migration Intensity – Migration intensity is the most important variable that WEST uses to support their conclusions. They concluded that volume is much lower over the project area than over any of the other sample polygons, thus implying low risk. However, there are a host of explanations for these findings that actually support the exact opposite of WEST's conclusions. The following explanation summarizes scenarios that WEST (or the EA) failed to address before drawing their potentially erroneous conclusions. If nothing else, these add to the uncertainty.

- In all cases reflectivity was greater at the 0.5 degree band than in the 1.5 degree band. This supports Diehl's contention that NEXRAD at this distance is inadequate to address migration intensity.

- Data suggest that a much greater migration volume is occurring below NEXRAD, which supports the dawn ascent phenomenon reported by Diehl and others. In this scenario, birds rise to higher altitudes initially as they near coastlines. This would have the effect of overestimating numbers of birds and bats in the shore polygons compared to those in the project area.

- Birds flying through the water polygons are in actuality much higher than the polygons over land. The land masses and radar units are well above water level at the similar distance.

- The seasonal variation of any dataset that occurs among years, stations, or seasons should not be lumped together for averaging without first testing for differences. The importance of time of night differences was not analyzed in this study and could have considerable effect on the different polygons.

- Migration intensity is greatly affected by weather and It must be kept in context that this is "clear air" only analysis, not a comprehensive migration analysis.

Page 23 – Discussion – Caveats – We question the first assumption made by WEST. Lake effect weather patterns are common along Lake Erie. The same may be true for Lake Ontario. So to assume the wind speed and direction is uniform over a large scale is likely invalid. Consequently, this should be tested. There are a considerable number of NOAA weather stations in the region to allow for that analysis.

Other limitations offered by WEST are not trivial in their importance. For example, the inability to distinguish individual targets precludes conclusions on density or intensity. The failure to cover the entire air column jeopardizes all conclusions drawn from NEXRAD-based radar studies. As pointed out by Diehl (pers. comm.) and the FWS Advanced Radar Team, it is an inappropriate radar type to address the questions posed by LEEDCo and its consultants. The use of side-cast marine radar would get at the concerns raised and provide useful information about risks. Four recent studies conducted by the FWS using this radar type have all concluded that over the waters of the Great Lakes and within at least five miles of the shoreline would be particularly bad sites for wind turbine development due to the substantial risks to both birds and bats.

Page 23-25 – Discussion – Summary and Conclusions – Data from this study do not support the conclusion that collision risk is lower at the project area. While the study indicates higher bird numbers on the shoreline or inland, there are no data available from altitudes within the rotor swept area (risk zone) of the proposed wind turbines during peak migration, during the winter, or in all weather conditions. Open water could support as many birds of some types as the shoreline but they are below the radar beam of this study, and thus unlikely to be detected. Diehl (2003) actually reported no significant difference in bird activity onshore versus offshore near Cleveland as well as Buffalo. This was most likely due to small sample size, but should not be reported here as support for the consultant's conclusions.

APPENDIX K REVIEW

Black Swamp Bird Observatory (BSBO) and American Bird Conservancy (ABC) submit the following review of the Tetra Tech Bird Survey Report – Appendix K of the Draft *Environmental Assessment LEEDCo Project Icebreaker Lake Erie, City of Cleveland, Cuyahoga County, Ohio* report prepared by U.S. Department of Energy (DOE); U.S. Coast Guard; and U.S. Army Corps of Engineers (ACE).

Text in blue indicates passages taken directly from the above-named paper, unless otherwise indicated. This review covers the area of expertise demonstrated by the author organizations. Therefore, comments are primarily associated with risk to birds and bats.

Page i - Executive Summary – States the goal of the EA was to document species composition, overall occurrence patterns, phenology, and flight behavior of birds and bats within the study area. This review is a critical attempt to assess the EA's success of meeting any of those goals and the relevance of such findings in determining actual risk to birds and bats. This survey was conducted for only one year, a violation of sound scientific principles as it does not take into account annual variations in weather or other natural phenomena

Page i - Executive Summary – Radar Survey – The surveys were conducted during "clean air", a reference to calm water and favorable weather conditions. The results are therefore not representative of overall bird and bat occurrence patterns, phenology, or flight behavior. The study's limited sample size thus fails to assess risk under all expected annual conditions and does not meet sound scientific practices.

Indicates that data were recorded 67.5% of available time; however the 642.9 hours of data represents only 22% of the study period's available time.

Page i-ii - Executive Summary – Boat Survey and radar Validation – The boat survey was comprised of only 10 surveys during one year. As a result, actual sample size was no greater than 6 in a given season (6 in fall, 4 in spring). This survey thus fails to meet sound scientific rigor and merit for advancing any conclusions made as a result.

The survey did not identify bird species (especially at night in a moving vessel), so could not determine relative abundance, distribution, or behavior. There is no correction for species differences in size, behavior, timing, visibility, or identification. Therefore, this study cannot be used to support any of its purported goals.

The only species recorded were large diurnal birds, such as gulls. If the sample size was greater in relation to migration patterns, it might have picked up a wider variety of species.

The survey design has inherit bias in flight height, occurrence and composition and provided no detectability analysis. The design is thus biased to result in beneficial findings for the developer.

Page iii-iv - Executive Summary – Avian Acoustic Survey – This survey actually was conducted for only part of one season, thus violating all criteria for scientific rigor. The very limited sample size is expected to have a huge impact on results, greatly underestimating the variety and abundance of birds and bats moving through the area.

There is no discussion of differences in flight call behavior onshore versus offshore over open water. Do birds the same call rate (e.g. call at the same frequency) under both circumstances? Any conclusions must take that potential bias into account.

Page iv - Executive Summary – Bat Acoustic Survey – There was a considerable problem in sample design. All offshore recorders essentially represented one location, rather than multiple locations. This provided one-fourth the coverage for estimation comparisons. Bats were recorded at all seasons and locations.

Page v - Executive Summary – Conclusions – In no way does this limited study design infer a comprehensive understanding of flight patterns over the study area during spring and fall migration. Only parts of a single migration-year were surveyed and the data covered only a select subset of all possible conditions confronted by migrating birds and bats.

Given the poor study design, we can only conclude that it was intentionally meant to support the pre-conceived conclusion of low species richness. Unfortunately, the study fails to meet sound scientific design principles on all levels and thus has not accurately measured species occurrence at the proposed project site.

Page 1 – 1.1 Introduction – Study Background and Purpose – State and federal wildlife agencies determined that the 2008 feasibility study failed to meet proper design to assess risk to birds and bats and required additional site specific data. The purpose of this study was to fulfill that request. It has failed miserably. As stated, this study was undertaken to document bird and bat species composition, density, flight height, flight direction, passage rates, activity levels, temporal distribution patterns, and correlations with climate. This review suggests that Tetra Tech failed on all counts due to poor study design, use of inappropriate technology and limited fieldwork.

Page 5 – 2.0 Radar Survey – A complete and critical review of the study design and analysis was provided to LEEDCo by the FWS Advanced Radar Team. It pointed out numerous errors in design, interpretation of results, and conclusions.

Page 7 – 2.1 Radar Survey – Methods – A critical design flaw is that the radar samples were only collected on clear nights. This could grossly underestimate bird activity, as migration is often associated with low pressure and storm events.

In the second paragraph, the authors cite both 11 and 13 days of useable data. Which is correct?

The study employed no horizontal radar offshore, which is required for collecting fight direction data.

Page 11 – 2.1.2 Radar Survey – Data Analysis – Orientation of radar during this study increased the risk of missing valid data and reducing the number of targets recorded (mentioned by FWS in their critical review). As previously mentioned, the FWS Advanced Radar Team reviewed the Tetra Tech study, found numerous errors and also questioned their results and conclusions.

Page 12 – 2.2.1 - Radar Survey – Results – Onshore Radar Data – Radar surveys were only recorded in less than 1 out of 5 available hours, bringing up sample size concerns. This is compounded by limiting the hours that were recorded to clear days and nights only. This eliminates the primary migration conditions and produces biased results. Thus the study covers only a subset of available conditions, does not address any of the report's stated goals and is therefore useless in evaluating potential risk to birds and bats.

Page 12 – 2.2.1 - Radar Survey – Results – Onshore Radar Data – Target passage rates – The study states that hourly passage rates were "variable" but fails to report any measure of variation (confidence interval, standard deviation, or standard error). These must be supplied to assess the usefulness of the study. Means – certainly by themselves - - are an improper metric to use. There is no evidence, for example, of differences that might exist between days, time of day or night, or seasons.

Discussion of flight height is irrelevant considering there are only data on clear nights. Height is greatly affected by weather, especially heavy rain and wind, fog and low cloud cover, and it is not addressed in Appendix K. The sampling strategy is thus suspect and makes it impossible to draw any valid conclusions.

Page 13 – 2.2.1 - Radar Survey – Results – Onshore Radar Data – Altitudinal Distribution of Targets – The FWS's Advanced Radar Team review raised several problems with the Tetra tech study and analysis, which invalidate its usefulness. First, the radar system used was biased towards detecting targets at higher altitudes. This is because the radar beam is cone-shaped, with a smaller portion of a cylinder covered by radar near the ground and a larger portion at the top. This data needs to be adjusted (through statistical corrections) or replicated using alternative technologies (such as those used by FWS in their Great Lakes studies) to allow valid measurements. Second, Tetra Tech miscalculated the height of the radar swept zone (RSZ) by incorrectly adjusting for crib height. Just these two errors alone would change the results and conclusions in ways favorable to the developers.

Page 17 – 2.2.2 - Radar Survey – Results – Offshore Radar Data – The study design, which measured only during parts of one year (spring/fall migration seasons) fails to meet scientific rigor. As stated above, the FWS Advanced Radar Team's review found considerable sample design and analysis problems with this study, questioning the results and their use for risk assessment.

Once again, there are no confidence intervals, or standard deviation supplied with the report to show the extent of variability in the data being presented. Nor were there any tests for statistical significance.

Page 17 – 2.2.2 - Radar Survey – Results – Offshore Radar Data – Target passage rates – All data need to be adjusted to account for the areas not covered by the radar beam at different heights. Results as presented are in error and do not support Tetra Tech's conclusions.

Page 28 – 2.3 - Discussion – Data from this study suggest there was a greater passage rate offshore than onshore, completely contrary to WEST's conclusions. Amazingly, considerable time was spent refuting their own findings. In the end, the study design failed to account for the differences. One possible scenario for this data was correct, but did not fit the needs of the developer, so was not considered.

Page 28 – 2.3 - Discussion – paragraph 4 – We challenge the assumptions presented in this paragraph. Though their explanations are possible, a host of others could explain the results. Due to poor study design other options cannot be eliminated. For example, it is expected that gulls would represent much of the diurnal activity; however, the boat surveys, as mentioned earlier, fail to support this conclusion. A lack of detectability analysis, with the expected differences in detection between 4 inch long birds and 24-inch birds, is highly problematic. Nocturnal observations of songbirds would be impossible with the study design used. This report fails to address or even mention these limitations. In addition, what supports the assumption that all bird species will be calling at equal rates onshore versus offshore over open water? This study failed to properly analyze the height of passage for birds by not correcting for beam cone errors. Even so, as the FWS team pointed out, this was the wrong type of radar to use to get at this question. Mean altitude is irrelevant for assessing risk, especially in the absence of standard deviations, a measure of variability. Methodology was also restricted to clear days and nights, therefore representing only a small subset of the annual weather conditions confronted by migrants. Inclement weather is more associated with migration and these conditions were not sampled. Including such data would most likely show greater passage rates, lower flight altitude, and represents a more accurate assessment of risk.

Page 28 – 2.3 - Discussion – paragraph 5 – It is suggested that Diehl (2003) and Geomarine (2008) studies support this report's findings. This incorrect assumption has already been covered in this review. NEXRAD radar is not capable of assessing flight height and the project area is at or beyond the effective distance for any NEXRAD radar to be useful. This conclusion was supported by Diehl in personal communications and also mentioned in the FWS review. The Tetra Tech report failed to account for beam cone to properly estimate passage rates at various altitudes, thus invalidating the conclusions.

Page 29 – 3.0 Boat based Survey - This survey design, as has already been explained, fails to provide data relevant to any of the stated goals:

- It consisted of extremely small sample size (10 boat trips) over two seasons (actual sample size of 4 and 6/season).

- There was no detectability analysis conducted to account for different bird size and its impacts on migrational timing, behavior, or in observer's ability to detect them.

- The study assumes accurate visual observation was possible at a distance much greater than science would predict, especially at night.

- The study used considerably different boat systems between seasons. This was not tested to see if this resulted in disturbance differences, thus possibly affecting visibility.

- Surveys were conducted only on days with low wind speed, high mean temperature, and calm water. This represents a minor fraction of expected migration conditions. No data were collected during other conditions, greatly biasing the results.

- Species identification would be expected to be difficult, if not impossible, especially in poor light.

- Spatial and temporal distribution would be affected by survey times and small sample size. Power to detect differences would be small.

- Using the techniques employed in this study, relative abundance analysis may only be possible for gull species where the probability of detection would be higher.

- This type of survey is not designed to account for bird behavior as described here. Sample size was small and surveys were not conducted during peak migration times for important species. Samples were only collected during good weather, thus greatly biasing the results.

This survey does not meet the criteria used to assess threatened or endangered species presence. It should therefore not even be included in the discussion.

Page 30 – 3.1 Boat based Survey – Methods – paragraph 2 – It was assumed that all species could be seen equally under all light conditions - an unreasonable assumption. There is no support for this and no detectability analysis was conducted. It is highly unlikely that small songbirds could be detected at a distance greater 50 meters from a moving boat with good visibility and light. This study is assuming accurate and complete observations were being made to greater than 350 m (300m out and 200m up). What is the sampling unit, a point or a transect? That was unclear. Any conclusions drawn from this dataset are therefore highly suspect and should be deleted from any risk assessment.

Page 30 – 3.2.1 – Results – Weather – How did the conditions of the surveys relate to the diversity of weather conditions occurring during the two seasons in which data were collected? The assessment should have included weather data for each season and an analysis to confirm or refute the assumption that the boat surveys represented a full range of seasonal conditions. Without this, it must be assumed that the sample design, collected only during clear and mild weather, does not represent an adequate sample of conditions faced by migrating birds and bats. Being a one year study also calls into question annual variability in weather conditions. At least three years of surveys should be conducted during a wide range of weather conditions to obtain an adequate sampling.

Page 30 – 3.2.2 – Results – Spring 2010 Observation Totals and Abundance – One year is not scientifically valid for making assumptions about bird and bat populations. A sample size of 4 transects does not provide the power to support or refute any assumptions. All surveys were conducted over 20 day period out of a nearly 100 day period. It is mentioned that there were considerable numbers of unidentified birds, which eliminates the ability to determine species composition.

Page 34 – 3.2.3 – Results – Spring 2010 Observation Temporal Distribution – Sample design of this study precludes any conclusions about temporal distribution of migrating birds and bats. Surveys only covered a 20 day period out of approximately 100 days of spring migration time. There were no surveys in March or April. This reduces the probability of detecting waterfowl as migration is over by May. Cormorants would be similarly affected by the mid-May survey time frame. This methodology is not designed to sample night-time migrant songbirds so is therefore immaterial for drawing any conclusions about this group, though it is probably the group of most conservation concern. Gulls would be the only bird group expected to be sampled sufficiently by this study design. If the survey personnel could not identify the majority of gulls, there is no reason to assume the single songbird was indeed a sparrow. The percentage of birds detected during the surveys had an extremely high proportion of "unidentified"; thus, any conclusions on species diversity are invalid. In fact, most migratory songbirds are traveling at night, when the visual surveys would have been ineffective.

Page 34 – 3.2.4 – Results – Spring 2010 Spatial Distribution – With the large number of unidentified birds, it is not appropriate to draw any conclusions on species composition. With the small sample size of 4 transects, it is questionable if any conclusions can be based on north versus south segments. This should have been examined for statistical significance using a two-sample t-test.

Page 34 – 3.2.4 – Results – Spring 2010 Spatial Distribution – paragraph 4 – While the unreliable nature of assigning heights and detectability has already been discussed, there is the question of all heights over water adding up to 92.5% of the observations. What were the other 7.5%?

Page 35 – 3.2.5 – Results – Fall 2010 Observation Totals and Abundance – Only six surveys were conducted from mid September to mid-October. The fall migration season occurs from at least mid-August to late December each year. So, only 6 days were sampled within a 135 day migration period. This sample size fails to represent the entire fall migratory season as well as only covering a small portion of a single year. At least three years should have been studied to obtain an adequate sample. The sample size of 6 is further divided between evening (4) and morning (2) surveys. No explanation was provided to support the authors lumping these together for analysis. The time frames surveyed covered almost no part of waterfowl migration, and therefore cannot be used to draw conclusions about that group. The same goes for songbirds, which are primarily nocturnal migrants. This survey method does not have the power to make any statements on the presence or absence of state- or federally endangered or threatened species, which makes it virtually useless for determining risks to protected wildlife.

Page 36 – 3.2.6– Results – Fall 2010 Observation Temporal Distribution – Valid results are not to be expected considering the poor sample design deployed. Composition would have been very different had the survey truly represented the entire fall migration season. Waterfowl would have just been beginning to arrive when the survey was completed. The Bonaparte's Gull, documented with its highest count on the last survey, would have been just arriving in the Central Basin. No conclusions on temporal distribution can be inferred from this study. It is therefore useless as a measure of risk to birds or bats.

Page 37 – 3.2.7 – Results – Fall 2010 Spatial Distribution – This study concludes that more birds were located further out in the open water of Lake Erie. This is contrary to assumptions made by WEST and the EA. However, there was no comparative analysis to determine if the differences were valid. Neither was there any analysis of evening versus morning surveys. In any case, the sample size is far too small and unrepresentative to draw general conclusions study-wide let alone in specific sub-divisions. While highly flawed, it should be pointed out that the location of Bonaparte's Gull observations is directly contrary to assumptions made by WEST and the EA.

As discussed under the spring season sample methodology, given a lack of detection analysis, evaluating the probability of detecting various species was impossible. So, any conclusions on flight height of various species is highly suspect and not defendable.

Page 38 – 3.2.8– Results – Spring and Fall 2010 Combined Temporal Distribution – As already noted, the study design precludes drawing any conclusions on temporal distribution. Sample timing eliminated all but large gulls as expected targets. The study design is not conducive to survey songbirds due to timing, visibility, and detection. The report states passerines were only recorded in the spring. This consisted of one record. Being nighttime migrants, this is not unexpected, especially since all samples were conducted during daylight and during good weather.

Page 38 – 3.2.9– Results – Spring and Fall 2010 Combined Spatial Distribution – As already stated, the study design precludes any conclusions on spatial distribution. Sample timing eliminated all but large gulls as expected targets. The study design is not conducive to survey passerines due to timing, visibility, and detection. The report states passerines were only recorded in the spring. This consisted of one record. Being nighttime migrants, this is not unexpected. Sample size is not adequate to allow for seasonal comparisons and should not be included in any risk assessment.

The report indicates problems with assessing flight height due to obvious concerns, but no effort was made to account for those variables. The report indicates an observation rate was calculated for each point. However, the graphs appear to be simply a tally of observations and not a calculated rate with mean and standard error.

Considering the poor study design, poor analysis, and a long list of unaccounted for variables, drawing any valid conclusions on spatial distribution from this report is impossible.

Page 41 – 3.3 Discussion - Many of the problems with this report have been covered in the individual sections. Beyond the detection of many large gulls in the study area, little can be concluded from this report.

The report draws conclusions about the origins of Herring and Ring-billed Gulls in the study area. These are inaccurate. Ring-billed Gulls that summer in the Lake Erie region have been shown (from band recoveries) to winter mostly in Florida. Winter gulls are from more northern breeding grounds. Band recoveries from Lake Erie-raised Ring-billed Gulls show a northward dispersal migration into late August, a true migration back into Lake Erie in September and October and exiting to the East Coast and arriving in Florida around December.

Page 44 – 4.1 Avian Acoustic Surveys – Methods – The report indicates the microphone for the acoustic system is capable to record up to 300m vertical and 250m horizontal; however, smaller migrants, such as warblers and kinglets cannot be heard at this distance. Many warblers are of conservation concern.

Page 45 – 4.2.1 Avian Acoustic Surveys – Results – Spring results – The study design did not allow for comparisons between onshore and offshore sites, which precludes very important distinctions for risk assessment. There is considerable disagreement or uncertainty on call rates among and between species as well as different environments. For example, what is known on call rate over open water for various species? Is there any support for them being the same as along a shoreline where large concentrations of birds may exist, as well as environmental features, such as brush and trees as they are over open water?

It is interesting to note in Table 4.2 that there were more warbler calls recorded onshore between April 7-12. This is a time when species diversity is extremely low in that taxon group. Were these all Yellow-rumped Warblers that may have a more consistent call rate? It is very strange that all calls were recorded in two short time frames. What information is available to ensure the equipment indeed functioned properly for 49 days?

Page 47 – 4.2.2 Avian Acoustic Surveys – Results – Fall results – The study relegated acoustic monitoring to part of one season during a single year. It is difficult to draw any conclusions based on such a limited sample size.

Page 47 – 4.3 Avian Acoustic Surveys – Discussion – While the discrepancy between onshore and offshore has some merit, differences could also be related to species composition and habitat effects on call rates. This report does not include specific identification for any birds. To provide just "warblers" does not allow for interpretation of collected data and raises concern over any conclusions made for composition or risk. Why were these identifications not included?

Page 49 – 5.1 Bat Acoustic Surveys – Methods – There were considerable sample design flaws in this study. For example, it was the intention to have 4 replicates of detectors onshore and 4 offshore. However, the design employed resulted in one replicate offshore. All analysis needed to account for this dependency and treat offshore as one site and onshore as four for

comparisons. For scientific rigor, at least three years of data should be collected and analyzed to account for annual variation.

Page 51 – 5.1.1 Bat Acoustic Surveys – Methods – Data Analysis – The analysis did not account for dependency of all four detectors offshore. Without this, all results were heavily biased towards detecting birds onshore versus offshore.

Page 51 – 5.2.1 Bat Acoustic Surveys – Results – Spring Results – Dependency of offshore detectors makes results and conclusions invalid as written.

Page 52 – 5.2.1 Bat Acoustic Surveys – Results – Spring Results – last paragraph – Utilizing the dependency correction, 15 times more calls occurring onshore than offshore drops to 4 times the number of calls. This would also change the Index of Activity measure dramatically. The results would still show a considerably higher call rate onshore even with these corrections. However, it is unknown whether call rates are similar onshore versus offshore. It is, for example, known that bats call more frequently in complex environments. The open water of Lake Erie is a very simple environment compared to the onshore environment, which is covered by trees and buildings.

Page 57 – 5.2.2 Bat Acoustic Surveys – Results – Summer/Fall Results – The same flaws as discussed in the spring analysis were present in fall analysis. Offshore detectors were dependent and need to be counted as one site, rather than four sites. When correcting for dependency, offshore detectors recorded 38% more Hoary and Eastern Red Bat call sequences than onshore detectors. This would completely change conclusions as derived by Tetra Tech for this report. Dependency analysis and detection probabilities should be completed to determine its effects on actual call sequences. The study assumes that call rates are similar over open water as compared to onshore. Age of bats cannot be accounted for in this method.

The comparison of onshore and offshore is confounded by combining summer data in this report. There should be a separation of the seasons to match behavioral changes and to accurately address risk.

Page 61 – 5.3 Bat Acoustic Surveys – Discussion – paragraph 1 - As discussed above, dependency of the offshore detectors calls into question the conclusion of nearly twice as many long-distance migratory bat species onshore. These data do not infer that migration occurs to lesser extent over Lake Erie, as discussed in our evaluation of the EA. The assumption that this is not a major migratory corridor is also not supported by the data.

Page 62 – 5.3 Bat Acoustic Surveys – Discussion – paragraph 3 - The report states that this method is not inherently well suited to identify risk to migratory bats from wind development. If so, why was this method chosen if not a sound method?

Page 62 – 5.3 Bat Acoustic Surveys – Discussion – paragraph 4 - The report acknowledges the dependency of the detectors on the crib but chooses to ignore the effect and concludes larger activity onshore. Instead, the authors try to explain the presence of bats over the lake. As mentioned in our review of the EA, there is now evidence that large numbers of migratory bats cross the lake.

Page 63 – 5.3 Bat Acoustic Surveys – Discussion – Conclusions are not valid with the dependency problems already identified. Data do not support the conclusion of greater bat activity onshore versus offshore during migration. The report acknowledges that there is bat activity even during the summer period.

The conclusion that no federally listed species were present in the study area is not supported by the data. It was reported that *Myotis* species could not be separated; therefore Indiana Bat could not be ruled out. Additionally, since the surveys could not identify species or did not study nighttime migration, the possibility of Kirtland's Warblers being in the study area cannot be ruled out, especially since recent studies have shown radio-marked birds traveling through this area, as mentioned in our review of the EA. The absence of data does not prove absence of species, especially when appropriate sampling did not occur.

Page 64 – 6.0 Conclusions – Due to a variety of poor sample design techniques, this report cannot be used to provide baseline data or to assess risk.

Page 64 – 6.0 Conclusions – paragraph 3 – Diehl's study increased our knowledge of bird activity along the lake shore. It does not support the idea that birds do not cross the lake, as these authors claim. The dawn ascent could explain the more true south migration in the fall and liftoff for migration northwards in spring. The Diehl data do not indicate greater migratory bird occurrence on land as suggested in this report. In fact, no significant difference was found by location due to small sample size.

Page 64 – 6.0 Conclusions – paragraph 4 – This report attributes bird occurrence to the lights on the crib. If this is of concern, then platform lighting of wind turbines would have these same attractions and be of considerable concern, as it might increase the probability of collisions.

Page 65 – 6.0 Conclusions – paragraph 2 – The sample design, including small sample size collected during limited portions of the year and/or migration season, and use of inappropriate technology (e.g. boat-surveys and NEXRAD), were pre-ordained to support the conclusions of Kerlinger and Guarnaccia, paid consultants to LEEDCo. As we point out in our review of the EA, there is a problem with scientific integrity when the people doing the research have a vested interest in its outcome.

Page 65 – 6.0 Conclusions – paragraph 3 – Use of Norris and Lott (2011) in this context is going beyond the scope of that work. For this purpose, species should be analyzed separately. When looking at the data on a species-by-species level, several important ones (Horned Grebe, Common Loon, and Bonaparte's Gull) all indicate as high or higher activity in the project area.

Page 65 – 6.0 Conclusions – paragraph 4 – The report discounts its own results/conclusions on acoustic studies due to poor sample design.

Page 65 – 6.0 Conclusions – paragraph 5 – The assumption that songbirds were migrating too high for detection on boat surveys is highly problematic. This ignores the fact that visual surveys would not have detected these smaller birds even at a fraction of the heights they indicated it

would. These data do not support the conclusions made in this report, especially since data were not collected during bad weather (e.g., in heavy rain and strong winds, fog, low clouds) that is known to affect flight height.

In conclusion, this poorly designed study cannot determine risk to birds or bats by the Icebreaker Project. We recommend that the entire study be redone using advanced radar units (such as those used by the FWS in their Great Lakes studies), Motus towers and radio-tagged individuals of various protected species known to be in the area, acoustic studies, new techniques using thermal tracking, and other techniques designed to assess real risk, not the cursory studies that have been conducted to date. Even more critical, these studies should be conducted by independent experts over a three year period under a wide variety of weather conditions.

References

Diehl, R.H., R.P. Larkin, and J.E. Black. 2003. Radar Observations of Bird Migration Over the Great Lakes. Auk 120: 278-290.

Geo-Marine, Inc. 2008. Analysis of WSR-88D Data to Assess Nocturnal Bird Migration Offshore of Cleveland, Ohio. Final Report. Prepared for Curry and Kerlinger, LLC by Geo-Marine, Inc.

Norris, J. and K. Lott. 2011. *Investigating Annual Variability in Pelagic Bird Distributions and Abundance in Ohio's Boundaries of Lake Erie*. Final Report for Funding Award #NA10NOS4190182 from the National Oceanic and Atmospheric Administration, US Department of Commerce, through the Ohio Coastal Management Program, Ohio Department of Natural Resources, Office of Coastal Management.

APPENDIX L REVIEW

Black Swamp Bird Observatory and American Bird Conservancy submit the following review of Appendix L: *Icebreaker Wind: Summary of Risks to Birds and Bats* prepared by Caleb Gordon and Wallace Erickson, consultants for WEST.

Text in blue indicates passages taken directly from the above-named paper, unless otherwise indicated. The first part of this review pertains to the Executive Summary. Comments may be repeated in the body of the text, or later expanded upon.

Page *i*; Para 1 - This conclusion stems largely from two principal observations: 1) the Project is small in scale, consisting of six turbines; 2) the level of use of this area by birds and bats is low compared to bird and bat use of terrestrial or nearshore environments.

We question both conclusions. This project cannot be viewed or reviewed in the limited context of just the 6 turbines in the initial phase. LEEDCo has repeatedly stated that this "experimental" project is just the first phase of what will ultimately be over 1,000 turbines in the lake. Risk analysis, therefore, must include a review of the full build-out. Second, the limited and biased data presented here do not support a finding of "low risk" to birds and bats from this project. This topic will be the primary focus of the comments throughout this review.

Page *i*; Para 2 - There's a misuse of statistics in this analysis. The authors calculated averages of all the surveys, which can be expected to bias the results. Some species were not present on all the surveys; therefore, data should be stratified to migration and/or wintering periods. This would increase the number and diversity of birds in the area at certain times of the year and thus estimate risk better than the mean for the whole project. This section also should include standard deviations, confidence intervals and p-values to indicate levels of trust in the data. The implied assumption that bird activity is "in transit or just passing through" is ultimately not supported for waterbirds and waterfowl by actual on-the-ground knowledge of the Central Basin of the Lake.

Page *i*; Para 2 - At such low densities, statistically significant displacement effects would not likely be detectable with a realistic survey effort. For the same reason, there is not a reasonable likelihood that any such effects could be biologically significant for any species.

This opinion is not supported by the limited data set and sampling strategy. It is the responsibility of the industry to base their conclusions on science and not to make highly speculative statements. LEEDCo's own surveys are embarrassing, and other cited studies are not being interpreted correctly or do not support their conclusions.

Page *i*; Para 3 - Although the passage rates of migrating birds through the Project area are expected to be lower than on land, along the shore of Lake Erie, or in nearshore waters

Data presented here do not support this conclusion. This is an opinion and not supported by the studies cited. They do admit the project has the potential to attract birds and bats and/or cause behavioral avoidance.

Page *i*; Para 3 - In such cases, the additional energy expenditure of this avoidance behavior is expected to be negligible, as has been demonstrated at offshore wind projects in Europe.

There is absolutely no basis for this over-reaching statement. Our local bird species and their metabolic profiles are different from those in the European study. We will further discuss this later in our review.

Page *ii*; Para 2 – Here the authors draw questionable conclusions from the literature, at the same time demonstrating a tendency towards downplaying collision risk. This is a common problem with non-independent, industry-paid consultants, which is pointed out in our review of the EA.

Page *ii*; Para 2 - The Project is not likely to generate population-level effects for any species. These conclusions are based primarily on the low use of offshore environments within the central Lake Erie basin by birds and bats, as well as the small size of the Project, and are also influenced by known patterns of taxon-specific collision susceptibility and species' geographic ranges.

This section raises several questions. First, the Migratory Bird Treaty Act (MBTA) is not based on "population-level effects." This is something the wind industry keeps trying to promote incorrectly. They ignore cumulative impacts of multiple developments in the region and the MBTA guidelines which make the take (killing) of even one individual bird illegal. As mentioned earlier their conclusion of "low use" is not supported by this study. Second, this consultant continues to try to present this project as a small demonstration project consisting of only 6 turbines, even as LEEDCo continues to talk about ultimately having over 1000 turbines in the Lake (Minor 2015). This was brought to the attention of C. Gordon at the open house, and he admitted this point. NEPA requires consideration of cumulative impacts in the assessment – another reason why a full blown EIS should be required for this project, rather than a cursory EA.

Page *ii*; Para 3 – Where is the assessment of raptor risk? Actual visual confirmation exists of eagles crossing the lake, not only in migration, but in common movement between Ontario and Ohio. In three of BSBO's last four pelagic boat trips (2015-2016) out of Cleveland, we have observed Bald Eagles coming from the north over the lake to the Ohio shore. It is well known that Bald Eagle, Osprey, and Peregrine Falcon readily cross Lake Erie. Sample design and

sample size of Tetra Tech's ground surveys were not adequate to make any statement on risk to raptors.

Page *ii*; Para 4 - For waterfowl and other waterbirds, baseline aerial survey data have shown that the spatial utilization pattern of such birds is largely restricted to the first three to six miles (five to 10 km) from shore in the central/southern Lake Erie basin, with minimal or negligible density of waterfowl and other waterbirds in the vicinity of the proposed Project area.

This is a misrepresentation and not what the aerial study actually says. This conclusion is taking the data beyond its design. For Horned Grebe, Common Loon, and Bonaparte's Gull, the concentrations were as great in the vicinity of the LEEDCo project as they were closer to land. The DOW study did not cover the winter period, so there are no data to support low risk for waterbirds during that time period.

Page *ii*; Para 4 – This section draws general conclusions that are, in actuality, unsupported opinions on potential collision risk. There are no data specifically related to this taxon group. We do not have adequate data on which to base a conclusion of "low risk."

Page *ii*; Para 4 - Additional insight into the potential for such effects can only be gained from post-construction observations.

This may be at least be partially true. However, by that time, the damage would have already been done. In addition, WEST has offered no methodology for collecting mortality or displacement data post-construction. There are no tested methods to accurately assess mortality over open water at offshore wind energy facilities (e.g., see Flowers et al., 2014), We are therefore curious to see what LEEDCo has in mind. Given the risks involved, the FWS and Ohio DNR must be satisfied in the developer's ability to collect such data with any degree of accuracy or independence. Otherwise the precautionary principle should kick in and the project cancelled. The fact that no adequate plan has been provided for consideration to date speaks volumes about the developer's inability to accomplish this task.

Page *iii*; Para 1 - The overall bat collision risk is low for Icebreaker Wind, nonetheless, because even if the Project results in fatality rates that are toward the upper end of the distribution of per megawatt bat fatality rates at regional land-based wind projects, the small size of the Project limits the total (facility-wide) bat fatality rate to one that would be moderate, at worst, in relation to land-based wind energy projects in the Great Lakes region.

With the present downward trend in bat populations (wind turbines are the second biggest killer of bats after White-nose Syndrome), to shrug off anything considered "moderate mortality" is irresponsible. To suggest that it's useless to gather additional baseline data ignores the potential for employing now available Motus towers which are already being used in the Great Lakes Region to track radio-tagged individuals (Taylor et al, 2016). Preliminary studies are documenting considerable movements of migratory bats over the Lake (Mackenzie, pers. comm.). This type of data should be required before any construction begins. Again, WEST has ignored the admitted intentions of LEEDCo to ultimately have over 1000 turbines in Lake Erie, and should review risks to bats within this larger context.

Page *iii*; Para 2 - Nocturnally migrating songbirds and similar birds may be exposed to collisions with Icebreaker Wind's turbines as they migrate across Lake Erie in spring and fall, though the terrestrial habitats of bird species in this category naturally restricts potential collision exposure to migratory flights.

To cite terrestrial habitats as a reason to assume low risk is inappropriate. The habitat used in migration and foraging movements is the air column. As we have pointed out in our review of the EA, both migratory songbirds and bats are crossing the Lake in large numbers and flight height can vary tremendously with weather conditions—conditions which have not been studied during any part of this limited assessment. Large numbers of waterbirds are using the Central Basin of the Lake at certain times of the year as well. Collisions with offshore structures in the North Sea are estimated to kill hundreds of thousands of birds annually (Hüppop et al. 2016).

Page *iii*; Para 2 - As a group, nocturnally migrating songbirds and similar birds exhibit low general susceptibility to collisions with wind turbines.

This conclusion is based on industry prepared reports that are hidden from public scrutiny. Do not trust that actual data supports this conclusion. For example, in one well-known case nearly 500 migrating songbirds were killed in one foggy night at the Laurel Mountain Wind Farm in West Virginia (Wald 2011). The birds actually collided with the buildings holding the battery and other infrastructure for the project. Events like this could easily occur during bad weather on the lake. Collisions with offshore structures in the North Sea are estimated to kill hundreds of thousands of birds annually (Hüppop et al. 2016). We do not consider that to be "low risk".

Page *iii*; Para 2 - NEXRAD radar data performed by an independent research team of government and academic scientists demonstrated that the density of songbird migration over the central Lake Erie basin was less than one half of what it was over terrestrial environments within the region.

This is not what the study said. We talked to the author and found that the table C. Gordon used was based on a single screenshot taken at midnight. In reality, there were 5 sample dates from spring and 13 from fall. Taking all this data into consideration, no statistical difference between land and water was actually indicated. More likely is that Gordon strategically chose a small sample size in order to support a pre-determined assumption.

Page *iii*; Para 2 - Recent studies employing marine radars in shoreline environments have demonstrated relatively high densities of nocturnal migrant birds along the shorelines of Lake Erie and Lake Ontario, reinforcing our understanding of the tendency of such migrants to concentrate along coastlines and avoid flying over large water bodies, such as Lake Erie, if possible.

Again, this is not the conclusion of the recent studies (especially the FWS study which is the most comprehensive to date). Rather, it's a total misrepresentation of the studies. All studies indicate a high volume of passage over the lake. As we have pointed out, the distance of the project from any NEXRAD radar unit has biased the data and resulted in questionable

conclusions. In reality, the FWS study, the Diehl NEXRAD study, the Buler study, and others all support the hypothesis of *dawn accent*, a phenomenon which gives the impression that birds are typically flying below the reach of radar, and only rise up into it as they approach the shore. This may indicate more risk at the distance of the project, not less.

Page *iii*; Para 2 - And also in light of the small size of the Project, we conclude that the collision risk for nocturnally migrating songbirds and similar birds is low.

Once again, this consultant is attempting to downplay the real truth behind the ultimate plans for this project. This study should take into account the cumulative impact of LEEDCo's future plan for over 1000 turbines in the Lake, as well as other projects planned for the region (e.g., on the Canadian side), not just the initial building of 6 "experimental" turbines in isolation.

Page *iii*; Para 2 – The consultants projected mortality figures are typically downplayed as they are in every pre-construction risk assessment we have encountered by paid consultants to the wind industry and as well-documented by Lintott et al., (2016) and Ferrer et al. (2011) for both birds and bats. In addition, the citations utilized indicate improper interpretation of third party studies for their purposes, totally inadequate and poorly designed LEEDCo data (C. Gordon admitted at open house that Tetra Tech data is very poor), and extremely suspect industry mortality data that repeatedly underestimates mortality. WEST continues to refer to only population-level impact as a concern, ignoring MBTA regulations, which make the take of even a single individual illegal. The same is true of the Endangered Species Act and Bald and Golden Eagle Protection Act, unless the developer has obtained an incidental take permit. Given the potential presence of eagles and endangered migratory songbirds in the project area, applications for such permits should be another prerequisite for approval.

Page 1 Para 1 – The original findings by Schuster et al. (2015) are not as strongly worded as this paragraph implies. Again, being terrestrial animals (which is not necessarily true for waterfowl and waterbirds) is not relevant; migratory birds utilize the air column, whether over water or land.

Page 1 Para 1 – Indicates a desire to build to learn for future development. Certainly we can learn by doing, but at what expense? We should not be killing large numbers of birds and bats simply to learn new information. In fact, if this project is a research project, rather than an energy production project, it would involve obtaining a totally different set of permits in order to kill protected wildlife. Unfortunately, this project is predicated on extremely poor pre-construction risk studies and has absolutely no plan for post-construction mortality studies. A viable plan for these studies is necessary before any construction should be allowed.

Page 1 Para 2 – GeoMarine conducted a NEXRAD review which has been discounted by many in the field. Svedlow is a Tetra Tech study which was extremely poor in design. Kerlinger's reports have been desktop studies of his own analysis and were reviewed very critically in the first EA. All of these studies were disputed as inadequate by science-based wildlife agencies and interested conservation organizations, such as BSBO and ABC. The reviewer does not know what Kerlinger (2016) may say as that article has not been available to review. WEST has

used only data collected by Tetra Tech and Kerlinger, supplemented with its own unverified opinions and interpretations of DOW's and Diehl's studies.

Page 2 Para 2 – In the case of Icebreaker Wind, there is minimal potential for displacement effects, as there is minimal to negligible utilization of the Project area by any bird or bat species for anything other than transit. This pattern was documented through an aerial baseline survey effort conducted over a two year period (2009-2010 and 2010-2011) by the Ohio Department of Natural Resources (ODNR) over a large portion of the south-central Lake Erie basin, including the Project area (Norris and Lott 2011).

There are two problems with using this study to conclude that there is low risk for displacement effects (avoidance of foraging, roosting, breeding, or wintering habitats). First, the DOW study did not include winter in its sample design. Second, it was not possible from the survey method used to assess bird activity (such as transit vs. stopover, roosting, or foraging). There were observations of foraging, but not enough to validate the assumptions made by WEST. In actuality, several species of special interest (Horned Grebe, Common Loon, and Bonaparte's Gull) had as high of concentrations in the project area as near shore. This was ignored by WEST, also suggesting that the consultant's interpretations were biased in favor of the developer.

Page 3 Para 1 – In order for Icebreaker Wind to have the potential to generate a displacement effect, the Project area must be utilized by wildlife species prior to the construction of the facility. Data from both years of the ODNR survey effort indicate that the abundance of birds was negligible (Year 1) or minimal (Year 2) at distances between eight and 10 miles from shore, corresponding to the zone in which the Project has been proposed (Figures 2 and 3).

Figures 2 & 3 are very misleading to the lay person, due to the scale used. Actually, thousands of birds were observed in the vicinity of the proposed project. However, the totals were dwarfed by large Merganser and large gull totals in the near-shore area. Thousands of birds are not "negligible" or "minimal" for the species of interest mentioned above. In addition, this study only assessed diurnal bird activity. Nothing is known about nocturnal activity of songbirds, waterbirds or waterfowl in this area throughout the year. Winter observations were not made in any of the cited studies, so it is unknown what WEST used to support its conclusions or if they were just stating an opinion.

The authors used the mean for the species of the entire dataset. Actual analysis should have used maximum values, or at the least the mean of surveys conducted during the time period of presence with their standard deviations. Using the mean of all data purposely lowers expectations of risk. This is flagrant misuse of statistics to downplay risk. They did not address winter or ice effects in this analysis. Ice leads could increase risk by providing open water near the turbines. This has not been taken into account.

Page 5 Para 2 – In the case of Icebreaker Wind, the potential for adverse effects on wildlife from behavioral avoidance is negligible, as the additional energetic expenditure required for migrating birds or bats to fly around the Project will be negligible. This conclusion is based on the findings of Masden et al. (2009), who found that the additional energetic expenditure required for

migrating birds to circumvent the Nysted Offshore Wind Energy Facility in the Danish Baltic Sea was negligible in relation to the overall energetic cost of their migratory journey. The Project will occupy a relatively small above-water footprint, consisting of a linear array of six turbines and measuring roughly two miles (three km) in length, substantially smaller than the dimensions of the facility studied by Masden et al. (2009). In addition, the Project's turbines would be spaced at approximately 600 meter intervals, providing space for birds to fly between turbines.

Several conclusions are made here that are not supported by the data or the citations. First, once again, the contractor focuses on the initial six turbines when really we should be considering the eventual cumulative impact of more than1,000 turbines. This is a much larger scope than the Nysted facility, so the comparisons are invalid.

Second, Madsen used full migration length to calculate negligible energetic expenditure. WEST has made no effort to calculate migration length for the species involved here, and therefore cannot assume conclusions similar to Madsen's study. Madsen's calculations also assumed distance was a straight line flight between endpoints. Madsen also indicated (ignored in WEST's report) that energetic cost would be different if in a stopover area where birds are making daily or multiday trips, stopping intermittently to rest and feed. It may be a different story when birds have to fly all the way across the Lake in a single flight. In such circumstances, even small deviations may result in increased energetic expenditures that impact at least some individuals. Therefore, using Madsen to support "no risk" is really not justified, neither by the data nor by the studies cited. Madsen also indicated that more farms (with more turbines) would greatly change their conclusion of no effect. An eventual expansion is exactly what LEEDCo is proposing, thus also changing the conclusions.

Third, the WEST statement of "providing space for birds to fly between turbines" is exactly opposite of their conclusion in comparing their case to Nysted's. Nysted's turbines were 850m apart and birds still went around the facility, rather than flying through it. LEEDCo states Icebreaker' turbines will be 600m apart, which is a smaller distance. This, in turn, implies less space to fly between turbines, which would create more of a barrier. Also, Icebreaker is oriented north-south, meaning a 2-mile barrier with just six turbines. It will therefore be a potential barrier to predominant east-west directional flight. This would be greatly compounded by the ultimate intentions of LEEDCo to include over 1000 turbines along the southern edge of the Lake. Madsen's findings actually support the concern that the project could result in high risk through avoidance – the exact opposite of WEST's conclusions.

Page 5 Para 3 – Similar to behavioral avoidance, behavioral attraction to offshore wind turbines may have both beneficial and adverse effects on flying wildlife. Beneficial effects may include increased availability of roosting and/or foraging sites in an otherwise inhospitable or unfavorable environment. Adverse effects may include increased exposure to collision risk.

This conclusion fails to consider all effects. It does not address the impacts of ice leads on bird activity. It mentions perching, but really should address waterbird and waterfowl roosting in open water.

Page 5 Para 4 – Only used wind industry papers. WHY?

Page 6 Para 1 – For birds, recent reviews of bias-corrected fatality rate estimates have indicated a fairly consistent pattern, with an overall average US rate of roughly four to five birds killed per MW of installed wind capacity per year (4.11 birds/MW/year reported by Loss et al. 2013).

This assumption is based on biased wind industry reports, and only those made public. Most mortality data is hidden from the public and concerned conservation organizations, and the raw data is not available to assess the industry analysis. This is the source of considerable tension between the public, conservation organizations and wind energy companies. There are real problems with this, as scientific integrity and data standardization are lacking (Carroll et al. 2017). This is precisely why the FWS and state of Hawaii now requires that all mortality data at wind facilities be collected by *independent* experts using standardized methods. The FWS has also adopted similar restrictions in its new 30-year eagle take guidelines for wind energy projects.

Page 6 Para 2 – Strickland works for WEST. The paper used industry-collected data, so it still lacks scientific integrity. Their conclusion here is sound, but the data upon which it is based raises the question of "risk". The Blue Creek study (which WEST conducted) shows evidence of multiple attempts to downplay and underestimate risk at this site – a site that was assumed by most to be safe for turbine placement. Horned Lark, Killdeer, and Golden-crowned Kinglets, strictly a migrant, had the three highest mortality rates. Over 40 species were confirmed killed at the site, with well over a third being migrants for that location. Their sample design also precluded a true estimate of mortality at the species level, as it covered only parts of migration and ignored winter movements.

Page 7 Para 1 – Mark Desholm and colleagues developed the Thermal Animal Detection System (TADS), and deployed it at the Nysted Offshore Wind Energy Facility in the Danish Baltic Sea. In vertical (collision) viewing mode, the system's infrared monitoring field of view covered roughly one third of the rotor of a single turbine, and it was deployed in this way for intensive monitoring periods during the peak period of spring and fall sea duck migration over a three year period (2004-2006; Desholm 2006).

C. Gordon concludes that there were no collisions when the study monitored 1/3 of the sweep zone of one turbine. That is equivalent to 0.46% of the zone of possible collision in a facility with 72 turbines. This was over open water, where there was no way to confirm any potential collisions. Despite this, the developer wants to proceed with Icebreaker without any tested effective methodology to monitor collisions over open water. We could find nothing on detectability confidence for the TADS system. Does it detect with a confidence of 100%, or is there another layer of uncertainty that has to be placed on that one-half of one percent of survey area? Gordon indicates that Europe is not even trying to develop the methods, preferring to employ an untested theoretical modeling system, which utilizes a vague "bird passage rate" and an even vaguer "collision avoidance rate" to assess risk.

Page 7 Para 1&2 – Avian impact studies at European offshore wind energy facilities in recent years have focused on collision risk modeling efforts, in which bird passage rates are combined with collision avoidance rates to "predict" collision fatality rates (Cook et al. 2014). Quite a bit of liberty has been taken with Cook's conclusions. Cook states "The selection of appropriate avoidance rates for use in collision risk models at offshore windfarms is often a key part of the Environmental Impact Assessment process. Ideally, these avoidance rates should reflect the behavioral responses of birds to turbines. However, they are often used as a 'fudge-factor' to incorporate aspects of model error. The situation is further complicated by a lack of data for marine birds and offshore windfarms. As a consequence, present guidance is based on values that have been derived for terrestrial species at onshore windfarms. This study reviewed data that have been collected from offshore windfarms and consider how they can be used to derive appropriate avoidance rates for use in the offshore environment." The species used in the Cook study were Northern Gannet, Black-legged Kittiwake, Lesser Black-backed Gull, Herring Gull and Great Black-backed Gull. Only the Herring Gull and Greater Black-backed Gull are really of importance to Lake Erie. None of the top priority species (Red-breasted Merganser, Common Loon, Horned Grebe, Ring-billed Gull or Bonaparte's Gull) were reviewed.

Extremely telling is Cook's conclusion: "Based on the available data, it was not possible to derive species-specific avoidance rates for three of the five priority species. Of particular concern is the lack of within-windfarm avoidance data for northern gannet given that it is taxonomically distinct from the other four species, all of which are gulls." Cook also adds further caution to indicate that rates are probably affected by weather, species, and visibility. Cook indicated a lot of variation between studies and sites. This would seem to preclude the application of ocean-based data from Europe to a lake-based North American situation in order to predict risk.

Page 7 Para 3 – The level of collision risk for eagles or any other species of raptor at Icebreaker Wind is low, primarily because no species of eagle or other raptor regularly utilizes offshore environments eight to 10 miles from shore.

This conclusion was based on LEEDCo's boat surveys and the DOW aerial survey. Neither survey was designed to detect raptors. DOW"s surveys were limited in time of year, and the effort spent within 10 miles of the project area was minimal. The boat survey consisted of 10 surveys at or near nighttime, with a very suspect sample design. Detectability was not assessed and is likely very low. Neither survey supports C. Gordon's conclusions. In response, three of the past four BSBO Pelagic Field Trips (in Nov 2015, Dec 2015, Nov 2016, and Dec 2016) have noted Bald Eagles coming in off the lake from some unknown destination. Lake Erie is not a major barrier to this species, or to the Peregrine Falcon which those same surveys have found perching on the crib. The minimal effort expended on this survey could just as easily support the exact opposite of WEST's conclusion. Indeed, WEST fails to mention that soaring, migratory raptors were attracted to offshore wind farms in Europe, which increased the risk of collision (Skov et al. 2016).

Page 8 Para 1 – The potential for Bald Eagles or other raptors to be exposed to any risk of collision with Icebreaker's turbines is therefore almost exclusively limited to migratory transits of these species across Lake Erie.

For the Bald Eagle, this is not accurate. Crossing could occur at any time of year, since both sides of Lake Erie are major habitats for non-breeders. Nothing is known about how much time Peregrines may spend over the lake. It's also important to note that Bald Eagles frequently use ice along the edge of open water as hunting perches, exactly the type of "habitat" the Icebreaker Project could create. They often prey on gulls, which would also be attracted to the project area due to the creation of ice leads during winter.

Page 8 Para 2 – This paragraph should recognize that wind turbines are just now moving into Bald Eagle habitat. There is a strong possibility that numbers of eagles reported killed by turbines are well below reality, thanks to the FWS's self-policing policy. Turbines have killed over 2,000 Golden Eagles in the infamous Altamont Wind Energy Area in California (Smallwood and Thelander 2008).

Page 8 Para 3 – The level of collision risk for waterfowl, or other water-affiliated bird species at Icebreaker Wind is low, overall, with some variation among waterbird taxa.

The assumptions used by WEST here raise several concerns. A major concern is basing their conclusion off aerial surveys (mean/survey) which is not the proper metric. The authors should have used surveys based upon when the species is present, in order to obtain more accurate density estimates. It's easy to lower detection rates by conducting surveys when a species is not present – this effectively underestimates true risk. There were no data presented for the winter timeframe. Nocturnal movements were also neglected. Furthermore, Cook et al (2014) for the most part, did not review the species of concern in Lake Erie and also indicated considerable variability in studies in Europe.

Page 9 Para 1 – We have similar concerns about WEST's conclusions on waterfowl and waterbirds such as loons and grebes. Using the mean/survey metric is very misleading, as this group is mostly migratory; this means that they are only present during part of the year and present during times when there were no surveys. The contractors should stratify surveys to a more appropriate timeframe to acquire more accurate samples. Nocturnal movement of these species was not evaluated at all. Boat surveys are not useful at all for this group. The birds are disturbed and avoid boats even farther than best case scenario during visual surveys. Also, WEST totally ignored actual findings of the ODOW report, which indicated that density levels for Common Loon and Horned Grebe are as large in the project area as near the shore.

Page 9 Para 1 – Although protected by the Migratory Bird Treaty Act, it should be noted that Double-crested Cormorants have been actively managed as a pest species in recent years in the Great Lakes region, as this species' recent population growth is believed to have negatively impacted fish populations (USFWS 2003); hence some collision risk for this species from Icebreaker Wind does not represent a significant concern from a biological or conservation perspective.

This statement does acknowledge the importance of MBTA, but also indicates a belief from WEST that adding mortality to the cormorant is a project benefit. This betrays the consultants' strong lack of concern for the wildlife resources of the region. Also, this does not address what subpopulation of cormorant may be affected. If the population includes migrant birds, it has nothing to do with management within Lake Erie's resident breeding populations.

Page 9 Para 3 – WEST provides no data to back up their conclusions here, and do not address the question of the formation of ice leads during winter. Ice leads may be the result of wind refraction around any object (such as a turbine base). The open water created can attract many birds, including Bald Eagles. Why did they choose 96% as a breaking point for their conclusions? This conclusion should be based on the number of days the Central Basin near shore areas are affected by ice. Such conditions would put many bird species farther out into open water. Their choice of criteria suggests pre-determination of results favorable to the developer. BSBO personnel have extensive knowledge (from flying many aerial surveys over Lake Erie) that open leads in the ice attract birds to the site.

Page 11 Para 2 – A lot of questionable assumptions were made here. Why does WEST only state "combined with calm winds"? Wind could keep water around the turbines open due to the turbulence created. Cherry-picking scenarios is not addressing a wide range of possible causative agents.

Page 12 Para 1 – Questionable assumptions are made here based on studies that reviewed different species in different situations. Masden (2009) even suggested that foraging/staging flocks would have greater risk of collisions than one-pass migrants. He also indicated that additional turbines will increase risk (again, this project should be reviewed in the context of >1,000 turbines, not 6). Lake Erie's birds may be present for weeks if not months, and flying at night as well as diurnally. WEST cannot support their conclusion of "low to no risk" for waterfowl based on their limited and poorly timed studies.

Page 13 Para 1 – WEST concludes that risk is "low" while at the same time admitting that it is unknown. They base their conclusions on the small size of the initial project when they know that the ultimate plan is to eventually build around 1,000 turbines in the Lake. And this is to occur when they are unsure about the true volume of migration across the Lake or the potential attraction to the turbines of migrating birds and bats. Could bats be more susceptible to collisions, as the turbines will represent the only thing to echolocate to? Could migrating birds be attracted to the turbine platform due to lighting or as a place to rest during their long flights? They indicate that only post-construction surveys can answer these questions; however, they provide no plan for how they would accomplish this. What if they are wrong? Are they going to decommission and take down the turbines if bird and bat mortality rates are higher than predicted? How would this even be determined over open water?

Page 13 Para 2 – The most informative source of information on the level of bat activity likely to occur at Icebreaker Wind is the bat acoustic study conducted by Tetra Tech in 2010, as part of Icebreaker's wildlife baseline data gathering effort (Svedlow et al. 2012).

There are a lot of sample design questions with the cited study. For example, they are basing call rates off of 4 detectors on-shore and four offshore; of which all four offshore detectors were located on the crib. These are statistically dependent, and therefore effectively represent one detector per night. This suggests offshore call rates should be quadrupled to be comparable. They could have calculated detectability probability by using these four as duplicate

observations. They included no standard deviation or p-value in the report or in the paper. So what is the variability? What is the statistical significance? Is mean by itself a good indicator of risk, or should there be a more complex analysis? Personal communication with a bat biologist indicated that bat call rates are known to be much less frequent over open spaces, like over open water, when compared with complex environments, such as those found onshore. Therefore, offshore call rates and onshore call rates are not directly comparable. There is no indication that Tetra Tech did any detectability corrections for this potential; therefore, differences between on- and offshore are likely greatly overestimated. Ultimately, this is extremely poor science by Tetra Tech. As a result, no conclusions of risk can or should be made from this data by WEST. Once again, our recent discussions with Bird Studies Canada indicate that Motus tower tracking of radio-tagged bats confirms movement over the Lake (Mackenzie, pers. comm.).

Page 14 Para 1 – The Icebreaker Wind bat baseline acoustic study demonstrated that the bat activity level was roughly 10 times greater on land than offshore during both the spring and summer/fall study periods. We note that this comparison may overestimate the level of bat activity likely to occur at the Project site, as the location used to represent the offshore environment in this case, the Cleveland water intake crib, is located roughly three miles from shore, whereas the Project site is located between eight and 10 miles from shore where the abundance of bats is likely to be lower.

The assumption of 10 times more bat activity onshore is highly questionable. As already mentioned, there are serious design flaws with dependent recorders. Also, a troubling lack of statistics (including confidence intervals and p-values) leads to questions about the effects of small sample size. What evidence does WEST have that there would be less activity eight miles from shore versus three miles? Once again, recent Motus tower tracking of radio-tagged animals suggests that bats are migrating across the Lake, possibly in large numbers.

Page 14 Para 2 – Further insight into how the offshore bat acoustic activity data gathered at the Cleveland water intake crib by Svedlow et al. (2012) compare to onshore bat acoustic activity patterns can be gained by comparing the overall rate recorded by Svedlow et al. (2012) to rates recorded during baseline bat acoustic studies conducted for land-based wind energy projects within the region.

Comparisons of the Icebreaker site to other sites is highly questionable. What Tetra Tech's design provided was four onshore sites, one offshore site three miles out, and zero offshore sites in the project footprint. Based on this inadequate sampling, WEST then draws concise conclusions. We find this entirely inappropriate from a scientific perspective.

Page 15 Figure 6 – Some serious concerns are raised here by the "low risk" conclusion made by WEST. The Cleveland Crib actually showed a higher mean rate of detection (with no statistical analysis to determine significance) than the Timber Road Wind Energy Project, which has demonstrated one of the highest bat mortalities recorded in North America. How does WEST justify a conclusion of "low risk" given this?

Page 16 Para 1 – Figure 7 illustrates 55 bias-corrected bat fatality rates that have been produced at land-based wind energy facilities in the Great Lakes region, representing all such studies for which bias corrected bat fatality rate estimates are publicly available.

This figure does not include data from Timber Road. Only six sites are represented in both Figure 6 and 7: four at the low end and two moderate level of bat mortality. Numbers come from eyeballing the two figures - Cedar Ridge 10 calls, 24 fatalities; Forward Energy 7 calls,18 fatalities; Buffalo Ridge 2001 3 calls, 4 fatalities; Noble 2008 3 calls, 3 fatalities; Noble 2009 3 calls, 4.5 fatalities; Buffalo Ridge 2002 3 calls, 2 fatalities. There seems to be a strong correlation between call detection (Fig 6) and fatality rate (Fig 7), which is just the opposite of what WEST concludes. A rough placement of the Crib with these other facilities would be 10-15 bat fatalities/MW/Year, which would be consistent with the higher 1/3 of all sites shown in Fig 7.

Page 16 Para 2 – How did WEST come up with a figure of 1-4 bats per year? WEST simply cannot support that statement with the data they present. They need to supply standard deviations, confidence limits, and p-values for their conclusions, since they are so far removed from actual data. Based on the data utilized, they would concede that somewhere between 1-30 bats taken/MW (this does not include the Timber Road site, which appears to have a greater bat take). This could make Icebreaker the worst place on the continent for bat mortality. However, WEST concludes this to be "Moderate" at worst.

Page 19 Bullet 1 – Nocturnally migrating birds are primarily terrestrial animals, and their expected level of activity at the Project site is expected to be low, and generally restricted to migratory transits.

Migration passage is airborne, therefore "primarily terrestrial" is irrelevant. WEST's data do not support a conclusion of "low risk" for nocturnally migrating songbirds. Indeed, they did not collect passage rate data or flight height for any migrating songbirds at the project site during a wide variety of weather conditions. Consequently, such conclusions are not only impossible, but irresponsible. Based on their own data, they have no way of knowing.

Page 19 Bullet 2 – Although substantial broad-front nocturnal migration activity occurs throughout the Great Lakes region, and extends to birds' passage directly over the Great Lakes, including Lake Erie, nocturnally migrating birds exhibit a well-known tendency to avoid flying over large bodies of water if possible, evidenced in the central Lake Erie basin by a radar study that demonstrated that the density of nocturnal migrant bird passage was more than twice as high over land than it was over the Lake during both spring and fall migration.

BSBO contacted Dr. Diehl and he confirmed that this is not what his study concludes. The data used by WEST from the Diehl paper pertained to screenshots at midnight (not a compilation of all data throughout the night as suggested by Gordon). It thus reflected the situation prior to the peak nightly migration. While the mean indicated 2-3 times higher bird activity over land at that screenshot (midnight), the small sample size (5 spring and 13 fall nights) failed to reach statistical significance over water versus over land. Therefore, WEST is overreaching by inferring that such a difference exists. Additionally, the recent FWS advanced radar study of Lake Erie supports lake crossing at high volume. Both Diehl and the FWS advanced radar studies indicate that lake passage may be of greater importance to turbine risk than predicted,

as both indicate the dawn ascent, which causes an uplift into the radar beam. Consequently, there is absolutely nothing in the WEST report that supports a conclusion of "low risk" to migratory songbirds.

Page 19 Bullet 3 – Numerous studies of bird fatality rates at land-based wind energy facilities have demonstrated that fatality rates of nocturnal migrant birds at wind energy facilities are sufficiently low that there is no reasonable likelihood of such fatalities causing population-level impacts to any nocturnal migrant bird species.

There is strong evidence that all or most wind industry post-construction mortality reports are highly suspect and seriously underestimate mortality (Lintott et al. 2016; Ferrer et al., 2011; Johnson et al. 2016). The Blue Creek Wind Energy Project in Ohio (WEST is the consultant) mortality data appear to be suspect and the owner has sued the state to keep it secret. In addition, population-level impacts are not part of the MBTA, which is another point the industry often tries to downplay. The taking of even one migratory bird is illegal, but prosecution and fines are at the discretion of the FWS. Cumulative effects are of concern, especially with this project that touts an ultimate plan to construct over 1000 turbines. Development on the Canadian side of the Lake is also of considerable concern, as the cumulative impacts of all this development could be significant. NEPA requires that all these potential cumulative impacts on the region's economically and ecologically important wildlife be taken into careful consideration in the development of an EA or EIS. Right now, they are not being taken into consideration, and are, in fact, being inappropriately downplayed by the developer and its paid consultants.

Page 19 Para 3 – The most informative source of information on the passage rates of nocturnally migrating birds through the Icebreaker Wind site and vicinity is a study of nocturnal bird migration density over the Great Lakes vs. over terrestrial environments within the region, published by a team of independent academic ornithologists in *The Auk* (Diehl et al. 2003).

Again, from personal communication with Dr. Diehl, NEXRAD is good for only 20-30 km (12-18 miles) from the radar unit in flat terrain. There are ridges near Hopkins Airport that may blind the radar even more at the extreme of the radar reach. This makes the LEEDCo project barely in or possibly out of range for use. As pointed out on several occasions, this radar type is limited in what it can tell us and, according to the FWS, useless for determining risk to birds and bats from wind turbine development.

Page 19 Para 3 – Diehl et al.'s (2003) analysis revealed that the density of nocturnally migrating birds was 2.72 times higher over land than it was over water in the central Lake Erie basin during the spring migration period, and 2.13 times higher over land than over the lake during the fall migration period.

This is not what the study says, per Diehl himself. There was no statistical significance between water and land due to small sample size. That table also represented a single screenshot near midnight, and not the entire picture of nighttime migration. In Diehl's own words, "this paper cannot support or refute the risk to migrating birds to turbines in Lake Erie".

Page 20 Para 1 – Diehl et al. (2003) were also able to document the signature of dawn ascent of migratory birds over water, as well as directional reorientation of migrating birds toward land, suggestive of these birds' tendency to avoid flying over water. These observations are consistent with recent studies by Rathbun et al. (2016) and Horton et al. (2016), who used marine surveillance radar systems deployed in shoreline environments in Lake Ontario and Lake Erie, respectively, to demonstrate high concentrations of nocturnal migrant birds in Great Lakes shoreline environments.

This is true, but birds re-orientating are also crossing the Lake. Both studies indicate a large lake crossing. Dawn ascent actually supports a greater risk, as birds are below radar until rising at dawn to reorient. The above conclusion by WEST is a misuse of Diehl and the FWS advanced radar studies. These latter studies have concluded that no turbines should be in the Lake or within 5-10 miles of its shoreline due to high risk of collisions.

Page 20 Para 3 – Figure 8 illustrates empirically-derived, bias-corrected bird fatality estimates from 42 studies conducted at operational, land-based wind energy facilities within the Great Lakes region, representing all such studies with publicly available data for the region. Reference information on the studies illustrated in Figure 8 is provided in Table 5.

As discussed many times before, these studies are suspect and the data is hidden from the public. Just the cursory views of data from Blue Creek (WEST data) indicate a series of data manipulations and lack of standardization that render such compilations inappropriate and underestimate actual mortality (see Johnson et al. 2016). In addition, any conclusions from studies that lack scientific integrity (conducted by paid consultants by the developer) are always suspect (Carroll et al. 2017).

Page 20 Para 3 – Although there appears to be a tendency toward lower bird fatality rates at land-based wind energy facilities in the Great Lakes region than for the US as a whole.

How does WEST support this? There are no data reported here, just a mean. Common statistical practice demands a confidence interval and p-values if comparing two or more sites.

Page 21 Para 1 – Given the observation that the nocturnal migrant bird passage density recorded in the offshore environment in the central Lake Erie basin was less than half of the level recorded at comparable sites over land during both spring and fall migrations (Diehl et al. 2003),

This is, quite simply, a complete misuse of Diehl's data, leading to an indefensible conclusion by WEST.

Page 21 Para 1 – This would suggest that bird fatality rates at Icebreaker in the range of 1-2 birds per megawatt of installed capacity per year

WEST has provided nothing in this report to support this conclusion. It is strictly smoke and mirrors, based on suspicious data reports from paid consultants with direct conflicts of interest. They failed to produce their own scientifically sound radar analysis (Tetra Tech, Appendix K), they conducted a boat survey that has little to no scientific merit for analysis (Tetra Tech), and

they provided biased bat and avian acoustic studies (Tetra Tech) with many design flaws. LEEDCo has spent a lot of money on poorly conducted studies with little or no scientific integrity.

Since this project is government funded, LEEDCo should be required to go back to step one and start all over with third-party, independent, scientifically sound pre-construction risk studies, as well as (if they can) provide a sound methodology for conducting accurate, post-construction mortality studies (also independent) over open water prior to being given permission to proceed. All conclusions should be couched within LEEDCo's well-known future intentions of having over 1,000 turbines as part of this project. Even if this is an "experimental" project to determine feasibility, its purpose is to expand, and its environmental cost must therefore be considered up front.

Page 21 Para 1 – At this level, or even if rates were towards the higher end of U.S. estimates, there is no reasonable likelihood that the Project could have a population level impact on any species of nocturnal migrant bird

The industry continues to try and decouple wind projects from the cumulative effects that the FWS has the regulatory responsibility for enforcing under NEPA and other legislation, including the MBTA, The Bald and Golden Eagle Protection Act, and the Endangered Species Act. Population-level effect is not mentioned in the MBTA. Even the taking of a single bird is illegal. However, enforcement is at the discretion of the FWS. There is no incidental take permit currently available under MBTA, but they are required under the Endangered Species Act and Bald and Golden Eagle Protection Act. Since this project does have the potential to kill Bald Eagles and endangered species (e.g. Kirtland's Warblers), the developer should state its intention to seek such permits to be in compliance with U.S. wildlife protection law.

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